No: MC-01

SUBMITTAL COVERSHEET Nanuet UFSD – Phase 3 Projects

Architect: O KSQ Architects Na 215 W 40 th Street, 15 th Floor 10 New York, NY 10018 Na Contractor: Joe Lombardo Plumbing & Heating Address: 321 Spook Rock Road Suite 109A Suffern, New York 10901 Nanuet Union Free School Dis	wner: anuet Union Free School District 01 Church Street anuet, NY 10954 ng of Rockland Inc	Construction Manager: Jacobs One Penn Plaza, 54 th floor New York, NY 10019 Contract: Ron Lombardo 845-357-6537 Telephone: Fax: 845-357-8529 chool & Nanuet High School
School Name:	Re-submittal	
[] Shop Drawings [] Product Data [] Test Report [] Certificate Submittal Description: DIRECT-DIGITAL CONTROL SYS	[] Schedule [] Sample [] Color Sample [] Warranty	[] []
Product Name:		
Manufacturer:	Drawi Rm. o	ing No(s):
Architect's/ Engineer's Review Stamp	Contractor Review Stateme These documents have be coordinated with job condit by this office and have bee provisions of the Contract I Ronald J. Lombardo Name: Company Name: Joe Lombardo Plumbing &	ent: en checked for accuracy and ions and Contract requirements in found to comply with the Documents. 5-21-24 Date: Heating of Rockland Inc.

<u> </u>	Insmittal				
To:	JOE LOMBARDO PLUMBING & HEATIN	NG	Dat	te:	Our Job No.
	OF ROCKLAND INC	:	5/2	1/2024	44OP-366733
	321 SPOOK ROCK RD		Job	Name	
	SUFFERN, NY- 10901-5319		NA	NUET BOND	PHASE 3 HIGH
	US.		SC	HOOL	
			Υοι	ur Order No.	
PHC	DNE: (845) 357-6537				
WE A	ARE SENDING YOU HEREWITH				
	UNDER SEPARATE COVER THE FOLLOWING ITEMS:				
\boxtimes	SUBMITTALS FOR REVIEW/APPROVAL			ENGINEERING C	OMMENTS
	APPROVED SUBMITTALS			ORIGINAL DRAW	INGS
	SUBMITTALS FOR YOUR USE		\boxtimes	SHOP DRAWING	S
	MARKED PLANS & SPECIFICATIONS			CHANGE ORDER	R(S)
\square	VALVE SCHEDULE		\boxtimes	THERMOSTAT LO	DCATION SUBMITTAL
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	FOR APPROVAL			FOR YOUR USE	
	FOR CORRECTION		\boxtimes	PLEASE RETURN	N1_ APPROVED COPY(S) FOR
	FOR COMMENTS			OUR USE	
DES	CRIPTION				
ONE	ELECTRONIC COPY OF REV#2 ATC SUBMITTAL	FOR THE	АВС) PROJECT.
	RDER TO PREPARE THE SUBMITTAL, WE HAVE F ARCHITECTURAL PLANS	OLLOWE		ELECTRICAL HE	N AS CHECKED BELOW ATING COIL WIRING
\boxtimes	MECHANICAL PLANS	Ε		CHILLER WIRING	3
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	ELECTRICAL SPECIFICATIONS	[DX COIL WIRING	
	EXISTING AS BUILTS	[COMPLETE SET(S) OF PLANS & SPECS.
\boxtimes	CUTSHEETS	[
PLEA	SE BE ADVISED THAT WE MUST HAVE THIS INFORMAT	ION BEFOR	RE M	ORK CAN BEGIN	ON YOUR SUBMITTAL
REM	ARKS				
		ΔΤΤΕΝΙΤΙ			
PLE/	ASE ADDRESS TOUR REMARKS TU:	ALLENII	ON:		

PLEASE ADDRESS YOUR REMARKS TO:	ATTENTION:
SIEMENS INDUSTRY, INC.	OLIVER WRIGHT (PROJECT MANAGER)
SMART INFRASTRUCTURE	TELEPHONE NO:
412 MT KEMBLE AVE.	(973) 575-6300
MORRISTOWN, NJ 07960, USA	

SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE

412 MT KEMBLE AVE. MORRISTOWN, NJ. 07960 USA

PHONE: (973) 575-6300 FAX: (973) 575-7968

REV#2-5/21/24

FOR INFORMATION CONTACT OLIVER WRIGHT (PROJECT MANAGER)

ATC SUBMITTAL FOR NANUET BOND PHASE3 HIGH SCHOOL

103 CHURCH ST NANUET, NY 10954-3030 USA

440P-366733

KSQ DESIGN ARCHITECT

SAGE ENGINEERING ASSOCIATES, LLP ENGINEER

JOE LOMBARDO PLUMBING & HEATING, ROCKLAND CONTRACTOR



Job Name: BNJ2 BAU Nanuet Bond Phase 3 High School JOB #: 44OP-366733 Siemens Industry Inc – Smart Infrastructure REV#2 ATC Submittal

Submittal Notes 5/21/2023

- 1. At the time of submission, Siemens has based our design from Bid Set Issuance drawings dated 06/06/2023, section 23 09 23 Direct-Digital Control System for HVAC dated 06/08/2023 and addendum #1 dated 06/22/2023, addendum #3 dated 06/29/2023 addendum #6 dated 07/12/2023.
- 2. At the time of submission, Siemens has followed the following reviewed cut sheets.
 - a. Indoor AHU Unit Vents and Heat Pumps Rev-02.
 - b. RTU, AHU, CCU, BC & MC Rev-02.
 - c. Heat Exchanger.
 - d. Hydronic Pumps.
 - e. Variable Frequency Drivers for Pumps.
 - f. Steam And Cond Specialties Rev-01.
 - g. Power Ventilators Rev-01.
 - h. Centrifugal Fans Rev-02.
- 3. At the time of submission, following cut sheets were not available. Design may change upon receiving the cut sheets.
 - a. Unit heaters.
 - b. Heating coils cut sheets for existing AHU's.
 - c. Radiation panels.
 - d. Fin tube radiators.
 - e. Heating water radiation.
- 4. BACnet thermostats are proposed for controlling the existing & new FTR's, Heating Radiation & Convector Units.

A. Barr Middle School building:

 At the time of submission, Siemens has designed the Unit Ventilators by providing field mounted Siemens controller, current switch, space thermostats for all UV units as per email received from D&B Building Solutions LLC dated 12/13/2023 and as per RFI response 2 in addendum #3. Siemens will wire the required control points to Siemens controller from UV terminal strip as shown in UV units wiring diagram file - 910413999 REV. 00. Siemens has included only one BACnet IP integration from Daikin Master Controller to BAS. As per new UV scope per above details, the sequence of operations given in specification section 230923 3.11/B/3 are not aligned with the designed system because of changed mechanical design.

Siemens will update the new sequences once received. D&B Building Solutions LLC will wire Expansion Valve Kit, Z-Control kit, Navigator (required t-stat for the VRV UV system).

- 2. At the time of submission, sequence of operation for Unit Heaters were not available on the specification section 230923. Siemens has proposed same sequence of operations of Cabinet Unit Heater for Unit Heaters.
- 3. At the time of submission, damper actuator type (modulating/On/off) was not mentioned for the replacement AHU & Unit Heaters damper actuators as per notes in mechanical drawings. Siemens has requested for the existing controller and termination details to which these devices will relate to. However, the requested information's are still not received. Siemens has proposed modulating type damper actuators for the AHU's and On/Off damper actuator for Face and bypass damper actuator for existing UHs. Siemens will update the BOM once relevant information's are received.
- 4. At the time of submission, existing controller & terminal details for existing AHU's (S-1 to S-4, S-6 to S-9), Hot Water Systems was not available. Siemens has added a table in Barr School submittal in drawing 500A which shows the equipment and type of sensors/field devices replaced. Siemens has proposed the replacement sensors/field devices for these systems, however wiring details are not provided due to insufficient existing terminal details. Siemens will provide the wiring diagram once the required information's are received.

B. High School building:

- 1. At the time of submission, Siemens has connected the IO points of Hot Water Coils, for existing AHU-1, 2 & AC-1 shown in detail D18 in drawing HS-M603 to existing panel HIGHSPXM05 & HIGHSPXM03. Siemens will add the new IO points to spare IO points in controller and will replace the existing points as required.
- At the time of submission, for RTU-HS-4 & RTU-Hs-5, Siemens has included only BACnet MSTP connection to BAS from Microtech III BACnet communication module. Includes supply of 4 qty AFMS (EA & SA) and wiring of 6 AFMS (OA, EA, SA) to Siemens DDC controller. Siemens has included the manufacturer provided sequence of operations in the submittal.
 - 3. At the time of submission, sequence of operations and cutsheets for existing Unit Ventilators were not available. Siemens has requested for existing unit sequences, cutsheets and wiring diagram, however, was not received. Siemens proposes the same sequence of operations which was provided for the Unit Ventilators in specification section 230923 clause 3.11/3 Unit Ventilators. Siemens has designed this unit based on the control schematics provided in detail A9 in drawing HS-M602 and will update the submittal as required once all requested information's are available.
 - 4. At the time of submission, Siemens has connected the new IO points of the Heat Exchanger (HX-HS-2) and pumps (P-HS-4, 5) to the spare point terminals in existing HIGHSPXC22.

5. At the time of submission, Siemens has designed Blower coil unit's controller to be placed inside the Blower control unit control enclosure. Separate panel is not provided.



Job Name: Nanuet Bond Phase 3 High School JOB #: 44OP-366733 Siemens Industry Inc – Smart Infrastructure Valve Schedule Submittal

Valve Submittal Notes 2/15/2024

- 1. At the time of submission Siemens has followed the following reviewed cut sheets.
 - a. Indoor AHU Unit Vents and Heat Pumps Rev-02.
 - b. RTU, AHU, CCU, BC & MC Rev-02.
 - c. Heat Exchanger.
- 2. At the time of submission, following cut sheets are not available. Valve for these units are sized based on GPM ratings given in Nanuet Bond Phase 3 HS Mech-Elec Drawings under mechanical schedule BM-M002, HS-M002 dated:06/06/23. Design may change upon receiving the cut sheets.
 - a. Unit heaters.
 - b. Heating coils cut sheets for existing AHU's.
 - c. Radiation panels.
 - d. Fin tube radiators.
 - e. Heating water radiation.
- 3. At the time of submission, all modulating valves are proposed based on specification details provided in the 230923/(2.10/C) dated: 06/08/23 and sequence of operations mentioned in specification section 23 09 23/(3.11/A) & (3.11/B).

A. Barr Middle School building:

- 1. At the time of submission, for Barr Middle School, existing pneumatic valves are replaced with new electric valves based on GPM data given in notes in drawings dated 06/06/2023. Coil data and pressure drops were not available at the time of design and to be confirmed on site.
- 2. Clarification: At the time of submission, 2-way modulating valves are proposed for existing Fin Tube Radiators as per control drawing detail-A10 in dwg BM-M602 dated 06/06/2023 and sequence of operations for Fin Tube Radiators mentioned in specification section 23 09 23/(3.11/B/5). As, tags are not available for existing FTR's, room numbers associated with existing FTR's are added in valve submittal comments for identification purpose.
- 3. Clarification: At the time of submission, as per note 17 & 18 in dwg BM-M110 the type of valves is not mentioned for Hot Water Storage Tank valve & Hot Water Booster Heater Heat Exchanger valve. Simens has proposed 2-way modulating valves for these units.
- 4. Unit Ventilator heating coil control valve have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.



- c. ANSI 250
- d. Close-off pressure: 120 psi.
- 5. Existing AHU valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 3-Way Modulating Valve, Spring return.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 73 psi.
- 6. Existing Hot Water System valves for main building heating loop have been selected with the following characteristics:
 - a. Butterfly Valve, Stainless Steel trim
 - b. 3-Way Modulating Valve, Spring return.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 175 psi.
- 7. Existing Hot Water System valves for hot water storage tank have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Closed.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 200 psi.
- 8. Existing Hot Water System valves for Hot Water Booster Heat Exchanger have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 201 psi.
- 9. Existing Fin Tube Radiator control valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 55 psi.
- 10. New Fin Tube Radiator control valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 120 psi.
- 11. Heating Water Radiator control valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250

d. Selected minimum Close-off pressure: 65 psi.

B. High School building:

- 1. Clarification: As per unit heater schedule in HS-M002 drawing and layout drawing given in HS-M107, these units are connecting to HW line. However, there is no specification related to valve control in SOO, hence Siemens has followed the specification given for cabinet unit heaters.
- 2. Existing heat exchanger 1/3 & 2/3 steam valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Closed.
 - c. ANSI 125
 - d. Selected minimum Close-off pressure: 34 & 39 psi.
- 3. Clarification: Building steam pressure has been identified at 7psi. Heat exchanger manufacturer has requested an operating pressure of 15 psi. Siemens has provided 1/3 & 2/3 steam valves with total pressure drop of 1.2 psi as a system. Individual pressure drops for each valve listed in table. Siemens is expecting to deliver 5 psi to the HX, please confirm this is acceptable.
- 4. Existing hot water valve return bypass valve in crawl space have been selected with the following characteristics:
 - a. 50% of line GPM and 10 psi pressure drop is considered.
 - b. Globe Valve, Stainless Steel trim
 - c. 2-Way Modulating Valve, Spring return, Normally Closed.
 - d. ANSI 125
 - e. Selected minimum Close-off pressure: 200 psi.
- 4. Blower coil unit hot water valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 65 psi.
- 5. Convector hot water valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 120 psi.
- 6. Radiator hot water valves have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 120 psi.

- 7. Existing AHU hot water coil HC-HS-2 & HC-HS-4 valves for AHU-1 & AHU-2, have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 3-Way Modulating Valve, Spring return.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 117 psi.
- 8. Existing AHU hot water coil HC-HS-3 valve for AC-1, have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 201 psi.
- 9. AHU-HS-3 hot water valve, have been selected with the following characteristics:
 - a. Globe Valve, Stainless Steel trim
 - b. 2-Way Modulating Valve, Spring return, Normally Closed.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 73 psi.
- 10. Cabinet unit heater & unit heater hot water valve, have been selected with the following characteristics:
 - a. Ball Valve, Stainless Steel trim
 - b. 2-Way 2 Pos Valve, Spring return, Normally Open.
 - c. ANSI 250
 - d. Selected minimum Close-off pressure: 200 psi.
- 11. Existing control valves for existing unit ventilators shall be reused, siemens need to consider wiring from controller to control valve actuator.



Job Name: Nanuet Bond Phase 3 High School JOB #: 44OP-366733 Siemens Industry Inc – Smart Infrastructure Thermostat Location Submittal

Submittal Notes 2/16/2024

- 1. BACnet thermostats are proposed for controlling the existing & new FTR's, Heating Radiation & Convector Units.
- 2. At the time of submission, as per DWG BM-M112, note-4 thermostat is connected to EX S-2. However, as per note-28 the same thermostat is mentioned as it will be controlling the 2-way valve for EX FTR. Thereby new BACnet thermostat will be provided for EX FTR and temperature reading will be shared with EX S-2.
- 3. At the time of submission, as per DWG BM-M111, UV-MS-3 and FT-MS-1 serving classroom 102A are sharing a single thermostat. Siemens proposes a new BACnet thermostat which will be controlling the FTR valve. Space temperature reading from this thermostat will be shared with UV-MS-3. New separate thermostat is not considered for UV units.
- 4. At the time of submission, as per DWG HS-M109, RTU-HS-5, R-2-3 and R-2-4 serving cafeteria are sharing a single thermostat. Siemens proposes a new BACnet thermostat (1 qty) for heating floor radiation units (R-2-3, R-2-4) which will be controlling radiation units' valves. RTU-HS-5 will be provided with manufacturer supplied thermostat.
- 5. At the time of submission, as per DWG HS-M109, RTU-HS-4, R-2-1 and R-2-2 serving dining room 2 are sharing a single thermostat. Siemens proposes a new BACnet thermostat (1 qty) for heating floor radiation units (R-2-1, R-2-2) which will be controlling radiation units' valves. RTU-HS-4 will be provided with manufacturer supplied thermostat.
- 6. At the time of submission, as per DWG HS-M109, thermostats are not shown for Convector units. Siemens is proposing new BACnet thermostat for these units to control the valves and to monitor space temperature. CV-HS-1 & CV-HS-2, CV-HS-4 & CV-HS-5 are serving same areas so single thermostat for each pair is considered.

BARR MIDDLE SCHOOL

DWG	DESCRIPTION	DWG	DESCRIPT	ION
ABAC ALN DWR1 DWR2 FLN PPMT1 PPMT2 PTR41 PTR42 PWR TTR41 TTR42 TTR43 TWR TTR41 TTR42 TTR43 TWR TTR41 TTR42 TTR43 TWR 001 001A 100 100A 100B 100C 100D 101 101A 101B 102 102A 102B 103	GENERAL ANIXTER BUILDING AUTO. CABLES ALN COMMUNICATION DXR WIRING SPECIFICATION DXR WIRING SPECIFICATION PM TERMINATION SPEC. PPM TERMINATION SPEC. SHEET 2 PXCC TERMINATION SPEC. SHEET 2 PXCC TERMINATION SPEC. SHEET 2 PXCC WIRING SPECIFICATION TX-I/O TERMINATION SPEC. 2 TX-I/O TERMINATION SPEC. 2 TX-I/O TERMINATION SPEC. 3 PXCM TX-I/O WIRING SPEC. CONTROL DRAWINGS FLN SCHEDULE VALVE SCHEDULE VALVE SCHEDULE M_RISER BM_RISER BM_UNIT VENTILATOR & HP (BOM/SOO) BM_UNIT VENTILATOR & HP (SOO) BM_UNIT VENTILATOR & HP (MECH) BM_UNIT VENTILATOR & HP (RISER) BM_UNIT VENTILATOR & HP (RISER) BM_UNIT VENTILATOR & HP (RISER) BM_UNIT VENTILATOR & HP (RISER) BM_EF-MS-8,10,21 (MECH) BM_EF-MS-8,10,21 (MECH) BM_EXHAUST FAN (EF-MS-23) (BOM) BM_EXHAUST FAN (EF-MS-23) (ELEC) BM_EX EF-5,6,7,11,15,16 (BOM)	103A 103B 103C 400 400A 401 401A 500 500A N01 N01A N01B N02 N02A N02B N02C N02D N02C N02D N02E N02C N02D N02E N02F N02G N02H N02I N02I N02I N02L	CONTROL DRA BM_EX EF-5 BM_EX EF-5 BM_EX EF-5 BM_EX EF-5 BM_FIN TUBE BM_FIN TUBE BM_RADIATOI BM_RADIATOI BM_MISC EXI BM_MISC EXI DDC PANEL LA NAN.BM.FLR1. NAN.BM.FLR1. NAN.BM.FLR2 PPM.EF.MS.10 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EF.MS.23 PPM.EX.EF.15 PPM.EX.EF.16 PPM.EX.EF.16 PPM.EX.EF.5 PPM.EX.EF.6 PPM.EX.EF.7 NAN.BM.FLR2 THERMOSTAT	AWINGS 6,6,7,11,15,16 (MEC 6,6,7,11,15,16 (ELE 6,6,7,11,15,16 (ELE 7,6,7,11,15,16 (ELE 7
REVISION HISTORY	SIEMENS	412 MT	KEMBLE AVE.	NANUET BOND PHA NANUET, NY
IN 12/10/2024 IND ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	MORRIS NJ. 079 Phone: Fax: (9	510WN 160 USA (973) 575-6300 73) 575-7968	LENGINEER DRAFTER CHECKI VB VB NS TABLE OF CON

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			Anixter Building Autom	nation	Cables	
			Non-Plenum			
	SBT Part Number	Description			Print Legend	
	Н-ТР20-СМ	20AWG,STR,1TP,CI	л,BLUE JACKET		NORTHFLEX ® H-TP20-CM "I	 DI, DO, AI, AO" (Mfg E#) 20AWG 1
	Н-3С20-СМ	20AWG,STR,3CONE	D,CM,BLUE JACKET		NORTHFLEX ® H-3C20-CM "	TEC V/D" (Mfg E#) 20 AWG 3C 75°
	H-TP18-CMR	18AWG,STR,1TP,CM	IR,BLUE JACKET		NORTHFLEX ® H-TP18-CMR	"DI, DO, AI, AO" (Mfg E#) 18AWG
	H-3C18-CMR	18AWG,STR,3CONE),CMR,BLUE JACKET		NORTHFLEX ® H-3C18-CMR	"TEC V/D" (Mfg E#) 18 AWG 3C 7
	H-2C14-CL3R	14AWG,STR,2CONE),CL3R,DARK BLUE JACKET		H-2C14-CL3R "LV POWER" (I	
	H-B-TSP24LC-CM	BLN24AWG,STR,TS	P,LOCAP,CM,ORANGE JACKET		H-B-TSP24LC-CM "BLN" (Mfg	j E#) 24 AWG 1P 75°C CM (UL) C(
	H-F-TSP24LC-CM	FLN24AWG,STR,TS	P,LOCAP,CM,ORANGE JACKET W/ BLUE STRIPE		NORTHFLEX ® H-F-TSP24LC	-CM "FLN" (Mfg E#) 24 AWG 1P 7
	H-3P24-CMR	24AWG,SOL,3P,CM	R,BLUE JACKET		NORTHFLEX ® H-3P24-CMR	"TEC STAT" (Mfg E#) 24 AWG 3P
	LON-1P22-CM	22AWG,STR,1PAIR,	CM,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-1P22-CM	/ "LON FLN" (Mfg E#) 22AWG 1P
	LON-2P22-CM	22AWG,STR,2PAIR,	CM,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-2P22-CM	/ "LON FLN" (Mfg E#) 22AWG 2P
	LON-1PS22-CM	22AWG,STR,1PAIR,	OAS,CM,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-1PS22-C	;M "LON FLN" (Mfg E#) 22AWG 1F
	LON-2PS22-CM	22AWG,STR,2PAIR,	OAS,CM,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-2PS22-C	M "LON FLN" (Mfg E#) 22AWG 2F
	E-4TP24CAT5-CM	24AWG,SOL,4TP,CA	AT5,CM		NORTHFLEX ® E-4TP24CAT	5-CM "ETHERNET" (Mfg E#) 24AW
	H-A-1.5TSP24LC-CM	ALN485, 24AWG, S	TR, TP+1C, OAS, LOCAP, CM		NORTHFLEX ® H-A-1.5TSP24	IC-CM "ALN485" 24 AWG 1P+1C
	H-F-1.5TSP24LC-CM	FLN485, 24AWG, ST	R, TP+1C, OAS, LOCAP, CM		NORTHFLEX ® H-A-1.5TSP24	LC-CM "FLN485" 24 AWG 1P+1C
			Plenum			
	SBT Part Number	Description			Print Legend	
	H-TP20-CMP	20AWG,STR,1TP,CI	MP,BLUE JACKET		NORTHFLEX ® H-TP20-CMP	"DI, DO, AI, AO" (Mfg E#) 20 AWG
	Н-3С20-СМР	20AWG,STR,3CONE),CMP,BLUE JACKET		NORTHFLEX ® H-3C20-CMP	"TEC V/D" (Mfg E#) 20 AWG 3C 75
	H-TP18-CMP	18AWG,STR,1TP,CM	IP,BLUE JACKET		NORTHFLEX ® H-TP18-CMP	"DI, DO, AI, AO" (Mfg E#) 18 AWG
	Н-3С18-СМР	18AWG,STR,3CONE),CMP,BLUE JACKET		NORTHFLEX ® H-3C18-CMP	"TEC V/D" (Mfg E#) 18 AWG 3C 75
	H-2C14-CL3P	14AWG,STR,2CONE),CL3P,DARK BLUE JACKET		NORTHFLEX ® H-2C14-CL3P	"LV POWER" (Mfg E#) 14 AWG 20
	H-B-TSP24LC-CMP	BLN24AWG,STR,TS	P,LOCAP,CMP,ORANGE JACKET		NORTHFLEX ® H-B-TSP24LC	;-CMP "BLN" (Mfg E#) 24 AWG TS
	H-F-TSP24LC-CMP	FLN24AWG,STR,TS	P,LOCAP,CMP,ORANGE JACKET W/ BLUE STRIPE		NORTHFLEX ® H-F-TSP24LC	-CMP "FLN" (Mfg E#) 24 AWG TSI
	H-3P24-CMP	24AWG,SOL,3PAIR,	CMP,BLUE JACKET		NORTHFLEX ® H-3P24-CMP	"TEC STAT" (Mfg E#) 24 AWG 3P
	LON-1P22-CMP	22AWG,STR,1PAIR,	CMP,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-1P22-CN	/IP "LON FLN" (Mfg E#) 22AWG 1F
	LON-2P22-CMP	22AWG,STR,2PAIR,	CMP,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-2P22-CN	/IP "LON FLN" (Mfg E#) 22AWG 2F
	LON-1PS22-CMP	22AWG,STR,1PAIR,	OAS,CMP,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-1PS22-C	MP "LON FLN" (Mfg E#) 22AWG 1
	LON-2PS22-CMP	22AWG,STR,2PAIR,	OAS,CMP,ORANGE JACKET W/ WHITE STRIPE		NORTHFLEX ® LON-2PS22-0	;MP "LON FLN" (Mfg E#) 22AWG 2
	E-4TP24CAT5-CMP	24AWG,SOL,4TP,C	AT5,CMP		NORTHFLEX ® E-4TP24CAT5	5-CMP "ETHERNET" (Mfg E#) 24A\
	H-A-1.5TSP24LC-CMP	ALN485, 24AWG, S	TR, TP+1C, OAS, LOCAP, CMP		NORTHFLEX ® H-A-1.5TSP24	LC-CM "ALN485" 24 AWG 1P+1C
	H-F-1.5TSP24LC-CMP	FLN485, 24AWG, S1	R, TP+1C, OAS, LOCAP, CMP		NORTHFLEX ® H-A-1.5TSP24	ILC-CM "FLN485" 24 AWG 1P+1C
		1	Assemblies		1	
	Part Number	Description			Print Legend	
	550-827	CABLE ASSEMBLY	TEC TO SSB 3 POS 10 FT		N	
	550-828	CABLE ASSEMBLY	TEC TO SSC 3 POS 10 FT		N	
	B6320FE	18AWG, SOL, 2CON	ID,CMP, WHITE JACKET		BELDEN 6330FE CMP 75C 2C	
REVISION HISTORY		<u> </u>	SIEMENS			NANUET BOND PH
R0 2/16/2024 VB ISSUED FOR	APPROVAL			412 MT K		NANUET, NY
				NJ. 0796	0 USA	
			SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (9 Fax: (973	73) 575-6300 3) 575-7968	





Important Safety Information

System-specific: The electrical safety for building automation and control systems by Siemens Building Technologies is essentially based on safely separating low voltage from mains voltage.

Application as per SELV or PELV pursuant to HD 384 "Electrical installation of buildings" depending on the grounding (24V AC) of the low voltage:

Ungrounded = Safety Extra-Low Voltage (SELV). Grounded = Protection by Extra Low Voltage (PELV). Device-related safety is guaranteed, among others, by:

Low-voltage power supply 24V AC per SELV or PELV

Comply with specific regulations for electrical 2 wiring per the following sections.

Observe the following points when grounding 24V .3 AC (system neutral):

Operating voltage of 24V AC is permitted in 4 principle for both grounded as well as non-grounded system neutral. Local regulations and customers apply accordingly.

Grounding may be required or not allowed for functional reasons.

6. 24V AC systems are generally grounded unless disadvised by the manufacturer.

7. In order to avoid ground loops, connect systems with PELV to the ground at one location only (especially for transformers), if no other indication exists.

Mains and operating voltage:

Operating voltage 24V AC:

It must meet requirements for SELV or PELV. Permitted deviation for nominal voltage 24V AC on the device: -10 + / - 20%.

Transformer specification 24V AC:

Use safety insulating transformers as per EN 61558 with double insulation designed for 100% duty to supply SELV or PELV circuits..

2. Power taken from the transformer should be at least 50% of nominal load for efficiency reasons (effectiveness).

Transformer nominal power should be at least 25VA. For smaller transformers, the ratio of open circuit voltage to full load is unfavorable (> + 20%).

Operational voltage fuse 24V AC:

Transformers on the secondary side correspond to the actual load of all connected devices as per transformer sizing:

1. 24V AC line (system potential) must always be fused.

2. There required, also line (system neutral).

Mains filter:

Spikes and high-frequency interference may occur in areas with high levels of interference. The disturbances not only impact the transformer on the primary side, but may also influence secondary connected components.

A mains filter should be attached on the primary transformer if such interference is anticipated. Mains filters should be installed as close to the network transformer as possible and grounded.

Device-specific :

Devices using different power circuits: Devices must have the required insulation of the power circuits from each other to be able to connect them directly without additional insulation.

Interfaces for different voltage circuits : Connections via interfaces increase the risk of distributing dangerous voltage through the building. Ensure that the required insulation is available at all times and installed per applicable regulations.

DXR2 with 24V AC supply:

A class 2 transformer or an external T4 A fuse is compulsory.

2. Max. 100VA per transformer / per fuse circuit.

Installation:

Mounting position:

Recommended: Wall, horizontal from left to right or from right to left.

Wall, vertical from bottom to top. Ambient temperature 23 to 122°F (-5 to 50 3.

·C)

AC 24V power lines:

DXR2 room automation stations with 24V AC supply are limited to a consumption of 4A/100VA. Supply: Class 2 transformer OR external 4A fuse OR transformer >100VA for more than one DXR2. (In this case a separate 4A fuse is required for every 100VA).

3. DXR2 room automation stations with 24V AC supply can only be wired in star topology. An external power supply of field devices should be fused separately for secure operation.

24V AC Transformer :

Operating voltage :

The operating voltage is 24V AC. It must comply with SELV or PELV to HD 60364-4-41 (2007-01-01) requirements.

The acceptable deviation of the 24V AC nominal voltage connected to the transformer is +20%/-10%. This means that after taking account of the cable and contact resistances, a tolerance of +/-20% for the field device supply can be guaranteed in the field devices.

Specification for 24V AC transformers: Double-insulated safety transformers to EN 61558, designed for continuous operation, to supply SELV or PELV circuits.

The rated transformer output must be at least 50VA. In smaller transformers the ratio of no-load voltage to full-load voltage is unfavorable (> +20%). For reasons of power efficiency the rated transformer output should not exceed 200 % of the maximum load.

Wiring DXR2

The 24V AC can only be wired in star distribution for the DXR2 room automation stations. 24V AC must be fused with max. 4A (or Class 2 transformer).

Power consumption DXR2 24V AC: Max. permissible input current 24V AC (through terminals 5 and 6) = Total max. 4A.

Base load (without loading by field devices) DXR2.M11, DXR2.x12P 9VA DXR2 M18 11VA DXR2.F18 13VA KNX PL-Link supply 5VA/3W

29V DC / Max. 50 mA The bus supply can be switched off manually via tool

if not used. Transit power 24V AC Field supply 24V AC Max. 6VA

Field supply 24V DC (DXR2.E18 only)Max. 2.4W Digital output (triac active) 6VA (250mA) Note: Certain applications ensure that only one triac at a time is active: No simultaneous heating and cooling. Two heating outputs are alternatively on 50% of the time, the same with two cooling outputs. This can be considered in the transformer sizing. 6VA (250mA) Unconfigured triac

Cable lengths 24V AC

The permissible voltage drop of 0.6 V on the power wire between the transformer and the most distant power point (room automation station, power module. bus interface module) is the basis for calculations.

Devening the lead [1/4]

	· _			
<u>Cable</u>	length for	_24V A	C_(SI)	
2.5m	5.0m	10m	20m	<u>50m</u>
200VA	100VA	50VA	25VA	10VA
320VA	160VA	80VA	40VA	16VA
<u>Cable</u>	length for	24V A	<u>C (US)</u>	
8.2ft	16.4ft	32.8ft	65.6ft	<u>164ft</u>
200VA	100VA	50VA	25VA	10VA
320VA	160VA	80VA	40VA	16VA
	Cable 2.5m 200VA 320VA Cable 8.2ft 200VA 320VA	Cable length for 2.5m 5.0m 200VA 100VA 320VA 160VA Cable length for 6.4ft 200VA 160VA 200VA 160VA	Cable length for 24V A 2.5m 5.0m 10m 200VA 100VA 50VA 320VA 160VA 80VA Cable length for 24V A 8.2tt 16.4tt 200VA 100VA 50VA 320VA 160VA 80VA 200VA 160VA 80VA 320VA 160VA 80VA	Cable length for 24V AC (SI) 2.5m 5.0m 10m 20m 200VA 100VA 50VA 25VA 320VA 160VA 80VA 40VA Cable length for 24V AC 8.2ft 16.4ft 32.8ft 65.6ft 200VA 100VA 50VA 25VA 320VA 160VA 80VA 40VA 320VA 160VA 80VA 40VA

Notes

The supply wire (24V AC) and return lines can each have the indicated lengths.

2. Power is added together for multiple back-to-back looped PXC3 or DXR2 ("daisy chain") which reduces the cable length accordingly. Each supply point (room automation 3.

stations/power module/bus interface module) is either connected separately to the transformer's

terminal block (star wiring) or looped via the room

automation station. Cables may be wired in parallel to increase the 4

cross section.

Wiring of field devices (without bus)

As a rule, comply with local regulations for electrical installations. These take precedence over any notes in this document.

Wiring for Triac outputs 24V AC.

The following applies for wiring to actuating devices such as valves, damper actuators or protection connected to the Triac outputs:

 Use stranded, 2 or multiple core round cables. screened (standard off-the-shelf installation cable). Single wires may not be used.

Wiring may be laid together with power lines (230V AC). They must be isolated from the power lines per regulations. Isolation must meet PELV requirements.

Wiring can not be led in the same cable as the 4 power lines.

See table below for maximum single cable engths. However, the length must not exceed 984ft (300m) (EM interference). DXR2: 262ft (80m).

DXR2 room automation stations with 24V AC supply:

Use cable cross section suited for 4A according to local regulations (T 4A fuse external / Class 2 transformer). Cable cross section >= AWG18. Triacs are not protected and are destroyed if overloaded. Cable length <= 262ft (80m)

Common conductor with multiple contacts: When several status or counter contacts are to be connected a common conductor may be used. This saves wiring. However, system ground must be connected at least once per module. Digital inputs are not electrically isolated from the system Use stranded, 2 or multiple core round cables, electronics. Mechanical contacts must be volt-free. Electronic switches must comply with SELV or PELV standards. Single wires or ribbon cables may not be used. Signal wiring may be laid together with power <u>Analog inputs</u> Cable length: The maximum permissible cable length for passive resistance sensors and transmitters depends on the Signal wiring can not be led in the same cable permissible measuring error due to the line resistance. The maximum cable length for DXR2 is The length must not exceed the following value 262ft (80m). Active sensors 0 - 10V DC All system neutral terminals of a device are Cable length: The maximum cable length for DXR2 is 262ft (80m). The permissible length of 10V DC cables for The system neutral of a digital input can be measured signals, and of the cables to supply the sensors from the TRA device, have to be calculated on the following basis for each active sensor. Max. 7% voltage drop (1.68V) on the cables due to the sensor supply current. Reason: to ensure sufficient voltage for the sensor supply. 2. Measuring error of max. 0.5% of the measuring With analog inputs and outputs, the measuring range due to line resistance on the measuring conductor (not critical, as the measuring current is only 0.1mA) Longer cables are permissible provided larger measuring errors are acceptable. 4. If the active sensor is supplied locally from a transformer, the sensor cable can be up to 984ft (300m) long (DXR2: 262ft (80m)) with a wire diameter of areater than or equil to 0.024in (0.6mm). The local transformer MUST NOT be earthed (earth loop)! In case of active sensors with 24V AC supply, use cable cross section suited for 10A according to External fuse of max. 10A for protection of the local regulations Digital outputs (relays, triacs) Cable length: The cable between the switching outputs and the equipment to be switched may be up to 262ft (80m) for DXR2 The permissible lengths of the cables between the relay outputs / triacs and the actuators depend on The sizing and fusing of the power lines are the type of actuator in use and are calculated as follows The fused electrical values must therefore be Relays: Voltage drop of max. 7% (1.68V) on the 24V AC operating voltage for the actuator. Triacs: Voltage drop of max. 3% (0.72V) on the 24V The lines must be secured on the device with AC operating voltage for the actuator (the triac itself has already 4% voltage drop). Cable length: as per load and local regulations. The maximum current of the relays is limited to <u>Analog outputs</u> Cable length The permissible cable lengths for 0 - 10V DC control signals and for the 24V AC operating voltage are given in the data sheets of the individual actuators. Where the actuators are supplied locally with 24V AC, the control signal cable may be up to 984ft (300m) long (DXR2: 262ft (80m)) with a diameter of areater than or equil to 0.024in (0.6mm). The local transformer MUST NOT be earthed (earth loop)! 0 - 10V DC actuators with 0 - 10V DC feedback: System neutral of output and feedback may be in the same conductor due to the small current. However, output and feedback must be on the same device. HASE3 MID SCHOOL 440P-366733 Δ CKED BY | INITIAL RELEASE | LAST EDIT DATE NSK 02/16/24 04/16/24 SPECIFICATION

Signal wiring The following applies in common for signal wiring of field devices such as temperature sensors, window switches, presence detectors, dew point sensors or electrical buttons: without screen (standard off-the-shelf installation cable) 2. lines (230V AC). They must be isolated from the power lines per regulations. Isolation must meet PELV requirements. as the power lines. (measuring errors, EM interference): DXR2: 262ft (80m). interconnected. TX-I/O: The connection is not in the terminal base but in the plua-in module. When this unit is unplugged there is no connection. connected to any signal neutral terminal of the device. 8. It is also permissible to combine the system neutral conductors of several digital inputs in order to save wire. TX-1/0: However, system ground must be connected at least once per module. 9. neutral must always be connected to the terminal associated with that specific I/O point to avoid possible measurement errors. 10. 0 to 10V DC actuators with 0 to 10V DC feedback: System neutral of output and feedback may be in the same conductor due to the small current of the U10 and Y10 signals. However, output and feedback must be on the same device and there is no 24V DC supply current admissible on the system neutral conductor. Relay outputs PCB tracks. 2. Relays have volt-free relay contacts. The mains voltage / switching voltage (230V AC / 24V AC/DC) must be supplied as an external voltage to the terminals. 3. The maximum load of the relay contracts must be observed (see data sheets for the corresponding devices) oriented to overall connected load and local regulations. reviewed in the data sheets for the corresponding devices. 6. strain relief. 4 (3)A. Inputs and Outputs **Digital** inputs Cable length The permissible length of the cables connected to the status contacts, regardless of the thickness of the wire (min. diameter 0.024in / 0.6mm) is restricted to 262ft (80m)

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	SMART INFRASTRUCTURE	Fax: (973) 575-7968	DXR WIRING

Ethernet network:

Network topologies

Star topology (general).

Line topology (for room automation). DXR2 and PXC3 can be mixed.

The number of room automation stations is

limited to 20 for a line topology (daisy chain). 5. The next device has no 24V AC power when a room automation station is removed. The connection exists only on the board, but not on the terminal block.

6. The Ethernet switch is inactive when a room automation station has no 24V AC power. The next devices, if in line topology, are disconnected from the network. For secure operation of the system it is recommended to supply each room automation station separately with 24V AC.

<u>Cables</u> – Room automation stations are connected to one another via switches and Ethernet cables with RJ45 connectors. The following conditions must be met:

Standard Ethernet cable min. category 5 1.

Shielded or unshielded STP (Shielded Twisted 2. Pair) or UTP (Unshielded Twisted Pair).

3 Length between switch and Room automation

station max. 328ft (100m). 4. Length between Room automation stations Max.

328ft (100m). Number of devices under a line topology max. 20.

Standard IT product at 100MB or 1GB. 6.

Power over Ethernet (PoE) - Power over Ethernet (PoE) is a simple solution to supply power to room operator units consuming only little power. This saves a power cable and associated installation costs. PoE allows for installing Ethernet devices also in hard-to-access locations or areas where too many cables are an issue. In PoE, power sourcing equipment (PSE) supplies power to powered devices (PD, here: end devices). Voltage is supplied via the RJ45 plugs and a twisted-pair cable (TP) to the devices either:

Via data transmission lines

Or via unused lines of the RJ45 connection. PoE requires a star topology. Standard PoE switches have between 4 and 16 outputs. In large plants (e.g. different rooms in a hotel) require use of multiple switches in a line topology.

Specifications:

Standard Ethernet cable min category 5 Screened or unscreened STP / UTP STP (Shielded Twisted Pair) or UTP (Unshielded Twisted Pair) Distance between switch and station = max 328ft (100m).

Distance between switch and end unit = max 328ft (100m).

MS/TP networks:

Network topologies - MS/TP networks for Desigo TRA can only be wired in line topology. The network distance for a fully or partially loaded network is 4000ft (1220m) at a maximum network speed of 76,800 bps. Lower speeds do not mean longer network sections are possible. DXR2 controller support up to 115,200 bps. Network repeaters can be used to extend this distance. To determine how many devices can be on a network section, add up all the loading numbers and do not exceed 32. Many third-party devices have full load interfaces. Check the manufacturer's literature for network loading information. The RS-485 specification allows 32 full load devices on a section of network cable before a repeater is required. Desigo TRA devices are 1/8 load devices, so, in theory, you could place 256 on a network section.

Response times normally limit the maximum number of devices on a network to lower values of around 96 devices

Two 1200hm ½W resistors between + and - at BOTH ends of the network section.

2. OneSpecial PTC thermistor between Reference () and earth at ONE end of the network section. This prevents the cable from being damaged by high ground currents that may occur if the reference wire is accidentally grounded to earth ground at a second location.

Technical data BACnet MS/TP - Inter-node protocol communications on BACnet MS/TP networks take place over RS-485 physical media. Desigo TRA devices use the 3-wire interface.

By providing the RS-485 ground signal of the interface to the network termination plug, all node communication ports can be referenced together providing a high degree of noise immunity. The RS-485 common reference wire is 2

terminated at one point (and only one point) to earth ground.

3. An overall foil shield and drain wire provide additional noise protection.

4. The decision to use the orange jacket cable or orange jacket with blue stripe cable is up to the user/customer. The only difference in the cables is the addition of the blue stripe, which can be useful to indicate a different protocol usage (e.g. Automatic level vs. floor level network).

 Reference wire Shield

Cable Specifications

Transmission medium 1.5-Pair (1 TP & 1 conductor) with overall Shield and drain wire (bus cable) Gauge (pair) 24 AWG (0.25 mm2) stranded Capacitance conductor to conductor 12.5 pF/foot (41 pF/m) conductor to shield 24 pF/foot (79 pF/m) 120 Ohm Impedance min. 4 per foot (13 per m) Twists Reference wire 24 AWG (0.25 mm2) stranded, 3 inch lay with twisted pair Shield 100% overall foil with drain wire UL listed, CM, CMP (167'F (75'C NEC class or higher) FT4, FT6 (167°F (75°C) or higher) CEC class

KNX PL-Link room bus:

The KNX PL-Link bus must be conducted inside the building. The cables must never leave the building.2. The KNX PL-Link bus facilities communications

from the PXC3 room automation station to a maximum 64 devices on the KNX bus devices for various manufacturers.

3. Note: The number of devices is also limited by the number of data points and the available bus power. Data points and bus power are incremented during engineering with the ABT tool. 4. The KNX PL-Link bus basic version comprises

one cable and two stranded bus wires. The PXC3 has one internal bus power supply of

160mA.

The DXR2 has one internal bus power supply of 50mA.

7. The PXC3 also includes an 24V AC / 2A output for devices with increased power consumption

that is supplied via 24V AC rather than via the KNX PL-Link bus. The KNX PL-Link is physically based on the 8

KNX bus (Konnex).

9. In KNX networks area/line couplers and IP routers are not admitted.

10. Interconnection of room automation stations via KNX PL-Link is not admissible; the connection is done exclusively via Ethernet switches (Section 9). 11. The polarity of the KNX PL-Link bus conductors must be respected (KNX terminals + and -).

Bus power supply - A bus power supply is required for bus communications. Throttled voltage 29V DC is used.

Internal KNX PL-Link Power Supply:

The room automation stations have an internal bus power supply. which is switched on by default. If an external supply is used, the internal supply must be switched off manually in the ABT (KNX PL-Link rail properties), as parallel operation is not permitted. Bus power and the KNX bus are electrically isolated from device electronics for devices with bus power. Parallel operation of the internal KNX PL-Link bus supply with an external bus power supply is not permitted

The internal bus power supply must be switched off in the tool when an external bus power supply is used.

External bus supply:

An external bus power supply unit (PSU) is required when the 160mA of the PXC3 / the 50mA of the DXR2 is insufficient to cover the power demand of the connected devices.

Power supply units for 160, 320 and 640mA

available in specialty stores. The total power supply for the devices must be calculated to determine the appropriate size. Comply with the corresponding details in the datasheet.

A 640mA power supply unit suffices for a line featuring 64 devices on the KNX bus with an average power demand of 10mA each.

(Parallel operation)

5. In principle, parallel operation of external bus supplies among themselves is possible. However, check if the specific PSU is allowed to be operated in parallel with other PSUs. Refer to the technical specifications. The below mentioned Siemens devices are not submitted to this restriction. 6 A minimum cable distance is required between

two PSU.

Bus topologies - Up to 64 devices with KNX PL-Link can be installed on one line (main line as well). No restrictions apply to the type mix.

Note:

1. There is no need to calculate the bus load number E for up to 64 devices. 2. A maximum of 64 devices may be installed even if devices requiring less power are used.

Permissible bus topologies are: Tree, line, and star topologies. These topologies can be mixed as needed. However, <u>ring topologies are not allowed.</u> The tree topology is advantageous if a large network must be created.

Cables

The bus lines (= wired pair) are connected via PL+ (red) and PL- (black).



24V AC can be provided in the same $(2 \times 2 \text{ stands})$ or in a separate cable.

Bus cable screening : In TRA plants, bus cables without screen are permitted. The screens available for bus cables do not need to be connected. If interference is expected on the KNX bus, use a cable with screen. Connect the screen as per standard installation rules.

station:

- 262ft (80m).
- 2. (80m).

external bus power supply (PSU)

- supply, Min. Oft (0m).
- Siemens power supply modules.).

inverted. (KNX terminals + and -).

Permissible load [VA] :

	Ca	ble length	1 tor 24V	AC
AWG	32.8ft	65.6ft	164ft	328f
AWG20	48VA	30VA	12VA	6VA
AWG18	48VA	48VA	20VA	10V/
AWG16	48VA	48VA	32VA	16V/
AWG14	48VA	48VA	48VA	24V





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SIEMENS



FLN TSP CABLE SPECIFICATIONS	
TWISTED PAIR SHIELD	
PAIR STRANDED) RRAD/FT CAPACITANCE OR LESS PER FOOT.	
RALL FOIL	
PART NUMBERS	
ABER: H-AF-TSP24LC-CMPBX-P ON: ALN/FLN24AWG,STR,TSP,LOCAP,CMP (FT-6)	
FLN 1.5 PAIR CABLE SPECIFICATIONS	
2AIR STRANDED) RRAD/FT CAPACITANCE CONDUCTOR TO CONDUCTOR. RRAD/FT CAPACITANCE CONDUCTOR TO SHIELD. PER FOOT. F WIRF	
STRANDED), 3 INCH LAY WITH TWISTED PAIR	
RALL FOIL WITH DRAIN WIRE	
PART NUMBERS	
ABER: H-A-1.5TSP24LC-CMP-Y ON: 24-1.5PR STR TC FFEP FT6 SHD YEL (FT-6)	
HBER: 8304R ON: 22AWG 3C STR FT6 ORG (FT-6)	
NETWORK CABLING CLOSER THAN 5 FEET TO A VARIABI HE POINT WHERE THE NETWORK MUST CONNECT TO TH MUST BE THROUGH A SEPERATE CONDUIT AND ALL NE & AS POSSIBLE FROM HIGH POWER CABLING IN THE DR	LE FREQUENCY DRIVE (VFD) IE VFD. NETWORK ENTRY TWORK WIRING MUST BE VE.
NETWORK CABLE CLOSER THAN 5 FEET FROM CONDUITS LWAYS CROSS HIGH POWER CABLES (AT A DISTANCE C	S CARRYING 100KVA OR DF 5 FEET) AT A 90' ANGLE.
N IN OPEN CABLE TRAYS WITH CIRCUITS CARRYING 20	AMPS SHOULD BE NO CLOSER
N IN ENCLOSED TRAYS WITH CONDUITS CARRYING OVER N 18 INCHES TO THE HIGHER POWER CABLES.	20 AMPS SHOULD BE NO
PHASE3 MID SCHOOL	44OP-366733
CHECKED BY INITIAL RELEASE I LAST FOIT DATE	
NSK 02/16/24 04/16/24	FLN

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iecked by	DTDN11 02/16/24 04/16/24 DTDN1
HASE3	MID SCHOOL 440P-366733 0
12	WHERE REQUIRED, NEUTRAL TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BA A NEC APPROVED MEANS.
11	WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY A NEC APPROVED MEANS. NOT A FUSE.
10	100mA TO 150mA – 250ft/76m 150mA TO 200mA – 187ft/57m 200mA TO 250mA – 150ft/46m
9	50mA OR LESS – 750ft/230m 50mA TO 100mA – 375ft/115m
8	EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC COMPACT COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125–3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
7	REFER TO DRAWING P2 ON PWIR FOR MAXIMUM CURRENT PROVIDED BY THE PXCC 24VDC SENSOR SUPPLY.
6	REFER TO PXCC TERMINATION TABLES FOR ACTUAL POINT ADDRESSES. COMMON TERMINAL MAY BE SHARED BY 2 POINTS. AND ORDER MAY BE REVERSED ON ADJACENT POINTS.
5	PXCC DO CONTACT RATINGS AC OPERATION: 4A @ 240VAC (RESISTIVE) 3A @ 240VAC (INDUCTIVE) SIZE 4 MOTOR STARTER DC OPERATION: 40W @ < 50VDC 20W @ > 50VDC
4	DI CANNOT BE USED FOR PULSE ACCUMULATION. UI, U, X MAXIMUM PULSE RATE = 20HZ (25ms PER STATE, 50ms PRE PULSE.
3	MAXIMUM CONTACT CLOSURE RATE IS 10 PER SECOND DI EXCITATION = 24VDC, 10mA UI, U EXCITATION = 24VDC, 6mA, 150ms, 1mA
	MAXIMUM CONTACT CLOSURE RATE IS



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDLE SCHOOL\PXCCTERM2.DWG

1

1	Point		IE FACS	PXC			
	Туре	_	Point Terminale Address				
Point Type	Number	l ern Signal ²	Inais	Audress			
Super Universal	X1	30	31	1			
Input/Output (X) ¹	X2	32	31	2			
4 -D	×3	33	34	3			
	×4	25	24				
	~4 \/F	30	07				
	X5	36	37	5			
	X6	38	37	6			
	X7	39	40	7			
	X8	41	40	8			
Universal	U9	50	51	9			
Input/Output (U)	U10	52	51	10			
⊴-⊳	U11	53	54	11			
	U12	55	54	12			
	1113	56	57	13			
	013						
	U14	58	57	14			
	U15	59	60	15			
	U16	61	60	16			
	U17	62	63	17			
	U18	64	63	18			
	U19	65	66	19			
	U20	67	66	20			
	U21	68	69	21			
	U22	70	69	22			
	1123	71	72	23			
	1124	70	72	20			
Digital Instit (DI)	024	13	75	24			
Digital Input (DI)	DI25	74	/5	25			
-►	DI26	/6	/5	26			
	DI27	77	78	27			
	DI28	79	78	28			
Digital Output	DO29	4,	5,6	29			
(DO)	DO30	7,8	8,9	30			
	DO31	10,1	1,12	31			
	DO32	13,1	4,15	32			
	DO33	16.1	7,18	33			
	DO34	19.2	20,21	34			
	DO35	22.2	3.24	35			
	D036	25.2	26.27	36			
es: For pre-pxc24 16 were unive The current s	1.2 CON RSAL I SUPER	ITROLL /O PO UNIVEF	ERS, F INTS II RSAL I,	POINTS NSTEAD			
FOR THE APPRC ASE REFER TO LUMN. THE Common TI LOWING SYMBOL	PRIATE THE RE ERMNAL .:	TERM SPECT	INAL S TVE PO LWAYS	SYMBOL DINT TY THE			
SEE BELOW FOR	DIGITA	L OUT	PUT S	YMBOL:			
MID SCHOOL			4	40P-3 ი			
			_				

PXCC	WIRING	TYPE AND GAUGE	E REQUIREME	<u>ENTS</u>
		TABLE 1		
CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING ²
AC LINE POWER ¹	POWER	#12-14 THHN	REFER TO NEC	CHECK LOCAL CODES
DIGITAL OUTPUT	1 & 2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT ⁴ 100K/10K Thermistor	2	#18-#24 TP ^{3.6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT ⁴ 1K Ni OR RTD	2	#18-#24 TP ^{3.6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 0-10 V	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG INPUT 4-20 mA	2	#18-#24 TP ^{3,6} or TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 0-10 V	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ANALOG OUTPUT 4-20 mA	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES
ETHERNET ALN	2	#24 (4) TP ⁶ CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES

1. WHEN DAISY-CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE.

2. CONDUIT SHARING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON-JACKETED UL LISTED 75°C(167'F) AND 300V, CABLE • COMPLY WITH LOCAL BUILDING CODES CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED ● SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE. 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. • ALL WIRE TO BE APPROVED OR LISTED FOR THE INTEND SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED. TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END.

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA-568-B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXES. USE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

PYCC WIRE SPECIFICATIONS TADLE 2

TAGE MINE SELVING	ATIONS TABLE 2			
	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	ММ, ММР
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC 2	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED
1. UL RECOGNIZED WIRE 2. 300 VAC WIRE CAN I	(LABELED WITH A BACKWARDS 'I BE USED IN FIELD PANELS CONTA	RU') IS NOT FIELD INSTALLABLE. INING VOLTAGES BELOW 150 VAC	USE ONLY UL-LISTED WIRE.	

REVISION HISTORY

R0 2/16/2024 VB ISSUED FOR APPROVAL

MAXIMUM DO WIRE RUN LENGHTS TARLE 3

NOMINAL	STARTER	WIRE SIZE								
INRUSH	I SIZE		# 16	<i>#</i> 14						
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)						
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)						
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)						
1500 VA	4	70ft (21m)	100ft (30m)	200ft (61m)						

TABLE 3 NOTES:

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAG DROP ACROSS THE WIRE FOR A TYPICAL STARTER.

PXCC DO CONTACT RATINGS 2. 4A @ 250VAC & 30VDC

SIZE 4 MOTOR STARTER 3. WIRING LENGTHS SHOWN ARE FOR 120VOLTS.

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNI

TARLE 4

SPEED	1200	4800	9600 – 38.4K	57.6K – 115.2K					
	BAUD	BAUD	BAUD	BAUD					
SERIES TIE'S	10	7	6						
ALN TRUNK	4000ft	4000ft	4000ft	3280ft					
DISTANCE	(1.2km)	(1.2km)	(1.2km)	(1km)					

• TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCC CON TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF ALN CABLE THAT EXITS BUILDING.

• THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE

GENERAL NOTES:

APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.

ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING

WIRING MUST HAVE INSULATION RATED FOR HIGHEST VO CIRCUIT IN CONDUIT.

● THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BET CABINETS. NO SPLICES ALLOWED.

● CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1 CIRCUITS.

SIEMENS

SIEMENS INDUSTRY, INC.

SMART INFRASTRUCTURE

• FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

NJ. 07960 Phone: (9)	DUSA 73)575-6300	ENGINEER VB	DRAFTER CHE
412 MT K MORRIST	EMBLE AVE. OWN	NANUE	T, NY
		NANUE	T BOND PH
	(P3) PXCC 00	COMN	<u>in termi</u>
			SHLD
	L AL		TERMINATOR (EOL ONLY)
	B: ALN TRUNK		SECURING WS IN TOP
			SHLD
_Y			
	A: ALN TRUNK		SECURING VS IN TOP
ETWEEN		1405	
VOLTAGE	5. USE ALN SHIEL E TERMINAL IS	D TERMI OPEN.	NATION P3B
NG.	ALN TRUNK ON 4. USE ALN SHIEL 5 TERMINIAL IS	NLY. _D TERMI _FARTH C	NATION P3A
NDED	USED AT BOTH 3. TERMINATE SH	ENDS OF	EAVING END
	1. COMMUNICATIO	N CONNEC DAISEY-C	TORS PLUG I
IE TIE.	00 NOTES:	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
DNNECTER	P2 F	ра 115VAC РХСС Р	OWFR WI
t	2. RECEPTACLE IS		ON A SINGL
J.ZN	NOTES: 1. NO MORE THAN	SEVEN (7) FULLY LOA
5.04		1 JU	
INK		T 24 T 36	10 20 35
	PRODUCT	2474	C VA RATING
R		AILY VA R	ATINGS & SE
AGE			IIT DENIE
, t)	$\begin{array}{c} \frac{\text{KNOCKOUT TYPES}}{\text{A}=1" \& 1-1/4"} \\ \text{B}=3/4" \& 1" \\ \text{C}=1/2" \& 3/4" \end{array}$	"A"	
1/ t	115V OUTLETS: 20	0 VA (MAX.) 0 VA (MAX.)	
t	LINE FREQUENCY: 50	4-264 VAC / 60 Hz	
it.	SERVICE BOX POWER SOURCE REQ	MAX UIREMENTS	
	SERVICE BOX	мах	

Fax: (973) 575-7968

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C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\PXCCWIRE.DWG





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4	8D, 16D MAXIMUM PULSE RATE = 10Hz (50ms PER STATE, 100ms PER PULSE) 8U, 8X MAXIMUM PULSE RATE = 20Hz (25ms PER STATE, 50ms PER PULSE)
5	PXC MODULAR DO CONTACT RATINGS AC OPERATION: 4A @ 240VAC (RESISTIVE) 3A @ 240VAC (INDUCTIVE) SIZE 4 MOTOR STARTER DC OPERATION: 40W @ < 50VDC 20W @ > 50VDC
6	REFER TO PXC MODULAR PANEL FOR ACTUAL POINT ADDRESSES. REFER TO TXMI TERMINATION TABLES FOR ACTUAL TERMINALS FOR EACH PANEL ADDRESS. COMMON TERMINAL MAY BE SHARED BY 2 POINTS.
7	REFER TO DRAWING P1 ON TWIR FOR MAXIMUM CURRENT PROVIDED BY THE 24VDC SENSOR SUPPLY ON P1 BIM OR BUS POWER SUPPLY
8	EXTERNAL POWER SUPPLY CAN EITHER BE A 24VDC POWER SUPPLY OR A 24VAC TRANSFORMER DEPENDING ON THE SENSOR SELECTED. IF NOT AN ISOLATED NC CLASS 2 CIRCUIT THEN POWER SOURCE, NEUTRAL AND PXC MODULAR COMMON MUST BE BOTH CONNECTED TO THE SAME OR BONDED BUILDING APPROVED EARTH GROUND. FOR FURTHER DETAILS SEE EARTH GROUNDING RULES (125–3002) APOGEE WIRING GUIDELINES FOR FIELD PANELS AND EQUIPMENT CONTROLLERS.
9	50mA OR LESS – 750ft/230m 50mA TO 100mA – 375ft/115m
10	100mA TO 150mA – 250ft/76m 150mA TO 200mA – 187ft/57m 200mA TO 250mA – 150ft/46m
11	WHERE H TERMINAL IS NOT A NEC CLASS 2 CIRCUIT, RELAY COMMON TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED TO 10A MAXIMUM BY AN NEC APPROVED MEANS. NOT A FUSE.
12	WHERE REQUIRED, N TERMINAL BRANCH CURRENT MUST BE EXTERNALLY LIMITED BY AN NEC APPROVED MEANS.
HASE3	MID SCHOOL 440P-366733
HECKED BY	
NSK	$\frac{02/16/24}{01} = 04/16/24} = 1 $
III Anii	



TXM1 TERMINATION TABLES

1. ALL TXM1 TERMINALS (MEASURING, NEUTRAL, RELAY, SUPPLY) ARE CONNECTED IN THE PLUG-IN I/O MODULE, NOT IN THE TERMINAL BUS.

		TXM1.8D, TXM1.16D							
I/O POINT		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL ¹	⊥ (−)	1	3	5	7	9	11	13	15
DIGITAL INPUT	+ (+)	2	4	6	8	10	12	14	16

1. NEUTRAL CAN BE CONNECTED TO ANY NEUTRAL TERMINAL ON SAME MODULE AND SEVERAL CAN SHARE SAME NEUTRAL TERMINAL.

	TXM1.16D							
I/O POINT	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
SYSTEM NEUTRAL \bot (-)	18	20	22	24	26	28	30	32
DIGITAL INPUT 1 (+)	19	21	23	25	27	29	31	33

1. NO PULSE ACCUMULATOR

	TXM1.8U, TXM1.8U-ML							
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SYSTEM NEUTRAL \bot (-)	2	6	10	14	19	23	27	31
UNIVERSAL I/O (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY' \eqsim		7		15		24		32

1. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

		TXM1.8X, TXM1.8X-ML						
I/O POINT	(1)	(2)	(3)	(4)	(5)	(6)	$(7)^{1}$	(8)
SYSTEM NEUTRAL \perp (-)	2	6	10	14	19	23	27	31
UNIVERSAL I/O (+)	4	8	12	16	21	25	29	33
24V AC/DC ACTUATOR SUPPLY2 \eqsim		7		15		24		32
24V DC SENSOR SUPPLY ³ ==	3		11		20		28	

1. 4-20 mA OUTPUT AVAILABLE ON POINTS 5-8 ONLY.

2. 24V DC ONLY AVAILABLE WITH BUS CONNECTOR MODULE (BCM) POWERED EXTERNALLY BY DC SUPPLY.

3. MAY POWER EXTERNAL SENSORS 0.6w (25mA) OR 1.2w (50mA) PER TERMINATION UP TO 2.4w (100mA) MAXIMUM FOR ALL TERMINATIONS.

			T>	<m1.6< th=""><th>3R, 1</th></m1.6<>	3R, 1
I/O POINT			(1)	(2)	(3)
COMMON ¹	t	(C)	3	9	15
NORMALLY CLOSED	ń	(NC)	4	10	16
NORMALLY OPEN	ł	(N0)	2	8	14

1. COMMONS ARE NOT INTERNALLY CONNECTED.

NOTE: REFER TO TERMINATION SHEET #1 FOR INSTALLATION DETAILS.

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R0 2/16/2024 VB ISSU	JED FOR APPROVAL		412 MT REMBLE AVE. MORRISTOWN NJ. 07960 USA	NANUET, NY
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٢M	1.8T			
4)	(5)	(6)	(7)	(8)
14	19	23	27	31
16	21	25	29	33

PXC MODULAR WIRING TYPE AND GAUGE REQUIREMENTS TABLE 1														
TABLE 1 CIRCUIT TYPE CLASS WIRE TYPE MAX. DISTANCE CONDUIT SHARING ²														
CIRCUIT TYPE	CLASS	WIRE TYPE	MAX. DISTANCE	CONDUIT SHARING ²										
AC LINE POWER ¹	POWER	#12-14 THHN	REFER TO NEC	CHECK LOCAL CODES										
DIGITAL OUTPUT	1&2	TP not required, check job specs & local codes #18 to #24 AWG	SEE TABLE 3	CHECK LOCAL CODES										
DIGITAL INPUT	2	TP not required, check job specs & local codes #18 to #24 AWG	750ft (230 m)	CHECK LOCAL CODES										
ANALOG INPUT ⁴ 100K/10K Thermistor	2	#18-#24 TP ^{3,6} or TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ANALOG INPUT ⁴ 1K Ni OR RTD	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ANALOG INPUT 0-10 V	2	#18-#24 TP ^{3,6} or TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ANALOG INPUT 4-20 mA	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ANALOG OUTPUT 0-10 V	2	#18-#24 TP ^{3,6} r TSP ⁵ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ANALOG OUTPUT	2	#18-#24 TP ^{3,6} r TSP ³ CM(FT4) or CMP(FT6)	750ft (230 m)	CHECK LOCAL CODES										
ETHERNET ALN	2	#24 (4) TP ⁶ CAT5 OR BETTER	295ft (90 m)	CHECK LOCAL CODES										
ALN TRUNK	2	#24 TSP	SEE TABLE 4	CHECK LOCAL CODES										

INRUSH	SIZE	# 18	# 16	<i>#</i> 14
200 VA	0 1	500ft (152m)	900ft (274m)	1400ft (427m)
550 VA	2	200ft (61m)	300ft (91m)	500ft (152m)
1150 VA	3	100ft (30m)	150ft (46m)	250ft (76m)

70ft

(21m)

MAXIMUM DO WIRE RUN LENGHTS

TABLE 3

WIRE SIZE

100ft

(30m)

200ft

(61m)

1500 VA TABLE 3 NOTES:

NOMINAL

1. DISTANCES SHOWN ASSURE LESS THAN 10% VOLTAGE DROP ACROSS THE WIRE FOR A TYPICAL STARTER.

2. PXCM DO CONTACT RATINGS

STARTER

4A @ 250VAC & 30VDC SIZE 4 MOTOR STARTER

MAXIMUM NUMBER HSTIE IN SERIES ON ALN TRUNK

TABLE 4

SPEED	1200	4800	9600 – 38.4K	57.6K – 115.2K
	BAUD	BAUD	BAUD	BAUD
SERIES TIE'S	10	7	6	6
ALN TRUNK	4000ft	4000ft	4000ft	3280ft
DISTANCE	(1.2km)	(1.2km)	(1.2km)	(1km)

1. WHEN DAISY-CHAINING 24VAC POWER TO CONTROLLERS USE #14 WIRE. TIE MUST BE USED TO ISOLATE ALN BETWEEN PXCM CONNECTED

2. CONDUIT SHARING RULES: ONLY WHERE LOCAL CODES PERMIT. BOTH CLASS1 AND CLASS 2 WIRING CAN BE RUN TO THE PXCC PROVIDED THE CLASS 2 WIRE IS UL LISTED 300V 75°C(167°F) OR HIGHER OR THE CLASS 2 WIRE IS NEC TYPE CM (FT4) (75°C OR HIGHER) OR CMP(FT6) (75°C OR HIGHER). NEC TYPE CL2 AND CL2P IS NOT ACCEPTABLE UNLESS ALSO UL LISTED AND MARKED 300V 75°C (167°F) OR HIGHER

3. TWISTED PAIR, NON-JACKETED UL LISTED 75 C(167 F) AND 300V, CABLE • ALL WIRE TO BE APPROVED OR LISTED FOR THE INTENDED CAN BE USED IN PLACE OF CM(FT4) OR CMP(FT6)(BOTH MUST BE RATED 75°C OR HIGHER) CABLE WHEN CONTAINED IN CONDUIT PER LOCAL CODES. SEE THE FIELD PURCHASING GUIDE FOR WIRE.

4. WIRE LENGTH AFFECTS POINT INTERCEPT ENTRY. ADJUST INTERCEPT ACCORDINGLY FOR EACH WIRE GAUGE AND SENSOR TYPE.

5. SHIELDED TWISETED PAIR (TSP) IS NOT REQUIRED FOR ELECTRICAL NOISE LEVELS UPTO 10 V/M. AT HIGHER LEVELS TSP MAY BE NEEDED. TERMINATE SHIELD ON ENCLOSURE AND TAPE BACK ON POINT END. ● CM/CMP/MM/MMP WIRE IS NOT USABLE FOR CLASS 1

6. FOR 24AWG INSTALL CATEGORY5 OR BETTER CABLE PER ANSI/TIA/EIA-568-B.1 OR HIGHER. USE SOLID COPPER BETWEEN JACK BOXÉS. ÚSE STRANDED COPPER PATCH CABLES 13ft (4m) TO CONNECT PXCC AND 20ft (6m) TO CONNECT SWITCH OR HUB.

PXCM WIRE SPECIFICATIONS TABLE 2

	LOW-VOLTAGE POINT APPLICATIONS	POINT USAGE	ALN TRUNK	EALN
CABLE CONFIGURATION	TWISTED PAIR OR TSP	TWISTED PAIR (UNJACKETED) OR TSP	TWISTED SHIELDED PAIR	(4) TWISTED PAIR
GAUGE	#18 TO #22 AWG (STRANDED)	#18 TO #22 AWG (STRANDED)	24 AWG (STRANDED)	24AWG(STRANDED)
CAPACITANCE	n.a.	n.a.	12.5 pf/ft OR LESS	13 pf/ft OR LESS
TWISTS PER FOOT	6 MINIMUM	6 MINIMUM	6 MINIMUM	CATEGORY 5 Min
SHIELDS	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	NOT REQUIRED (IN CASE OF TSP, 100% FOIL W/ DRAIN WIRE)	100% FOIL W/ DRAIN WIRE	NOT REQUIRED
NEC CLASS	CM, CMP (75°C OR HIGHER)	NOT SPECIFIED	CM, CMP (75°C OR HIGHER)	MM, MMP
CEC CLASS	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED	FT4, FT6 (75°C OR HIGHER)	NOT SPECIFIED
UL VOLTAGE RATING	NOT SPECIFIED	300 VAC 2	NOT SPECIFIED	NOT SPECIFIED
UL TEMP. RATING	NOT SPECIFIED	75°C (167°F)	NOT SPECIFIED	NOT SPECIFIED
1. UL RECOGNIZED WIRE	(LABELED WITH A BACKWARDS '	RU') IS NOT FIELD INSTALLABLE.	USE ONLY UL-LISTED WIRE.	

2. 300 VAC WIRE CAN BE USED IN FIELD PANELS CONTAINING VOLTAGES BELOW 150 VAC

REVISION HISTORY

R0 2/16/2024 VB ISSUED FOR APPROVAL

TO DIFFERENT SERVICE GROUNDS OR ON BOTH SIDES OF THE ALN CABLE THAT EXITS BUILDING.

• THE MAX ALN DISTANCE APPLIES TO EACH SIDE OF THE TIE.

GENERAL NOTES:

● SIZE WIRE FOR LOAD, CURRENT, AND VOLTAGE.

APPLICATION BY AGENCIES SUCH AS UL, NEC, CSA.

ALWAYS REFER TO LOCAL CODES FOR CONDUIT SHARING.

WIRING MUST HAVE INSULATION RATED FOR HIGHEST VOLTAGE CIRCUIT IN CONDUIT.

● THE ALN TRUNK MUST BE AN UNINTERRUPTED RUN BETWEEN CABINETS. NO SPLICES ALLOWED.

CIRCUITS.

SIEMENS

SIEMENS INDUSTRY, INC.

SMART INFRASTRUCTURE

• FOR EXTENDED TEMPERATURE INSTALLATIONS USE ONLY COPPER WIRE LISTED FOR 90°C OR HIGHER

PXA-ENC-19 19 x 22 x 5 3\4 PXA-ENC-34 34 x 22 x 5 3\4 PXA-ENC-18 18 x 22 x 6 KNOCKOUT TYPES $A = 1" \& 1 - 1/4 \\ B = 3/4" \& 1"$ C= 1/2" & 3/4" T1 PXCM CONDUIT PENETRATIONS 00 SERVICE BOX MAX POWER SOURCE REQUIREMENTS 102-132 VAC 204-264 VAC VOLTAGE: LINE FREQUENCY: 50 / 60 Hz 115V OUTLETS: 200 VA (MAX.) PXA-SB115V384VA 2 440 VA (MAX. PXA-SB115V192VA 2 220 VA (MAX.) PXA-SB230V384VA 440 VA (MAX.) PXA-SB230V192VA 220 VA (MAX.) PXCM FAMILY VA RATINGS & SENSOR SUPPLY PRODUCT 24VDC (W) 24VAC INPUT VA 24VAC OUTPUT VA PXC100-X 24 TXB1.P1 125 150 14.4 TXS1.12F4 28.8 TXS1.EF4 96 TX-I/O MODULE TXM1.8D 24VDC LOAD (W) MAX. TXM1 16D TXM1.8U 1.5 TXM1.8U-ML 1.8 2.2 TXM1.8X TXM1.8X-ML 2.3 1.7 TXM1.6R TXM1.6R-M 1.9 NOTES 1. NO MORE THAN THREE (3) 384VA OR FIVE (5) 192VA FULLY LOADED PXA CABINETS ALLOWED ON A SINGLE 3-WIRE 115V. 15A CIRCUIT. RECEPTACLE IS PREWIRED AND MOUNTED IN FACTORY, FOR 115VAC SERVICE BOX ONLY 3. DC INPUT/OUTPUT ONLY AVALABLE ON BUSS CONNECTION MODULES. T2 PXCM POWER WIRING 00 A: PXCM ALN TRUNK CONNECTOR WIRE SECURING SCREWS IN TOP $\supset d$ $\supset \square$ $\supset \infty$ BOTH ENDS WHEN SYSTEN TERMINATE SHIELD AT - SHLD LEAVING END ONLY WHEN SYSTEN NEUTRAL IS EARTH GROUNDED. **(-)** - WIRE SECURING SCREWS IN TOP ALN TERMINATOR (EOL ONLY) DO BOTH ENDS WHEN USING 19.2K BAUD OR GREATER C: PXCM ALN TRUNK CONNECTOR $\int \infty$ SHLD NOTES: COMMUNICATION CONNECTORS PLUG INTO PXCM. 2. ALN MUST BE DAISY-CHAINED WHEN RUNNING 19.2K BAUD OR FASTERAND TRUNK TERMINATORS USED AT BOTH ENDS OF LINE T3C. 3. TERMINATE SHIELD A LEAVING END OF ALN TRUNK ONLY TJA USE ALN SHIELD TERMINATION T3A WHEN 24VAC E TERMINAL IS EARTH GROUNDED. 5. USE ALN SHIELD TERMINATION T3B WHEN 24VAC E TERMINAL IS OPFN T3 PXCM & P1 BIM COMMUNICATION TERMINATIONS 00 FOR PXC MODULAR, SERIES CONTROLLERS AND SUPPLY MODULES 412 MT KEMBLE AVE. NANUET. NY

ENCLOSURE H x W x D (IN)

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VB

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NJ. 07960 USA

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Siemens I Smart Infr Field- NAN	SIEMENS Siemens Industry, Inc. Field-Level Network Device Schedule NANUET BOND PHASE 3-MIDDLE SCHOOL System					Installat N: new i E: existir M: existi R: existir	tion Status installation ng, to remai ing, to be m ng, to be rer	<u>s Key</u> ain amodified emoved				Network Type BAC-IP: BACne BAC-M1: BACr BAC-M2: BACr BAC-M2: BACr KNX: KNX dev P1-1: P1 FLN o P1-3: P1 FLN o P1-3: P1 FLN o MB-RTU: Modl MB-RTC: Modl	t IP FLN device et MS/TP FLN de et MS/TP FLN de ce evice - FLN 1 evice - FLN 2 evice - FLN 3 us RTU device us TCP device	evice - FLN 1 evice- FLN 2					Insta - Dev - Pov - Net - Act - Sen - Flor	allation Check vice mounted? ver connected twork connect uator(s) wired sor(s) wired? w tubes connect	klist ? d? ted? d? ected?	<u>Pr</u> + Ø	essurization Mode : Positive pressure : Negative pressure : Neutral pressure	2 Key 1. IP A	DDRESS, INS	GENERAL NOTES	N NO TO BE	FIELD CO-ORDINA	TED. REV 0	DATE DWN 4/16/2024 VB	CHK ISSUED FOR AI	REVISION H	ISTORY D	SCRIPTION
System						1			Network				Device / Ec	quipment						Grou	uping Roon	n Airflow		Supply	VAV Termina	al		I	Extra	ct / Exhaust VAV Termin	nal	Room	Operator I	nit Comments
Item	Device Name	Floor	Room No	Room / Device Description	Equipment ID	Siemens Dwg. No.	Mech Dwg No	Served By (Airside)	Installation Status FLN Network No	Network Type IP Line / Loop Tag	MAC/ Device Address	Instance No. IP Address	Туре	Equipment Controlled	Coil Type	Radiation Type V	Rad 'alve / Field Po Relay Sourc Qty	wer Device Loa e (VA)	d XFMR Load (VA) Instal (In	ll Check (Group Master	Pre.comfort/ Occ Stby Economy / Unocc	Protection / Vacant Pressurization Mode	Transferred J Officer	g SAV Clg Max	SAV Htg SAV Htg SAV Vent SAV Ver Min Max Min Max	tu SAV Smoke Flow	SAV H/I	SAV W EAV V Mir	Area (Turni) (ent EAV Vent Wax Support (Turni) Max Support (Turni) Purg (Turni)	EAV H/D	Temperature	Humidity CO2 Itser Interface	Lighting Austhoritons
1	MS.1F.UV.MS.6	1st Floor	125A	Classroom	UV-MS-6	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
2	MS.1F.UV.MS.40	1st Floor	110	Fabrication Classroom	UV-MS-40	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
3	MS.1F.UV.MS.39	1st Floor	110	Fabrication Classroom	UV-MS-39	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	x	
4	MS.1F.UV.MS.41	1st Floor	108	Tech Classroom	UV-MS-41	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
5	MS.1F.UV.MS.38	1st Floor	107	Facility Lounge	UV-MS-38	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP	-		UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
6	MS.1F.EX.FTR	1st Floor	106A	Stor	EX FTR	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-I 1	CKT- 6	54 / 80													x	×	
7	MS.1F.UV.MS.5	1st Floor	106	Classroom	UV-MS-5	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP	-	-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
8	MS.1F.UV.MS.4	1st Floor	104	Classroom	UV-MS-4	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP			UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	x	
9	MS.1F.FT.MS.1	1st Floor	102A	Classroom	FT-MS-1	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-I	EKT- 6	54 / 80													x	×	
10	MS.1F.UV.MS.3	1st Floor	102A	Classroom	UV-MS-3	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP			UV-XFN	//R 11.5	11.5 <i>1</i> 9999		Master													Thermostat shared with FT-MS-1.
11	MS.1F.UV.MS.1	1st Floor	1008	Classroom	UV-MS-1	1008	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP	-	-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
12	MS.1F.UV.MS.2	1st Floor	100A	Classroom	UV-MS-2	100B	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP			UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
13	MS.1F.EX.FTR	1st Floor	116.38	Office	EX FTR	400A	BM-M113	3 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet T'stat				XFMR-1-I	^{EKT-} 6	54/80													×	×	
14	MS.1F.EX.FTR	1st Floor	116.36	Stor	EX FTR	400A	BM-M113	3 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-I	^{CKT-} 6	54/80								_					×	×	
15	MS.1F.EX.FTR	1st Floor	116.3	Office	EX FTR	400A	BM-M113	3 NA	N NOTE 1 E	AC-M1	NOTE 1		Tstat				1 XFMR-1-	6	54/80													×	×	
16	MS.1F.EX.FTR	1st Floor	C115	Health	EX FTR	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		Tstat				1	6	54/80													×	X	
17	MS.1F.UV.MS.12	1st Floor	120	Classroom	UV-MS-12	1008	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP			UV-XFN	/R 11.5	9999		Master											×	X	
19	MS.1F.FX.FTR	1st Floor	108	Cidssruom Multipurpose/Cafeteria	EX FTR	4004	BM-M111	1 NA		AC-M1	NOTE 1		BACnet	UV W/ DP			XFMR-1-	EKT- 6	9999 54 / 80		marcel											×		++
20	MS.1F.EX.FTR	1st Floor	C138	Office	EX FTR	400A	BM-M111	1 NA		AC-M1	NOTE 1		BACnet				1 XFMR-1-	EKT- 6	54/80													x		
21	MS.1F.EX.FTR	1st Floor	C128	Principal Office	EX FTR	400A	BM-M111	1 NA	N NOTE1 E	AC-M1	NOTE 1		BACnet				XFMR-1-	EKT- 6	54/80													x	x	++
22	MS.1F.EX.FTR	1st Floor	C129	Asst. Principal Office	EX FTR	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-	EKT- 6	24/80													x	×	
23	MS.1F.EX.FTR	1st Floor	C132	Administration	EX FTR	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-I	^{EKT-} 6	24/80													x	×	
24	MS.1F.EX.FTR	1st Floor	C133	Guidance	EX FTR	400A	BM-M111	1 NA	N NOTE 1 E	AC-M1	NOTE 1		BACnet Tstat				XFMR-1-	EKT- 6	24/80													x	×	
25	MS.1F.UV.MS.10	1st Floor	116	Classroom	UV-MS-10	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP			UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
26	MS.1F.UV.MS.9	1st Floor	116.5	Classroom	UV-MS-9	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5/ 9999		Master											x	×	
27	MS.1F.UV.MS.8	1st Floor	114.5	Classroom	UV-MS-8	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP		-	UV-XFN	/R 11.5	11.5 <i>1</i> 9999		Master											x	×	
28	MS.1F.UV.MS.7	1st Floor	114	Classroom	UV-MS-7	100B	BM-M112	2 NA	N NOTE 1 E	AC-M1	NOTE 1		DXR	UV W/ HP	-	-	UV-XFN	AR 11.5	11.5 <i>1</i> 9999		Master											x	×	

SIEMENS Simmer Industry. Inc.	Installation Status Key Network Type K N: new installation Existing BAC-IP: BACnet II Existing, to remain BAC-MI: BACnet	ey Installatio PFLN device - FLN 1 - Device m MSTIP FLN device - FLN 1 - Power co	n Checklist <u>Pressurization Mode Key</u> <u>GENERAL NOTES</u> punted? + : Positive pressure - : Neasitive rossure - : Neasitive rossure	REV DATE DWN CHK DESCRIPTION 0 4/16/2024 VB NSK ISSUED FOR APPROVAL
Field-Level Network Device Schedule	M: existing, to be modified BAC-M2: BA	MS/TP FLN device- FLN 2 NetWork 	omnects? y wird? wird? y wird? y w wird? y w w w wird? y w w w w w wird? y w w w w wird? y w w w w w wird? y w w w w w	
NANUET BOND PHASE 3-MIDDLE SCHOOL	P1-2:-T1 FLW dev P1-3:-T1 FLW dev MB-RTU:-Modbus MM-TV:-Modbus	Ke - Fu Z How Lub ice - Flu 3 RTU device - TCP device	s comected?	
System	Network	Device / Equipment	Grouping Room Airflow Supply VAV Terminal	Extract / Exhaust VAV Terminal Room Operator Unit
Item Device Name Floor Room No Room / Device Description Equipment ID	America Day Mo. Mech Day Mo. Mech Day Mo. More non Type More non Type More Net Tobal The Statement More More Net Tobal The Statement More More Day More The Statement More More Day More The Statement More More More More More More More More	Type Equipment Coll Type Radiution Type Radiution Type Relation Type Rel	k Group Matter U U U U U U U U U U U U U U U U U U U	Animoli (C-Ma) Duck size (m) Duck size (m) EAV Vent Max 100 g size (size (m) 100 g size (size (m)) Min Max 100 g size (size (siz
29 MS.1F.EX.FTR 1st Floor 123 Storage EX FTR	400A BM-M112 NA N NOTE 1 BAC-M1 NOTE 1	BACnet Tstat		
30 MS.1F.UV.MASTER.PNL 1st Floor 119 Receiving Custodial UV MASTER PNL	1008 BM-M112 NA N NOTE 1 BAC-IP LOOP 1 M NOTE 1 NOTE 1	DXR UVW/HP	Matter	
31 MS.2F.UV.MS.29 2nd Floor 224 Science Lab UV-MS-29	1008 8M-M115 NA N NOTE 1 8AC-M1 NOTE 1	DXR UV-WHP UV-XFMR 11.5 19999	Master	x x
32 MS.2F.UV.MS.28 2nd Floor 222 Classroom UV-MS-28	1008 BM-M115 NA N NOTE1 BAC-M1 NOTE1	DXR UVWHP UV-X7MR 11.5 1999	Master I <td></td>	
33 MS.2F.UV.MS.27 2nd Floor 220 Classroom UV-MS-27	1008 8M-M115 NA N NOTE 1 8AC-M1 NOTE 1	DXR UVWHP UV-XYMR 11.5 1999	Master	x x
34 MS.2F.UV.MS.26 2nd Floor 218 Classroom UV-MS-26	1008 BM-M115 NA N NOTE1 BAC-M1 NOTE1	DXR UVW/HP UV.XXMR 11.5 1999	Master Image: Comparison of the state of th	
35 MS.2F.UV.MS.25 2nd Floor 216 Classroom UV-MS-25	1008 BM-M114 NA N NOTE 1 BAC-M1 NOTE 1	DXR UV W/HP UV-XFMR 11.5 1157 9999	Master	
36 M5.2F.UV.M5.24 2nd Floor 214 Classroom UV-M5-24	1008 BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR UVW/HP UV-XFMR 11.5 9999	Master	
37 M5.2F.UV.M5.23 2nd Floor 212 Classroom UV-M5-23	1008 BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR LVW/HP	Master	
38 MS.2F.EX.FTR 2nd Floor 210A Storage EX.FTR	400A BM-M114 NA N NOTE1 BAC-M1 NOTE1	BACnet Tstat XPMB-LCK: 3 6 18 / 80		
39 MS.2F.UV.MS.22 2nd Floor 210 Classroom UV-MS-22	1008 BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR UVWHP UV-37MR 11.5 11.5/ 9999	Matter Image: Constraint of the constraint o	
40 MS.2F.UV.MS.21 2nd Floor 208 Classroom UV-MS-21	1008 BM-M114 NA N NOTE 1 BAC-M1 NOTE 1	DXR UVW/HP UV-XFMR 11.5 11.5/ 9999	Master I <td></td>	
41 MS.2F.UV.MS.19 2nd Floor 206 Classroom UV-MS-19	1008 BM-M114 NA N NOTE 1 BAC-M1 NOTE 1	DXR UV W HP · · · · · · · · · · · · · · · · · ·	Master Image: Constraint of the second	
42 MS.2F.UV.MS.16 2nd Floor 204 Classroom UV-MS-16	1008 BM-M114 NA N NOTE 1 BAC-M1 NOTE 1	DXR UV WHP	Master Image: Constraint of the second	
43 MS.2F.UV.MS.14 2nd Floor 202 Classroom UV-MS-14	1008 BM-M114 NA N NOTE 1 BAC-M1 NOTE 1	DXR UVWHP UV-374R 11.5 11.5 9999	Master Image: Constraint of the constraint o	
44 MS.2F.UV.MS.13 2nd Floor 200 Classroom UV-MS-13	1008 BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR UVW/HP UV-XFMR 11.5 9999	Master Image: Comparison of the comp	
45 MS.2F.UV.MS.37 2nd Floor 240 Classroom UV-MS-37	1008 BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR UV.W/HP UV-XFMR 11.5 9999	Master Image: Comparison of the comp	
46 MS_2F_UV.MS_36 2nd Floor 238 Classroom UV-MS-36	1008 BM-M114 NA N NOTE: BAC-M1 NOTE:	DXR UV Wi HP - - UV xrxir 11.5 9999 Log Log Log 11.5 9199 11.5	Master	
vr MS.2F.UV.MS.35 Znd Floor 236 Classroom UV-MS-35 40 MS.2F.IV.MS.15 2nd Floor 202 Floor 203	1000 DM-H114 NA IN NOTE1 BAC-M1 NOTE1	UAR UV WI MP - - UV SOUR 11.5 9999 DVR LIV/WI MP - - UV SOUR 11.5 1		
The most of mast of mas		UNING UNING <th< td=""><td></td><td></td></th<>		
S0 MS.2F.UV.MS.20 2nd Floor 207 Classification UV-MS-17 50 MS.2F.UV.MS.20 2nd Floor 207 Classification UV-MS-17	1008 BM-M114 NA N NOTE1 BACM1 NOTE1	DXR UVW/HP . INJURY 11.5 9999		
51 MS.2F.R.MS.1.2 2nd Floor 241 Library R-MS-1.2	401A BM-M114 NA N NOTE1 BAC-M1 NOTE1	DXR RADIATOR COILS . XPMR-1-CRT 6 187.401	Master Master<	
52 MS.2F.UV.MS.34 2nd Floor Classroom 234 UV-MS.34	1008 BM-M115 NA N NOTE1 BAC-M1 NOTE1	DXR UV WI HP - UV VI MIR 11.5 11.5.1	Master Master<	
53 MS.2F. UV.MS.33 2nd Floor Classroom 232 UV-MS.33	1008 BM-M115 N N NOTE 1 BAC-M1 NOTE 1	DXR UV W/ HP - - UV-XMR 11.5 11.5.7	Master Master<	
54 MS.2F.EX.FTR 2nd Floor 230A Storage EX.FTR	400A BM-M115 NA N NOTE1 BAC-M1 NOTE1	BACHER STMB-1-CUT. 6 18/80		
55 MS.2F.UV.MS.32 2nd Floor Science Lab 230 UV-MS.32	1008 BM-M115 NA N NOTE 1 BAC-M1 NOTE 1	DXR UV WI HP - - UV-X5MR 11.5 / 0000	Matter Matter<	
56 MS.2F,UV.MS.31 2nd Floor Science Lab 228 UV-MS-31	1008 BM-M11S NA N NOTE 1 BAC-M1 NOTE 1 NOTE 1	DXR UV WI HP - - UV-XGMR 11.5 11.5/ 9999	Master Master<	
57 MS.2F.UV.MS.30 2nd Floor Computer Classroom 226 UV-MS-30	1008 BM-M115 NA N NOTE 1 BAC-M1 NOTE 1	DXR UVWHP UV-XFMR 11.5 115/ 9999	Master Master<	
58 MS.RF.EF.MS.10 Roof SCIENCE LABS 228/230 EF-MS-10	101A BM-M103 NA N NOTE 1 BAC-M1 NOTE 1 NOTE 1	PPM XFMR-1-CRT- 4 13 52 / 80		

0150	SIEMENS Installation Status Key				Network Type	Network Type Key					Installation	Checklist		Pressurization Mode Key			GENERAL NOTES					-	R	EVISION HISTC	JRY		-						
SIEN	/IENS					N					DAG ID: DAG-	ID FLM desides					Device man				1. IP ADDRESS	, INSTANCE NUMBE	R, MAC ADDRESS, FLN	NO TO BE FIELD C	O-ORDINATED.	REV	DATE DW	N CHK			DESCR	PTION	
Siemens In	dustry, Inc.					E: existing, to remai	in				BAC-IP: BACIE BAC-M1: BACIE	t MS/TP FLN device - FLN 1					- Power conn	ected?		+ : Positive pressure						0 4	1/16/2024 VE	3 NSK ISS	UED FOR APPROVA	4L			
Smart Infra	istructure					M: existing, to be m	odified				BAC-M2: BACn	t MS/TP FLN device- FLN 2					- Network co	nnected?		 Negative pressure Neutral pressure 													
Field-I	evel Network Device	Schedule				R: existing, to be rer	moved				KNX: KNX devi	e					- Actuator(s)	wired?		D . Neutral pressure													
											P1-1: P1 FLN 0	vice - FLN 1 vice - FLN 2					- Sensor(s) w	ired?															
											P1-3: P1 FLN d	vice - FLN 3					now tubes	connected.															
NANU	JET BOND PHASE	3-MIDDLE	SCHOOL								MB-RTU: Modb	is RTU device																					
											MB-TCP: Modb	is TCP device																					
System								Network				Device / Equipment						Grouping	Room Airflow		Supply VAV Ter	minal				Extract / I	Exhaust VAV Te	rminal		Room Op	erator Unit	Comments	
																			Minimum Airflow	(CFM) Pressurization	Airflow (CFM)			Duct Siz	e (in)	Airflow (CF	FM)	Duct Size	≥ (in)				
							_		1		22					1	1		×										1 17				
ltem	Device Name	Floor	Room No	Room / Device Description	Equipment ID	Siemens Dwg. No. Mech Dwg No	Served By (Airside)	Installation Status FLN Network No	Network Type	IP Line / Loop Tag	Instance No. IP Address	Type Equipment Controlled	Coil Type	Radiation Type	Rad Valve / Field Powe Relay Source Qty	er Device Load (VA) XFM (VA	R Install Check (Initial)	Group Master	Comfort / Occ Pre.comfort / Occ Stt	Economy / Unocc Protection / Vacant Pressurization Mode Transferred / Offset	SAV Clg SAV Min Mi	Clg SAV Htg SAV ax Min Ma	Htg SAV Vent SAV Ven x Min Max	5AV Smoke Flow SAV Shape	SAV HID SAV	W EAV Vent Min	EAV Vent Max (5) ayours	Purge (Fume Hood) EAV Shape	EAV H/D EAV W	Temperature Humidity	CO2 User Interface Lighting Pushbutton		
59	MS.RF.EF.MS.21	Roof	BOYS LOCKER ROOM	116.41	EF-MS-21	101A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK 4	r- 13 52/8	80																
60	MS.RF.EF.MS.23	Roof	CAFETERIA	108	EF-MS-23	102A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK	r- 13 52/8	80																
61	MS.RF.EF.MS.8	Roof	SCIENCE LABS	222/224	EF-MS-8	101A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK	r- 13 52/8	80																
62	MS.RF.EX.EF.11	Roof	STORAGE	230A	EX-EF-11	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK 5	^{r-} 13 78/8	80																
63	MS.RF.EX.EF.15	Roof	CORRIDOR	-	EX-EF-15	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK	^{[-} 13 78/8	80																
64	MS.RF.EX.EF.16	Roof	CORRIDOR	-	EX-EF-16	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK 5	^{r-} 13 78/8	80																
65	MS.RF.EX.EF.5	Roof	WASHROOM	-	EX-EF-5	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	PPM			XFMR-1-CK	^{[-} 13 78/8	80																
66	MS.RF.EX.EF.6	Roof	WASHROOM	-	EX-EF-6	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK 5	^{r-} 13 78/8	80																
67	MS.RF.EX.EF.7	Roof	CORRIDOR	-	EX-EF-7	103A BM-M103	NA	N NOTE 1	BAC-M1	N	OTE 1	РРМ			XFMR-1-CK 5	^{[-} 13 78/8	80																

SIEMENS INDUSTRY, INC. Valve Submittal - Water																		
SMA	RT	INFRASTRUCTURE																
LOCAT JOB N ENGR:	101 D:	L: NANUET, NY 440P-366733 VB					PROJ	ECT NAM	DATE: PAGE: REV:		2/16 1 0	6/24						
GENERAL NOTES: 1. All valves 2-1/2" and larger have flanged ends, 2" and smaller have screwed ends. UNITS: 1. All valves 2-1/2" and larger have flanged ends, 2" and smaller have screwed ends. Steam inlet pressure, actual pressure dr indicated in PSIG. 2. All control valves and wells shall be installed by the mechanical contractor. Standard abbreviations used on control valves are: Steam inlet pressure, actual pressure dr indicated in PSIG. BODY TYPES: 3W - Three way; 2W - Two way; A - Angle; N.C Normally Closed; N.O Normally Open; NOC - Ball Valve can be N.O. or N.C.; BF - Butterfly Valve; DS - Double Seated; ACTUATOR TYPES: SR - Spring Return CR - Capacitor Driven Return; Valve Qty Product Number Valve Body Actual Actuator Design Required Min Max Preset Steam Pre													sure drop, Return; I eturn; DA	, and shu NSR - No - Double	t off pr Spring Acting	essure Returr	1	
Valve ID/ Location	Qty	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mec	han	ical System: 100_BM_UNIT V	ENTILAT	OR & HI	•			BM_U		TILATO	OR & HP							
V-1	40	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.00	N/A	N/A	N/A		1.56	155 306	120	250	UV-MS-1 TO 40 VI V
Mec	han	ical System: 104_BM_AHU						BM_/	AHU's									
V-2	1	274-03146	0.50	3W	Globe	2.50	SR	5.00	4.90	N/A	N/A	N/A		3.84	155 304	250	250	EX AHU S-9
V-3	1	274-03148	0.75	3W	Globe	6.30	SR	5.00	9.60	N/A	N/A	N/A		2.32	155 304	250	250	EX AHU S-8
V-4	1	274-03150	1.25	3W	Globe	16.00	SR	5.00	28.50	N/A	N/A	N/A		3.17	155 304	117	250	EX AHU S-6
V-5	1	274-03146	0.50	3W	Globe	2.50	SR	5.00	4.00	N/A	N/A	N/A		2.56	155 304	250	250	EX AHU S-4
V-6	1	274-03147	0.50	3W	Globe	4.00	SR	5.00	6.20	N/A	N/A	N/A		2.40	155 304	250	250	EX AHU S-3
V-7	1	274-03151	1.50	3W	Globe	25.00	SR	5.00	39.00	N/A	N/A	N/A		2.43	155 304	73	250	EX AHU S-1
V-8	1	274-03151	1.50	3W	Globe	25.00	SR	5.00	39.00	N/A	N/A	N/A		2.43	155 304	73	250	EX AHU S-2
V-9	1	274-03146	0.50	3W	Globe	2.50	SR	5.00	4.90	N/A	N/A	N/A		3.84	155 304	250	250	EX AHU S-9
Mec	han	ical System: 300_BM_HWS V	ALVES					BM_I	HWS VAL	VES								
V-10	1	B304FB-HA266.600	4.00	3W	BF	841.00	NSR	0.00	0.00	0	1176	N/A		0.00 A	6V1185896	53 175	250	MB HTG LOOP MXG
V-11	1	274-06626	3.00	2W	Globe	100.00	NC-SR	5.00	160.00	N/A	N/A	N/A		2.56	154067	200	250	HW STORG TNK

NOTES: All control valves and wells shall be installed by the heating contractor.

SIE	4E	ENS INDUSTRY, INC.				١	/alve S	ubmit	tal - V	Vater								
SMA	R1	T INFRASTRUCTURE																
LOCAT JOB N ENGR	ГІС 0: :	ON: NANUET, NY : 440P-366733 VB					PROJI	ECT NAM	ie: Nam	IUET BO	nd phas	E3 HIGH	SCHC	DATE: PAGE: REV:		2/16 2 0	/24	
GENEI 1. All v 2. All c 3. Star BODY NO	ralv cont ndai TY C -	AL NOTES: ves 2-1/2" and larger have flanged e ntrol valves and wells shall be installe ard abbreviations used on control val YPES: 3W - Three way; 2W - Two w - Ball Valve can be N.O. or N.C.; BF	nds, 2" and d by the m ves are: vay; A - Ang · Butterfly \	l smaller echanica gle; N.C. /alve; D	have so al contra - Norm S - Doul	crewed e actor. ally Clos	ends. sed; N.O ed;	Normally	, Open;	UNITS Steam indicat	S: inlet pres ed in PSI ATOR TY CR - C	ssure, act G. ' PES: SR apacitor [ual pres - Spring Driven R	ssure drop, g Return; I eturn; DA	, and shu NSR - No - Double	t off pro Spring Acting	essure Returr	1
Valve ID/ Locatior	Q1 1	Qty Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mec	ha	anical System: 300_BM_HWS V	ALVES					BM_	HWS VAL	VES								
V-12	1	1 274-03113	1.00	2W	Globe	10.00	NO-SR	5.00	20.00	N/A	N/A	N/A		4.00	155 304	201	250	HW BSTR H.E>
Mec	ha	anical System: 400_BM_FIN TU	BE RADIA	TORS				BM_	NEW FIN	TUBE R	ADIATO	R (MECH	H)					
V-13	1	1 262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.30	N/A	N/A	N/A		2.07	155 306	120	250	FT-MS-1
Mec	ha	anical System: 401_BM_RADIA		s				BM_	RADIATO	R COIL	S (MECH)						
V-14	1	1 262-02055	0.50	2W	Globe	2.50	NO-SR	3.00	3.50	N/A	N/A	N/A		1.96	155 306	65	250	R-MS-1&2
Mec	ha	anical System: 402_BM_FIN TU	BE RAIDA	TORS				BM_I	FIN TUBE	RAIDA	TORS (M	1ECH)						
V-15	1	1 262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.40	N/A	N/A	N/A		1.00	155 306	120	250	RM-STOR 116.36
V-16	1	1 262-02051	0.50	2W	Globe	1.00	NO-SR	3.00	1.50	N/A	N/A	N/A		2.25	155 306	120	250	RM-106A
V-17	1	1 262-02051	0.50	2W	Globe	1.00	NO-SR	3.00	1.50	N/A	N/A	N/A		2.25	155 306	120	250	RM-123
V-18	1	1 262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.50	N/A	N/A	N/A		1.56	155 306	120	250	RM-1ST OFC
V-19	1	1 262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.50	N/A	N/A	N/A		1.56	155 306	120	250	RM-1ST OFC
V-20	1	1 262-02051	0.50	2W	Globe	1.00	NO-SR	3.00	1.50	N/A	N/A	N/A		2.25	155 306	120	250	RM-230A
V-21	1	1 262-02061	0.75	2W	Globe	6.30	NO-SR	3.00	8.70	N/A	N/A	N/A		1.91	155 306	55	250	RM-C108
NOTES		All control valves and wells shall be	installed h	w the br	ating of	ontractor												
	•			, and no	ating c		-											

SIEMENS INDUSTRY, INC. Valve Submittal - Water																		
SMART INFRASTRUCTURE																		
LOCATION:NANUET, NYJOB NO:440P-366733ENGR:VB				PROJECT NAME: NANUET BOND PHASE3 HIGH SCHC						DATE: PAGE: REV:		2/16/24 3 0						
GENERAL NOTES: I. All valves 2-1/2" and larger have flanged ends, 2" and smaller have screwed ends. UNITS: Standard abbreviations used on control valves are: Standard abbreviations used on control valves are: Standard abbreviations used on control valves are: BODY TYPES: 3W - Three way; 2W - Two way; A - Angle; N.C Normally Closed; N.O Normally Open; NOC - Ball Valve can be N.O. or N.C.; BF - Butterfly Valve; DS - Double Seated; ACTUATOR TYPES: SR - Spring Return; NSR - No Spring Return CR - Capacitor Driven Return; DA - Double Acting					1													
Valve ID/ Location	Qty	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mec	han	ical System: 402_BM_FIN TU	JBE RAIDA	TORS				BM_F	FIN TUBE	RAIDA	FORS (M	1ECH)						
V-22	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.00	N/A	N/A	N/A		1.56	155 306	120	250	RM-C115
V-23	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.40	N/A	N/A	N/A		2.25	155 306	120	250	RM-C128
V-24	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.40	N/A	N/A	N/A		2.25	155 306	120	250	RM-C129
V-25	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.40	N/A	N/A	N/A		2.25	155 306	120	250	RM-C132
V-26	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.40	N/A	N/A	N/A		2.25	155 306	120	250	RM-C137
V-27	1	262-02053	0.50	2W	Globe	1.60	NO-SR	3.00	2.40	N/A	N/A	N/A		2.25	155 306	120	250	RM-C138
V-28	1	262-02051	0.50	2W (Globe	1.00	NO-SR	3.00	1.50	N/A	N/A	N/A		2.25	155 306	120	250	RM-2ND FL STAIRS

NOTES: All control valves and wells shall be installed by the heating contractor.





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Control Device	l	Qty	Product Number	Manufacturer	Document Number	Description
Field M	lounted Devices					
CS	1	40	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
ENC	1	40	550-002	SIEMENS	N/A	ENCLOSURE ASSY, TEC
RE	1	40	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
TTE	1	39	S55624-H105-A	SIEMENS	N/A	QMX3.P34 Temp. Sensor and Room Unit
۷						SEE VALVE SUBMITTAL
Panel N	Mounted Devices		•	•		
DXR	1	40	DXR2.M18-101B	SIEMENS	A6V10502840	DXR2.M18 Room Automation Station

PROPOSED SEQUENCE OF OPERATION

UNIT VENTILATORS & HEAT PUMP

- RUN CONDITIONS SCHEDULED: 1.
 - 1) THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
 - a) OCCUPIED MODE: THE UNIT SHALL MAINTAIN
 - A 76'F (ADJ.) COOLING SETPOINT 1)
 - A 70°F (ADJ.) HEATING SETPOINT. 2)
 - b) UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN
 - 1) A 85°F (ADJ.) COOLING SETPOINT.
 - A 64'F (ADJ.) HEATING SETPOINT. 2)
 - 2) UNIT VENTILATOR SENSORS SHALL INCLUDE LOCAL TEMPERATURE BUT SHALL NOT ALLOW USER TEMPERATURE SENSOR OVERRIDE CAPABILITY FROM THE SENSOR, THAT SHALL OCCUR AT THE DDC FRONT END.
 - 3) ALARMS SHALL BE PROVIDED AS FOLLOWS:
 - a. HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
 - b. LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
 - c. ZONE UNOCCUPIED OVERRIDE:
 - A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE a) THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
 - d. FREEZE PROTECTION:
 - THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A LOW TEMPERATURE a) THERMOSTAT STATUS WHILE THE OUTSIDE/RETURN AIR DAMPER SHALL CLOSE THE OUTSIDE AIR DAMPER AND OPEN THE FACE AND BYPASS DAMPER FULLY OPEN TO THE BYPASS POSITION.
 - e. FAN:
 - THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS a) SHUTDOWN ON SAFETIES.
 - f. FACE AND BYPASS DAMPERS CONTROL:

REVISION HISTORY

R1 4/16/2024 VB REVISED AS PER COMMENTS DATED 3/15/24

R0 2/16/2024 VB ISSUED FOR APPROVAL

SIEMENS		NANUE				
	MORRISTOWN	NANUE	T, NY			
	NJ. 07960 USA		DRAFTER (C		
SIEMENS INDUSTRY, INC.	Phone: (9/3) 575-6300 Fax: (973) 575-7968	BM U		1		

3.

- a) BYPASS DAMPERS THROUGH ONE OF THE FOLLOWING:
- 1) HEATING:
- a) MODULATING THE AIR PASSING OVER THE HEATING COIL.
- b) DAMPERS SHALL CLOSE TO FACE POSITION (OPEN TO BYPASS POSITION). c)
 - HEATING COIL VALVE: POSITION.
- THE HEATING SHALL BE ENABLED WHENEVER: d)
 - 1) OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.).
 - 2) AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
 - 3) AND THE FAN IS ON.
- g. ECONOMIZER:
 - a) HN_QCCUPIED_AND_NON=ECONOMIZER_MODE
 - THE LOCKOUT TEMPERATURE FOR ECONOMIZER UNIT IS 55'F.) THE ECONOMIZER SHALL BE ENABLED WHENEVER:

 - 2) AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 64'F (ADJ.)
 - 3) THE OUTSIDE AIR DAMPER SHALL BE 100% OPEN AND THE RETURN DAMPER CLOSED WHEN IN ECONOMIZER MODE.
 - d)

 - f)
- THE OUTSIDE DAMPER AND OPEN THE RETURN DAMPER. MECHANICAL COOLING VIA VARIABLE REFRIGERANT VOLUME (VRV) HEAT PUMP SYSTEM:
- a) START AND STOP OPERATION OF THE HEAT PUMP UNITS.
- ENABLED TO OPERATE.
- SETPOINT, THE FOLLOWING SHALL OCCUR:
- KIT TO ENABLE THE UNIT VENTILATOR SUPPLY FAN.
- COOLING AS REQUIRED TO MEET THE SPACE SETPOINT.
- MINIMUM OUTSIDE AIR VENTILATION FIXED PERCENTAGE:
- a) DURING UNOCCUPIED HOURS.
- DISCHARGE AIR TEMPERATURE: 4.
 - a) THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE.
 - ALARMS SHALL BE PROVIDED AS FOLLOWS: b)

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THE UNIT SHALL MAINTAIN ZONE HEATING AND COOLING SETPOINTS BY MODULATING THE FACE AND

WHEN THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT, THE FACE AND BYPASS DAMPERS SHALL MODULATE OPEN TO FACE POSITION (CLOSED TO BYPASS POSITION) TO MAINTAIN SETPOINT BY

WHEN THE ZONE TEMPERATURE IS GREATER THAN THE HEATING SETPOINT, THE FACE AND BYPASS

1) THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT WITH THE FACE AND BYPASS DAMPER FULLY OPEN TO THE FACE (COIL)

4) THE HEATING COIL VALVE SHALL OPEN WHENEVER THE LOW TEMPERATURE THERMOSTAT IS ON.

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE MIXED AIR DAMPERS IN SEQUENCE TO MAINTAIN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OPEN BASED ON THE VENTILATION RATES DURING HEATING AND VENTILATION WHENEVER

1) OUTSIDE AIR TEMPERATURE IS AT LEAST 2°F (ADJ.) LESS THAN THE ZONE TEMPERATURE.

THE ECONOMIZER SHALL CLOSE WHENEVER THE LOW TEMPERATURE THERMOSTAT IS ON.

THE OUTSIDE AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE. SHOULD DISCHARGE TEMPERATURE DROP BELOW A USER DEFINABLE TEMPERATURE (ADJ.), THE CONTROLLER SHALL ENABLE THE HEATING, CLOSE

THE DDC SHALL INTEGRATE INTO THE BACNET CONTROLLER ON THE VRV HEAT PUMP SYSTEM TO PROVIDE

WHEN ECONOMIZER OPERATION IS AVAILABLE THROUGH THE DDC SYSTEM, THE HEAT PUMP SHALL BE LOCKED OFF FROM MECHANICAL COOLING OPERATION. WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 64 DEGREES F(ADJUSTABLE) AND ANY UNIT VENTILATOR IS CALLING FOR COOLING, THE HEAT PUMPS SHALL BE

WHEN AN INDIVIDUAL UNIT VENTILATOR IS CALLING FOR COOLING TO MEET THE SPACE TEMPERATURE

1) THE DDC SYSTEM SHALL SEND A DRY CONTACT TO THE UNIT VENTILATOR VRV CONTROL KIT TO ENABLE COOLING VIA THE VRV EXPANSION VALVE KIT AND A SEPARATE DRY CONTACT SENT TO THE VRV CONTROL

2) THE DDC SYSTEM SHALL SEND A 0-10 VDC INPUT TO THE VRV EXPANSION VALVE KIT TO PROVIDE

THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION (ADJ.) AS DETERMINED BY THE BALANCING OPERATIONS DURING BUILDING OCCUPIED HOURS WHEN IN NON-ECONOMIZER MODE AND BE CLOSED

OND	PHASE3	MID SCHOO	L
IY			
FTER 'B	CHECKED BY	INITIAL RELEASE 02/16/24	LAST EDIT DATE 04/16/24

440P-366733 Δ

VENTILATOR & HP (BOM/SOO)
C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\100_BM_UNIT VENTILATOR & HP-K01.DWG





C:\USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDLE SCHOOL\100_BM_UNIT VENTILATOR & HP.DWG





						\sim	
Control Device	Qty Product Number	Manufacturer	Document [Number	Description	B. TRENDING POINTS a. FAN START/STOP b. EXHAUST AIR DAMF	PER	
Field Mounted Devices					C. FAN SPEED		
AE 1-3	3 GMA126.1P	SIEMENS	154004	ACT, 2P ,SR,PLENUM	a. FAN STATUS		
CS 1-3	3 H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED			
RE 1–3	3 RIBU1C	FUNCTIONAL DEVICES	1208cut013 F	RIB 120VAC 24VAC/DC SPDT			
SCIENCE CLASSROO A. WHEN THE AND EF-M B. EF-MS-8: UVS ARE NON-ECOI AND BALA VALUE RE TO THE R FAN SHAL C. EF-MS-10 UVS ARE NON-ECOI AND BALA VALUE RE TO THE R FAN SHAL C. EF-MS-10 UVS ARE NON-ECOI AND BALA VALUE RE TO THE R FAN SHAL D. TRENDING a. F b. E E. ALARM P(a. F BOYS LOCKER ROO A. WHEN THE STATUS IN	ERATION OM EXHAUST FANS EF-MS- C DDC SYSTEM DETERMINES AS-10 SHALL OPERATE, AND FAN SPEED SHALL BE BAS IN ECONOMIZER MODE, FAN NOMIZER, OCCUPIED VENTILA NCING AGENCY SHALL NOTI QUIRED TO EXHAUST EACH L BE OFF. DDC WILL MONTO D: FAN SPEED SHALL BE BA IN ECONOMIZER MODE, FAN NOMIZER, OCCUPIED VENTILA NCING AGENCY SHALL NOTI QUIRED TO EXHAUST EACH L BE OFF. DDC WILL MONTO POINTS AN START/STOP XHAUST AIR DAMPER DINTS AN STATUS DM EXHAUST FAN EF-MS-2 C DDC SYSTEM DETERMINES ERATE, AND THE ASSOCIATE N BAS	8/EF-MS-10: THE BUILDING TO BE IN OF D THE ASSOCIATED MOTORI SED ON VENTILATION COND SPEED SHALL BE SET TO TION MODE, FAN SPEED SI FY THE DDC SYSTEM PROG AIR RATE LISTED AND THE CONDITION. WHEN THE UV OR THE DAMPER ACTUATOR ASED ON VENTILATION CONI SPEED SHALL BE SET TO TION MODE, FAN SPEED SI FY THE DDC SYSTEM PROG AIR RATE LISTED AND THE CONDITION. WHEN THE UV OR THE DAMPER ACTUATOR I: THE BUILDING TO BE IN OF ED MOTORIZED DAMPER OP	CCUPED MODE, IZED DAMPER C ITIONS OF UV- EXHAUST 1,980 HALL BE SET T RAMMER OF TH OUTSIDE AIR STATUS IN B DITIONS OF UV- EXHAUST 2,050 HALL BE SET T RAMMER OF TH DDC PROGRAM OUTSIDE AIR STATUS IN B STATUS IN B	ROOFTOP EXHAUST FANS EF-MS-8 PENED. MS-28 AND UV-MS-29. WHEN BOTH O EXHAUST 1,075 CFM. THE TESTING IS EXHAUST 1,075 CFM. THE TESTING IS FAN SPEED AND 0-10 VDC INPUT MING SHALL ADJUST THE FAN SPEED DAMPERS ARE CLOSED THE EXHAUST S-1 - MS-31 AND UV-MS-32. WHEN BOTH O EXHAUST 1,065 CFM. THE TESTING IS FAN SPEED AND 0-10 VDC INPUT MING SHALL ADJUST THE FAN SPEED DAMPERS ARE CLOSED THE EXHAUST AS-1 S-1		NANJET BOND PHASE3 MID SCHOOL	
				SIEMENS		NANUET BOND PHASES MID SCHOOL	
REVISION H	HISTORY			JILIVILIAJ			440P-366733
REVISION R1 4/16/2024 V	HISTORY /b revised as per co	MMENTS DATED 3/15/24			412 MT KEMBLE AVE. MORRISTOWN		44OP-366733 0

EXHAUST FAN (EF-MS-8) LOCATION: ROOF SERVICE: SCIENCE LABS 222/224 RELIEF AIR

EXHAUST FAN (EF-MS-10) LOCATION: ROOF SERVICE: SCIENCE LABS 228/230, PREP 228A RELIEF AIR

EXHAUST FAN (EF-MS-21) LOCATION: ROOF SERVICE: BOYS LOCKER ROOM







SIEMENS		NANUET BOND
	412 MI KEMBLE AVE. MORRISTOWN	NANUET, NY
	NJ. 07960 USA Phone: (973) 575-6300	ENGINEER DRAFTER (VB VB
SMART INFRASTRUCTURE	Fax: (973) 575-7968	BM_EF-MS-8,
-	SIEMENS SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	SIEMENS SIEMENS MORRISTOWN NJ. 07960 USA SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE SIEMENS 575-6300 Fax: (973) 575-7968

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440P-366733\DT\MDT_BARR MIDDLE SCHOOL\101_EXHAUST FAN(EF-MS-8,10,21).DWG



Control Device	Qty	Product Number	Manufacturer	Document Number	Description		
Field Mounted Devic	es		I			-	
NE 1	1	GMA126.1P	SIEMENS	154004	ACT, 2P ,SR,PLENUM		
s 1		Н608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED	7	
RE 1	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT	_	
A. THE STA SUPPLY SHALL A DAMPER B. TRENDIN a. b. c. C. ALARM I a.	F AIR F, TUS OF FAN ST, ONITOR END SV G POINT FAN ST, EXHAUS FAN SPI POINTS FAN ST,	AN EF-MS-23: EXISTING AIR HANDLING ATUS IS ON, EF-MS-23 T THE EE-MS-23 FAN SPE VITCH STATUS IN BAS. S ART/STOP T AIR DAMPER EED ATUS	UNIT SUPPLY FAN SYST SHALL OPERATE WITH T EED THROUGH THE VARI	TEM S-1 SHA HE MOTORIZI IABLE FREQU	ALL BE MONITORED AND WHENEVER THE ED DAMPER OPEN. THE DDC SYSTEM ENCY DRIVE. DDC WILL MONTOR THE		
REVISION	HIST	ORY			SIEMENS	412 MT KEMBLE AVE.	
REVISION 4/16/2024 2/16/2024	HIST VB VB	ORY REVISED AS PER COMME ISSUED FOR APPROVAL	ENTS DATED 3/15/24			412 MT KEMBLE AVE. Morristown, nj. 07960 USA	



EXHAUST FAN (EF-MS-23) LOCATION: ROOF SERVICE: CAFETERIA 108 RELIEF AIR



I	REVISION HISTORY			SIEMENS		NANUET BOND P
R1 R0	4/16/2024	VB VB	REVISED AS PER COMMENTS DATED 3/15/24		412 MI REMBLE AVE. MORRISTOWN NJ 07960 LISA	NANUET, NY
	271072021			SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-6300 Fax: (973) 575-7968	BM_EXHAUST

C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\102_EXHAUST FAN (EF-MS-23).DWG

<u>GENEI</u>	RAL	NOTES:					
1.	SEE	WIRING	DETAIL	ON	ELECTRICAL	DRAWING	102B.





PHASE3		
MID SCHO		
DOL SE LAST EDIT LAST EDIT 23) (ELE(23) (ELE		
<u>рате</u> 124 С) С)		DRAWING NOTES: (1) RELAY WILL BE INSTALLED IN THE FIELD NEAR VFD. <u>GENERAL NOTES:</u>
40P-366 102		1. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.
T 33		

Contro Device		Qty	Product Number	Manufacturer	Document Number	Description		
Field M	ounted Devices							
E	1-6	6	GMA126.1P	SIEMENS	154004	ACT, 2P ,SR,PLENUM		
S	1-6	6	Н608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED		
E	1-6	6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT	-	
	NG EXHAUST EF-11, 15, DAMPER SI DAMPER EI DAMPER EI DAMPER EI TRENDING a. FA b. EX ALARM POI a. FA	FANS: 16: F HALL 0 VD SW POINTS HAUS NTS NTS NTS	TANS SHALL OPERATE WHI OPEN WHEN FAN IS CALLE (TCH STATUS ON BAS) 1 IS SHALL OPERATE WHEN OPEN WHEN FAN IS CALLE (TCH STATUS ON BAS) 1 S ART/STOP T AIR DAMPER ATUS 1	EN BUILDING IS IN OCC ED TO RUN AND BE CI BUILDING IS IN OCCUP ED TO RUN AND BE CI	CUPIED MODE LOSED WHEN PIED MODE A LOSED WHEN	AND BE OFF IN UNOCCUPIED MODE. FAN IS OFF DDC SHALL MONITOR		





IERAL NOTES:



PHASE3 MID SCHOOL CHECKED BY INITIAL RELEASE NSK 02/16/24 LAST EDIT DATE 02/16/24 04/16/24 5,6,7,11,15,16 (ELEC) DL_440P-366733\DT\MDT_BARR MIDLE SCHOOL\1		
440P-366733 103B		DRAWING_NOTES: 1 REFER RISER DRAWING ODIA FOR POWER TRUNK INFORMATION. (2) RELAY WILL BE INSTALLED IN THE FIELD NEAR STARTER PANEL. (3) EXISTING MOTOR DETAILS ARE NOT AVAILABLE. (3) EXISTING MOTOR DETAILS ARE NOT AVAILABLE. (3) EXISTING TO DETAILS ARE NOT AVAILABLE. (3) EXISTING TO DETAILS ARE NOT AVAILABLE. (3) EXISTING TO DETERMINED. GENERAL NOTES: 1. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.



-5,6,7,11,15,16 (ELEC)	CHECKED BY INITIAL RELEASE LAST EDIT DATE		LOCATION: ROOF	
EX EF (EF-5,6,7,11,15,16)B.DWG	440P-366733			DRAWING NOTES: 1 RELAY WILL BE INSTALLED IN THE FIELD NEAR STARTER PANEL. 2 EXISTING MOTOR DETAILS ARE NOT AVAILABLE. 3 EXISTING MOTOR DETAILS ARE NOT AVAILABLE. 4 EXISTING MOTOR DETAILS ARE NOT AVAILABLE. 5 TO BE FIELD DETERMINED. 5 ENERAL NOTES: 1. ALL WRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

Control Device	Qty	Product Number	Manufacturer	Document Number	Description		
Field Mounted Device	;	1	I	I			
TTE 1	15	RDB160BNU	SIEMENS	N/A	Room Thermostat with BACnet MS/TP Comm		
٧					SEE VALVE SUBMITTAL		
FIN TUBE RADIATI A. MODULATI MODE OF 70 DEGREES F (A B. FOR SPAC SHALL BE THI EXISTING LIBR C. TRENDING a. HEATING b. SPACE TE D. ALARM PC a. SPACE TE	DN: E NORM DEGREE DJUST EES SE FIRST ARY 24 POINT CONTRO MPERA DINTS MPERA DINTS	MALLY OPEN 2-WAY M ES F (ADJUSTABLE) AS ABLE). RVED BY HEATING COII I STAGE OF HEATING A 41 RTU-1 AND EXISTIN S OL VALVE TURE	ODULATING CONTROL V S WELL AS UNOCCUPIEI LS WITHIN AIR HANDLIN AND THE AIR SYSTEM G CAFETERIA 108 AIR	ALVE TO MAINT D REDUCED TEN IG UNITS OR RO THE SECOND ST HANDLING UNIT	TAIN ROOM AT SETPOINT IN OCCUPIED MPERATURE SETPOINT CONDITIONS OF 62 OOFTOP UNITS, THE FLOOR RADIATION TAGE OF HEATING, INCLUDING THE T SYSTEM S-1.		
REVISION	IIST	ORY			SIEMENS		NANUE
REVISION	HIST	ORY REVISED AS PER COM	IMENTS DATED 3/15/	24	SIEMENS	412 MT KEMBLE AVE. MORRISTOWN	NANUE NANUE





VA RATING							
S.NO	EQUIPMENT	VA DRAWN					
1	TTE-1	2.5					
2	V-1	3.5					
-	TOTAL	6					

					-		
Control Device	Qty Product Number	Manufacturer	Document Number	Description	-		
Field Mounted Devices							
TTE 1	1 RDB160BNU	SIEMENS	N/A	Room Thermostat with BACnet MS/TP Comm		-	
V				SEE VALVE SUBMITTAL	-	-	
					-		
SEQUENCE OF OPEF	ATION						
RADIATOR COILS/FL	DOR RADIATION:						
A. MODULATE MODE OF 70 DE	NORMALLY OPEN 2-WAY M GREES F (ADJUSTABLE) A	MODULATING CONTROL VAL	VE TO MAINT	AIN ROOM AT SETPOINT IN OCCUPIED PERATURE SETPOINT CONDITIONS OF 62			
DEGREES F (AD.	JUSTABLE).						
B. FOR SPACES SHALL BE THE I	S SERVED BY HEATING COI FIRST STAGE OF HEATING	NLS WITHIN AIR HANDLING AND THE AIR SYSTEM THE	UNITS OR RC E SECOND ST	OFTOP UNITS, THE FLOOR RADIATION AGE OF HEATING, INCLUDING THE			
C. TRENDING P	POINTS	NG CAFETERIA 100 AIR HA	ANDLING UNIT	5151EM 5-1.			
a. HEATING CO b. SPACE TEMF	PRATURE						
D. ALARM POIN a. SPACE TEMI	NTS { PERATURE }						
BEVISION H	ISTORY			SIEMENS			NANUET BOND PHASE3 MID SCHOOL
R1 4/16/2024 VB	REVISED AS PER CON	MMENTS DATED 3/15/24				412 MT KEMBLE AVE. MORRISTOWN	412 MT KEMBLE AVE. NANUET, NY MORRISTOWN
20 2/16/2024 VB	2024 VB ISSUED FOR APPROVAL SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE		NJ. 07960 USA Phone: (973) 575-6300 Fay: (973) 575-768	NJ. 07960 USA Phone: (973) 575-6300 Fay: (973) 575-7968 DAA DADIATOD COULS (DOM(24) 04/16/24			
COPYRIGHT 1994-24 SIEMENS F	NDUSTRY, INC. All Rights Reserved				2	Fax: (973) 575-7968 4PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANU	Fax: (973) 575-7968 BM_RADIATOR COILS (BOM/SOO) 4PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL 440P-366733\DT\MDT BARR MIDLE SCHOOL 440P-3





VA RATING							
S.NO	EQUIPMENT	VA DRAWN					
1	TTE-1	2.5					
2	V-1	3.5					
-	TOTAL	6					

Control Device		Qty	Product Number	Manufacturer	Document Number	Description			
Field Mo	unted Devices								
AE	1	1	GMA121.1P	SIEMENS	154004	2PT SR 24V,62LBIN,PLM			
AE	2	10	GCA161.1P	SIEMENS	154001	MOD(V) SR,24V, MED. PLNM			
TTE	1	5	QAA2212.EWSN	SIEMENS	149708	RTS, 1K OHM PT (385), BLANK FRONT			
Panel Ma	Panel Mounted Devices								
RE	1	3	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT			

REVISION HISTORY	SIEMENS	NANUET BOND PH
R0 2/16/2024 VB ISSUED FOR APPROVAL	412 MI REMBLE AVE. MORRISTOWN NJ. 07960 USA SIEMENS INDUSTRY, INC. Phone: (973) 575-6300 SMART INFRASTRUCTURE Fax: (973) 575-7968	NANUET, NY ENGINEER DRAFTER CHE VB VB I BM_MISC EXI



						Replacement Sensors/Field Devices						
Si No	Existing Equipment	Equipment Tag	Location Floor Plan DWG		Controller Name	Valve	Terminal Details on Existing CTRL	Damper Actuator	Terminal Details on Existing CTRL	Thermostat	Terminal Details on Existing CTRL	Relay
					Barr Middle Scho	ol						
1	AHU	S-1	1st Flr-SE	BM-M112	NA	3-Way	NA	OAD	NA	-	NA	-
2	AHU	S-2	1st Flr-SE	BM-M112	NA	3-Way	NA	OAD, RAD	NA	Yes	NA	-
3	AHU	S-3	1st Flr-NE	BM-M111	NA	3-Way	NA	OAD, RAD	NA	-	NA	-
4	AHU	S-4	1st Flr-NE	BM-M111	NA	3-Way	NA	OAD	NA	Yes	NA	-
5	AHU	S-6	Basement	BM-M110	NA	3-Way	NA	OAD, RAD	NA	Yes	NA	Yes
6	AHU	S-7	Basement	BM-M110	NA	3-Way	NA	OAD	NA	Yes	NA	Yes
7	AHU	S-8	Basement	BM-M110	NA	3-Way	NA	OAD	NA	Yes	NA	Yes
8	AHU	S-9	Basement	BM-M110	NA	3-Way	NA	-	NA	-	NA	-
9	Hot Water System	EX-B-1, EX-B-2	Basement	BM-M110	BARRMSPXM10	3-Way	0.1.5	-	NA	-	NA	-
10	Hot Water Storage Tank	EX-HWST	Basement	BM-M110	NA	2-Way	NA	-	NA	-	NA	-
11	Heat Exchanger	Ex-HEX	Basement	BM-M110	NA	2-Way	NA	-	NA	-	NA	-



	REVISION	HIS	STORY	SIEMENS		NANUE	ET BOND F
F	R1 4/16/2024 R0 2/16/2024	VB VB	REVISED AS PER COMMENTS DATED 3/15/24 ISSUED FOR APPROVAL		MORRISTOWN NJ. 07960 USA	NANUE ENGINEER	T, NY
				SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-6300 Fax: (973) 575-7968	BM_N	<u>⊥ vb</u> MISC EX

GENERAL NOTES:

- BELOW TABLE SHOWS REPLACEMENT SENSORS/FIELD DEVICES FOR EACH SYSTEMS MENTIONED IN MECHANICAL DRAWING NOTES. TERMINAL DETAILS WAS NOT AVAILABLE AND ARE TO BE FIELD DETERMINED.
- SIEMENS HAS FURNISHED REPLACEMENT SENSORS AS PER BELOW TABLE. SIEMENS WILL UPDATE THE WIRING DRAWINGS ONCE EXISTING TERMINAL DETAILS ARE RECEIVED.



C:\Users\z004pb8f\OneDrive - Siemens AG\BNJ2 BAU Nanuet Bond Phase 3 High School_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\500_MISC EXISTING EQUIP.dwg

Control Device	Qty	Product Number	Manufacturer	Document Number	Description				
Field Mounted Devices	Field Mounted Devices								
ENC 1	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"				
Panel Mounted Devices	Panel Mounted Devices								
PXCM 1	1	PXC00-E96.A	SIEMENS	149478	PXC MOD, BACNET, 96 NODE, APOGEE				
SB 1	1	PXA-SB115V192VA	SIEMENS	588783	SERVICE BOX 115V, 24VAC, 192VA				

REVISION HISTORY	SIEMENS	NANUET BOND PH
R0 2/16/2024 VB ISSUED FOR APPROVAL	AIZ MI REMDLE AVE. MORRISTOWN NJ. 07960 USA SIEMENS INDUSTRY INC. Phone: (973) 575-6300	NANUET, NY ENGINEER DRAFTER CHI VB VB CHI
	SMART INFRASTRUCTURE Fax: (973) 575-7968	NAN.BM.FLR1.



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\KEY-000.DWG

R0 2/16/20	REVISIO				
24 VB ISSUED FOR	N HISTORY			PXCM -00000 PXC00-E96.A PXC MODULAR	
2 APPROVAL				Module: 1 / Rall: 1	
		ł	_		_
SIEMENS INDUS. SMART INFRAST	SIEMENS				
TRY, INC. TRUCTURE					
MORRISTOWN NJ. 07960 US Phone: (973) 5 Fax [,] (973) 575	412 MT KEMBI	ł	_		_
575-6300	LE AVE. NA				
AN.BM.FLF	NUET BOND				

THER CHECKED BY INITIAL RELEASE LAST EDIT DATE B NSK 02/16/24 04/16/24 FLR1.PXCM1 (LAYOUT) HASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE 5	OND PHASE3 MID SCHOOL		
NO1A	440P-366733	L	



[1							
Control Device	Qty	Product Number	Manufacturer	Document Number	Description					
Field Mounted Devices	leld Mounted Devices									
ENC 2	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"					
XFMR 1	1	PSH500A	FUNCTIONAL DEVICES	1208cut143	PS FIVE 100VA C2 120-24VAC ENC					
Panel Mounted Devices	1		•	•						
PPM 1	1	PPM-2U3322.BPR	SIEMENS	149220	MSTP PPM, 2UI 3DI 3DO 2AO 2AI,REMOVABLE					
PPM 2	1	PPM-2U3322.BPR	SIEMENS	149220	MSTP PPM, 2UI 3DI 3DO 2AO 2AI,REMOVABLE					
PPM 3	1	PPM-2U3322.BPR	SIEMENS	149220	MSTP PPM, 2UI 3DI 3DO 2AO 2AI,REMOVABLE					
PPM 4	1	PPM-2U3322.BPR	SIEMENS	149220	MSTP PPM, 2UI 3DI 3DO 2AO 2AI,REMOVABLE					
PPM 5	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
PPM 6	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
PPM 7	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
PPM 8	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
PPM 9	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
РРМ 10	1	PPM-1U32.BPR	SIEMENS	149220	MSTP PPM, 1UI 3DI 2DO (U.S)					
PXCM 2	1	РХС00-Е96.А	SIEMENS	149478	PXC MOD, BACNET, 96 NODE, APOGEE					
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485					
SB 2	1	PXA-SB115V192VA	SIEMENS	588783	SERVICE BOX 115V, 24VAC, 192VA					

REVISION HISTORY	SIEMENS		NANUET BOND PH
R0 2/16/2024 VB ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC.	412 MT REMDLE AVE. MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300	NANUET, NY ENGINEER DRAFTER CHE VB VB CHE
	SMART INFRASTRUCTURE	Fax: (973) 575-7968	NAN.BM.FLR2.



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\KEY-001.DWG

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			<u> </u>			
C: \USERS\Z00.	SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	SIEMENS				
4PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUE	MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300 Fax: (973) 575-7968		⊢-		_	
SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3	WNUL COLL USA 3) 575-6300 575-7968 NAN.BM.FLR					

TER CHECKED BY INITIAL RELEASE LAST EDIT DATE B NSK 02/16/24 04/16/24 FLR2.PXCM2 (LAYOUT) HASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE	OND PHASE3 MID SCHOOL	
NO2A	440P-366733 0	

















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PHASE3 MID SCHOOL	440P-366733 0
HECKED BY INITIAL RELEASE LAST EDIT DATE NSK 02/16/24 04/16/24	
(LAYOUT) HASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR	MIDDLE SCHOOL\PPM.EX.EF.5.DWC







C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_BARR MIDDLE SCHOOL\NAN.BM.FLR2.PXCM2A.DWG




4

KEYED NOTES:

- UNIT AND PROVIDE A 3/4" HARD PIPED CONNECTION TO THE CONDENSATE OUTLET. PROVIDE A P-TRAP BELOW FAN COIL UNIT, THEN ROUTE 3/4" CONDENSATE PIPING THROUGH ELEVATOR MACHINE ROOM TO MECHANICAL AREA OF BASEMENT AS SHOWN.
- (21) PROVIDE 3/4" CONDENSATE DROP DOWN AT LOCATION SHOWN TO FLOOR LEVEL, THEN ROUTE 3/4" CONDENSATE PIPING BELOW BOTTOM OF DOOR OPENING TO OA INTAKE PLENUM, THEN ROUTE 3/4" CONDENSATE PIPING ALONG FLOOR LEVEL TO NEW FLOOR DRAIN BEING PROVIDED ON PLUMBING DRAWINGS. TERMINATE CONDENSATE PIPING OPEN-ENDED ABOVE NEW FLOOR DRAIN.





13 12 11 10	9 8 7	6 5 4 3 2 1
	KEYED NOTES (CONTINUED):	GENERAL NOTES:
" HWR RISER AT FLOOR LEVEL AND ROUTE 1-1/4" HWR PIPING MAIN WITHIN SHELVING CABINET PIPING TUNNEL AS SHOWN.	(27) ROUTE 1-1/4" CONDENSATE DRAIN PIPING DOWN THROUGH CEILING ALONG WALL AND TERMINATE ABOVE FLOOD RIM OF EXISTING DRINKING FOUNTAIN AT LOCATION SHOWN WITH MITER CUT OPEN-ENDED OUTLET.	 REFRIGERANT PIPING NOTE: 90 DEGREE ELBOWS SHALL BE KEPT A MINIMUM OF 20" FROM CEILING UV DX COILS AND 20" FROM BRANCH CONNECTOR 'Y' JOINTS. IN ADDITION, BRANCH CONNECTOR 'Y' JOINTS SHALL BE A MINIMUM OF 40" FROM ANOTHER BRANCH 'Y' CONNECTOR JOINT.
NDENSATE DRAIN PIPING FROM FIRST FLOOR UV DRAIN PAN OUTLET AND CONDENSATE FROM SECOND FLOOR UV DRAIN RIOR WALL. TERMINATE PIPING WITH MITER CUT ELBOW FACING GRADE LEVEL AND PITCH PIPING TOWARDS THE EXTERIOR UIRED.	(28) PROVIDE CLEANOUT PLUG AT LOCATION SHOWN WITHIN CONDENSATE DRAIN PIPING.	2. REFRIGERANT PIPING NOTE: THE HEAT PUMP SYSTEM MANUFACTURER SHALL INSPECT ALL FIELD INSTALLED REFRIGERANT PIPING PRIOR TO INSULATION INSTALLATION.
IID BRANCH CONNECTOR 'Y' FITTING JOINT.	(29) CONNECT TO EXISTING 1-1/4" HWS RISER AT BASE OF RISER AND ROUTE 1-1/4" HWS PIPING MAIN THROUGH 24" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE. PROVIDE PIPE ENCLOSURE UNITS AROUND PERIMETER OF SPACE AS SHOWN. TERMINATE	3. THE EXISTING SUSPENDED CEILING SYSTEMS LOCATED WITHIN THE SCOPE OF WORK AREA OUTSIDE OF AREAS BEING RENOVATED BY THE GENERAL CONTRACTOR SHALL BE DISCONNECTED AND REMOVED TO ALLOW FOR THE INSTALLATION WORK AND REINSTALLED FOLLOWING COMPLETION OF THE WORK BY THE MECHANICAL CONTRACTOR. THE
ION BRANCH CONNECTOR 'Y' FITTING JOINT.	HORIZONTAL ENCLOSURE AT SIDE OF UV-MS-2. MOUNT TOP OF ENCLOSURE EVEN WITH TOP OF UNIT VENTILATOR UV-MS-2. PROVIDE A 1" HWS BRANCH TO UV-MS-2 AND A 1" HWR CONNECTION TO UV-MS-2 HEATING COIL. CONTINUE 1-1/4" HWS AND 1" HWR THROUGH UV PIPING TUNNEL TO CLASSROOM 100B	SUSPENDED CEILING GRID SYSTEMS SHALL BE REMOVED AND MODIFIED TO COMPLETE THE WORK AND REINSTALLED FOLLOWING THE COMPLETION OF WORK. THE CEILING TILES SHALL BE REMOVED AS REQUIRED TO COMPLETE THE WORK AND REINSTALLED FOLLOWING THE COMPLETION OF THE INSTALLATION WORK. ANY CEILING TILES DAMAGED DURING THE INSTALLATION WORK SHALL BE REPLACED BY THE MECHANICAL CONTRACTOR TO MATCH THE EXISTING CEILING THES
ER UP THROUGH FLOOR. ROUTE TO VERTICAL PIPING ENCLOSURE AND DROP DOWN INTO SHELVING SYSTEM PIPING TUNNEL		
SYSTEM SHELVING/CABINET FILLER PIECE BETWEEN END OF UNIT VENTILATOR AND WALL AT LOCATIONS SHOWN.	30 PROVIDE 8" WIDE x 8" DEEP VERTICAL PIPE ENCLOSURE UNIT AT CORNER OF CLASSROOM TO CONCEAL REFRIGERANT LIQUID- SUCTION PIPING DROPS. ROUTE VERTICAL SUCTION/LIQUID PIPING DOWN THROUGH TOP OF HORIZONTAL PIPING ENCLOSURE UNIT AND CONNECT TO UV-MS-2 DX COIL CONNECTION AND UV EXPANSION VALVE KIT AS REQUIRED. HEIGHT OF VERTICAL	 ALL CUTTING, PATCHING, AND FIREPROOFING ASSOCIATED WITH THE INSTALLATION WORK SHALL BE COMPLETED BY THE MECHANICAL CONTRACTOR. PATCHED AREAS SHALL MATCH EXISTING CONDITIONS. ALL REFRIGERANT PIPING AND CONDENSATE PIPING PENETRATIONS THROUGH CORRIDOR WALLS SHALL BE FIREPROOFED PER SPECIFICATION SECTION 078400
DEEP UTILITY COMPARTMENT AT LOCATION SHOWN FOR HOUSING DDC SYSTEM CONTROLLER AND VARIABLE REFRIGERANT ENTS. THE UTILITY COMPARTMENT SHALL HOUSE THE FOLLOWING VARIABLE REFRIGERANT VOLUME CONTROL	PIPING ENCLOSURE SHALL EXTEND FROM TOP OF HORIZONTAL PIPING ENCLOSURE UNIT TO UNDERSIDE OF SUSPENDED CEILING SYSTEM.	5. ROUTE REFRIGERANT SUCTION AND LIQUID PIPING FROM THE UNIT VENTILATOR DX COIL CONNECTIONS TO THE HEAT PUMP UNITS. SIZE PIPING AND PROVIDE BRANCH
/IGATION REMOTE CONTROLLER 2. VARIABLE REFRIGERANT VOLUME CONTROL BOX AND 3. VARIABLE REFRIGERANT VOLUME VIDE UNIT VENTILATOR SYSTEM SHELVING/CABINET FILLER PIECE BETWEEN END OF UTILITY COMPARTMENT AND WALL TO	(31) ROUTE 3/4" CONDENSATE DRAIN PIPING FROM UV DRAIN PAN OUTLET OUT THROUGH EXTERIOR WALL. TERMINATE PIPING WITH	CONNECTOR 'Y' JOINTS PER THE DRAWING. CONFIRM PIPING SIZES AND BRANCH CONNECTOR 'Y' JOINT LOCATIONS REQUIRED WITH HEAT PUMP SYSTEM MANUFACTURER.
COMPARTMENT END AND WALL.	MITER CUT ELBOW FACING GRADE LEVEL AND PITCH PIPING TOWARDS THE EXTERIOR WALL PENETRATION AS REQUIRED. PROVIDE 36" WIDE x 10-3/8" HIGH OUTSIDE AIR LOUVER FURNISHED WITH UNIT VENTIL ATOR AT LOCATION SHOWN, PROVIDE A	6. THE SMALLEST VOLUME ROOM THAT THE REFRIGERANT PIPING SYSTEMS ROUTE THROUGH FOR EACH OF THE HEAT PUMP SYSTEMS IS BELOW THE ASHRAE STANDARD 15 REFRIGERANT CONCENTRATION LIMIT OF 26 POUNDS PER 1,000 CUBIC FEET OF ROOM VOLUME FOR OCCUPIED SPACES.
COMPENSATORS ON THE HWS/HWR PIPING MAINS ROUTED WITHIN THE UNIT VENTILATOR PIPING TUNNEL AT LOCATION	32 36"x10" OUTSIDE AIR DUCT SLEEVE FROM THE INTERIOR OF THE LOUVER CONNECTION TO THE REAR OF UV-MS-2. PROVIDE AN OPENING IN THE REAR OF THE UV OUTSIDE AIR DUCT PLENUM THE SIZE OF THE DUCT SLEEVE.	7. PROVIDE FIRESTOPPING PER SPECIFICATION SECTION 078400 AT ALL PIPING PENETRATIONS THROUGH CORRIDOR WALLS AND STORAGE ROOM WALLS.
RS SHALL BE 13.812" LONG. PROVIDE ANCHORS ON EACH END OF BOTH THE HWS/R RUNS AND PROVIDE PIPE GUIDES WITHIN COMPENSATORS		8. THE UV UTILITY COMPARTMENT SHALL INCLUDE A REMOVABLE FRONT PANEL, STANDARD #1/4-20 HEX FASTENER, STEEL TOP AND BACK WALL F-CHANNEL.
XISTING 1-1/2" HWS RISER AT CONNECTION POINT SHOWN AND ROUTE 1-1/2" HWS WITHIN UV-MS-38 AND ASSOCIATED	FROM NEAREST DDC CONTROLLER TO SENSOR AND UV DDC CONTROLLER AS REQUIRED.	10. ROUTE REFRIGERANT SUCTION-LIQUID PIPING WITHIN UNIT VENTILATOR PIPING TUNNELS AND UNIT VENTILATOR SHELVING SYSTEM TUNNELS TO DX COOLING COIL CONNECTIONS AND UV EXPANSION VALVE KITS PER THE MANUFACTURER'S RECOMMENDATIONS.
PIPING TUNNEL. RECONNECT HORIZONTAL 1-1/2" HWS PIPING TO EXISTING HWS AT CONNECTION POINT SHOWN AT WALL SSROOM 108 AND ROUTE 1" HWR PIPING FROM UV-MS-38 HEATING COIL WITHIN PIPING TUNNEL SYSTEM AND RECONNECT TO	(34) PROVIDE 24" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE ON EITHER SIDE OF UV-MS-1. MOUNT TOP OF ENCLOSURE EVEN WITH TOP OF UNIT VENTILATOR UV-MS-1. PROVIDE 1" HWS/R BRANCHES TO UV-MS-1 HEATING COIL AND ROUTE 1-1/4" HWS/R	KEYED NOTES (CONTINUED):
ATION AS SHOWN.	MAINS THROUGH UV PIPING TUNNEL TO CLASSROOM 102A.	(38) PROVIDE SEMI-RECESSED HORIZONTAL UNIT VENTILATOR UV-MS-3 AT LOCATION SHOWN. PROVIDE UV WITH BOTTOM RETURN AIR INLET STAMPED
UCTION-3/8" REFRIGERANT LIQUID DOWN TO UV UTILITY COMPARTMENT WITHIN VERTICAL CHASE WALL SYSTEM.	35 PROVIDE 1-1/4" EXPANSION COMPENSATORS ON THE HWS/HWR PIPING MAINS ROUTED WITHIN THE FIN TUBE ENCLOSURE SYSTEM AT LOCATION SHOWN. THE COMPENSATORS SHALL BE 13.812" LONG. PROVIDE ANCHORS ON EACH END OF BOTH THE	UV AS REQUIRED.
IG ENCLOSURE UNIT BETWEEN END OF UV-MS-41 AND END OF EXISTING PIPING ENCLOSURE AT LOCATION SHOWN. THE SIZE ENCLOSURE UNIT SHALL MATCH THE SIZE OF THE EXISTING ENCLOSURE INSTALLED ADJACENT TO THE NEW UNIT.	HWS/R RUNS AND PROVIDE PIPE GUIDES WITHIN 14 PIPE DIAMETERS OF THE COMPENSATORS ON BOTH THE HWS AND HWR COMPENSATORS.	(39) PROVIDE WALL MOUNTED SPACE TEMPERATURE SENSOR AT LOCATION SHOWN SERVING UV-MS-3 AND FIN TUBE RADIATION FT-MS-1 CONTROL VALVE. PROVIDE CONTROL WIRING FROM NEAREST DDC CONTROL FR TO SENSOR AND UV DDC CONTROL FR AS REQUIRED.
EXISTING AIR HANDLING UNIT S-4 PNEUMATIC MOTORIZED OUTSIDE AIR DAMPER ACTUATOR AT LOCATION SHOWN AND MOTORIZED DAMPER ACTUATOR . TIE CONTROL OF DAMPER INTO EXISTING DDC SYSTEM. REMOVE PNEUMATIC TUBING ACK TO PNEUMATIC PIPING MAIN.	(36) PROVIDE WALL-TO-WALL, 24" HIGH x 5-5/16" DEEP FIN TUBE ENCLOSURE WITHIN WITHIN CLASSROOM 102A. PROVIDE 20-FEET OF ACTIVE FIN TUBE FT-MS-1 WITHIN THE ENCLOSURE CENTERED IN THE CLASSROOM. PROVIDE 1" HWS/R BRANCH CONNECTIONS FROM THE 1-1/4" HWS/R MAINS TO THE ACTIVE FIN TUBE. ROUTE THE 1-1/4" HWS MAIN BELOW THE ACTIVE FIN TUBE AS PEOLIPED, BALANCE FLOW THROUGH 20 FEET OF ACTIVE FIN TUBE AND THE 1 1/4" HWB MAIN APOVE THE ACTIVE FIN TUBE AS PEOLIPED, BALANCE FLOW THROUGH 20 FEET OF ACTIVE FIN TUBE TO 2.3	PROVIDE 72"x5" SA PLENUM CONNECTED TO FRONT DISCHARGE OUTLET ON UV-MS-3. INSULATE THE SA PLENUM WITH 2" THICK FLEXIBLE GLASS FIBER DUC WRAP INSULATION. CONNECT THE EXISTING, THREE 10" ROUND SA BRANCHES TO THE TOP OF THE 72"x5" SA PLENUM AS REQUIRED. INSTALL UV-MS-3 SO THAT THE THE BOTTOM OF THE SA PLENUM. WITH INSULATION, IS ABOVE THE TOP OF THE FXISTING SUSPENDED CEILING SYSTEM.
EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENLCOSURE SYSTEM. DISCONNECT AND REMOVE XK TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 1.5 GPM AT LOCATION OF REMOVED	GPM.	(41) REBALANCE SUPPLY AIRFLOW THROUGH EXISTING LAY-IN SA DIFFUSERS UTILIZING EXISTING IN-DUCT VOLUME DAMPERS ON EACH SA BRANCH TO 430 CFM
E. MODIFY HWS BRANCH PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. PROVIDE SPACE	(37) PROVIDE A 16" DEEP x 8" WIDE VERTICAL PIPE ENCLOSURE UNIT AT CORNER OF CLASSROOM 102A TO CONCEAL 3/4" CONDENSATE DRAIN RISER AND 1" HWS/R RISERS. ROUTE 3/4" CONDENSATE FROM UV-MS-3 DRAIN PAN, COMBINE WITH 3/4"	WITH UV-MS-3 OPERATING AT DESIGN SUPPLY AIRFLOW.
CONTROL VALVE AND REPLACEMENT SENSOR AS REQUIRED.	DRAIN RISER ROUTED UP THROUGH FLOOR TO A 1" CONDENSATE MAIN, DROP 1" CONDENSATE RISER DOWN THROUGH VERTICAL ENCLOSURE, THEN ROUTE 1" CONDENSATE DRAIN PIPING FROM UV DRAIN PAN OUTLET OUT THROUGH EXTERIOR	(42) REBALANCE SUPPLY AIRFLOW THROUGH EXISTING LAY-IN SA DIFFUSER UTILIZING EXISTING IN-DUCT VOLUME DAMPERS ON EACH SA BRANCH TO 480 CFM WITH UV-MS-3 OPERATING AT DESIGN SUPPLY AIRFLOW.
EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENCLOSURE SYSTEM. DISCONNECT AND REMOVE X TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 2.0 GPM AT LOCATION OF REMOVED E. MODIFY HWS BRANCH PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. DISCONNECT AND EMPERATURE SENSOR INLCUDING ASSOCIATED PNEUMATIC TUBING AND PROVIDE REPLACEMENT SPACE TEMPERATURE WIN AND THE OPERATION OF CONTROL VALVE/SENSOR INTO EXISTING SEMENS DDC SYSTEM. PROVIDE CONTROL WIRING	WALL. TERMINATE PIPING WITH MITER CUT ELBOW FACING GRADE LEVEL AND PITCH PIPING TOWARDS THE EXTERIOR WALL PENETRATION AS REQUIRED. CONNECT TO 1-1/4" HWS/R MAINS WITHIN 18" HIGH HORIZONTAL PIPE ENCLOSURE WITHIN CLASSROOM 102A AND PROVIDE 1" HWS/R BRANCHES TO HORIZONTAL, SEMI-RECESSED UV-MS-3 HEATING COIL. ROUTE HWS/R RISERS TO ABOVE CEILING WITHIN VERTICAL PIPE ENCLOSURE. HEIGHT OF VERTICAL PIPING ENCLOSURE SHALL EXTEND FROM TOP OF HORIZONTAL PIPING ENCLOSURE UNIT TO UNDERSIDE OF SUSPENDED CEILING SYSTEM.	PROVIDE EXTERNALLY MOUNTED WIRED NAVIGATION REMOTE CONTROLLER, VARIABLE REFRIGERANT VOLUME CONTROL BOX AND VARIABLE REFRIGERAN VOLUME EXPANSION VALVE KIT SERVING HORIZONTAL UNIT VENTILATOR UV-MS-3 AT LOCATION SHOWN ABOVE EXISTING SUSPENDED CEILING SYSTEM. ROUTE LIQUID/SUCTION REFRIGERANT PIPING TO EXPANSION VALVE KIT AND UV DX COIL AS REQUIRED.
AND REPLACEMENT SENSOR AS REQUIRED.		(4) PROVIDE 24" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE ON EITHER SIDE OF UV-MS-4. MOUNT TOP OF ENCLOSURE EVEN WITH TOP OF UNIT VENTILATOR UV-MS-4. PROVIDE 1" HWS/R BRANCHES TO UV-MS-4 HEATING COIL AND ROUTE HWS/R MAINS THROUGH UV PIPING TUNNEL TO CLASSROOM 10
EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENLCOSURE SYSTEM. DISCONNECT AND REMOVE CK TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 2.4 GPM AT LOCATION OF REMOVED E. MODIFY HWS BRANCH PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. DISCONNECT AND EMPERATURE SENSOR INLCUDING ASSOCIATED PNEUMATIC TUBING AND PROVIDE REPLACEMENT SPACE TEMPERATURE VN AND TIE OPERATION OF CONTROL VALVE/SENSOR INTO EXISTING SIEMENS DDC SYSTEM. PROVIDE CONTROL WIRING AND REPLACEMENT SENSOR AS REQUIRED.		PROVIDE 16" WIDE x 8" DEEP VERTICAL PIPE ENCLOSURE UNIT AT CORNER OF CLASSROOM TO CONCEAL REFRIGERANT LIQUID-SUCTION PIPING DROPS AND THE 3/4" CONDENSATE RISER DROP FROM THE TWO SECOND FLOOR CONDENSATE RISERS DROPS. ROUTE VERTICAL SUCTION/LIQUID PIPING DOWN THROUGH TOP OF HORIZONTAL PIPING ENCLOSURE AND CONNECT TO UV DX COIL CONNECTION AND UV EXPANSION VALVE KIT AS REQUIRED. ROUTE CONDENSATE DRAIN PIPING FROM VERTICAL DROP THROUGH HORIZONTAL PIPING ENCLOSURE AND CONNECT TO HORIZONTAL CONDENSATE DRAIN PIPING FROM FIRST FLOOR UV DRAIN PAN OUTLET PRIOR TO EXITING THROUGH EXTERIOR WALL. HEIGHT OF VERTICAL PIPING ENCLOSURE SHALL EXTEND FROM TOP OF HORIZONTAL PIPING ENCLOSURE UNIT TO UNDERSIDE OF EXISTING SUSPENDED CEILING SYSTEM.
EXISTING OA LOUVER	IG 58"X12" -1" HWS 6 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID- 1" CONDENSATE DOWN	(46) PROVIDE 24" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE ON EITHER SIDE OF UV-MS-5. MOUNT TOP OF ENCLOSURE EVEN WITH TOP OF UNIT VENTILATOR UV-MS-5. PROVIDE 1" HWS/R BRANCHES TO UV-MS-5 HEATING COIL AND ROUTE 1-1/4" HWR MAIN THROUGH UV PIPING TUNNEL PAST UV-MS-5, THROUGH THE HORIZONTAL PIPING ENCLOSURE AND CONNECT TO THE EXISTING 1-1/4" HWR RISER AT THE CONNECTION POINT SHOWN AT BOTTOM RISER.
$\begin{array}{c c} 1 & 1/4" \text{ HWS} \\ \hline CP-MS-1(47) \\ \hline \\ $	$\int \frac{45}{-11/4" \text{ HWR}} \int \frac{11/4" \text{ HWR}}{11/4" \text{ HWR}}} \int \frac{11/4" \text{ HWR}}{11/4" \text{ HWR}} \int 11/4" \text{ $	(47) PROVIDE MINI-CONDENSATE REMOVAL PUMP AT LOCATION SHOWN ATTACHED TO UV-MS-3. ROUTE CONDENSATE FROM HORIZONTAL UV DRAIN PAN OUTLE TO INLET OF PUMP, THEN ROUTE CONDENSATE DRAIN PIPING FROM OUTLET OF PUMP TO 3/4" CONDENSATE DRAIN PIPING LINE AS SHOWN.
	EXFTR 28 46 (15) 3/4" COND (15) 3/4" COND	 DISCONNECT AND REMOVE EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENLCOSURE SYSTEM. DISCONNECT AND REMOVE ALL PNEUMATIC TUBING BACK TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 8.7 GPM AT LOCATION OF REMOVED PNEUMATIC CONTROL VALVE. MODIFY HWS BRANCH PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. DISCONNECT AND REMOVE EXISTING SPACE TEMPERATURE SENSOR INLCUDING ASSOCIATED PNEUMATIC TUBING AND PROVIDE REPLACEMENT SPACE TEMPERATURE SENSOR AT LOCATION OF CONTROL VALVE/SENSOR INTO EXISTING SIEMENS DDC SYSTEM. PROVIDE CONTROL WIRING BETWEEN CONTROL VALVE AND REPLACEMENT SENSOR AS REQUIRED.
		evel 3/4" Condensate drain Riser up Through Floor. Route condensate piping to drinking fountain termination outlet as outlined in Keyed Note 27.
3/8" RL 3/8" RL		50 PROVIDE 1" CONDENSATE DRAIN RISER UP THROUGH FLOOR AT LOCATION SHOWN.

- EXISTING 1-1/2" HWS DOWN TO FLOOR LEVEL

—3/4" COND

-1" HWR

-1 1/2" HWS

- 3/4" CONDENSATE

FABRICATION

-1 1/4" HWS

-1 1/4" HWR

CNC ROOM

(A)

DOWN

3/4" CONDENSATE

- EXISTING 1-1/4" HWS

UP TO SECOND FLOOR

51 LOCATION OF TYPICAL CEILING MOUNTED RELIEF AIR REGISTER DUCTED THROUGH CORRIDOR WALL TO CORRIDOR CEILING PLENUM, TERMINATED OPEN-

ENDED ABOVE CEILING PLENUM FOR RELIEF AIR OF CLASSROOMS.









	13 12 11 10 9 DNOTES (CONTINUED): 9	8	7	6	5 4	3	2 1
	OUTE 3/4" CONDENSATE DRAIN FROM RISER UP THROUGH FLOOR AND THE 3/8" LIQUID-5/8" SUCTION PIPING DROPS DOWN THROUGH VERTICAL CHASE TO WITHIN UNIT ENTILATOR PIPING TUNNEL. ROUTE SUCTION/LIQUID PIPING TO EXPANSION VALVE KIT WITHIN UTILITY COMPARTMENT AND UV DX COIL AS REQUIRED. ROUTE CONDENS	SATE		<u>GENERAL NOTES:</u> 1. REFRIGERANT	PIPING NOTE: 90 DEGREE ELBOWS SHALL BE KEPT A MINIMUM (OF 20" FROM BRANCH CONNECTOR 'Y' JC	INTS. IN ADDITION. BRANCH CONNECTOR 'Y' JOINTS SHALL BE
	RAIN PIPING TO UV-MS-40 CONDENSATE DRAIN LINE AS REQUIRED. OMBINE TWO 3/4" CONDENSATE DRAINS FROM TWO RISER LOCATIONS UP THROUGH FLOOR TO ONE 1" CONDENSATE RISER DROP, AND THE 3/8" LIQUID-5/8" SUCTION			A MINIMUM OF 2. REFRIGERANT	40" FROM ANOTHER BRANCH 'Y' CONNECTOR JOINT. PIPING NOTE: THE HEAT PUMP SYSTEM MANUFACTURER SHALL	INSPECT ALL FIELD INSTALLED REFRIG	ERANT PIPING PRIOR TO INSULATION INSTALLATION.
	ONNECT TO EXISTING 1" HWS DROP AT BASE OF RISER AND ROUTE 1" HWS TO UV-MS-6 HEATING COIL.	Ŷ		3. THE EXISTING DISCONNECTE SUSPENDED C	SUSPENDED CEILING SYSTEMS LOCATED WITHIN THE SCOPE OF D AND REMOVED TO ALLOW FOR THE INSTALLATION WORK AND FILING GRID SYSTEMS SHALL BE REMOVED AND MODIFIED TO C	WORK AREA OUTSIDE OF AREAS BEING REINSTALLED FOLLOWING COMPLETION	RENOVATED BY THE GENERAL CONTRACTOR SHALL BE NOF THE WORK BY THE MECHANICAL CONTRACTOR. THE FOLLOWING THE COMPLETION OF WORK, THE CELLING THES
	ONNECT TO EXISTING 1" HWR DROP AT BASE OF RISER AND ROUTE 1" HWR TO UV-MS-6 HEATING COIL.			SHALL BE REM DURING THE IN	IOVED AS REQUIRED TO COMPLETE THE WORK AND REINSTALLE IOVED AS REQUIRED TO COMPLETE THE WORK AND REINSTALLE INSTALLATION WORK SHALL BE REPLACED BY THE MECHANICAL (D FOLLOWING THE COMPLETION OF THI CONTRACTOR TO MATCH THE EXISTING	E INSTALLATION WORK. ANY CEILING TILES DAMAGED CEILING TILES.
	ROVIDE 24" WIDE x 21-7/8" DEEP UTILITY COMPARTMENT AT LOCATION SHOWN FOR HOUSING DDC SYSTEM CONTROLLER AND VARIABLE REFRIGERANT VOLUME CONTR OMPONENTS. THE UTILITY COMPARTMENT SHALL HOUSE THE FOLLOWING VARIABLE REFRIGERANT VOLUME CONTROL COMPONENTS: 1. WIRED NAVIGATION REMOTE ONTROLLER 2. VARIABLE REFRIGERANT VOLUME CONTROL BOX AND 3. VARIABLE REFRIGERANT VOLUME EXPANSION VALVE KIT. PROVIDE UNIT VENTILATOR SYSTEM HELVING (CARINET FILLER DIECE RETWEEN FOR OF UTILITY COMPARTMENT AND WALL TO FILL CAR RETWEEN UTILITY COMPARTMENT FOR AND WALL	OL		4. ALL CUTTING, I MATCH EXISTII SECTION 07840	PATCHING, AND FIREPROOFING ASSOCIATED WITH THE INSTALL NG CONDITIONS. ALL REFRIGERANT PIPING AND CONDENSATE F 00.	ATION WORK SHALL BE COMPLETED BY IPING PENETRATIONS THROUGH CORRI	THE MECHANICAL CONTRACTOR. PATCHED AREAS SHALL DOR WALLS SHALL BE FIREPROOFED PER SPECIFICATION
	OUTE 1" CONDENSATE DRAIN PIPING TO 6" ABOVE EXISTING SLOP SINK FLOOD RIM. TERMINATE OPEN-ENDED WITH MITER CUT OUTLET.			5. ROUTE REFRIC CONNECTOR	GERANT SUCTION AND LIQUID PIPING FROM THE UNIT VENTILAT(Y' JOINTS PER THE DRAWING. CONFIRM PIPING SIZES AND BRAN	OR DX COIL CONNECTIONS TO THE HEAT CH CONNECTOR 'Y' JOINT LOCATIONS RE	PUMP UNITS. SIZE PIPING AND PROVIDE BRANCH EQUIRED WITH HEAT PUMP SYSTEM MANUFACTURER.
	OCATION OF EXISTING AIR HANDLING UNIT S-1 DDC SYSTEM CONTROLLER. DISCONNECT AND REMOVE DAMPER ELECTRIC-TO-PNEUMATIC TRANSDUCER AND 3-WAY ONTROL VALVE ELECTRIC-TO-PNEUMATIC TRANSDUCER INCLUDING ASSOCIATED PNEUMATIC TUBING AND PNEUMATIC DIAL OPERATORS. REMOVE PNEUMATIC TUBING ACK TO PNEUMATIC PIPING MAIN AND CAP. TIE ELECTRONIC CONTROL VALVE AND ELECTRONIC MOTORIZED DAMPER OUTLINED IN KEYED NOTES 1 AND 26 INTO THE S-	1		6. THE SMALLEST REFRIGERANT	T VOLUME ROOM THAT THE REFRIGERANT PIPING SYSTEMS ROU CONCENTRATION LIMIT OF 26 POUNDS PER 1,000 CUBIC FEET O	TE THROUGH FOR EACH OF THE HEAT F F ROOM VOLUME FOR OCCUPIED SPACE	PUMP SYSTEMS IS BELOW THE ASHRAE STANDARD 15 ES.
	DC CONTROLLER AS REQUIRED. ISCONNECT AND REMOVE EXISTING AIR HANDLING UNIT S-1 PNEUMATIC MOTORIZED OUTSIDE AIR DAMPER AT LOCATION SHOWN AND REPLACE WITH ELECTRONIC INTORIZED DAMPER. THE CONTROL OF DAMPER INTO EXISTING DDC SYSTEM. REMOVE PNEUMATIC TUBING FROM REMOVED DAMPER BACK TO PNEUMATIC PUPING MAIN			 PROVIDE FIRE 8. THE UV UTILITY 	STOPPING PER SPECIFICATION SECTION 078400 AT ALL PIPING F Y COMPARTMENT SHALL INCLUDE A REMOVABLE FRONT PANEL,	ENETRATIONS THROUGH CORRIDOR WA STANDARD #1/4-20 HEX FASTENER, STE	ALLS AND STORAGE ROOM WALLS. EL TOP AND BACK WALL F-CHANNEL.
	ISCONNECT AND REMOVE EXISTING HYDRONIC UNIT HEATER UH-E DUAL PNEUMATIC FACE AND BAYPASS DAMPER ACTUATORS AT LOCATION SHOWN AND REPLACE WI LECTRONIC MOTORIZED DAMPER ACTUATORS. TIE CONTROL OF DAMPERS INTO EXISTING DDC SYSTEM. REMOVE PNEUMATIC TUBING FROM REMOVED DAMPER BACK	TH TO		10. ROUTE REFRIC AND UV EXPAN	GERANT SUCTION-LIQUID PIPING WITHIN UNIT VENTILATOR PIPIN ISION VALVE KITS PER THE MANUFACTURER'S RECOMMENDATIO	G TUNNELS AND UNIT VENTILATOR SHEI NS.	VING SYSTEM TUNNELS TO DX COOLING COIL CONNECTIONS
	NEUMATIC PIPING MAIN. ISCONNECT AND REMOVE EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENLCOSURE SYSTEM. DISCONNECT AND REMOVE ALL PNEUMATIC						
	UBING BACK TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 1.5 GPM AT LOCATION OF REMOVED PNEUMATIC CONTROL VALVE. MODIFY WS BRANCH PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. PROVIDE SPACE TEMPERATURE SENSOR AT LOCATION SHOWN OUTLINED IN EYED NOTE 4 AND TIE OPERATION OF CONTROL VALVE/SENSOR INTO EXISTING SIEMENS DDC SYSTEM.						
	ROVIDE EXHAUST REGISTER ER-MS-1 AT LOCATION SHOWN AT LOCATION OF MISSING REGISTER. CONNECT EXISTING 12"x12" EA DROP TO REGISTER AS REQUIRED. ALANCE AIRFLOW THROUGH REGISTER TO 150 CFM WITH EXISTING EXHAUST FAN EF-11 OPERATING.						
	ROVIDE 24" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE BETWEEN END OF UV-MS-7 AND WALL BETWEEN STORAGE 123 AND CLASSROOM 114. ROUTE HWS/R BRANG IPING ROUTED FROM STORAGE 123 INTO THE PIPING ENCLOSURE.	CH 4"					
	WS/R BRANCHES TO UV-MS-7 HEATING COIL, THEN ROUTE 1" HWS TO UV-MS-8 WITHIN CLASSROOM 114. ROUTE HWS/R THROUGH HORIZONTAL PIPE ENCLOSURE, PROVIDE HROUGH THE UV PIPING TUNNELS TO THE SECOND CONNECTION POINT SHOWN UPSTREAM OF THE HWR PENETRATION THROUGH THE EXISTING VERTICAL CHASE. ROVIDE A 1" HWR CONNECTION TO THE UV-MS-8 HEATING COIL AS REQUIRED.	I					
	ROVIDE DAIKIN MODEL DCM014A51 BACNET INTERFACE AT LOCATION SHOWN CAPABLE OF INTEGRATION WITH THE BUILDING'S EXISTING IRECT DIGITAL CONTROL (DDC) SYSTEM. THE DDC SHALL PROVIDE A LOW VOLTAGE CONNECTION FROM THE NEAREST DDC CONTROL PANEL						
	O THE BACNET INTERFACE AS REQUIRED. THE BACNET INTERFACE DEVICE SHALL ALLOW THE DDC SYSTEM TO MONITOR AND CONTROL THE ARIABLE REFRIGERANT VOLUME INDOOR AND OUTDOOR UNITS INSTALLED. TWISTED PAIR COMMUNICATION WIRING SHALL BE PROVIDED ROM EACH ROOFTOP HEAT PUMP UNIT TO THE BACNET INTERFACE DEVICE, AND TWISTED PAIR COMMUNICATION WIRING SHALL BE ROVIDED FROM FACH HEAT PUMP UNIT TO FACH CONTROL FRIKT LOCATED WITHIN THE UTUITY COMPARTMENT OF FACH NEW UNIT						
	ENTILATOR. ROVIDE UL-207 LISTED EXPANSION LOOP FOR THE 3/8" REFRIGERANT LIQUID AND 7/8" REFRIGERANT SUCTION LINES AT LOCATION SHOWN. THE 3/8" LOOP SHALL BE 28-	1/2"					
	DNG x 17-1/2" HIGH. THE 7/8" LOOP SHALL BE 28-1/2" LONG x 19-3/4" WIDE. PROVIDE PIPE GUIDES ON EITHER SIDE OF LOOP AND PIPE ANCHORS AT END OF PIPING RUNS I ANUFACTURER'S RECOMMENDATIONS. INSTALL REFRIGERANT MAINS AT DIFFERENT ELEVATIONS TO ALLOW LOOPS TO AVOID CONFLICT WITHIN CEILING PLENUM.	PER					
	ROVIDE CLEANOUT PLUG AT LOCATION SHOWN WITHIN CONDENSATE DRAIN PIPING. ONNECT TO EXISTING 3/4" HWS AND 1-1/4" HWR PIPING LINES AT CONNECTION POINT SHOWN UPSTREAM OF PIPING PENETRATIONS THROUGH EXISTING VERTICAL HEETROCK PIPING CHASE						
	ISCONNECT, REMOVE AND REINSTALL EXISTING PLYWOOD SERVING AS BOTTOM OF SOFFIT WITHIN CLASSROOM 116.5 AS REQUIRED TO PROVIDE REFRIGERANT RISEF ALLED OUT. UTILIZE EXISTING SCREWS WITHIN PLYWOOD SOFFIT AS REQUIRED TO REMOVE/REINSTALL.	RS		Unit is located in BM-M111			
	OCATION OF TYPICAL CEILING MOUNTED RELIEF AIR REGISTER DUCTED THROUGH CORRIDOR WALL TO CORRIDOR CEILING PLENUM, TERMINATED OPEN-ENDED ABOVE EILING PLENUM FOR RELIEF AIR OF CLASSROOMS.						
	ROVIDE DDC SYSTEM CONTROL PANEL/ENCLOSURE AT LOCATION SHOWN TO HOUSE DDC CONTROLLERS, TRANSFORMERS, RELAYS, AND REQUIRED DDC SYSTEM OMPONENTS TO ACCOMPLISH THE SPECIFIED SEQUENCES OF OPERATIONS.				 		
THE REPORT OF TH		/					
THE CONTRACT OF THE CONTRACT O						1" CONDENSATE 108B DOWN 20	
	3/8" RL-						
	-3/4" COND $-3/4" COND$ $-3/4" COND$ $-3/4" GRADE$ $-3/4" COND$ -3						
	9 CLASSROOM 9 116 33		2-4				
	- 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID-			SP.ED. REL. SERVICE		-3/4" COND	
	3/4" CONDENSATE DOWN TO UV PIPING CABINET PIPING TUNNEL						
	3/8" RL				FABRICATION CLASSROOM	5/8" RS-3/8" RL-	
	3/8" RL 7/8" RS					3/4" CONDENSATE DOWN	
WENNER WALL DENORMAL	T STH GRADE				VIDEO PRODUCTION		
Res 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	116.5 5/8" RL 11/8" RS	3/8" REF 5/8" REF	RIGERANT LIQUID- RIGERANT SUCTION	110			
HING WITH HINGTON							
	1/4" HWS 3/8" RL 3/4" RL 2" HWS 115 2						
A REAL PROVIDE AND A REAL PROVIDEAND A RE		44"x20" SA					
EXTRACTION OF THE CARD OF THE	3/4" REFRIGERANT LIQUID- 1.3/8" REFRIGERANT					2" HWR	UV-MS-XX UNIT VENTILATOR
Image: Control of the control of th	SUCTION UP TO SECOND FLOOR				1" REFRIGERANT LIQUID- 1" REFRIGERANT SUCTION UP TO SECOND FLOOR		UV-WALL SENSOR
THE RECEIPTING OF THE RECEIPTI		SERVING 116					EXISTING FIN TUBE RADIATOR
RADE RADE ST IS ST I			EXISTING 10"x10" EA UP TO EF-4 ON BOOE	CUSTODIAN			EX FTR-WALL SENSOR
RADE CON ST FINGE CON CON CON CON CON CON CON CON			70"x24" SA		L I SP.ED.		EX S-X EXISTING AIR HANDLING UNIT
NSM SPERIE OF REFERENCENT SUIDON SPERIE OF REFERENCENT SPERIE OF REFERENCENT SUIDON SPERIE O	SRADE II -5/8" RS II I 1/2" HWR 114						T EX AHU-WALL SENSOR
38" RL S8" RS 1 1 HF HWR 0 00WN TO UV PINIC CABINET 1 HWR UP TO SECOND FLOOR 1 HWR UP TO SECOND	4.5 3/8" RL 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID- 3/4" CONDENSATE	EXISTING 46"x18" GREASE EA UP		EX S-1 2" HWR 2" HWR 2" HWR			
COND COND	-3/8" RL 5/8" R\$ II 11/4" HWR C C C C C C C C C C C C C C C C C C C	NG GREASE HOOD EX MOP SINK		-2" HWS} 		CTION- "REFRIGERANT QUID-	
PPING TUNNEL			1º Truce			" CONDENSATE WN TO UV PING CABINET	
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A COND C A COND				CUSTODIAL 120		STOR	
CEXISTING 1" HWR UP TO SECOND FLOOR TO SECOND FLOOR	$\begin{array}{c c} & & & \\ \hline & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline \end{array} \end{array} \begin{array}{c} & & \\ \hline \end{array} \end{array} $	HWR UP TO SECOND FLOOR		Ą /	3/4" COND-7		
	EXISTING 1" HWR UP TO SECOND FLOOR TO SECOND FLOOR TO SECOND FLOOR	UP)R	(34)-J (34)-J (34)- (26) EXIST	TING 1" HWR DOWN TO FLOOR —	14/ L(1) EXISTING 1" F	WS UP	SIEMENS WAL







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	KEYED (1) DI: AN LC CC PF EX (2) DI: DA DI: (3) DI: (3) DI:	NOTES: SCONNECT AND REMOVE EXISTING 2 ND REMOVE ALL PNEUMATIC TUBING I DCATION OF REMOVED PNEUMATIC CO DNTROL VALVE. DISCONNECT AND RE ROVIDE REPLACEMENT SPACE TEMPE (ISTING SIEMENS DDC SYSTEM. PROV SCONNECT AND REMOVE EXISTING G MPER TO REPLACE THE GRAVITY AC SCONNECT, REMOVE AND REINSTALL SCONNECT AND REMOVE EXISTING 2	WAY PNEUMATIC CONTROL VALVE W BACK TO PNEUMATIC MAIN. PROVIDE DNTROL VALVE. MODIFY HWS BRANC MOVE EXISTING SPACE TEMPERATUF RATURE SENSOR AT LOCATION SHOW (IDE CONTROL WIRING BETWEEN CON RAVITY ACTUATED DAMPER WITHIN E TUATED DAMPER TIED TO THE OPER/ EXISTING SUSPENDED CEILING SYST WAY PNEUMATIC CONTROL VALVE W	/ITHIN EXISTING FIN TUBE ENLCOSUR ELECTRONIC 2-WAY CONTROL VALVE H PIPING AS REQUIRED FOR INSTALL RE SENSOR INLCUDING ASSOCIATED MN AND TIE OPERATION OF CONTROI NTROL VALVE AND REPLACEMENT SE EXISTING 20"x20" EA RISER AND PROV ATION OF REPLACEMENT ROOFTOP E FEM AS REQUIRED TO REPLACE THE I	E SYSTEM. DISCONNECT E RATED AT 0.5 GPM AT ATION OF ELECTRONIC PNEUMATIC TUBING AN L VALVE/SENSOR INTO NSOR AS REQUIRED. //IDE A MOTORIZED EXHAUST FAN EF-MS-21. DAMPER. E SYSTEM. DISCONNECT
	LC	ND REMOVE ALL PNEUMATIC TUBING I	BACK TO PNEUMATIC MAIN. PROVIDE ONTROL VALVE. MODIFY HWS BRANC	ELECTRONIC 2-WAY CONTROL VALVE H PIPING AS REQUIRED FOR INSTALL	E RATED AT 0.4 GPM AT ATION OF ELECTRONIC
	CC	ONTROL VALVE, DISCONNECT AND RE	MOVE EXISTING SPACE TEMPERATUR	RE SENSOR INLCUDING ASSOCIATED	PNEUMATIC TUBING AN

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EX FTR-WALL SENSOR



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1 1/4" HWS 5/8" REFRIGERANT SUCTION- 1 1/4" HWR 5/8" REFRIGERANT SUCTION- 1 1 1/4" HWR 5/8" REFRIGERANT SUCTION- 1 1/4" HWR 5/8" REFRIGERANT SU	5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID DOWN TO UV PIPING CABINET PIPING TUNNEL
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
6TH GRADE CLASSROOM 204 5/8" RS 5/8" RS 5/8" RS 5/8" RS 5/8" RL 6TH GRADE CLASSROOM 208	6TH GRADE CLASSROOM
- 3/4" REFRIGERANT LIQUID- 1-3/8" REFRIGERANT SUCTION UP TO HEAT PUMP HP-MS-4 ON ROOF 206 206 206 206 206 206 206 206	7/8" REFRIGERANT LIQUID- 1-1/2" REFRIGERANT SUCTION UP TO HEAT PUMP HP-6 ON ROOF 27 27 27 27 27 27 27 27 27 27
-X X X X X X	EXISTING EA RISER UP TO EF-MS-3 ON ROOF
2 1 3/8" RS 5/8" RL 7TH GRADE CLASSROOM 5/8" RL 205 5/8" RL 205 9 5/8" RL 5/8" RL 205 9 5/8" RL 5/8" RL 205 1 1/8" RS 3/8" RL 5/8" RS 3/8" RL 5/8" RS 3/8" RL 5/8" RS 3/8" RL 5/8" REFRIGERANT SUCTION- 3/8" RL 5/8" RS 3/8" RL 5/8" REFRIGERANT SUCTION- 3/8" RL 5/8" REFRIGERANT SUCTION- 3/8" RL 7/8" RL 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID 5/8" REFRIGERANT SUCTION- 3/8" REFRIGERANT LIQUID 11/2" RS 207 CABINET DIPING 207 CABINET DIPING	SA RISER UP TO MAU-MS-1 ON ROOF 5/8" RS 3/8" RL 3/8" RL 7/8" RS 3/8" REFRIGERANT LIQUID- 7/8" REFRIGERANT SUCTION DOWN TO FIRST FLOOR CEILING
CABINET PIPING TUNNEL CABINET PIPING TUNNEL 1 UV-MS-17 9 4 33 1 9 4 33 1 1 4 33 1 1 4 1 4 1 4 1 4 1 5 4 5	7TH GRADE 3/8" RL CLASSROOM 5/8" RS 212
EXISTING 1" HWR DOWN TO FIRST FLOOR	EXISTING EA RISER UP TO GRAVITY RELIEF VENTILATOR ON ROOF 2 7TH GRADE CLASSROOM
EXISTING EA RISER UP TO EF-5 ON ROOF 20 20 20 20 20 20 20 20 20 20 20 20 20	7TH GRADE CLASSROOM 216 3/8" RL 5/8" RS -3/8" RL
4" HWS 22 SMALL INST. VS DOWN VS DOWN VS DOWN Call Call Call Call Call Call Call Call	7/8" RS 3/8" RL 5/8" RS 3/4
	В
13 12 11 10 9	8

(33) PROVIDE 1" CONDENSATE DRAIN PIPING DROP DOWN TO FIRST FLOOR AT LOCATION SHOWN FROM WITHIN UV PIPING TUNNEL SYSTEM. (3A) LOCATION OF TYPICAL CEILING MOUNTED RELIEF AIR REGISTER DUCTED THROUGH CORRIDOR WALL TO CORRIDOR CEILING PLENUM, TERMINATED OPEN-ENDED ABOVE CEILING

TUNNEL SYSTEM OF UV-MS-17. (32) ROUTE 3/4" CONDENSATE DRAIN PIPING FROM DRAIN PAN OUTLET OF UV-MS-17 WITHIN UV PIPING TUNNEL SYSTEM AND CONNECT TO 3/4" HORIZONTAL DRAIN PIPING ROUTED FROM UV-MS-17. AT POINT OF COMBINING TWO UV CONDENSATE DRAINS, INCREASE HORIZONTAL CONDENSATE DRAIN PIPING TO 1", THEN ROUTE THROUGH UV PIPING TUNNEL SYSTEMS TO POINT OF DROP DOWN TO FIRST FLOOR AS OUTLINED ON KEYED NOTE 33.

(31) ROUTE 3/4" CONDENSATE DRAIN PIPING FROM DRAIN PAN OUTLET OF UV-MS-20 WITHIN UV PIPING TUNNEL SYSTEM AND CONNECT TO HORIZONTAL DRAIN PIPING WITHIN PIPING

MANUFACTURER'S RECOMMENDATIONS.

30 PROVIDE UL-207 LISTED EXPANSION LOOP FOR THE 5/8" REFRIGERANT LIQUID AND 1-1/4" REFRIGERANT SUCTION LINES AT LOCATION SHOWN. THE 5/8" LOOP SHALL BE 28-1/2" LONG x 193/4" HIGH. THE 1-1/4" LOOP SHALL BE 30" LONG x 23" WIDE. PROVIDE PIPE GUIDES ON EITHER SIDE OF LOOP AND PIPE ANCHORS AT END OF PIPING RUNS PER

CONTROLLER. PROVIDE CONTROL WIRING FROM REPLACEMENT SENSOR TO UV CONTROLLER AS REQUIRED. PROVIDE REPLACEMENT SPACE TEMPERATURE SENSOR TIED TO UV-MS-22 DDC CONTROLLER. PROVIDE CONTROL WIRING FROM REPLACEMENT SENSOR TO UV CONTROLLER AS REQUIRED.

PROVIDE REPLACEMENT TEMPERATURE SENSOR AT LOCATION SHOWN AND UTILIZE FOR SPACE TEMPERATURE CONTROL OF UNIT VENTILATOR AS REQUIRED. PROVIDE

(29) PROVIDE UL-207 LISTED EXPANSION LOOP FOR THE 7/8" REFRIGERANT LIQUID AND 1-1/2" REFRIGERANT SUCTION LINES AT LOCATION SHOWN. THE 7/8" LOOP SHALL BE 28-3/4" LONG x 21" HIGH. THE 1-1/2" LOOP SHALL BE 31" LONG x 25" WIDE. PROVIDE PIPE GUIDES ON EITHER SIDE OF LOOP AND PIPE ANCHORS AT END OF PIPING RUNS PER

SUCTION/LIQUID REFRIGERANT PIPING WITHIN HORIZONTAL ENCLOSURE TO UV PIPING TUNNEL. (19) PROVIDE 18" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE UNIT BETWEEN WALL AND END OF UV UTILITY COMPARTMENT AT LOCATION SHOWN. ROUTE HWR PIPING AND SUCTION/LIQUID REFRIGERANT PIPING WITHIN HORIZONTAL ENCLOSURE TO UV PIPING TUNNEL. (20) CONNECT TO EXISTING 1-1/4" HWS/R RISERS ABOVE FLOOR PENETRATIONS AT CONNECTION POINTS SHOWN AND ROUTE HWS/R TO RADIATOR UNITS AS REQUIRED.

(22) PROVIDE HORIZONTAL AND VERTICAL TRIM COVERS AT LOCATIONS SHOWN TO CONCEAL THE HWS/HWR PIPNG SERVING R-MS-1/R-MS-2 FURNISHED BY THE RADIATOR MANUFACTURER, WITH HEIGHT AND DEPTH OF TRIM COVER TO MATCH THE RADIATOR HEIGHT AND DEPTH.

PROVIDE SPACE TEMPERATURE SENSOR AT LOCATION SHOWN. PROVIDE CONTROL WIRING FROM SENSOR TO CONTROL VALVE SERVING RADIATOR UNITS R-MS-1/R-MS-2 AS

23 PROVIDE 3/4" EXPANSION COMPENSATOR FLEXIBLE CONNECTOR AT LOCATION SHOWN BETWEEN TWO RADIATOR UNITS R-MS-1 AND R-MS-2. INSTALL THE FLEXIBLE CONNECTOR IN A U-BEND FORMAT WITH THE U FACING DOWN. CONNECT THE OUTLET PIPING FROM R-MS-1 TO THE INLET OF R-MS-2. PROVIDE A HORIZONTAL WALL TRIM COVER OVER THE

PROVIDE MOTORIZED DAMPER WITHIN EXISTING EA DUCT RISER. MODIFY EA RISER AS REQUIRED FOR DAMPER INSTALLATION. TIE CONTROL OF DAMPER TO OPERATION OF

DISCONNECT AND REMOVE EXISTING 2-WAY PNEUMATIC CONTROL VALVE WITHIN EXISTING FIN TUBE ENLCOSURE SYSTEM. DISCONNECT AND REMOVE ALL PNEUMATIC TUBING BACK TO PNEUMATIC MAIN. PROVIDE ELECTRONIC 2-WAY CONTROL VALVE RATED AT 1.5 GPM AT LOCATION OF REMOVED PNEUMATIC CONTROL VALVE. MODIFY HWS BRANCH

PIPING AS REQUIRED FOR INSTALLATION OF ELECTRONIC CONTROL VALVE. PROVIDE SPACE TEMPERATURE SENSOR AT LOCATION SHOWN AND TIE OPERATION OF CONTROL

DISCONNECT AND REMOVE DAMAGED SPACE TEMPERATURE SENSOR AT LOCATION SHOWN AND PROVIDE REPLACEMENT SPACE TEMPERATURE SENSOR TIED TO UV-MS-21 DDC

ROOFTOP EXHAUST FAN CONNECTED TO EA RISER. PROVIDE CONTROL RELAY TO EXISTING EXHAUST FAN AND TIE OPERATION OF EXHAUST FAN TO DDC SYSTEM.

PIPING AND FLEXIBLE CONNECTOR BETWEEN THE TWO RADIATOR UNITS FURNISHED BY THE RADIATOR MANUFACTURER, WITH HEIGHT AND DEPTH OF TRIM COVER TO MATCH

(18) PROVIDE 18" HIGH x 5" DEEP HORIZONTAL PIPING ENCLOSURE UNIT BETWEEN WALL AND END OF UNIT VENTILATOR AT LOCATION SHOWN. ROUTE HWS PIPING AND

10

11

12 KEYED NOTES (CONTINUED):

13

21) REQUIRED

THE RADIATOR HEIGHT AND DEPTH.

MANUFACTURER'S RECOMMENDATIONS.

PLENUM FOR RELIEF AIR OF CLASSROOMS.

VALVE/SENSOR INTO EXISTING SIEMENS DDC SYSTEM.

CONTROL WIRING BETWEEN SENSOR AND UNIT VENTILATOR UV-MS-17 DDC CONTROLLER AS REQUIRED.

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6	5	4	3	2	1
GENERAL NOT	ES:				
1. REFRIG A MINIM	ERANT PIPING NOTE: 90 DEGREE ELE IUM OF 40" FROM ANOTHER BRANCH	3OWS SHALL BE KEPT A MINIMUM OF 2 'Y' CONNECTOR JOINT.	20" FROM BRANCH CONNECTOR 'Y' JO	DINTS. IN ADDITION, BRANCH CONNEC	CTOR 'Y' JOINTS SHALL BE
2. REFRIG	ERANT PIPING NOTE: THE HEAT PUM	P SYSTEM MANUFACTURER SHALL IN	SPECT ALL FIELD INSTALLED REFRIG	ERANT PIPING PRIOR TO INSULATION	INSTALLATION.
3. THE EXI DISCON SUSPEN SHALL E DURING	STING SUSPENDED CEILING SYSTEM NECTED AND REMOVED TO ALLOW F IDED CEILING GRID SYSTEMS SHALL BE REMOVED AS REQUIRED TO COMP THE INSTALLATION WORK SHALL BE	IS LOCATED WITHIN THE SCOPE OF W OR THE INSTALLATION WORK AND RE BE REMOVED AND MODIFIED TO COM PLETE THE WORK AND REINSTALLED F REPLACED BY THE MECHANICAL COM	ORK AREA OUTSIDE OF AREAS BEIN INSTALLED FOLLOWING COMPLETIO PLETE THE WORK AND REINSTALLED OLLOWING THE COMPLETION OF TH NTRACTOR TO MATCH THE EXISTING	G RENOVATED BY THE GENERAL CON N OF THE WORK BY THE MECHANICAL D FOLLOWING THE COMPLETION OF W E INSTALLATION WORK. ANY CEILING CEILING TILES.	ITRACTOR SHALL BE CONTRACTOR. THE ORK. THE CEILING TILES TILES DAMAGED
4. ALL CUT MATCH SECTIO	ITING, PATCHING, AND FIREPROOFIN EXISTING CONDITIONS. ALL REFRIGE N 078400.	IG ASSOCIATED WITH THE INSTALLATI RANT PIPING AND CONDENSATE PIPI	ON WORK SHALL BE COMPLETED BY NG PENETRATIONS THROUGH CORRI	THE MECHANICAL CONTRACTOR. PA IDOR WALLS SHALL BE FIREPROOFED	TCHED AREAS SHALL PER SPECIFICATION
5. ROUTE CONNEC	REFRIGERANT SUCTION AND LIQUID CTOR 'Y' JOINTS PER THE DRAWING.	PIPING FROM THE UNIT VENTILATOR CONFIRM PIPING SIZES AND BRANCH	DX COIL CONNECTIONS TO THE HEAT CONNECTOR 'Y' JOINT LOCATIONS R	T PUMP UNITS. SIZE PIPING AND PROV EQUIRED WITH HEAT PUMP SYSTEM I	/IDE BRANCH MANUFACTURER.
6. ROUTE THE RO	REFRIGERANT PIPING THROUGH THE OF PENETRATION OF EACH HEAT PU	E ROOF TO THE ROOF MOUNTED HEA' MP SYSTEM.	T PUMP SYSTEMS. PROVIDE A PIPE C	URB AND SIDE REFRIGERANT PIPIPN	G OUTLET PORTAL AT

7. THE SMALLEST VOLUME ROOM THAT THE REFRIGERANT PIPING SYSTEMS ROUTE THROUGH FOR EACH OF THE HEAT PUMP SYSTEMS IS BELOW THE ASHRAE STANDARD 15

REFRIGERANT CONCENTRATION LIMIT OF 26 POUNDS PER 1,000 CUBIC FEET OF ROOM VOLUME FOR OCCUPIED SPACES. 8. PROVIDE FIRESTOPPING PER SPECIFICATION SECTION 078400 AT ALL PIPING PENETRATIONS THROUGH CORRIDOR WALLS AND STORAGE ROOM WALLS.

9. THE UV UTILITY COMPARTMENT SHALL INCLUDE A REMOVABLE FRONT PANEL, STANDARD #1/4-20 HEX FASTENER, STEEL TOP AND BACK WALL F-CHANNEL.

10. ROUTE REFRIGERANT SUCTION-LIQUID PIPING WITHIN UNIT VENTILATOR PIPING TUNNELS AND UNIT VENTILATOR SHELVING SYSTEM TUNNELS TO DX COOLING COIL CONNECTIONS AND UV EXPANSION VALVE KITS PER THE MANUFACTURER'S RECOMMENDATIONS.

LEGEN	D:
UV-MS-XX	UNIT VENTILATOR
1	UV-WALL SENSOR
EX FTR	EXISTING FIN TUBE RADIATO
T	EX FTR-WALL SENSOR
R-MS-X	HEATING WATER RADIATION
T	RAD-WALL SENSOR

PROJECT NUMBER: 2111002.00

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GENI	ERAL NOTES:					
1.	REFRIGERANT PIPING NOTE: 90 I A MINIMUM OF 40" FROM ANOTHI	DEGREE ELBOWS SHALL BE KEPT A ER BRANCH 'Y' CONNECTOR JOINT.	A MINIMUM OF 20" FROM BRANCH C	CONNECTOR 'Y' JOINTS. IN ADDITION, I	BRANCH CONNECTOR 'Y' JOINTS SHALL	BE
2.	REFRIGERANT PIPING NOTE: THE	E HEAT PUMP SYSTEM MANUFACTU	JRER SHALL INSPECT ALL FIELD IN	STALLED REFRIGERANT PIPING PRIOF	R TO INSULATION INSTALLATION.	
3.	THE EXISTING SUSPENDED CEILI DISCONNECTED AND REMOVED SUSPENDED CEILING GRID SYST SHALL BE REMOVED AS REQUIRI DURING THE INSTALLATION WOR	NG SYSTEMS LOCATED WITHIN TH TO ALLOW FOR THE INSTALLATION EMS SHALL BE REMOVED AND MOI ED TO COMPLETE THE WORK AND I K SHALL BE REPLACED BY THE ME	E SCOPE OF WORK AREA OUTSIDE WORK AND REINSTALLED FOLLOW DIFIED TO COMPLETE THE WORK A REINSTALLED FOLLOWING THE CO CCHANICAL CONTRACTOR TO MATC	E OF AREAS BEING RENOVATED BY TH VING COMPLETION OF THE WORK BY ND REINSTALLED FOLLOWING THE CO MPLETION OF THE INSTALLATION WO CH THE EXISTING CEILING TILES.	IE GENERAL CONTRACTOR SHALL BE THE MECHANICAL CONTRACTOR. THE OMPLETION OF WORK. THE CEILING TIL RK. ANY CEILING TILES DAMAGED	.ES
4.	ALL CUTTING, PATCHING, AND FI MATCH EXISTING CONDITIONS. A SECTION 078400.	REPROOFING ASSOCIATED WITH T LL REFRIGERANT PIPING AND CON	HE INSTALLATION WORK SHALL BE IDENSATE PIPING PENETRATIONS	E COMPLETED BY THE MECHANICAL C THROUGH CORRIDOR WALLS SHALL E	ONTRACTOR. PATCHED AREAS SHALL BE FIREPROOFED PER SPECIFICATION	
5.	ROUTE REFRIGERANT SUCTION CONNECTOR 'Y' JOINTS PER THE	and Liquid Piping from the Unit Drawing. Confirm Piping Sizes	F VENTILATOR DX COIL CONNECTIO S AND BRANCH CONNECTOR 'Y' JOI	ONS TO THE HEAT PUMP UNITS. SIZE I NT LOCATIONS REQUIRED WITH HEAT	PIPING AND PROVIDE BRANCH PUMP SYSTEM MANUFACTURER.	

6. ROUTE REFRIGERANT PIPING THROUGH THE ROOF TO THE ROOF MOUNTED HEAT PUMP SYSTEMS. PROVIDE A PIPE CURB AND SIDE REFRIGERANT PIPIPNG OUTLET PORTAL AT 7. THE SMALLEST VOLUME ROOM THAT THE REFRIGERANT PIPING SYSTEMS ROUTE THROUGH FOR EACH OF THE HEAT PUMP SYSTEMS IS BELOW THE ASHRAE STANDARD 15

REFRIGERANT CONCENTRATION LIMIT OF 26 POUNDS PER 1,000 CUBIC FEET OF ROOM VOLUME FOR OCCUPIED SPACES.

8. PROVIDE FIRESTOPPING PER SPECIFICATION SECTION 078400 AT ALL PIPING PENETRATIONS THROUGH CORRIDOR WALLS AND STORAGE ROOM WALLS.

10. ROUTE REFRIGERANT SUCTION-LIQUID PIPING WITHIN UNIT VENTILATOR PIPING TUNNELS AND UNIT VENTILATOR SHELVING SYSTEM TUNNELS TO DX COOLING COIL CONNECTIONS AND UV EXPANSION VALVE KITS PER THE MANUFACTURER'S RECOMMENDATIONS.

LEGENI	D:
UV-MS-XX	UNIT VENTILATOR
T	UV-WALL SENSOR
EX FTR	EXISTING FIN TUBE RADIATO
1	EX FTR-WALL SENSOR

HIGH SCHOOL

DWG	DESCRIPTION	DWG	DESCRIPT	ΓΙΟΝ
001 001A 110 110A 110B 110C 111 111 111B 111C 112 112A 112B 112C 113 112A 112B 112C 113 113A 113B 113C 113 113A 113B 113C 114 114 114 114 114 114 115 115A 115B 116 116 116	SCHEDULES FLN SCHEDULE VALVE SCHEDULE AFMS SCHEDULE CONTROL DRAWINGS RISER RISER HS-BC-HS-01 (BOM/SOO) HS-BC-HS-01 (BOM/SOO) HS-BC-HS-01 (BCH) HS-BC-HS-01 (ELEC) HS-BC-HS-02 (BOM/SOO) HS-BC-HS-02 (BOM/SOO) HS-BC-HS-02 (ELEC) HS-BC-HS-03 (BOM/SOO) HS-BC-HS-03 (BOM/SOO) HS-AHU-HS-03 (BOM/SOO) HS-AHU-HS-03 (ELEC) HS-AHU-HS-03 (ELEC) HS-AHU HW COIL (BOM/SOO) HS-AHU HW COIL (BOM/SOO) HS-AHU HW COIL (ELEC) HS-AHU HW COIL (ELEC) HS-RTU (RTU-HS-4,5) (BOM/SOO) HS-RTU (RTU-HS-4,5) (BOM/SOO) HS-RTU (RTU-HS-4,5) (ELEC) HS-RTU (RTU-HS-4,5) (ELEC) HS-EXHAUST FANS (BOM/SOO) HS-EXHAUST FANS (BOM/SOO) HS-EXHAUST FANS (ELEC) HS-UNIT VENTILATOR (BOM/SOO) HS-UNIT VENTILATOR (SOO)	410A 411 411A 412 412A 413 413A 413 413A E01 E01A E02 E02A E02B E03 E03A E03B N01 N01A N01A N01B N01C N01D N01E N02 N02A N02B N02C N02F N03 N03A	CONTROL DR HS-CONVEC HS-RADIATO HS-RADIATO HS-CABINET HS-CABINET HS-UNIT HE HS-UNIT HE HS-UNIT HE DDC PANEL L HIGHPXC22 HIGHPXC22 HIGHPXM03 HIGHPXM03 HIGHPXM03 HIGHPXM05 HIGHPXM05 HIGHPXM05 HIGHPXM05 NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.BAS NAN.HS.PH.F NAN.HS.PH.F NAN.HS.PH.F NAN.HS.PH.F NAN.HS.PH.F NAN.HS.PH.F	AWINGS TOR (MECH/ELEC) OR COIL (BOM/SOO OR COIL (MECH/ELE UNIT HEATER (B UNIT HEATER (M ATER (BOM/SOO) ATER (MECH/ELEC AYOUTS & INSTALL (BOM) (LAYOUT) (LAY
210 210A 210A 210B 410	HS-HEAT EXCHANGER (BOM/SOO) HS-HEAT EXCHANGER (MECH) HS-HEAT EXCHANGER (MECH) HS-HEAT EXCHANGER (ELEC) HS-CONVECTOR (BOM/SOO)		THERMOSTAT	LOCATION SUBMIT
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R0 2/16/2024 VB ISSUED FOR APPROVAL		IC. Phone:	(973) 575-6300	VB VB N

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LATION DRAWINGS

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System								Network			MB-TCP: Modbus TCP dev	e / Equipment	t					Grouping Room	n Airflow		Supply	VAV Termina	al			Ex	tract / Exhaust VAV T	erminal	Ro	oom Opera	ator Unit	Comments
						ý o	(e)	sn og		ag Iress								Minim	ium Airflow (CFN	1) Pressuri	ization Airflow ((CFM)		3	Duct Size (in)	Air	flow (CFM)	Duct Size (in)			e tons	2
ltem	Device Name	Floor	Room No	Room / Device Description	Equipment ID	Siemens Dwg. h Mech Dwg No	Serrved By (Airsi	Installation stall FLN Network N	Network Type	WAC / Device Add	nce No. IP Address Type	Equipmer Controlle	ent Coil Type Ra	adiation Type Rad Relay Qty	Field Power E Source	Device Load (VA)	XFMR Load (VA) Install Check (Initial)	Group Master	Pre.comfort / Occ Economy / Uno	Protection / Vac Pressurization M	Transferred / Off Arflow Win	lg SAV Clg Max	SAV Htg SAV Htg SAV Vent SAV Vent Min Max	SAV Smoke Flo	SAV Shape	SAV H/D SAV W	W Vent EAV Vent Min Max	Furge (Fume Ho EAV Shape	H/D EAV W annual Competition	Humidity CO2	User Interface Lighting Pushbut	
1	HS.1F.EX.UV.1	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	S UV -	-	UV-XFMR	20.5	20.5 / 9999	Master											x	(x	
2	HS.1F.EX.UV.2	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	3 UV -	-	UV-XFMR	20.5	20.5 / 9999	Master											x	¢	x	
3	HS.1F.EX.UV.3	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA I	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	ιυν -		UV-XFMR	20.5	20.5 / 9999	Master											×	(x	
4	HS.1F.EX.UV.4	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	s uv -	-	UV-XFMR	20.5	20.5 / 9999	Master											x	¢	x	
5	HS.1F.EX.UV.5	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	3 UV -	-	UV-XFMR	20.5	20.5 / 9999	Master											x	(x	
6	HS.1F.EX.UV.6	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	s uv	-	UV-XFMR	20.5	20.5 / 9999	Master											x	¢	x	
7	HS.1F.EX.UV.7	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	s uv -	-	UV-XFMR	20.5	20.5 / 9999	Master											x	¢	x	
8	HS.1F.EX.UV.8	1st Floor	NA	Classroom	EX UV-1	116B HS-M106	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	EXISTING	s uv -	-	UV-XFMR	20.5	20.5 <i>1</i> 9999	Master											x	¢	x	
9	HS.1F.CV.HS.1	1st Floor	126	Cafeteria	CV-HS-1	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												x	(x	
10	HS.1F.CV.HS.2	1st Floor	126	Cafeteria	CV-HS-2	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80															CV-HS-1 & CV-HS-2 shares same thermostat.
11	HS.1F.CV.HS.3	1st Floor	50	Corridor	CV-HS-3	410A HS-M109	NA I	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												×	(x	
12	HS.1F.CV.HS.4	1st Floor	50	Corridor	CV-HS-4	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												x	(x	
13	HS.1F.CV.HS.5	1st Floor	50	Corridor	CV-HS-5	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80															CV-HS-4 & CV-HS-5 shares same thermostat.
14	HS.1F.CV.HS.7	1st Floor	NA	Stor	CV-HS-7	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												×	(x	
15	HS.1F.CV.HS.8	1st Floor	NA	Storage	CV-HS-8	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												×	(x	
16	HS.1F.CV.HS.9	1st Floor	NA	Storage	CV-HS-9	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												×	(x	
17	HS.1F.CV.HS.10	1st Floor	3	Toilet	CV-HS-10	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												x	(x	
18	HS.1F.CV.HS.11	1st Floor	1	Kitchen Storage 1	CV-HS-11	410A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												x	(x	
19	HS.1F.CUH.HS.3	1st Floor	-	Kitchen	СИН-НS-З	413A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	DXF	CABINET U HEATER	UNIT -		XFMR-1-CKT- 2	16.4	16.4 <i>1</i> 80	Master											x	(x	
20	HS.1F.R.2.3.R.2.4	1st Floor	126	Cafeteria	R-2-3 R-2-4	411A HS-M109	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 1	6	72/80												×	(x	R-2-3,4 shares same thermostat.
21	HS.1F.R.2.1.R.2.2	1st Floor	5	Dining 2	R-2-1 R-2-2	411A HS-M109	NA P		BAC-M1		BACn T'sta	et			XFMR-1-CKT- 1	6	72/80												x	(x	R-2-1,2 shares same thermostat.
22	HS.1F.RTU.HS.4	1st Floor	5	Dining 2	RTU-HS-4	114B HS-M109	NA P	NOTE 1	BAC-M2	NOTE 1	Third Part	;																	x	(x	Manufacturer supplied thermostat
23	HS.1F.RTU.HS.5	1st Floor	126	Cafeteria	RTU-HS-5	114B HS-M109	NA P		BAC-M2	NOTE 1	Third Part	;																	x	(x	Manufacturer supplied thermostat
24	HS.BAS.R.3.1	Basement	237	Office	R-3-1	411A HS-M107	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 <i>1</i> 80												×	(x	
25	HS.BAS.R.1.4	Basement	244	Trainer	R-1-4	411A HS-M107	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 <i>1</i> 80												x	(x	
26	HS.BAS.R.1.5	Basement	243	Office	R-1-5	411A HS-M107	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 <i>1</i> 80												x	(x	
27	HS.BAS.R.1.7	Basement	226	Office	R-1-7	411A HS-M107	NA	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 <i>1</i> 80												×	(x	
28	HS.BAS.R.1.1	Basement	229	Locker	R-1-1	411A HS-M107	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 / 80												×	(x	
29	HS.BAS.R.1.2	Basement	228	W Toilet	R-1-2	411A HS-M107	NA	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 / 80												×	(x	
30	HS.BAS.R.1.3	Basement	227	M Toilet	R-1-3	411A HS-M107	NA P	NOTE 1	BAC-M1	NOTE 1	BACn T'sta	et t			XFMR-1-CKT- 3	6	64.4 <i>1</i> 80												×	<	x	

						Installation S	Status Key					Network Ty	e Key				h	stallation Checkl	ist	Pressurization M	lode Key			GENERAL NOTES							REVISIO	N HISTORY		
Sieme Smart Fiel NA	INTERNS Infrastructure d-Level Network Devic NUET BOND PHASI	e Schedule E 3-HIGH SC	HOOL			N: new installe E: existing, to M: existing, to R: existing, to	llation o remain to be modified o be removed	d				8AC-IP: BAC BAC-M2: BA KNX: KNX d P1-1: P1 FL P1-2: P1 FL M&RTU: M MB-TCP: MC	et IP FLN device net MS/TP FLN device - FLN 1 net MS/TP FLN device - FLN 2 ice device - FLN 1 device - FLN 2 device - FLN 2 device - FLN 3 bus RTU device bus TCP device					Device mounted? Power connected? Network connecte Actuator(s) wired? Sensor(s) wired? Flow tubes connec	d? ted?	+ : Positive press - : Negative pres Ø : Neutral press	ure sure ure	1. IP ADDRESS, INSTANC	E NUMBER, M	C ADDRESS, FLN	NO TO BE FIEL	D CO-ORDINAT	ED.	1 5/21/202	DWN CHK 4 VB NSK 4 VB NSK	ISSUED FOR A	PPROVAL PER COMMEN	DES	CRIPTION	
System									Network				Device / Equipment					Group	ping Ro	om Airflow		Supply VAV Terminal					E	xtract / Exhaust	VAV Terminal		Ro	om Operator Un	t Comments	
Item	Device Name	Floor	Room No	Room / Device Description	Equipment ID	Siemens Dwg. No .	Mech Dwg No	Served By (Airside)	Installation Status FLN Network No	Net work Type	IP Line / Loop Tag	Instance No. IP Addres	Type Equipment Controlled	Coil Type	Radiation Type R	Rad Jive Field Power Devic elay Source (1 Qty	e Load XFMR Load (VA)	stall Check (Initial) Gr	Mir oup Master	Protection / Vacant / Unocc / Protection / Vacant / Protection / Vacant / Protection / Vacant / Unocc / Vaca	Pressurization Mode Transferred / Offset Airflow	SAV Clg SAV Clg SAV Fi Min Max Mii	Htg SAV Htg n Max	AV Vent SAV Vent Min Max	SAV Smoke Flow	t Size (in)	SAV W	rflow (CFM) AV Vent EAV Ver Min Max	Smoke (General EAV) Purge (Fume Hood)	EAV H/D	EAV W	Humidity CO2 User Interface	Lighting Pushbuttons	
31	HS.BAS.R.1.6	Basement	48	Locker	R-1-6	411A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	BACnet Tstat			XFMR-1-CKT- 3	6 64.4 <i>1</i> 80														×	x		
32	HS.BAS.UH.HS.1	Basement	240	Mechanical Room	UH-HS-1	414A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	DXR UNIT HEATER	-	-	XFMR-1-CKT- 3 1	6.4 64.4 <i>1</i> 80		Master												×	x		
33	HS.BAS.BC.HS.1	Basement	45	Art Room	BC-HS-1	110A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	PXCC			XFMR-1-CKT- 3	- 64.4 / 80														×	x		
34	HS.BAS.BC.HS.2	Basement	43	Computer Room	BC-HS-2	110A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	РХСС			XFMR-1-CKT- 3	- 64.4 <i>1</i> 80														>	x		
35	HS.BAS.CUH.HS.1	Basement	-	-	CUH-HS-1	413A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	DXR CABINET UNIT HEATER	-	-	XFMR-1-CKT- 4 1	5.4 ^{32.8} / 80		Master												×	x		
36	HS.BAS.CUH.HS.2	Basement	-	Basement Storage Room	CUH-HS-2	413A HS-I	-M107	NA	N NOTE 1	BAC-M1	NC	TE 1	DXR CABINET UNIT HEATER	-		XFMR-1-CKT- 4	5.4 32.8 <i>1</i> 80		Master												×	x		

SIEMEN	S INDUST	RY, INC.				V	/alve S	ubmitt	tal - St	team								
SMART I	NFRASTRU	CTURE																
LOCATION:	1	NANUET, NY	,				PROJI	ECT NAM	IE: NAN	UET BON	ND PHASE	E3 HIGH	SCHC D	DATE:		2/16	6/24	
JOB NO:	4	4OP-366733											PA	GE:		1		
ENGR:	S	5N											R	REV:		0		
GENERAL N 1. All valves 2 2. All control 3. Standard a BODY TYPE NOC - Ba	OTES: 2-1/2" and larger valves and wells abbreviations use S: 3W - Three we Il Valve can be N.	have flanged shall be instal d on control va ay; 2W - Two O. or N.C.; BF	ends, 2" and led by the me alves are: way; A - Ang - Butterfly V	smaller echanica gle; N.C. /alve; DS	have so Il contra - Norm 5 - Doub	crewed e actor. ally Clos ble Seate	ends. ed; N.O ed;	· Normally	[,] Open;	UNITS Steam indicate	inlet pres ed in PSI (TOR TY CR - Ca	sure, act G. PES: SR apacitor [ual press - Spring I Driven Re	ure drop, Return; N turn; DA	and shut NSR - No - Double	t off pr Spring Acting	essure Returr	١
Valve Qty ID/ Location	Product N	umber	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (lb/hr)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mechanic	al System: 210	D_HS-HEAT E	XCHANGER	2				HS-H		IANGER	(MECH)						
V-1 1	294-060)52	4.00	2W (Globe	160.00	NC-SR	5.00	3,430.00	N/A	N/A	N/A	7.00	2.55	155 304	39	125	2/3 V-HX-HS-2
V-2 1	291-060	051	3.00	2W (Globe	100.00	NC-SR	2.00	1,715.00	N/A	N/A	N/A	7.00	1.60	155 304	63	125	1/3 V-HX-HS-2

NOTES: All control valves and wells shall be installed by the heating contractor.

SIEMENS	INDUSTRY, INC.				V	/alve S	ubmitt	al - V	later								
SMART INF	RASTRUCTURE																
LOCATION: JOB NO: ENGR:	NANUET, NY 440P-366733 SN					PROJE	ECT NAME	II NAN	iuet Boi	nd phase	3 HIGH S	SCHC D Pag R	PATE: E: REV:		2/16 2 0	/24	
GENERAL NOT 1. All valves 2-1/ 2. All control valves 3. Standard abbi BODY TYPES: NOC - Ball Valves	ES: '2" and larger have flanged e ves and wells shall be installe reviations used on control va 3W - Three way; 2W - Two alve can be N.O. or N.C.; BF	ends, 2" and ed by the me ilves are: way; A - Ang - Butterfly V	smaller chanica le; N.C. alve; DS	have sc il contra - Norma 5 - Dout	rewed e ctor. ally Clos de Seate	:nds. ed; N.O ed;	Normally	Open;	UNITS Steam indicat	S: inlet press ed in PSIC ATOR TY CR - Ca	sure, acti 5. P ES: SR pacitor D	ual pressi - Spring I Driven Re	ure drop, Return; M turn; DA	, and shut NSR - No - Double	off pro	essure Returr	1
Valve Qty ID/ Location	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design I P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mechanical S	System: 110_HS-BLOWE	R COIL UN	IT				HS-BC	C-HS-1 (MECH)								
V-1 1	262-02058	0.50	2W (Globe	4.00	NO-SR	5.00	8.00	N/A	N/A	N/A		4.00	155 306	65	250	BC-HS-01
Mechanical S	System: 111_HS-BLOWE	R COIL UN	IT				HS-BC	C-HS-02	(MECH)								
V-2 1	262-02055	0.50	2W (Globe	2.50	NO-SR	5.00	5.00	N/A	N/A	N/A		4.00	155 306	65	250	BC-HS-02
Mechanical S	System: 112_HS-AHU-03	3 UNIT					HS-AF	1U-HS-0	3 (MECI	H)							
V-3 1	274-03133	1.50	2W (Globe	25.00	NC-SR	5.00	45.90	N/A	N/A	N/A		3.37	155 304	73	250	HWV AHLEHS-3
Mechanical S	System: 113_HS-AHU H	N COIL					HS-Ał	IU HW C	OIL (M	ECH)							
V-4 1	274-03150	1.25	3W (Globe	16.00	SR	5.00	28.50	N/A	N/A	N/A		3.17	155 304	117	250	HWV FX-AHI I-2
V-5 1	274-03113	1.00	2W (Slobe	10.00	NO-SR	5.00	20.23	N/A	N/A	N/A		4.09	155 304	201	250	HWV AC-1
V-6 1	274-03150	1.25	3W (Globe	16.00	SR	5.00	26.66	N/A	N/A	N/A		2.78	155 304	117	250	HWV FX-AHI J-1
Mechanical S	System: 210_HS-HEAT E	XCHANGER	<u> </u>				HS-HE	EAT EXC	HANGE	R (MECH)							
V-7 1	274-06616	3.00	2W (Globe	100.00	NC-SR	10.00	250.00	N/A	N/A	N/A		6.25	154067	200	125	CRAWL SPACE
Mechanical S	System: 410_HS-CONVE	CTOR (MEC	:Н)				HS-CC)NVECT(OR (MEG	CH)							
V-8 1	262-02047	0.50	2W (Jobe	0.40	NO-SR	3.00	0.38	N/A	N/A	N/A		0.92	155 306	120	250	CV-HS-9
NOTES: All co	ntrol valves and wells shall b	e installed by	y the he	ating co	ntractor	·.											

SIEN		NS INDUSTRY, INC.				١	/alve S	ubmitt	al - V	Vater								
LOCAT JOB N ENGR:	R I [ION 0:	INFRASTRUCTORE NANUET, NY 440P-366733 SN					PROJ	ECT NAM	E: NAI	NUET BOI	ND PHASI	E3 HIGH S	SCHC E Pac F	DATE: GE: REV:		2/16 3 0	/24	
GENER 1. All v 2. All c 3. Stan BODY NO	RAL alves ontro dard TYP C - B	NOTES: 5 2-1/2" and larger have flanged of bl valves and wells shall be install abbreviations used on control va ES: 3W - Three way; 2W - Two va all Valve can be N.O. or N.C.; BF	ends, 2" anc ed by the m alves are: way; A - Ang - Butterfly \	l smaller echanica gle; N.C. /alve; D	r have sc al contra Norm S - Doub	ctor. ally Clos	ends. sed; N.O ed;	· Normally	Open;	UNITS Steam indicat	5: inlet pres ed in PSI ATOR TY CR - Ca	ssure, acti G. ' PES: SR apacitor D	ual press - Spring Driven Re	ure drop, Return; I turn; DA	, and shut NSR - No - Double	t off pro Spring Acting	essure Return	
Valve ID/ Locatior	Qty 1	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Мес	hani	cal System: 410_HS-CONVE	CTOR (ME	CH)				HS-C	ONVECT	OR (MEC	CH)							
V-9	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.31	N/A	N/A	N/A		0.59	155 306	120	250	CV-HS-10
V-10	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.38	N/A	N/A	N/A		0.92	155 306	120	250	CV-HS-11
V-11	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.67	N/A	N/A	N/A		2.81	155 306	120	250	CV-HS-1
V-12	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.67	N/A	N/A	N/A		2.81	155 306	120	250	CV-HS-2
V-13	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.67	N/A	N/A	N/A		2.81	155 306	120	250	CV-HS-3
V-14	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.67	N/A	N/A	N/A		2.81	155 306	120	250	CV-HS-4
V-15	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.67	N/A	N/A	N/A		2.81	155 306	120	250	CV-HS-5
V-16	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.38	N/A	N/A	N/A		0.92	155 306	120	250	CV-HS-7
V-17	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.38	N/A	N/A	N/A		0.92	155 306	120	250	CV-HS-8
Мес	hani	cal System: 411_HS-RADIA	TOR					HS-R	ADIATO	R COIL (MECH)							
V-18	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-1
V-19	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-2
V-20	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-3

NOTES: All control valves and wells shall be installed by the heating contractor.

SIEN SMA	<mark>1EN</mark> RT I	S INDUSTRY, INC. NFRASTRUCTURE				١	/alve S	ubmit	tal - V	Vater								
LOCAT JOB N ENGR:	'ION: 0:	NANUET, NY 440P-366733 SN					PROJ	ECT NAM	ie: Nam	NUET BOI	ND PHAS	E3 HIGH	SCHC D PAC	DATE: GE: REV:		2/16 4 0	6/24	
GENER 1. All vi 2. All ci 3. Stan BODY NOC	RAL N alves 2 ontrol dard a TYPE C - Bal	OTES: 2-1/2" and larger have flanged evalues and wells shall be installed abbreviations used on control va S: 3W - Three way; 2W - Two va Il Valve can be N.O. or N.C.; BF	ends, 2" and ed by the m Ilves are: way; A - And - Butterfly N	l smaller echanica gle; N.C. /alve; D	^r have so al contra Norm S - Doul	crewed e actor. ally Clos	ends. sed; N.O ed;	Normally	open;	UNITS Steam indicate	5: inlet pres ed in PSI ATOR TY CR - C	ssure, act G. ' PES: SR apacitor [ual press - Spring Driven Re	ure drop, Return; N turn; DA	and shut NSR - No - Double	t off pr Spring Acting	essure Return	
Valve ID/ Location	Qty	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mec	hanic	al System: 411_HS-RADIA	FOR					HS-R	ADIATO	R COIL (MECH)							
V-21	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-4
V-22	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-5
V-23	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-6
V-24	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.48	N/A	N/A	N/A		1.44	155 306	120	250	R1-7
V-25	1	262-02055	0.50	2W	Globe	2.50	NO-SR	3.00	2.96	N/A	N/A	N/A		1.40	155 306	65	250	R2-1
V-26	1	262-02055	0.50	2W	Globe	2.50	NO-SR	3.00	2.96	N/A	N/A	N/A		1.40	155 306	65	250	R2-2
V-27	1	262-02055	0.50	2W	Globe	2.50	NO-SR	3.00	2.96	N/A	N/A	N/A		1.40	155 306	65	250	R2-3
V-28	1	262-02055	0.50	2W	Globe	2.50	NO-SR	3.00	2.96	N/A	N/A	N/A		1.40	155 306	65	250	R2-4
V-29	1	262-02047	0.50	2W	Globe	0.40	NO-SR	3.00	0.50	N/A	N/A	N/A		1.56	155 306	120	250	R3-1
Mec	hanic	al System: 413_HS-CABINI	ET UNIT HI	EATER				HS-C	ABINET	UNIT HE	ATER (I	MECH)						
V-30	1	171H-10302S	0.50	2W	Ball	1.00	NO-SR	3.00	1.41	N/A	N/A	N/A		1.99	154038	200	250	CUH-HS-1
V-31	1	171H-10302S	0.50	2W	Ball	1.00	NO-SR	3.00	1.64	N/A	N/A	N/A		2.69	154038	200	250	CUH-HS-2
V-32	1	171H-10304S	0.50	2W	Ball	2.50	NO-SR	3.00	3.27	N/A	N/A	N/A		1.71	154038	200	250	CUH-HS-3

NOTES: All control valves and wells shall be installed by the heating contractor.

SIEMENS SMART IN	INDUSTRY, INC. FRASTRUCTURE				١	/alve S	ubmitt	tal - W	Vater								
LOCATION: JOB NO: ENGR:	NANUET, NY 440P-366733 SN					PROJ	ECT NAM	E: NAN	IUET BON	nd phas	E3 HIGH	SCHC E P/ F	DATE: AGE: REV:		2/16 5 0	6/24	
GENERAL NO 1. All valves 2-1 2. All control va 3. Standard abl BODY TYPES: NOC - Ball V	TES: L/2" and larger have flanged lives and wells shall be install previations used on control va 3W - Three way; 2W - Two /alve can be N.O. or N.C.; BF	ends, 2" and led by the m alves are: way; A - Ang - Butterfly N	l smaller echanica gle; N.C. /alve; DS	have so al contra - Norm S - Doul	crewed e actor. ally Clos	ends. sed; N.O ed;	Normally	Open;	UNITS Steam i indicate	inlet pres ed in PSI NTOR TY CR - C	ssure, act G. ' PES: SR apacitor [ual press - Spring Driven Re	ure drop, Return; I turn; DA	, and shut NSR - No - Double	t off pr Spring Acting	essure Return	
Valve Qty ID/ Location	Product Number	Valve Size	Body Type	Body Style	Actual Cv	Actuator Type	Design P. Drop (psi)	Required Flow (gpm)	Min (gpm)	Max (gpm)	Preset (gpm)	Steam Inlet	Press Drop (psi)	Valve Spec Sheet	Shut Off	ANSI Class	Comment
Mechanical	System: 414_UNIT HEAT	TER					HS-U	NIT HEAT	TER (ME	CH)							
V-33 1	171H-10301S	0.50	2W	Ball	0.63	NO-SR	3.00	0.80	N/A	N/A	N/A		1.61	154038	200	250	UH-HS-01
NOTES: All co	ontrol valves and wells shall b	be installed b	v the he	eating co	ontracto	r.											

SIEMENS

Siemens Smart Infrastructure Building Automation Division

AIR FLOW STATION SCHEDULE

	0		-														
Siemens Job	Number:	44OP-366733						Date: 5/21/20)24								
Project Nam	e:	BNJ2 BAU NANUET BO	OND PHASE 3	_HIGH SCHOOL				DR: VB	CH: NSK	Revision:						REV	2
		SYSTEM				PANSMITT	:p				s	ENSOR					
REF MECH DWG	REF CONTROL DWG	MECHANICAL SYSTEM	SERVICE (SA/RA/ODA)	MAX DESIGN AIR FLOW	TAG	MODEL	MFGR	TAG	TYPE Duct / Fan Inlet	RANGE	QTY (Probes x Sensors/probe)		r size	BELL DIAMETER	MODEL	MFGR	COMMENTS
HS-M111	114B	RTU-HS-4	SA	5000 CFM	AFMS-1	GTC108e	EBTRON	AFMS-1	Fan Inlet	0-5000 FPM	2 x 1/1	-	-	20	GTC108e-F/SI	EBTRON	
~HS-M111	-114B~	CONFILLING ACCOUNTS	m®Am	~5000 CEV	AEMS-2	GIC108e	EBTRON	AFMS-2~	EanInlet		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mm	mm	\sim	~@ {6}68eF/\$ +~	EBTRON	
AS-MIT	μ_{AB}		<u>us</u> u	U SUOD CFM	AFMS-4	GIC108e	EBIRON				$\psi_{2\times m}$	u,u	سبب	μ_{20}	GTC108e-F/SI	EBIRON	
HS-M111	114B	RTU-HS-5	RA	5000 CFM	AFMS-5	GTC108e	EBTRON	AFMS-5	Fan Inlet	0-5000 FPM	2 x 1/1	-	-	20	GTC108e-F/SI	EBTRON	

NOTE:

1 Bell diameter to be finalized before placing the order.

2 Probes and sensor qty to be finalized before placing the order.

3 Sensor part number need to be finalized before placing the order.

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		CAT 6 DROP B	OTHERS AND	CONNECTED TO EXISTING	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	>	NETWORK SWITC	H. IERS.		
	}	IP ADDRESS, DE	VICE INSTANCE	TO BE FIELD	
	}	COORDINATED 8	LOCATION TO	BE CONFIRMED ON FIELD.	
	$\left\{ \right. \right\}$	SHOWN.		TO DE INSTALLED AS	
	$\left\{ \right. \right\}$	5 EXISTING UNIT AS IN DWG HS-	/ENTILATOR TAU -M106 IT WAS ↓	G IO BE FIELD VERIFIED ONLY SHOWING AS	
	$\left\{ \right. \right\}$	6 EXISTING PANEL	DETAILS TO B	E FIELD COORDINATED.	
	$\left\{ \right. \right $	GENERAL NOTES:			
R-1/CKT-1	ξL	1. REFER FLN SCH	EDULE FOR LO	CATION DETAILS.	
VAC	Ś	Γ	LEGEND:		
R-1/CKT-2	Ş			BACNET MSTP FLN-1	
	Ş			BACNET MSTP FLN-2 BLN	
VAC B AWG	}	L			
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Device		Qty	Product Number	Manufacturer	Document Number	Description
Field M	ounted Devices					1
AE	1-2	2	FBO	N/A	N/A	DAMPER ACTUATORS
CS	1	1	C-2320-L ECM	SENVA	N/A	ADJ. CURRENT SWITCH FOR ECM MOTORS 0.25
PTE	1	1	2641001WD11A1C	SETRA	0608cut003	DP TRAN AIR,1%,1" ENC
TDE	1	1	FBO	N/A	N/A	LOW TEMP DETECTOR
E	1	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
E	2-4	3	RH2B-UL-AC24VKIT	IDEC	1202cut016	RELAY&SOC,GP DPDT AC24V W/LED
D	1	1	FBO	N/A	N/A	SMOKE DETECTOR
PP	1-2	2	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TE	1	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	2	1	544-342-8	SIEMENS	149261	DUCT AVG. TMP, 1K OHM, PT(375), 8', FLEX
TE	3	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	4	1	QAD2030U	SIEMENS	149918	SURFACE TMP SNSR, 10K OHM TYPE 2, METAL
TE	5	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	6	1	QAA2212.EWSN	SIEMENS	149708	RTS, 1K OHM PT (385), BLANK FRONT
,						SEE VALVE SUBMITTAL
anel N	Nounted Device	5		I		
(FMR	1	1	FBO	N/A	N/A	TRANSFORMER
	NCE OF OPE	RATION S ATION:	IS GENERAL: START BLOV		N THE BMS	SCHEDULE DETERMINES EQUIPMENT TO
SEQUE BLOWE A. SI RE	FAN OPER TART. STAR ETURN DUCT	T FAN SMOKE	FOLLOWING CONTACT C	IOSURE FOR FIRE ALARN PLICABLE). PROVE FAN	I SHUTDOWN, FLOW FOR SU	LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH
SEQUE BLOWE A. SI RE CL	FAN OPER TART. STAR ETURN DUCT JRRENT SENS	T FAN SMOKE SORS.	FOLLOWING CONTACT C	LOSURE FOR FIRE ALARN PLICABLE). PROVE FAN	I SHUTDOWN,	LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH
SEQUE BLOWE A. ST RE CL 1)	FAN OPER TART. STAR ETURN DUCT JRRENT SENS OPTIMAL S NECESSAR	T FAN SMOKE SORS. START: Y FOR	FOLLOWING CONTACT C DETECTOR (WHERE AP THE SUPPLY FAN SHAI THE ZONES TO REACH	LOSURE FOR FIRE ALARM PLICABLE). PROVE FAN LL START PRIOR TO SCH THEIR OCCUPIED SETPOI	EDULED OCCI	LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY
SEQUE BLOWE A. ST RE CL 1)	FAN OPER TART. STAR ETURN DUCT JRRENT SENS OPTIMAL S NECESSAR	T FAN SMOKE SORS. START: Y FOR	FOLLOWING CONTACT C DETECTOR (WHERE AP THE SUPPLY FAN SHAL THE ZONES TO REACH	LOSURE FOR FIRE ALARM PLICABLE). PROVE FAN LL START PRIOR TO SCH THEIR OCCUPIED SETPOI	EDULED OCC	LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY SIEMENS
A. SI RE CI 1)	FAN OPER TART. STAR ETURN DUCT JRRENT SENS OPTIMAL S NECESSAR	T FAN SMOKE SORS. START: Y FOR	FOLLOWING CONTACT C DETECTOR (WHERE AP THE SUPPLY FAN SHAL THE ZONES TO REACH ORY	LOSURE FOR FIRE ALARN PLICABLE). PROVE FAN LL START PRIOR TO SCH THEIR OCCUPIED SETPOI	EDULED OCCI	LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY SIEMENS

ADJUST BASED ON HANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES. THE INITIAL OPTIMAL START TIME SHALL BE 1 HOUR PRIOR TO OCCUPIED MODE STARTING (ADJUSTABLE).

- TEMPERATURE DECREASES, THE DISCHARGE AIR SETPOINT SHALL BE INCREASED. THE MINIMUM DISCHARGE AIR TEMPERATURE SHALL BE 90 DEGREES F (FIELD ADJUSTABLE THROUGH BMS).
- THE OPEN POSITION WHEN THE BLOWER COIL IS IN OPERATION, IN OCCUPIED MODE.
- ECONOMIZER COOLING:
- 1) WHEN THE DISCHARGE AIR TEMPERATURE SETPOINT AND THE SPACE TEMPERATURE SENSOR ARE CALLING FOR 2) THĚ LOCKOUT TĚMPĚRATURĚ FOR ECONOMIZĚR UNIT IS 55F.
- SCHEDULE.
  - 1) UNOCCUPIED MODE HEATING: THE BLOWER COIL SHALL BE NORMALLY OFF WHEN THE BMS DETERMINES THE PROVIDE 95 DEGREE AIR TO THE SPACE UNTIL THE UNOCCUPIED SETPOINT IS REACHED.
- LOW TEMPERATURE PROTECTION:
- 2) SEND AN ALARM TO THE BMS.
- 3) OPEN THE CONTROL VALVE TO 100% OPEN.
- 4) THE LOW TEMPERATURE THERMOSTAT SHALL BE OF THE MANUAL RESET TYPE. 5) CLOSE OUTSIDE AIR DAMPER. 1
- ALARM THROUGH THE BMS WHEN DIFFERENTIAL STATIC PRESSURE EXCEEDS FIELD ADJUSTABLE SETPOINT.
- FIRE ALARM SHUTDOWN: WHEN THE FIRE ALARM SYSTEM IS IN AN ALARM CONDITION AS NOTED THROUGH SHALL BE PLACED IN THEIR NORMAL POSITIONS.
  - THE OUTSIDE AIR DAMPERS SHALL CLOSE WHENEVER THE UNIT IS OFF.

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![](_page_90_Figure_17.jpeg)

F	REVISION H	IISTORY	SIEMENS		NANUET BOND PHASE3 HIGH SCHOOL	440P-366733
R1	4/16/2024 V	B REVISED AS PER COMMENTS DATED 3/15/24		412 MT KEMBLE AVE. MORRISTOWN	NANUET, NY	0
RO	2/16/2024 V	B ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC.	NJ. 07960 USA Phone: (973) 575-6300	ENGINEER         DRAFTER         CHECKED         BY         INITIAL         RELEASE         LAST         EDIT         DATE           VB         VB         NSK         02/16/24         04/16/24         04/16/24	110
			SMART INFRASTRUCTURE	Fax: (973) 575-7968	HS-BC-HS-01 (BOM/SOO)	

2) UNOCCUPIED MODE: BLOWER COILS SHALL BE NORMALLY OFF IN UNOCCUPIED MODE AS DETERMINED BY THE BMS.

DISCHARGE AIR SETPOINT CONTROL: DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET ACCORDING TO THE SPACE TEMPERATURE SENSOR SERVED BY THE BLOWER COILS. AS THE SPACE TEMPERATURE RISES ABOVE A SETPOINT OF 74 DEGREES F (FIELD ADJUSTABLE THROUGH BMS), THE DISCHARGE AIR SETPOINT SHALL BE REDUCED. AS SPACE TEMPERATURE SHALL BE 55 DEGREES F (FIELD ADJUSTABLE THROUGH BMS), AND THE MAXIMUM DISCHARGE AIR

MINIMUM OUTSIDE AIR VENTILATION: NORMALLY CLOSED, OPPOSED BLADE OUTSIDE AIR DAMPER SHALL MOVE TO

COOLING AND RETURN AIR TEMPERATURE IS HIGHER THAN THE OUTSIDE AIR TEMPERATURE, THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE TO MEET THE DISCHARGE AIR TEMPERATURE TO COOL THE SPACE.

HEATING CONTROL- OCCUPIED MODE: IF THE OUTSIDE AIR TEMPERATURE IS 65 DEGREES F (ADJUSTABLE) OR BELOW AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS CALLING FOR HEATING. THE HOT WATER VALVE SHALL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SUPPLY AIR SETPOINT AS DETERMINED BY THE RESET

BUILDING TO BE IN UNOCCUPIED MODE. WHEN THE SPACE TEMPERATURE SENSOR SERVED BY THE BLOWER COIL FALLS BELOW THE UNOCCUPIED SETPOINT OF 62 DEGREES F (ADJUSTABLE). THE BLOWER COIL SHALL OPERATE WITH OUTSIDE AIR DAMPER CLOSED, RETURN DAMPER 100% OPEN, HEATING CONTROL VALVE MODULATING TO

1) WHEN THE MIXED AIR TEMPERATURE DOWNSTREAM OF THE HEATING COIL IS BELOW 35 DEGREES F (ADJUSTABLE) IN ANY 12-INCH-LONG SECTION OF THE LOW TEMPERATURE THERMOSTAT CAPILLARY THE FOLLOWING SHALL OCCUR:

FILTER DIFFERENTIAL: PROVIDE ANALOG INPUT TO MEASURE STATIC PRESSURE DIFFERENTIAL ACROSS FILTER AND

CONTACTS IN THE FIRE ALARM PANEL, THE UNIT SHALL BE SHUT DOWN AND ALL DAMPERS AND VALVE ACTUATORS

REVISION HISTORY         R1       4/16/2024       VB       REVISED AS PER COMMENTS DATED 3/15/24         R0       2/16/2024       VB       ISSUED FOR APPROVAL	SIEMENS	412 MT KEMBLE AVE. MORRISTOWN NJ. 07960 USA	NANUET BOND NANUET, NY
REVISION HISTORY	SIEMENS	412 MT KEMBLE AVE.	
g. LOW DISCHARGE AIR TEMPERATURE			
e. LOW SPACE TEMPERATURE f. HI DISCHARGE AIR TEMPERATURE			
b. LOW TEMPERATURE THERMOSTAT c. FILTER DIFFERENTIAL PRESSURE			
K. ALARM POINTS a. BLOWER COIL SUPPLY FAN STATUS			
k. RETURN AIR DAMPER			
i. HEATING COIL CONTROL VALVE j. HEATING COIL HWR TEMPERATURE k. RETURN AIR DAMPER I. OUTSIDE AIR DAMPER			
f.       FILTER DIFFERENTIAL PRESSURE         g.       BLOWER COIL SUPPLY FAN SPEED         h.       BLOWER COIL SUPPLY FAN START / STOP         i.       HEATING COIL CONTROL VALVE         j.       HEATING COIL HWR TEMPERATURE         k.       RETURN AIR DAMPER         I.       OUTSIDE AIR DAMPER			
e. SPACE TEMPERATURE f. FILTER DIFFERENTIAL PRESSURE g. BLOWER COIL SUPPLY FAN SPEED h. BLOWER COIL SUPPLY FAN START / STOP i. HEATING COIL CONTROL VALVE j. HEATING COIL HWR TEMPERATURE k. RETURN AIR DAMPER I. OUTSIDE AIR DAMPER			

![](_page_91_Picture_3.jpeg)

![](_page_92_Figure_0.jpeg)

![](_page_93_Figure_0.jpeg)

3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL	CHECKED BY INITIAL RELEASE LAST EDIT DATE NSK 02/16/24 04/16/24	PHASE3 HIGH SCHOOL	1 BCU-HS-1 - WIRING DIAGRAM	
110_HS-BLOWER COIL UNITA.DWG	110C	440P-366733 0		DRAWING NOTES:         1       CONTROL XFMR WILL BE SUPPLIED BY UNIT MANUFACTURER.         2       ECM TERMINAL TO BE FIELD DETERMINED.         3       RELAY AND SWITCH WILL BE INSTALLED IN THE FIELD NEAR VFD PANEL.         4       FIELD DEVICE TERMINAL TO BE FIELD DETERMINED.

		Qty	Product Number	Manufacturer	Document Number	Description
Field M	ounted Device	6				
AE	1-2	2	FBO	N/A	N/A	DAMPER ACTUATORS
CS	1	1	C-2320-L ECM	SENVA	N/A	ADJ. CURRENT SWITCH FOR ECM MOTORS 0.25
PTE	1	1	2641001WD11A1C	SETRA	0608cut003	DP TRAN AIR,1%,1" ENC
TDE	1	1	FBO	N/A	N/A	LOW TEMP DETECTOR
E	1	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
E	2-4	3	RH2B-UL-AC24VKIT	IDEC	1202cut016	RELAY&SOC,GP DPDT AC24V W/LED
D	1	1	FBO	N/A	N/A	SMOKE DETECTOR
;PP	1-2	2	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE
TE	1	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	2	1	544-342-8	SIEMENS	149261	DUCT AVG. TMP, 1K OHM, PT(375), 8', FLEX
TE	3	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	4	1	QAD2030U	SIEMENS	149918	SURFACE TMP SNSR, 10K OHM TYPE 2, METAL
TE	5	1	544-339-8	SIEMENS	149261	DCT POINT TEMP, PT 1K OHM (375), 8"
TE	6	1	QAA2212.EWSN	SIEMENS	149708	RTS, 1K OHM PT (385), BLANK FRONT
I						SEE VALVE SUBMITTAL
anel I	Nounted Device	s	l	I		
FMR	1	1	FBO	N/A	N/A	TRANSFORMER
SEQUE BLOWE A.	ENCE OF OPI TR COIL UNIT	RATION	GENERAL: START BLOW	ER COIL UNIT FAN WHEI	N THE BMS S	SCHEDULE DETERMINES EQUIPMENT TO
SEQUE 3LOWE 4. S ⁻ RI CI	NCE OF OPI FAN OPEF TART. STAF ETURN DUCT JRRENT SEN	ATION: TS T FAN SMOKE SORS.	GENERAL: START BLOW FOLLOWING CONTACT CL DETECTOR (WHERE APF	ER COIL UNIT FAN WHEI OSURE FOR FIRE ALARN PLICABLE). PROVE FAN	n THE BMS S I SHUTDOWN, FLOW FOR SU	SCHEDULE DETERMINES EQUIPMENT TO LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH
SEQUE BLOWE A. S [.] RI CI	NCE OF OPI FAN OPEF TART. STAF ETURN DUCT JRRENT SEN OPTIMAL NECESSAF	ATION: ATION: T FAN SMOKI SORS. START: RY FOR	GENERAL: START BLOW FOLLOWING CONTACT CL E DETECTOR (WHERE APF THE SUPPLY FAN SHALL THE ZONES TO REACH	ER COIL UNIT FAN WHEI DSURE FOR FIRE ALARM PLICABLE). PROVE FAN - START PRIOR TO SCH THEIR OCCUPIED SETPOI	N THE BMS S I SHUTDOWN, FLOW FOR SU EDULED OCCI NTS. THE ST	SCHEDULE DETERMINES EQUIPMENT TO LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY
SEQUE 3LOWE A. S [.] RI CI 1)	TARE OF OPI FAN OPER TART. STAR ETURN DUCT JRRENT SEN OPTIMAL NECESSAR	ATION: ATION: T FAN SMOKE SORS. START: Y FOR	GENERAL: START BLOW FOLLOWING CONTACT CL DETECTOR (WHERE APF THE SUPPLY FAN SHALL THE ZONES TO REACH	ER COIL UNIT FAN WHE DSURE FOR FIRE ALARN PLICABLE). PROVE FAN START PRIOR TO SCH THEIR OCCUPIED SETPOI	N THE BMS S I SHUTDOWN, FLOW FOR SU EDULED OCCI NTS. THE ST	SCHEDULE DETERMINES EQUIPMENT TO LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY SIEMENS
SEQUE 3LOWE A. S' RI CI 1)	INCE OF OPI FAN OPEF TART. STAF ETURN DUCT JRRENT SEN OPTIMAL NECESSAF	ATION: TS ATION: T FAN SMOKE SORS. START: RY FOR	GENERAL: START BLOW FOLLOWING CONTACT CL E DETECTOR (WHERE APF THE SUPPLY FAN SHALL THE ZONES TO REACH ORY	ER COIL UNIT FAN WHE DSURE FOR FIRE ALARM PLICABLE). PROVE FAN START PRIOR TO SCH THEIR OCCUPIED SETPOI	N THE BMS S I SHUTDOWN, FLOW FOR SU EDULED OCCI NTS. THE ST	SCHEDULE DETERMINES EQUIPMENT TO LOW TEMPERATURE THERMOSTAT, AND JPPLY FAN INDIVIDUALLY THROUGH JPANCY BASED ON THE TIME ART TIME SHALL AUTOMATICALLY SIEMENS

ADJUST BASED ON HANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES. THE INITIAL OPTIMAL START TIME SHALL BE 1 HOUR PRIOR TO OCCUPIED MODE STARTING (ADJUSTABLE).

- TEMPERATURE SHALL BE 90 DEGREES F (FIELD ADJUSTABLE THROUGH BMS).
- THE OPEN POSITION WHEN THE BLOWER COIL IS IN OPERATION, IN OCCUPIED MODE.
- ECONOMIZER COOLING:
- 1) WHEN THE DISCHARGE AIR TEMPERATURE SETPOINT AND THE SPACE TEMPERATURE SENSOR ARE CALLING FOR 2) THE LOCKOUT TEMPERATURE FOR ECONOMIZER UNIT IS 55'F.
- SCHEDULE.
  - PROVIDE 95 DEGREE AIR TO THE SPACE UNTIL THE UNOCCUPIED SETPOINT IS REACHED.
- LOW TEMPERATURE PROTECTION:
- SEND AN ALARM TO THE BMS.
- 3) OPEN THE CONTROL VALVE TO 100% OPEN. 4) THE LOW TEMPERATURE THERMOSTAT SHALL BE OF THE MANUAL RESET TYPE.
- CLOSE OUTSIDE AIR DAMPER./1
- ALARM THROUGH THE BMS WHEN DIFFERENTIAL STATIC PRESSURE EXCEEDS FIELD ADJUSTABLE SETPOINT.
- FIRE ALARM SHUTDOWN: WHEN THE FIRE ALARM SYSTEM IS IN AN ALARM CONDITION AS NOTED THROUGH SHALL BE PLACED IN THEIR NORMAL POSITIONS.
  - THE OUTSIDE AIR DAMPERS SHALL CLOSE WHENEVER THE UNIT IS OFF.

![](_page_94_Figure_17.jpeg)

	REVISION	HIS	TORY	SIEMENS		NANUET BOND PHASE3 HIGH SCHOOL	440P-366733
R	1 4/16/2024	VB	REVISED AS PER COMMENTS DATED 3/15/24		412 MT REMBLE AVE. MORRISTOWN	NANUET, NY	0
R	2/16/2024	VB	ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER CHECKED BY INITIAL RELEASE LAST EDIT DATE	444
				SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-6300 Fax: (973) 575-7968	HS-BC-HS-02 (BOM/SOO)	

2) UNOCCUPIED MODE: BLOWER COILS SHALL BE NORMALLY OFF IN UNOCCUPIED MODE AS DETERMINED BY THE BMS.

DISCHARGE AIR SETPOINT CONTROL: DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET ACCORDING TO THE SPACE TEMPERATURE SENSOR SERVED BY THE BLOWER COILS. AS THE SPACE TEMPERATURE RISES ABOVE A SETPOINT OF 74 DEGREES F (FIELD ADJUSTABLE THROUGH BMS), THE DISCHARGE AIR SETPOINT SHALL BE REDUCED. AS SPACE TEMPERATURE DECREASES, THE DISCHARGE AIR SETPOINT SHALL BE INCREASED. THE MINIMUM DISCHARGE AIR TEMPERATURE SHALL BE 55 DEGREES F (FIELD ADJUSTABLE THROUGH BMS), AND THE MAXIMUM DISCHARGE AIR

MINIMUM OUTSIDE AIR VENTILATION: NORMALLY CLOSED, OPPOSED BLADE OUTSIDE AIR DAMPER SHALL MOVE TO

COOLING AND RETURN AIR TEMPERATURE IS HIGHER THAN THE OUTSIDE AIR TEMPERATURE, THE OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE TO MEET THE DISCHARGE AIR TEMPERATURE TO COOL THE SPACE.

HEATING CONTROL- OCCUPIED MODE: IF THE OUTSIDE AIR TEMPERATURE IS 65 DEGREES F (ADJUSTABLE) OR BELOW AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS CALLING FOR HEATING, THE HOT WATER VALVE SHALL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SUPPLY AIR SETPOINT AS DETERMINED BY THE RESET

1) UNOCCUPIED MODE HEATING: THE BLOWER COIL SHALL BE NORMALLY OFF WHEN THE BMS DETERMINES THE BUILDING TO BE IN UNOCCUPIED MODE. WHEN THE SPACE TEMPERATURE SENSOR SERVED BY THE BLOWER COIL FALLS BELOW THE UNOCCUPIED SETPOINT OF 62 DEGREES F (ADJUSTABLE). THE BLOWER COIL SHALL OPERATE WITH OUTSIDE AIR DAMPER CLOSED, RETURN DAMPER 100% OPEN, HEATING CONTROL VALVE MODULATING TO

1) WHEN THE MIXED AIR TEMPERATURE DOWNSTREAM OF THE HEATING COIL IS BELOW 35 DEGREES F (ADJUSTABLE) IN ANY 12-INCH-LONG SECTION OF THE LOW TEMPERATURE THERMOSTAT CAPILLARY THE FOLLOWING SHALL OCCUR:

FILTER DIFFERENTIAL: PROVIDE ANALOG INPUT TO MEASURE STATIC PRESSURE DIFFERENTIAL ACROSS FILTER AND

CONTACTS IN THE FIRE ALARM PANEL, THE UNIT SHALL BE SHUT DOWN AND ALL DAMPERS AND VALVE ACTUATORS

} e. SPACE TEMPERATURE				
} f. FILTER DIFFERENTIAL PRESSURE				
a. Blower coil supply fan speed				
b. BLOWER COLL SUPPLY FAN START / STOP				
( J. HEATING COLL HWR TEMPERATURE )				
( K. RETURN AIR DAMPER )				
( I. OUTSIDE AIR DAMPER )				
{				
K. ALARM POINTS				
A. BLOWER COIL SUPPLY FAN STATUS				
} b. LOW TEMPERATURE THERMOSTAT <				
C. FILTER DIFFERENTIAL PRESSURE				
│				
e LOW SPACE TEMPERATURE				
a LOW DISCHARGE AIR TEMPERATURE				
g. LOW DISCHARGE AIR TEMPERATURE				
REVISION HISTORY	SIEMENS		NANUET BOND PHASE3 HIGH SCHOOL	440P-366733
		412 MT KEMBLE AVE.		Λ
R1 4/16/2024 VB REVISED AS PER COMMENTS DATED 3/15/24	4	MORRISTOWN		v
R0 2/16/2024 VB ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER CHECKED BY INITIAL RELEASE LAST EDIT DATE	444 \Lambda
	SIEMENS INDUSTRY, INC.	Phone: (973) 575-6300	VB VB NSK U2/16/24 04/16/24	
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C: USERS Z004PB8F ONEDRIVE - SIEMENS AG BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733 DT MDT_HIGH SCHOOL 111_HS-BLOWER COIL UNIT-K01.DWG

![](_page_96_Figure_0.jpeg)

C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\111_HS-BLOWER COIL UNIT.DWG

![](_page_97_Figure_0.jpeg)

O2 (ELEC)           3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\	PHASE3 HIGH SCHOOL	 1 BCU-HS-2 - WIRING DIAGRAM	
11_HS-BLOWER COIL UNITA.DWG	440P-366733		DRAWING NOTES:.         1       CONTROL XFMR WILL BE SUPPLIED BY UNIT MANUFACTURER.         2       ECM TERMINAL TO BE FIELD DETERMINED.         3       RELAY AND SWITCH WILL BE INSTALLED IN THE FIELD NEAR VED PANEL.         4       FIELD DEVICE TERMINAL TO BE FIELD DETERMINED.

[ <b></b>		1	Ι	1					
Control Device		Qty	Product Number	Manufacturer	Document Number	Description			
Field Mounted Devices									
AE	1-3	3	GCA161.1P	SIEMENS	154001	MOD(V) SR,24V, MED. PLNM			
CS	1	1	C-2320-L ECM	SENVA	N/A	ADJ. CURRENT SWITCH FOR ECM MOTORS 0.25-			
CS	2	1	H614	VERIS	N/A	Current Switch, 1.5–150A, Split Core,VFD			
DPTE	1	1	26410R5WD11A1C	SETRA	0608cut003	DP TRAN AIR,1%,0.5" ENC			
ES	2	1	FBO	N/A	N/A	END SWITCH			
LTDE	1	2	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL			
RE	1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT			
SD	1	1	FBO	N/A	N/A	SMOKE DETECTOR			
SPP	1-2	2	269-062	SIEMENS	N/A	PR269 ACCESSORY, SENSING TUBE			
TTE	1	1	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID			
TTE	2	2	544-342-16	SIEMENS	149261	DUCT AV. TMP, 1K OHM, PT(375), 16', FLEX			
TTE	3-4	2	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID			
TTE	5	1	544-577-25	SIEMENS	149261	IMMERSION TMP SNSR, PT 1K OHM(375) 2.5"			
TTE	6	1	QAA2212.EWSN	SIEMENS	149708	RTS, 1K OHM PT (385), BLANK FRONT			
v						SEE VALVE SUBMITTAL			
Panel M	ounted Devices	•							
RE	3-4	2	RH3B-ULAC24V-KIT	LECTRO COM	1202cut016	(1) RH3B-ULAC24V and (1) SH3B-05 socket			
XFMR	1	1	TR100VA002	KELE INC	TR100VA002	Xfrmr 100VA,120-24V,dual hub,ClassII UL			

FAN OPERATION: GENERAL: START AHU THROUGH 0-10 VDC INPUT SIGNAL ON THE AHU CONTROL BOX. IN AUTO

POSITION, START UNIT OPERATION WHEN THE BMS SCHEDULE DETERMINES THE BUILDING IS IN OCCUPIED MODE, START

FAN FOLLOWING CONTACT CLOSURE FOR LOW TEMPERATURE THERMOSTAT. WHEN AHU SUPPLY FAN STARTS, INTERLOCK ASSOCIATED LOCKER RETURN FAN F-HS-3 THROUGH THE FAN'S VFD. PROVE FAN FLOW FOR SUPPLY FAN AND RETURN

SEQUENCE OF OPERATIONS

Δ

GYM AIR HANDLING UNIT AHU-HS-3

FAN INDIVIDUALLY THROUGH CURRENT SENSORS.

- 1) OPTIMAL START: THE SUPPLY FAN SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME BASED ON CHANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES.
- Β. THE DISCHARGE AIR SETPOINT SHALL BE INCREASED.
- C. THE MAXIMUM DISCHARGE AIR TEMPERATURE SHALL BE 100 DEGREES F (FIELD ADJUSTABLE THROUGH EMCS).
- D. UNIT FAN ARRAY SUPPLY FANS ARE OPERATING.
- Ε. DISCHARGE AIR TEMPERATURE SETPOINT.
  - (2) THE LOCKOUT TEMPERATURE FOR ECONOMIZER UNIT IS 55 F. )
- F. HEATING
  - SHALL MODULATE OPEN AS REQUIRED TO MEET THE DISCHARGE AIR TEMPERATURE SETPOINT.
  - SETPOINT OF 90 DEGREES F TO MEET THE UNOCCUPIED SETPOINT OF 60 DEGREES F.
  - SECTION OF THE LOW TEMPERATURE THERMOSTAT CAPILLARY THE FOLLOWING SHALL OCCUR: a)
    - SEND AN ALARM TO THE BAS.
  - b) THE LOW TEMPERATURE THERMOSTAT SHALL BE MANUALLY RESET. CLOSE OUTSIDE AIR DAMPER.
- DX COOLING:

G.

- DEGREES F AND A MAXIMUM DISCHARGE AIR TEMPERATURE OF 72 DEGREES F IN COOLING MODE.
- SETPOINT OF 57 DEGREES F UNTIL THE SPACE REACHES 78 DEGREES F.
- Н. ALARM THROUGH THE EMCS WHEN DIFFERENTIAL STATIC PRESSURE EXCEEDS FIELD ADJUSTABLE SETPOINT.

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	3 PER COMMENTS DATED 3/15/24       AIZ MI REMADE AVE. MORRISTOWN NJ. 07960 USA       NANUET, NY         R APPROVAL       NJ. 07960 USA       Engineer Drafter CHecked BY INITIAL Release Last edit D.	
SIEMENS INDUSTRY, INC. FINITE	SIEMENS INDUSTRY, INC.         Phone:         (973)         575-6300         VB         NSK         02/16/24         04/16/24           SMART INFRASTRUCTURE         Fax:         (973)         575-7968         HS-AHU-HS-O3         (BOM/SOO)	

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NECESSARY FOR THE ZONE TO REACH ITS OCCUPIED SETPOINTS. THE START TIME SHALL AUTOMATICALLY ADJUST

DISCHARGE AIR SETPOINT CONTROL: DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET ACCORDING TO THE SPACE TEMPERATURE SENSOR. AS THE SPACE TEMPERATURE SENSOR IN THE SELECTED SPACE INCREASES ABOVE A COOLING SETPOINT OF 75 DEGREES F (FIELD ADJUSTABLE THROUGH EMCS), THE DISCHARGE AIR SETPOINT SHALL BE REDUCED. AS SPACE TEMPERATURE DECREASES BELOW A HEATING SETPOINT OF 70 DEGREES F (FIELD ADJUSTABLE),

THE MINIMUM DISCHARGE AIR TEMPERATURE SHALL BE 57 DEGREES F (FIELD ADJUSTABLE THROUGH EMCS), AND

MINIMUM OUTSIDE AIR VENTILATION: NORMALLY CLOSED OUTSIDE AIR DAMPER SHALL MOVE TO THE OPEN POSITION WHEN AHU IS IN OPERATION. THE OUTSIDE AIR DAMPER POSITION SHALL BE SET TO PROVIDE 3,200 CFM (BASED ON POSITION SET UP BY TESTING AND BALANCING AGENCY) WHEN BUILDING IS IN OCCUPIED MODE AND THE AIR HANDLING

ECONOMIZER OPERATION: WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS LESS THAN 64 DEGREES F (FIELD ADJUSTABLE THROUGH BAS) AND THE OUTSIDE AIR DRY BULB TEMPERATURE IS 2 DEGREES F LESS THEN THE RETURN AIR TEMPERATURE AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS LESS THAN THE OUTSIDE AIR TEMPERATURE. MODULATE THE OUTSIDE AIR DAMPER TO MAINTAIN A MIXED AIR TEMPERATURE SETTINGCORRESPONDING TO THE

1) THE RETURN AIR DAMPER SHALL MODULATE CLOSED IN CONJUCTION WITH THE OUTSIDE AIR DAMPER OPENING IN ECONOMIZER MODE WITH THE EXHAUST RAMPER OPENING IN CONJUCTION WITH THE RETURN DAMPER CLOSING.

1) WHEN THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT, THE 2-WAY MODULATING CONTROL VALVE 2) UNOCCUPIED MODE HEATING: AHU SHALL BE NORMALLY OFF WHEN THE EMCS DETERMINES THE BUILDING TO BE IN UNOCCUPIED MODE. WHEN THE SPACE TEMPERATURE SENSOR IN UNOCCUPIED MODE FALLS BELOW THE HEATING SETPOINT, THE AHU AND RETURN FAN F-HS-3 SHALL TURN ON WITH THE OUTSIDEAIR DAMPER CLOSED, THE EXHAUST AIR DAMPER CLOSED AND THE RETURN AIR DAMPER 100% OPEN (RUNNING THE UNIT IN 100% RECIRCULATION MODE). THE AHU SUPPLY FAN SHALL RUN TO AT 75% SUPPLY FAN SPEED WITH A DISCHARGE AIR 3) WHEN HEATING COIL DISCHARGE AIR TEMPERATURE IS BELOW 40 DEGREES F (ADJUSTABLE) IN ANY 12 INCH LONG

MODULATE THE HEATING COIL CONTROL VALVE SERVED BY AHU TO 100% OPEN TO HEAT.

1) IF THE CONDITIONS FOR ECONOMIZER COOLING ARE UNAVAILABLE AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS CALLING FOR COOLING, THE DDC SYSTEM SHALL SEND A 0-10 VDC SIGNAL TO THE AHUS AIR COOLED CONDENSING UNIT REFRIGERATION CONTROLS TO STAGE THE COMPRESSORS AS REQUIRED TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT WHILE MAINTAINING A MINIMUM DISCHARGE AIR TEMPERATURE OF 57 2) UNOCCUPIED COOLING: IN UNOCCUPIED MODE, SHOULD THE SPACE TEMPERATURE EXCEED 80 DEGREES F (ADJUSTABLE), THE AHU SHALL OPERATE IN 100% RETURN AIR MODE/0% OUTSIDE AIR, WITH THE SUPPLY FAN OPERATING AT 100% SUPPLY AIRFLOW, EXHAUST DAMPER CLOSED, RETURN FAN ON AND A DISCHARGE AIR

FILTER DIFFERENTIAL: PROVIDE ANALOG INPUT TO MEASURE STATIC PRESSURE DIFFERENTIAL ACROSS FILTER AND

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R1       4/16/2024       VB       REVISED AS PER COMMENTS DATED 3/15/24		412 MT KEMBLE AVE. MORRISTOWN	NANUET BOND I
REVISION HISTORY	SIEMENS		NANUET BOND I
a. OUTSIDE AIR TEMPERATURE       /         b. RETURN AIR TEMPERATURE       /         c. SUPPLY AIR TEMPERATURE       /         d. AHU MIXED AIR TEMPERATURE       /			
K. TRENDING POINTS			
J. THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN	WHENEVER THE UNIT IS OFF.		
I. SMOKE DETECTION: WHEN THE PRESENCE OF SMOKE IS DETECTED AT A DUCT SMOKE RETURN DUCT. THEN THE FAN STARTER CIRCUIT SHALL BE DE-ENERGIZED AND THE EMO	E DETECTOR LOCATED IN THE		

![](_page_99_Picture_3.jpeg)

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![](_page_100_Figure_0.jpeg)

![](_page_101_Figure_0.jpeg)

[						
Control Device		Qty	Product Number	Manufacturer	Document Number	Description
Field Mo	ounted Devices	•		•	•	
CS	1-2	2	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED
LTDE	1-3	3	134–1510	SIEMENS	155 115	LOW TEMP DET STATAUTO RESET
RE	1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
RE	3–5	3	RH2B-UL-AC24VKIT	IDEC	1202cut016	RELAY&SOC,GP DPDT AC24V W/LED
TTE	1	1	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID
TTE	2	1	544-577-25	SIEMENS	149261	IMMERSION TMP SNSR, PT 1K OHM(375) 2.5"
TTE	3	1	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID
TTE	4	1	544-577-25	SIEMENS	149261	IMMERSION TMP SNSR, PT 1K OHM(375) 2.5"
TTE	5	1	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID
V						SEE VALVE SUBMITTAL

# SEQUENCE OF OPERATION

### HEATING COILS HC-HS-2/HC-HS-4

- Α. THE DDC SYSTEM SHALL INTEGRATE THE HEATING COILS INTO THE EXISTING DDC PROGRAMMING SERVING EXISTING LOCKER ROOM AIR HANDLING UNITS AHU-1 AND AHU-2.
- HEATING CONTROL- OCCUPIED MODE: IF THE OUTSIDE AIR TEMPERATURE IS 65 DEGREES F (ADJUSTABLE) OR Β. BELOW AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS CALLING FOR HEATING, THE HEATING OPERATION SHALL BE STAGED TO MAINTAIN DISCHARGE AIR AT SETPOINT.
  - 1) THE HEATING WATER 3-WAY CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN THE HEATING DISCHARGE AIR SETPOINT.
  - 2) THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL VALVE OPEN TO HOT WATER FLOW TO MAINTAIN ITS HEATING SETPOINT.
  - 3) THE HEATING COIL'S SSOCIATED HEATING COIL CIRCULATION PUMP SHALL OPERATE WHENEVER THE HEATING COIL VALVE IS CALLED TO OPEN FOR HEATING.
    - WHEN OUTSIDE AIR CONDITIONS ARE BELOW 40, DEGREES F (ADJUSTABLE) THE HEATING COIL CIRCULATION а. PUMP SHALL RUN AND (VALVE SHOULD BE OPEN. /1
  - 4) UNOCCUPIED MODE HEATING: AHU SHALL BE NORMALLY OFF WHEN THE EMCS DETERMINES THE BUILDING TO BE IN UNOCCUPIED MODE. WHEN A SPACE SENSOR CONNECTED TO THE AHU FALLS BELOW THE UNOCCUPIED SETPOINT OF 62 DEGREES F (ADJUSTABLE), THE AHU SHALL TURN ON AND THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE 90 DEGREES F.
  - 5) LOW TEMPERATURE PROTECTION:
    - WHEN THE MIXED AIR TEMPERATURE DOWNSTREAM OF THE HEATING COIL IS BELOW 35 DEGREES F а.

(ADJUSTABLE) IN ANY 12-INCH-LONG SECTION OF THE LOW TEMPERATURE THERMOSTAT CAPILLARY THE FOLLOWING SHALL OCCUR:

- 1) SEND AN ALARM TO THE BAS.
- CIRCULATION PUMP.
- INCREASES ABOVE 40 DEGREES F.

# HEATING COIL HC-HS-3

- Α. WEIGHT ROOM AIR HANDLING UNIT AC-1.
- B. STAGED TO MAINTAIN DISCHARGE AIR AT SETPOINT.
  - SETPOINT.
  - TO HOT WATER FLOW TO MAINTAIN ITS HEATING SETPOINT.
  - 3) UNOCCUPIED MODE HEATING: AHU SHALL BE NORMALLY OFF WHEN THE EMCS DETERMINES THE BUILDING TO BE IN BE 90 DEGREES F.
  - 4) LOW TEMPERATURE PROTECTION:
    - FOLLOWING SHALL OCCUR:
    - SEND AN ALARM TO THE BAS. 1)
    - 2) MODULATE THE HEATING WATER CONTROL VALVE TO 100% OPEN.
    - 3)

### TRENDING POINTS

- a. 3-WAY MODULATING HEATING CONTROL VALVE
- b. DISCHARGE AIR TEMPERATURE
- c. HEATING COIL PUMP STATUS
- d. HEATING COIL RETURN WATER TEMPERATURE
- e. HEATING COIL PUMP SPEED

# ALARM POINTS

- a. LOW TEMPERATURE THERMOSTAT
- b. HI DISCHARGE TEMPERATURE
- c. LOW DISCHARGE TEMPERATURE

F	REVISION	HIS	STORY	SIEMENS		NANUET BOND P
R1	4/16/2024	VB	REVISED AS PER COMMENTS DATED 3/15/24		MORRISTOWN	NANUET, NY
RO	2/16/2024	VB	ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER CH
				SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-5300 Fax: (973) 575-7968	HS-AHU HW

2) MODULATE THE HEATING WATER CONTROL VALVE TO 100% OPEN AND OPERATE THE HEATING COIL

3) THE LOW TEMPERATURE THERMOSTAT SHALL BE AUTOMATICALLY RESET ONCE THE SENSOR TEMPERATURE

THE DDC SYSTEM SHALL INTEGRATE THE HEATING COIL INTO THE EXISTING DDC PROGRAMMING SERVING EXISTING

HEATING CONTROL- OCCUPIED MODE: IF THE OUTSIDE AIR TEMPERATURE IS 65 DEGREES F (ADJUSTABLE) OR BELOW AND THE DISCHARGE AIR TEMPERATURE SETPOINT IS CALLING FOR HEATING, THE HEATING OPERATION SHALL BE

1) THE HEATING WATER 2-WAY CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN THE HEATING DISCHARGE AIR

2) THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING COIL VALVE OPEN

UNOCCUPIED MODE. WHEN A SPACE SENSOR CONNECTED TO THE AHU FALLS BELOW THE UNOCCUPIED SETPOINT OF 62 DEGREES F (ADJUSTABLE). THE AHU SHALL TURN ON AND THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL

a. WHEN THE MIXED AIR TEMPERATURE DOWNSTREAM OF THE HEATING COIL IS BELOW 35 DEGREES F (ADJUSTABLE) IN ANY 12-INCH-LONG SECTION OF THE LOW TEMPERATURE THERMOSTAT CAPILLARY THE

> THE LOW TEMPERATURE THERMOSTAT SHALL BE AUTOMATICALLY RESET ONCE THE SENSOR TEMPERATURE INCREASES ABOVE 40 DEGREES F.

![](_page_102_Picture_52.jpeg)

![](_page_103_Figure_0.jpeg)

![](_page_104_Figure_0.jpeg)

![](_page_105_Figure_0.jpeg)

PHASE3 HIGH SCHOOL		
440P-366733 0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 0 0 4 4 0 0 8 0 8		DRAWING NOIES:         1         EXISTING TRANSFORMER TO BE REUSED.         2         EXISTING MOTOR & RELAY DETAILS ARE NOT AVAILABLE. WRING SHOWN FOR INTERLOCKING PURPOSE ONLY.         GENERAL NOTES:         1.       10 POINTS ARE CONNECTED TO EXISTING SIEMENS DDC CONTROLLER. POINT TERMINALS AND ADDRESS TO BE FIELD DETERMINED AND POINT NAMES TO BE FIELD VERIFIED.         2.       ALL WRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

						THE CONDENSED HEAD DESCRIPE WILL BE MONITORED BY THE			
Control Device	Qty Product Number	Manufacturer	Document De Number	cription	B. HEAD PRESSURE CONTROL: MAINTAIN HEAD PRESSURE A TRIPS ON HIGH LOAD DAYS.	AND THE COMPRESSOR OPERATING ENVELOPE AT ALL TIMES TO CONDENSER FANS WITH ECM MOTORS SHALL BE PROVIDED AS	AVOID HIGH PRESSURE WELL AS FACTORY		
Field Mounted Devices					SENSORS TO PROVIDE THIS	FROTECTION.			
AE 1-3	5 FBO	N/A	N/A DA	IPER ACTUATOR	C. COMPRESSOR ENVELOPE COM DISCHARGE PRESSURE AND	C. COMPRESSOR ENVELOPE CONTROL: THE UNIT CONTROLLER WILL CONTINUALLY MONITOR THE SUCTION DISCHARGE PRESSURE AND TEMPERATURE CONDITIONS DURING COMPRESSOR OPERATION. THE UNIT W			
AFMS 1–3	6 REFER AFMS SCHD.	N/A	N/A AIF	FLOW MEASURING STATION	THE COMPRESSOR, CONDENSER HEAD PRESSURE, AND ELECTRONIC EXPANSION VALVE TO MAINTAIN A SAFE COMPRESSOR OPERATING CONDITIONS TO ADD RELIABILITY, AND LIMIT UNIT SHUT DOWN DURING FRINGE OPE				
CS 1	2 FBO	N/A	N/A CU	RRENT SWITCH	CONDITIONS.				
DPS 1	2 FB0	N/A	N/A DIF	FERENTIAL PRESSURE SWITCH	CHANGE OVER SETPOINTS: THE UNIT (OAT), RETURN AIR TEMPERATURE (F	⁻ CHANGE OVER SOURCE TEMPERATURE IS THE VARIABLE, OUTDO RAT), OR SPACE TEMPERATURE (ST), THAT DRIVES THE CHANGE	OOR AIR TEMPERATURE OF UNIT STATES. THI		
DPTE 1	2 FBO	N/A	N/A RC	DM PRESSURE SENSOR	UNIT STATE WILL CHANGE FROM COC OR COOLING SETPOINTS.	DLING, FAN ONLY OR HEATING BASED ON THE CHANGEOVER HEA	TING		
EN 1-2	4 FB0	N/A	N/A EN	HALPY SENSOR	SUPPLY FAN: THE RTU WILL BE FAC	TORY SUPPLIED WITH A DIRECT DRIVE SUPPLY FAN.			
ES 1	2 FB0	N/A	N/A EN	) SWITCH	SINGLE ZONE VAV: THE SUPPLY FAN	N WILL OPERATE CONTINUOUSLY BETWEEN A SPECIFIED MINIMUM	AND MAXIMUM SPEED.		
HE 1	2 FB0	N/A	N/A HU	AIDITY SENSOR	THE UNIT WILL MODULATE THE SUPP CONTROL TEMPERATURE (TYPICALLY	PLY FAN BETWEEN THE MINIMUM AND MAXIMUM BASED ON HOW I SPACE OR RETURN TEMP) IS AWAY FROM SETPOINT.	NEAR OR FAR THE		
LD 1	2 FB0	N/A	N/A LE	K DETECTOR	MINIMUM OUTSIDE AIR VENTILATION:	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
LTDE 1	2 FB0	N/A	N/A LO	I TEMP DETECTOR	NORMALLY CLOSED OUTSIDE AIR DAM	MPER SHALL MOVE TO THE OPEN POSITION WHEN RTU IS IN OPE JTSIDE AIR MODE, DAMPER WILL BE POSITIONED TO MAINTAIN MIN	RATION IN OCCUPIED NIMUM OF 2,500 CFM.		
SD 1	2 FB0	N/A	N/A SM	DKE DETECTOR	COOLING:				
SPP 1-2	4 FBO	N/A	N/A PR	SSURE PROBE	A. DISCHARGE AIR CONTROL: IN THE COOLING MODE, THE UNIT CAPACITY WILL MODULATE THE VARIABLE SPEED COMPRESSOR TO MAINTAIN THE UNIT COOLING DISCHARGE AIR SET POINT. THE COOLING DAT SET POINT WILL B ADJUSTABLE AT THE UNIT CONTROLLER. UNIT CAPACITY WILL BE MODULATED BY THE VARIABLE SPEED				
TTE 1-7	14 FBO	N/A	N/A TE	PERATURE SENSOR					
Panel Mounted Devices	3		11		COMPRESSOR OPERATION.				
XFMR 1-2	2 TR100VA002	KELE INC	TR100VA002 Xfr	nr 100VA,120—24V,dual hub,ClassII UL	B. COOLING DAT RESET: THE COOLING DAT SETPOINT MAY BE RESET BY THE SPACE TEMP, RETURN TEMP, OAT OR EXTERNAL VOLTAGE/MA SIGNALS. A LINEAR RELATIONSHIP BETWEEN THE DAT AND THE RESET VARIABLE WILL BE CREATED FOR THE MINIMUM AND MAXIMUM DAT SETPOINTS AS THE RESET VARIABLE CHANGES THE DAT WILL				
					ADJUST ACCORDING TO THE ECONOMIZER: A COMPARATIVE DRY E ENGAGED WHENEVER THE OUTDOOR I UTILIZE OUTSIDE AIR FOR COOLING. ( SUDDLY AIR TENDERATURE SET DOIN	RELATIONSHIP. BULB (STANDARD OPTION) OR COMPARATIVE ENTHALPY (SELECT. ENTHALPY OR DRY BULB IS LESS THAN THE RETURN AIR ENTHA OUTSIDE AIR AND RETURN AIR DAMPERS SHALL MODULATE TO M	ABLE OPTION) SHALL ALPY OR DRY BULB TO MAINTAIN		
SEQUENCE OF OPER	RATION				EXHAUST FAN SPEED: AN AIRFLOW N AIRFLOW AND AN AIR MEASURING ST MEASURING STATION INSTALLED ON VARIABLE SPEED DRIVE SHALL MODU	MEASURING STATION INSTALLED ON THE SUPPLY FAN SHALL MEA TATION SHALL BE INSTALLED TO MEASURE OUTSIDE AIRFLOW. A THE EXHAUST FAN SHALL MEASURE EXHAUST FAN AIRFLOW. THE JLATE TO MAINTAIN EXHAUST FAN AIRFLOW AS A FUNCTION OF	ASURE SUPPLY FAN SIMILAR AIRFLOW E EXHAUST FAN THE OUTSIDE AIRFLOW		
n 10-no-4/n 10-no-5					ENERGY RECOVERY WHEEL:				
PACKAGED RTU UNI	T MANUFACTURER PROVIDED SE	EQEUNCE OF OPERATION	S AS PER BELO	V.	WHEEL CONTROL: THE ENTHALPY WH	HEEL IS TURNED ON WHENEVER THE EXHAUST FAN IS RUNNING A	AND THE OUTDOOR AIR		
UNIT CONTROLS:					DAMPERS ARE AT THE MINIMUM POS SHUT OFF IF THE EXHAUST FAN EVE	SITION (I.E. THE UNIT IS NOT IN THE ECONOMIZER OPERATING ST. ER TURNS OFF OR IF THE UNIT ENTERS THE ECONOMIZER OPERA	ATE). THE WHEEL IS TING STATE.		
A. BUILDING A MSTP, IP A	UTOMATION SYSTEM (BAS) INTE ND LON BAS SYSTEMS (REQUIR	RFACE: THE FACTORY L ES OPTIONAL COMMUNIC	JNIT CONTROLLE CATION CARD).	R WILL INTERFACE WITH BACNET	BYPASS DAMPERS: ON ECONOMIZER DAMPERS. BYPASS DAMPERS ARE OF	UNITS (NOT 100% OUTSIDE AIR UNITS) THE WHEEL IS EQUIPPED PENED WHEN THE UNIT ENTERS THE ECONOMIZER OPERATING ST	WITH BYPASS ATE. OTHERWISE, THE		
	ISTORY			SIEMENC		NANUET BOND PHASE3 HIGH SCHOOL	440D-266722		
		NTS DATED 5/10/24		JIEIAIEIAD	412 MT KEMBLE AVE.	NANUET, NY	<del>14</del> 0r-300/33		
R1 4/16/2024 VE	REVISED AS PER COMME	NTS DATED 3/15/24			NJ. 07960 USA	ENGINEER DRAFTER CHECKED BY INITIAL RELEASE LAST EDIT DATE			
R0 2/16/2024 VE	ISSUED FOR APPROVAL			SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-6300 Fax: (973) 575-7968	HS-RTU (RTU-HS-4.5) (ROM/SOO)	114		
COPYRIGHT 1994-24 SIEMENS	NDUSTRY, INC. All Rights Reserved			]	USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BA	U NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\	JL		

UNITS-K00.DWG

BYPASS DAMPERS REMAIN CLOSED.

WHEEL EFFECTIVENESS CONTROL: THE ENERGY RECOVERY WHEEL WILL MODULATE ITS SPEED TO MEET THE DISCHARGE AIR TEMPERATURE SET POINT USING FACTORYMOUNTED TEMPERATURE SENSORS. THE ENERGY WHEEL IS THE FIRST FORM OF HEATING OR COOLING WHEN ACTIVE. COMPRESSORS OR HEAT WILL ONLY BE ACTIVE WHEN THE ENERGY RECOVERY WHEEL CANNOT SATISFY THE DAT.

ON/OFF DEFROST CONTROL- (STANDARD OPTION): WHEN THE OUTSIDE AIR TEMP IS BELOW AN ADJUSTABLE FROST TEMPERATURE (DEFAULT 32F) THE WHEEL IS STOPPED FOR AN ADJUSTABLE PERIOD OF TIME (DEFAULT 5 MINUTES) ONCE EVERY 60 MINUTES (ADJUSTABLE).

FROST PREVENTION CONTROL (SELECTABLE OPTION) - THE UNIT WILL MONITOR RETURN AIR TEMPERATURE AND HUMIDITY, OUTSIDE AIR TEMPERATURE, AND EXHAUST AIR TEMPERATURE. ASSUMING AN OUTDOOR AIR RELATIVE HUMIDITY OF 95% THE UNIT WILL

CALCULATE THE POINT AT WHICH CONDENSATE WILL DEVELOP IN THE EXHAUST AIR. WHEN THE EXHAUST AIR REACHES THIS TEMPERATURE, THE WHEEL WILL BEGIN TO MODULATE TO REDUCE THE EFFECTIVENESS OF THE WHEEL AND AVOID FROST BUILDUP. THIS ALLOWS THE WHEEL TO REMAIN ON AT THESE FROST PREVENTION TIMES AND STILL RECOVER SOME ENERGY.

TRENDING POINTS

- a. RETURN AIR TEMPERATURE
- b. OUTSIDE AIR TEMPERATURE
- c. MIXED AIR TEMPERATURE
- d. OUTSIDE AIR DAMPER
- e. SUPPLY FAN SPEED
- f. EXHAUST FAN SPEED
- g. SUPPLY FAN START / STOP
- h. EXHAUST FAN START / STOP
- i. RETURN AIR DAMPER
- i. SUPPLY DISCHARGE AIR TEMPERATURE
- k. HIGH TURNDOWN MODULATING NATURAL GAS HEAT EXCHANGER
- I. OUTSIDE AIRFLOW MEASURING STATION
- m. SUPPLY AIRFLOW MEASURING STATION
- n. EXHAUST AIRFLOW MEASURING STATION
- o. DX COOLING OPERATION
- p. ENERGY RECOVERY WHEEL START/STOP
- q. ENERGY RECOVERY WHEEL SPEED
- r. ENERGY RECOVERY BYPASS DAMPER

ALARM POINTS

- a. FILTER STATUS
- b. RETURN AIR SMOKE DETECTOR
- c. SUPPLY FAN STATUS
- d. EXHAUST FAN STATUS
- e. LOW TEMPERATURE THERMOSTAT

	REVISION	HIS	TORY	SIEMENS		NANUET BOND PH
R2	5/21/2024	VB	UPDATED AS PER COMMENTS DATED 5/10/24		MORRISTOWN	
R1 R0	4/16/2024 2/16/2024	VB VB	REVISED AS PER COMMENTS DATED 3/15/24 ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC.	NJ. 07960 USA Phone: (973) 575-6300	VB VB
				SMART INFRASTRUCTURE	Fax: (973) 575-7968	HS-RTU (RTU

![](_page_107_Picture_33.jpeg)

C:\USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\114_HS-ROOF TOP UNITS-K01.DWG




Device		Qty	Product Number	Manufacturer	Document Number	Description	
ield M	ounted Devices	1 1					
λE	1	1 (	GMA126.1P	SIEMENS	154004	ACT, 2P ,SR,PLENUM	
S.	1	1	H614	VERIS	N/A	Current Switch, 1.5-150A, Split Core,VFD	
E	1	1 6	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT	
A	WHEN THE I TURNED ON FAN IS ON WILL MONITO	DDC S AND THE M R THI	SYSTEM DETERMINES THAT TH OPERATED THROUGH THE F MOTORIZED DAMPER SHALL E È DAMPER END SWITCH STA	HE BUILDING IS IN ( AN'S VFD. THE DDC BE OPEN. THE DAMF TUS ON BAS. 1	DCCUPIED MO SYSTEM SHA PER SHALL BE	DE, EXHAUST FAN F-HS-2 SHALL BE ALL TRACK THE FAN SPEED. WHEN THE E CLOSED WHEN THE FAN IS OFF. DC	



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\115_EXHAUST FANS-K00.DWG





	REVISION HISTORY			SIEMENS		NANUET BOND F
R1	4/16/2024	VB	REVISED AS PER COMMENTS DATED 3/15/24		412 MT REMBLE AVE. MORRISTOWN	NANUET, NY
R0	2/16/2024	VB	ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER C
				SIEMENS INDUSTRY, INC.	Phone: (973) 575-6300	
				SMART INFRASTRUCTURE	Fax: (973) 575-7968	HS-EXHAUST

DRAWING NOTES: 1 CONTROL TRANSFORMERS MOUNTED IN DDC ENCLOSURE. GENERAL NOTES:

1. SEE WIRING DETAIL ON ELECTRICAL DRAWING 115B.

PHASE3 HIGH SCHOOL	44OP-366733 0
HECKED BY INITIAL RELEASE LAST EDIT DATE NSK 02/16/24 04/16/24 FANS (MECH)	115A
FANS (MECH)	

C: USERS/Z004PB8F/ONEDRIVE - SIEMENS AG/BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733/DT/MDT_HIGH SCHOOL/115_EXHAUST FANS.DWG



PHASE3 HIGH SCHOOL CHECKED BY INITAL RELEASE LAST EDIT D NSK 02/16/24 04/16/2 FANS (ELEC) HASE 3 HIGH SCHOOL_440P-366733\DT\MDT_		
440P-366733 4 4 4 4 4 4 4 4 9 8 6 7 3 8 9 8 7 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 8 9 8 9 8 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 9 8 8 9 8 9 8 8 9 8 8 8 9 8 9 8 8 8 9 8 8 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8		DRAWING NOTES: TRELAY WILL BE INSTALLED IN THE FIELD NEAR VFD. GENERAL NOTES: 1. ALL WRING TO MEET REQUIREMENTS OF STANDARD WRING SPECIFICATIONS DRAWINGS.

Control Device		Qty	Product Number	Manufacturer	Document Number	Description		
Field Mo	Field Mounted Devices							
CS	1	8	H608	VERIS	1006cut016	CUR SW SPLTCOR-ADJ SETPT W/LED		
DXR	1	8	DXR2.M18-101B	SIEMENS	A6V10502840	DXR2.M18 Room Automation Station		
LTDE	1	8	134–1504	SIEMENS	155 016	T'STAT, LOW TEMP,15/55,MANUAL		
RE	1	8	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT		
TTE	1	8	544-342-16	SIEMENS	149261	DUCT AV. TMP, 1K OHM, PT(375), 16', FLEX		
TTE	2	8	544-339-18	SIEMENS	149261	DCT PT TEMP, PT 1K OHM (375), 18" RIGID		
TTE	3	8	S55624-H105-A	SIEMENS	N/A	QMX3.P34 Temp. Sensor and Room Unit		
V						SEE VALVE SUBMITTAL		
Existing	Equipment To R	emair	1					
AE	1–3	24	ETR	N/A	N/A	DAMPER ACTUATORS		
ENC	1	8	ETR	N/A	N/A	ENCLOSURES		
RE	2	8	ETR	N/A	N/A	RELAY		
XFMR	1	8	ETR	N/A	N/A	TRANSFORMER		

# SEQUENCE OF OPERATION

### UNIT VENTILATORS & HEAT PUMP

- RUN CONDITIONS SCHEDULED: 1.
  - 1) THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
  - a) OCCUPIED MODE: THE UNIT SHALL MAINTAIN
    - 1) A 76'F (ADJ.) COOLING SETPOINT
    - A 70'F (ADJ.) HEATING SETPOINT. 2)
  - b) UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN
    - 1) A 85'F (ADJ.) COOLING SETPOINT.
    - A 64'F (ADJ.) HEATING SETPOINT. 2)
  - 2) UNIT VENTILATOR SENSORS SHALL INCLUDE LOCAL TEMPERATURE BUT SHALL NOT ALLOW USER TEMPERATURE SENSOR OVERRIDE CAPABILITY FROM THE SENSOR, THAT SHALL OCCUR AT THE DDC FRONT END.
  - 3) ALARMS SHALL BE PROVIDED AS FOLLOWS:
  - a. HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).
  - b. LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.).

1	1	c.	ZONE	UNO	CCUPIE	D OVER	RIDE:
			a)	А	TIMED	LOCAL	OVEF

- CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE.
- d. FREEZE PROTECTION:
  - a) OPEN THE FACE AND BYPASS DAMPER FULLY OPEN TO THE BYPASS POSITION.
- e. FAN: a)
- SHUTDOWN ON SAFETIES. f. FACE AND BYPASS DAMPERS CONTROL:
  - a) BYPASS DAMPERS THROUGH ONE OF THE FOLLOWING: 1) HEATING:
  - a) MODULATING THE AIR PASSING OVER THE HEATING COIL.
  - WHEN THE ZONE TEMPERATURE IS GREATER THAN THE HEATING SETPOINT, THE FACE AND BYPASS b) DAMPERS SHALL CLOSE TO FACE POSITION (OPEN TO BYPASS POSITION).
  - c) HEATING COIL VALVE: POSITION.
  - THE HEATING SHALL BE ENABLED WHENEVER: d) 1) OUTSIDE AIR TEMPERATURE IS LESS THAN 65'F (ADJ.).
    - 2) AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
    - 3) AND THE FAN IS ON.
- g. ECONOMIZER:
  - a)
- -IN_QCCUPIED_AND_NON-ECONOMIZER_MODE. THE LOCKOUT TEMPERATURE FOR ECONOMIZER UNIT IS 55 F.) /1
- THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- 1) OUTSIDE AIR TEMPERATURE IS AT LEAST 2'F (ADJ.) LESS THAN THE ZONE TEMPERATURE.
- 2) AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 64'F (ADJ.)
- MODE.

- f) THE OUTSIDE DAMPER AND OPEN THE RETURN DAMPER.
- MECHANICAL COOLING VIA VARIABLE REFRIGERANT VOLUME (VRV) HEAT PUMP SYSTEM:
- a)
- START AND STOP OPERATION OF THE HEAT PUMP UNITS. b) ENABLED TO OPERATE.

REVISION HISTORY	SIEMENS	NANUET BOND PHASE3 HIGH SCHOOL	440P-366733
R1 4/16/2024 VB REVISED AS PER COMMENTS DATED 3/15/24	MORRISTOWN	NANUET, NY	j U
R0 2/16/2024 VB ISSUED FOR APPROVAL	NJ. 07960 USA	ENGINEER DRAFTER CHECKED BY INITIAL RELEASE LAST EDIT DATE	110
	SIEMENS INDUSTRY, INC. Phone: (973) 575-6300 SMART INFRASTRUCTURE Fax: (973) 575-7968	HS-UNIT VENTILATOR (BOM/SOO)	OII

2.

/ERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME,

THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A LOW TEMPERATURE THERMOSTAT STATUS WHILE THE OUTSIDE/RETURN AIR DAMPER SHALL CLOSE THE OUTSIDE AIR DAMPER AND

THE FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS

THE UNIT SHALL MAINTAIN ZONE HEATING AND COOLING SETPOINTS BY MODULATING THE FACE AND

WHEN THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT, THE FACE AND BYPASS DAMPERS SHALL MODULATE OPEN TO FACE POSITION (CLOSED TO BYPASS POSITION) TO MAINTAIN SETPOINT BY

1) THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE HEATING COIL VALVE TO MAINTAIN ITS HEATING SETPOINT WITH THE FACE AND BYPASS DAMPER FULLY OPEN TO THE FACE (COIL)

4) THE HEATING COIL VALVE SHALL OPEN WHENEVER THE LOW TEMPERATURE THERMOSTAT IS ON.

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE MIXED AIR DAMPERS IN SEQUENCE TO MAINTAIN THE ZONE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OPEN BASED ON THE VENTILATION RATES DURING HEATING AND VENTILATION WHENEVER

3) THE OUTSIDE AIR DAMPER SHALL BE 100% OPEN AND THE RETURN DAMPER CLOSED WHEN IN ECONOMIZER

THE ECONOMIZER SHALL CLOSE WHENEVER THE LOW TEMPERATURE THERMOSTAT IS ON.

THE OUTSIDE AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IF OPTIMAL START UP IS AVAILABLE THE MIXED AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE. SHOULD DISCHARGE TEMPERATURE DROP BELOW A USER DEFINABLE TEMPERATURE (ADJ.), THE CONTROLLER SHALL ENABLE THE HEATING, CLOSE

THE DDC SHALL INTEGRATE INTO THE BACNET CONTROLLER ON THE VRV HEAT PUMP SYSTEM TO PROVIDE

WHEN ECONOMIZER OPERATION IS AVAILABLE THROUGH THE DDC SYSTEM, THE HEAT PUMP SHALL BE LOCKED OFF FROM MECHANICAL COOLING OPERATION. WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 64 DEGREES F(ADJUSTABLE) AND ANY UNIT VENTILATOR IS CALLING FOR COOLING, THE HEAT PUMPS SHALL BE

WHEN AN INDIVIDUAL UNIT VENTILATOR IS CALLING FOR COOLING TO MEET THE SPACE TEMPERATURE

C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\116_UNIT VENTILATOR-K00.DWG

ON HISTORY 024 VB REVISED AS PER COMMENTS DATED 3/15/24 024 VB ISSUED FOR APPROVAL	SIEMENS SIEMENS INDUSTRY, INC.	412 MT KEMBLE AVE. MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300	NANUET BOND PHA NANUET, NY ENGINEER DRAFTER CHECK VB VB NS
ON HISTORY	SIEMENS	412 MT KEMBLE AVE. MORRISTOWN	NANUET BOND PHA NANUET, NY
ON HISTORY	SIEMENS	A12 MT KEMBI E AVE	NANUET BOND PHA
ALARMS SHALL BE PROVIDED AS FOLLOWS: 1) HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPE 2) LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPE N STATUS: THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS: FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON. ENDING POINTS CE AND BYPASS DAMPER OPERATION NE SPACE TEMPERATURE SCHARGE AIR TEMPERATURE TURN AIR/OUTSIDE AIR DAMPER OPERATION IT VENTILATOR FAN START/STOP KED AIR TEMPERATURE COOLING OPERATION WAY MODULATING HEATING WATER CONTROL VALVE OPERATION ARM POINTS W TEMPERATURE THERMOSTAT IT VENTILATOR FAN STATUS NE SPACE TEMPERATURE ME SPACE TEMPERATURE	JRE IS GREATER THAN 110'F (ADJ.). RE IS LESS THAN 40'F (ADJ.).		
BALANCING OPERATIONS DURING BUILDING OCCUPIED HOURS W DURING UNOCCUPIED HOURS. SCHARGE AIR TEMPERATURE: THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TE	IN NON-ECONOMIZER MODE AND BE CLOSED		
VIMUM OUTSIDE AIR VENTILATION – FIXED PERCENTAGE: THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM F BALANCING OPERATIONS DURING BUILDING OCCUPIED HOURS W	ON (ADJ.) AS DETERMINED BY THE		
<ol> <li>2) THE DDC SYSTEM SHALL SEND A 0-10 VDC INPUT TO TH COOLING AS REQUIRED TO MEET THE SPACE SETPOINT.</li> </ol>	V EXPANSION VALVE KIT TO PROVIDE		
COOLING VIA THE VRV EXPANSION VALVE KIT AND A SEP/	E DRY CONTACT SENT TO THE VRV CONTROL		
1) THE DDC SYSTEM SHALL SEND A DRY CONTACT TO THE U	VENTILATOR VRV CONTROL KIT TO ENABLE		
	SETPOINT, THE FOLLOWING SHALL OCCUR: 1) THE DDC SYSTEM SHALL SEND A DRY CONTACT TO THE UNIT ' COOLING VIA THE VRV EXPANSION VALVE KIT AND A SEPARATE KIT TO ENABLE THE UNIT VENTILATOR SUPPLY FAN. 2) THE DDC SYSTEM SHALL SEND A 0–10 VDC INPUT TO THE VR' COOLING AS REQUIRED TO MEET THE SPACE SETPOINT. NIMUM OUTSIDE AIR VENTILATION – FIXED PERCENTAGE: THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITI BALANCING OPERATIONS DURING BUILDING OCCUPIED HOURS WHEN DURING UNOCCUPIED HOURS. SCHARGE AIR TEMPERATURE: THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATU 2) LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATU 3) HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATU 4) LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATU 3) THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS: THE CONTROLLER SHALL MONITOR THE STATUS IS OFF. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF. FAN FAILURE: COMMANDED OFF, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS OFF. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON. WENDING POINTS ACE AND BYPASS DAMPER OPERATION NIT VENTILATOR FAN START/STOP XED AIR TEMPERATURE SCHARGE AIR TEMPERATURE COOLING OPERATION WAY MODULATING HEATING WATER CONTROL VALVE OPERATION ARM POINTS WE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN START/STOP XED AIR TEMPERATURE COOLING OPERATIOR ARM POINTS WE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN STARTUS WE SPACE TEMPERATURE WE SPACE TEMPERATURE WIT VENTILATOR FAN STATUS WIT EMPERATURE THERMOSTAT WIT VENTILATOR FAN STATUS NOT SENDER THEORERATURE SCHARGE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN STATUS NOT SENDER THEORERATURE WIT VENTILATOR FAN STATUS NOT SENDER THEORERATURE WIT VENTILATOR FAN STATUS NOT SENDER SPACE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN STATUS NOT SENDER SPACE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN STATUS NOT SENDER SPACE TEMPERATURE THERMOSTAT WIT VENTILATOR FAN STATUS NOT SENDER SPACE TEMPERATURE SCHARGE SPACE TEMPERA	SETPOINT, THE FOLLOWING SHALL OCCUR: 1) THE DDC SYSTEM SHALL SEND A DRY CONTACT TO THE UNIT VENTILATOR VRY CONTROL KIT TO ENABLE COOLING VIA THE VRY EXPANSION VALVE KIT AND A SEPARATE DRY CONTACT SENT TO THE VRY CONTROL KIT TO ENABLE THE UNIT VENTILATOR SUPPLY FAN. 2) THE DDC SYSTEM SHALL SEND A 0–10 VDC INPUT TO THE VRY EXPANSION VALVE KIT TO PROVIDE COOLING AS REQUIRED TO MEET THE SPACE SEPTONT. NIMUM OUTSIDE AIR VENTILATION – FIXED PERCENTAGE: THE OUTSIDE AIR VENTILATION – FIXED PERCENTAGE: THE OUTSIDE AIR VENTILATION – FIXED PERCENTAGE: THE CONTROLLER SHALL MOINTOR THE DISCHARGE AIR TEMPERATURE. ALARMS SHALL BE PROVIDED AS FOLLOWS: 1) HICH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 110° (ADJ). 2) LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 110° (ADJ). 3) LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40° (ADJ). 3) THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40° (ADJ). 4) LIOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40° (ADJ). 5) THE CONTROLLER SHALL MONITOR THE FAN STATUS. 4) ARMS SHALL BE PROVIDED AS FOLLOWS: FAN FAILURE: COMMANDED OF, BUT THE STATUS IS ON. 5) THE CONTROLLER SHALL MONITOR THE FAN STATUS. 4) ARMS SHALL BE PROVIDED AS FOLLOWS: 50 CAMBE FAN TORE OPERATION 50 ESPACE TEMPERATURE 50 CAMBE FANDER OPERATION 50 ESPACE TEMPERATURE 50 CANDE DRYNS CAMPER OPERATION 50 WE SPACE TEMPERATURE 50 CANDE DRYNS TO AMEER OPERATION 50 WE TEMPERATURE 50 CANDE DRYNS TO AMEER OPERATION 50 WE TEMPERATURE 50 CANDE DRYNS TATUS 50 AND EMPERATURE 50 CANDE THEREFATURE 50 CANDE DRYNS TATUS 50 AND EMPERATURE 50 CANDE DRYNS TATUS 50 AND EMPERATURE 50 CANDE DRYNS TATUS 50 AND EMPERATURE 50 CANDE TEMPERATURE 50 CANDE THEREFATURE 50 CANDE T	SETFOINT, THE FOLLOWING SHALL OCCUR: 1) THE DOC SYSTEM SHALL SEND A DRY CONTACT TO THE UNIT VENTILATOR VRY CONTROL KIT TO ENABLE COOLING AN THE VRY EVANION VALVE KIT AND A SEPARATE DRY CONTACT SENT TO THE VRY CONTROL KIT TO ENABLE THE UNIT VENTILATOR SUPPLY FAN. 2) THE DOC SYSTEM SHALL SEND A O-10 VOC INPUT TO THE VRY EXPANSION VALVE KIT TO PROVIDE COOLING AS REQUIRED TO MEET THE SPACE SETPONT. NUM OUTSIDE AR VENTILATION OF INCUT OT THE VRY EXPANSION VALVE KIT TO PROVIDE COOLING AS REQUIRED TO MEET THE SPACE SETPONT. NUM OUTSIDE AR DAMPERS SHALL MAINTAIN A MINIMUM POSITION (ADJ) AS DETERMINED BY THE BALANCING OPERATIONS DUILDING OCCUPED HOURS WHEN IN NON-ECONOMIZER MODE AND BE CLOSED DURING UNOCCUPED HOURS. SHALE BE PROVIDED AS FOLLOWS: 1) HIGH DISCHAREC AR TEMPERATURE: ALARMS SHALL BE PROVIDED AS FOLLOWS: 1) HIGH DISCHAREC AR TEMPE: IF THE DISCHAREC AR TEMPERATURE IS CREATER THAN 110° (ADJ). NI STATUS: THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS: 1) AND MESTARE CAR TEMPE: IF THE DISCHARE AR TEMPERATURE IS LESS THAN 40° (ADJ). NI STATUS: THE CONTROLLER SHALL MONITOR THE FAN STATUS. ALARMS SHALL BE PROVIDED AS FOLLOWS: 1) AND MESTARE CAR TEMPE STATUS IS OFF. FAN I MAND: COMMANDED OFF, BUT THE STATUS IS OFF. FAN I MAND: COMMANDED OFF, BUT THE STATUS IS ON. EXCERN DEVFASS DAMPER OPERATION NE SPACE TEMPERATURE EVENDING FAN STARTYSTOP KED AND FORTS WHERE ROPERATION WIT VENTILATOR FAN STARTYSTOP WED MODILATING HEATING WARER CONTROL VALVE OPERATION WIT MEMERATURE IT VENTILATOR FAN STARTYSTOP WED MEMERATURE IT VENTILATOR FAN STARTYSTOP WED MEMERATURE IT VENTILATOR FAN STARTYSTOP WED SPACE TEMPERATURE IN SPACE TEMPERATURE



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\116_UNIT VENTILATOR-K01.DWG



DRAWING NOTES:
1 DXR-1 TO BE MOUNTED IN EXISTING SIEMENS ENCLOSURE.
2 SENSORS/FIELD DEVICES ARE EXISTING TO REMAIN AND RE-WRED TO NEW SIEMENS CONTROLLERS BY SIEMENS.
$\fbox{3}$ NEW SENSORS FURNISHED, INSTALLED AND WIRED BY SIEMENS.
(4) ALL TERMINALS TO BE FIELD VERIFIED.
5 LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS.
$\fbox{6}$ EXISTING DETAILS FOR VALVES & ACTUATORS ARE NOT AVAILABLE AND VA RATINGS FOR FIELD DEVICES TO BE FIELD DETERMINED.

LEGEND:			
	24VA(	C WIR	ING
	FIELD	KNX	WIRING

VA RATING				
S.NO	EQUIPMENT	VA DRAWN		
1	DXR-1	8		
2	AE-1,2,3	9		
3 V-1		3.5		
	TOTAL	20.5		



C: USERS Z004PB8F ONEDRIVE - SIEMENS AG BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733 DT MDT_HIGH SCHOOL 116_UNIT VENTILATOR.DWG

Control Device		Qty	Product Number	Manufacturer	Document Number	Description	e. PUMP P-HS-3 START/STOP f. PUMP P-HS-4 START/STOP g. HEATING LOOP DIFFERENTIAL PRESSURE
Field Mo	ounted Devices				1		i. STEAM 1/3-CONTROL VALVE
CS	1-2	2	H614	VERIS	N/A	Current Switch, 1.5–150A, Split Core,VFD	J. HEATING LOOP BYPASS CONTROL VALVE
DPTE	1	1	2301050PD3V11B	SETRA	0608cut002	DP TRAN,WET,50PSI,4-20MA,W/MAN	a. PUMP P-HS-3 STATUS
RE	1-2	2	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT	C. CONDENSATE PUMP CP-HS-2 HIGH WAT
TTE	1	1	544-577-25	SIEMENS	149261	IMMERSION TMP SNSR, PT 1K OHM(375) 2.5"	
TTE	2	1	544-577-40	SIEMENS	149261	IMMERSION TMP SNSR, PT 1K OHM(375) 4"	
V						SEE VALVE SUBMITTAL	

# SEQUENCE OF OPERATION

## STEAM-TO-HOT WATER HEAT EXCHANGER HX-HS-2

- A. HEAT EXCHANGER OPERATION SHALL BE ENABLED AT ALL TIMES BASED ON OUTSIDE AIR TEMPERATURE. WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 65 DEGREES F (ADJUSTABLE), THE HEAT EXCHANGER SHALL BE ENABLED.
  - 1) THE STEAM CONTROL VALVES SHALL MODULATE TO MAINTAIN THE LEAVING WATER TEMPERATURE SETPOINT. THE HEAT EXCHANGER 1/3 CONTROL VALVE SHALL MODULATE FIRST TO MAINTAIN THE LEAVING WATER SETPOINT. SHOULD THE 1/3 CONTROL VALVE BE 100% OPEN AND NOT ABLE TO MEET SETPOINT, THE 1/3 CONTROL VALVE SHALL CLOSE AND THE 2/3 CONTROL VALVE SHALL MODULATE TO MAINTAIN THE HEATING SETPOINT. SHOULD THE 2/3 CONTROL VALVE BE 100% OPEN AND NOT ABLE TO MEET SETPOINT, THE 1/3 CONTROL VALVE SHALL MODULATE WITH THE 2/3 CONTROL VALVE 100% OPEN TO MAINTAIN SETPOINT. SHOULD THE LEAD HEAT EXCHANGER'S CONTROL VALVES FAIL TO OPEN ON A CALL FOR HEAT, ALARM THE DDC.
- B. WHENEVER THE OUTSIDE AIR TEMPERATURE IS 65 DEGREES OR BELOW (ADJUSTABLE) THE DDC SYSTEM SHALL TURN ON THE HEATING WATER LOOP PUMPS P-HS-3/P-HS-4. THE PUMP STATUS SHALL BE CONFIRMED WITH A CURRENT SENSOR. ONE OF THE TWO HEATING WATER PUMP P-HS-3/P-HS-4 SHALL BE OPERATED. ONE OF THE TWO PUMPS SHALL BE DEEMED THE LEAD PUMP, AND LEAD PUMP SHALL ROTATE WEEKLY. SHOULD THE LEAD PUMP FAIL TO START ON ALARM, THE LAG PUMP SHALL START.
- C. THE HEATING WATER SYSTEM CONTROLLER SHALL MEASURE HOT WATER DIFFERENTIAL PRESSURE AND MODULATE THE SPEED OF PUMPS P-HS-3/P-HS-4 TO MAINTAIN ITS DIFFERENTIAL PRESSURE SETPOINT. THE CONTROLLER SHALL MODULATE THE SPEED TO MAINTAIN A HOT WATER DIFFERENTIAL PRESSURE OF 15 PSIG (ADJUSTABLE).
- D. THE FINAL DIFFERENTIAL PRESSURE SETTING OF ALL PUMP SENSORS SHALL BE OPTIMIZED FOLLOWING INSTALLATION AND COMMISSIONING OF ALL DDC SYSTEMS BY SEQUENTIALLY LOWERING THE DIFFERENTIAL PRESSURE SETTING UNTIL THE SETPOINT CAN'T BE REACHED.
  - SHOULD THE PUMP SPEED ON THE VFD SHALL DROP DOWN TO 25% OF MAXIMUM PUMP SPEED, THE 1) BYPASS CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN A MINIMUM 25% PUMP SPEED AT ALL TIMES.

### E. TRENDING POINTS

 $\sim\sim\sim\sim\sim\sim$ 

- HOT WATER SUPPLY TEMPERATURE а.
- HOT WATER RETURN TEMPERATURE b.
- PUMP P-HS-3 SPEED с.
- PUMP P-HS-4 SPEED d.

REVISION HISTORY	SIEMENS	NANUET BOND PH	
R1 4/16/2024 VB REVISED AS PER COMMENTS DATED 3/15/24		MORRISTOWN	NANUET, NY
R0 2/16/2024 VB ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER CHE
	SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	Phone: (973) 575-6300 Fax: (973) 575-7968	HS-HEAT EX





C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\210_HS-HEAT EXCHANGER-K00.DWG





PHASE3 HIGH SCHOOL CHECKED BY INITIAL RELEASE LAST EDIT DATE NSK 02/16/24 04/16/24 XCHANGER (ELEC) 3 HIGH SCHOOL_440P-366733 (DT \MDT_HIGH SCHOO		
440P-366733 210_HS-HEAT EXCHANGERA.DW	1 HOT WATER SYSTEM-WIRING DIAGRAM	DRAWING NOTES: 1 120VAC POWER TO XFMR FROM SAME CIRCUIT AS FIELD PANEL. 2 RELAY WILL BE INSTALLED IN THE FIELD NEAR VFD. <u>GENERAL NOTES:</u> 1. ALL WIRING TO MEET REQUIREMENTS OF STANDARD WIRING SPECIFICATIONS DRAWINGS.

Device	Qty	Product Number	Manufacturer	Document Number	Description		
Field Mounted Device	s						
TTE 1	8	RDB160BNU	SIEMENS	N/A	Room Thermostat with BACnet MS/TP Comm		
٧					SEE VALVE SUBMITTAL		
A. MODULAT MODE OF OF 62 DE B. TRENDING a. H b. S C. ALARM P a. H b. L	E NORM 70 DE CGREES POINT IEATING SPACE OINTS II SPAC OW SP	MALLY OPEN 2-WAY MODU GREES F (ADJUSTABLE) A F (ADJUSTABLE). S G CONTROL VALVE TEMPERATURE ACE TEMPERATURE ACE TEMPERATURE	ILATING CONTROL VA S WELL AS UNOCCUF	LVE TO MAINT PIED REDUCED	AIN ROOM AT SETPOINT IN OCCUPIED TEMPERATURE SETPOINT CONDITIONS		
REVISION	HIST	ŌRY			SIEMENS	412 MT KEMRI E AVE	
<b>REVISION</b> 1       4/16/2024         2       2/16/2024	HIST	ORY REVISED AS PER COMMEN	NTS DATED 3/15/24	4	SIEMENS	412 MT KEMBLE AVE. MORRISTOWN NJ, 07960 USA	NANUET E NANUET, I ENGINEER DR.



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\410_HS-CONVECTOR (MECH)-K00.DWG



VA RATING					
S.NO	EQUIPMENT	VA DRAWN			
1	TTE-1	2.5			
2	V-1	3.5			
-	TOTAL	6			

Tell Number Devices       Image: Stream Removals with BACket MS//P Comm.         Y       Image: Stream Removals with BACket MS//P Comm.         Y       Image: Stream Removals with BACket MS//P Comm.         SECURNCE OF OPERATION       RAMATOR COLS         A. MODULATE NORMALLY OPEN 2- WAY MODULATING CONTROL VALVE TO MAINTAIN ROOM AT SETERANT IN OCCUPIED MODE OF DEGREES F (AUSUSTABLE).         B. SECURATION FOR 2- WAY MODULATING CONTROL VALVE TO MAINTAIN ROOM AT SETERANT IN OCCUPIED MODE OF DEGREES F (AUSUSTABLE).         B. SECURATION FOR 2- WAY MODULATING CONTROL VALVE TO MAINTAIN ROOM AT SETERANT IN OCCUPIED MODE OF DEGREES F (AUSUSTABLE).         B. SECURATION FOR 2- WAY MODULATING CONTROL VALVE TO MAINTAIN ROOM AT SETERANT CONDITIONS         C. STREAM ROOM FORMS         a. HEATING CONTROL VALVE         b. SECURATIONE         C. ALARM POINTS         a. HISTAGE TEMPERATURE         b. UND SPACE TEMPERATURE         b. UND SPACE TEMPERATURE         b. UND SPACE TEMPERATURE         C. ALARM POINTS         a. HISTAGE TEMPERATURE         B. HISTORY         MEDICAL TEMPERATURE	
TE       1       0       REPORT       Record       Recor	ield Mounted Devices
K       SECURICE OF OPERATION         SEQUENCE OF OPERATION       SAULT NORMALITY OPEN 2- WAY MODULATING CONTROL, VALVE TO MAINTAIN FROM AT SETFORT IN OCCUPED MODULATING CONTROL, VALVE TO MAINTAIN FROM AT SETFORT CONDITIONS OF 02 DEDRES F (AUAUSTABLE).         III:       TENDINIC FORTS         III:       SEACE TEMPERATURE	TE 1
SECUENCE OF OPERATION  AND/LATE NORMALLY OPEN 2-NAY MODULATING CONTROL VALVE TO MAINTAIN ROOM AT SETPOINT IN OCCUPED OF 00 DEGREES F (AUBITABLE) AS WELL AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS WELL AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS WELL AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS WELL AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS WELL AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE SETPOINT CONDITIONS OF 00 TO DEGREES F (AUBITABLE) AS UNOCCUPED REDUCED TEMPERATURE	1
REVISION HISTORY SIEMENS 412 MT KEMBLE AVE.	A. MODULATE I MODE OF 70 OF 62 DEGF B. TRENDING P a. HEA b. SPA C. ALARM POIN a. HI b. LOV
14/16/2024 LVR LREVISED AS PER COMMENTS DATED 3/15/24	
Image: Prevised as per comments dated 5/15/24     MORRISTOWN, NJ. 07960       0     2/16/2024     VB     ISSUED FOR APPROVAL     USA	REVISION HI



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\411_HS-RADIATOR-K00.dwg



C:\USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\411_HS-RADIATOR.DWG

VA RATING					
S.NO	EQUIPMENT	VA DRAWN			
1	TTE-1	2.5			
2	V-1	3.5			
-	TOTAL	6			

Control Device		Qty	Product Number	Manufacturer	Document Number	Description
Field W	lounted Device	es				
ENC	1	3	550-002	SIEMENS	N/A	ENCLOSURE ASSY, TEC
RE	1	3	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT
ITE	1	3	S55624-H105-A	SIEMENS	N/A	QMX3.P34 Temp. Sensor and Room Unit
/						SEE VALVE SUBMITTAL
^D anel	Mounted Devic	ces				
DXR	1	3	DXR2.M11-101B	SIEMENS	A6V10502834	DXR2.M11 Room Automation Station
<pre>B</pre>	. TRENDING a. b.	G POINTS HEATING SPACE	CONTROL VALVE	IE.		
B C C	. TRENDING a. b. . ALARM F a. b.	G POINTS HEATING SPACE - POINTS HI SPAC LOW SP/	CONTROL VALVE CONTROL VALVE TEMPERATURE ACE TEMPERATURE	IE. ∖		
	<ul> <li>TRENDING</li> <li>a.</li> <li>a.</li> <li>b.</li> </ul>	G POINTS HEATING SPACE - POINTS HI SPAC LOW SP/	CONTROL VALVE CONTROL VALVE TEMPERATURE ACE TEMPERATURE	LΕ.		SIEMENS
	<ul> <li>TRENDING</li> <li>a.</li> <li>b.</li> <li>ALARM F</li> <li>a.</li> <li>b.</li> </ul>	G POINTS HEATING SPACE - POINTS HI SPAC LOW SP/	CONTROL VALVE CONTROL VALVE TEMPERATURE ACE TEMPERATURE ACE TEMPERATURE ORY	MENTS DATED 3/15/24		SIEMENS



C: USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\412_HS-CABINET UNIT HEATER-K00.DWG



C: \USERS\Z004PB8F\ONEDRIVE - SIEMENS AG\BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733\DT\MDT_HIGH SCHOOL\412_HS-CABINET UNIT HEATER.DWG

VA RATING					
S.NO	EQUIPMENT	VA DRAWN			
1	DXR-1	8			
2	TTE-1	0.3			
3	V-1	7			
4	RE-1	1.1			
	TOTAL	16.4			

Control Device	Qty	Product Number	Manufacturer	Document Number	Description	
Field Mounted Devices	•					
ENC 1	1	550-002	SIEMENS	N/A	ENCLOSURE ASSY,TEC	
RE 1	1	RIBU1C	FUNCTIONAL DEVICES	1208cut013	RIB 120VAC 24VAC/DC SPDT	
TTE 1	1	S55624-H105-A	SIEMENS	N/A	QMX3.P34 Temp. Sensor and Room Unit	
V					SEE VALVE SUBMITTAL	
Panel Mounted Devices						
DXR 1	1	DXR2.M11-101B	SIEMENS	A6V10502834	DXR2.M11 Room Automation Station	

# SEQUENCE OF OPERATION

# UNIT HEATERS

A. CYCLE FAN OPERATION AND VALVE POSITION TO MAINTAIN SPACE TEMPERATURE AT SETPOINT CONDITIONS THROUGH SPACE TEMPERATURE SENSOR. PROVIDE ATWO-POSITION, NORMALLY-OPEN, SPRING RETURN CONTROL VALVE ON THE HOT WATER RETURN LINE.

- B. TRENDING POINTS HEATING CONTROL VALVE а.
  - SPACE TEMPERATURE b.

C. ALARM POINTS

a. HI SPACE TEMPERATURE b.

LOW SPACE TEMPERATURE 

	REVISION	HIS	STORY	SIEMENS			
R1	4/16/2024	VB	REVISED AS PER COMMENTS DATED 3/15/24		MORRISTOWN	NANUET, NY	
R0	2/16/2024	VB	ISSUED FOR APPROVAL		NJ. 07960 USA	ENGINEER DRAFTER CHE	
				SIEMENS INDUSTRY, INC.	Phone: (973) 575-6300		
				SMART INFRASTRUCTURE	Fax: (973) 575-7968	HS-UNIT HEAT	



C: USERS/Z004PB8F/ONEDRIVE - SIEMENS AG/BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733/DT/MDT_HIGH SCHOOL/413_UNIT HEATER-K00.DWG



VA RATING					
S.NO	EQUIPMENT	VA DRAWN			
1	DXR-1	8			
2	TTE-1	0.3			
3	V-1	7			
4	RE-1	1.1			
-	TOTAL	16.4			

Control Device	Qty	Product Number	Manufacturer	Document Number	Description	
Existing Equipment To R	emair	1				
PXCC 1	1	PXC36-EF.A	SIEMENS	149206	APOGEE 36PT, BACNET IP/MSTP,TXIO,RS485	
	1	TXA1.K24	SIEMENS	149476	@ADDRESS KEY 1-24	

REVISION HISTORY	SIEMENS		NANUET BOND P
R0 2/16/2024 VB ISSUED FOR APPROVAL	SIEMENS INDUSTRY INC	412 MT REMOLE AVE. MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300	NANUET, NY  ENGINEER DRAFTER CF VB VB
	SMART INFRASTRUCTURE	Fax: (973) 575-7968	HIGHPXC22 (

PHASE3 HIGH SCHOOL	44OP-366733 0
HECKED BY INITIAL RELEASE LAST EDIT DATE NSK 02/16/24 04/16/24	F01
(BOM)	

C: USERS Z004PB8F ONEDRIVE - SIEMENS AG BNJ2 BAU NANUET BOND PHASE 3 HIGH SCHOOL_440P-366733 DT MDT_HIGH SCHOOL KEY-000.DWG



Control Device	Qty	Product Number	Manufacturer	Document Number	Description			
Existing Equipment To R	Existing Equipment To Remain							
PXCM 3	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE			
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485			
	1	TXA1.K24	SIEMENS	149476	@ADDRESS KEY 1-24			
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE			
	1	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA			
	1	TXM1.8X-ML	SIEMENS	149476	8 UNIV 1/0 W/ 4-20MA, OVD&LCD			
	1	TXM1.8D	SIEMENS	149476	8 DIGITAL INPUT MODULE			
	1	TXM1.6R-M	SIEMENS	149476	6 RELAY OUTPUT MODULE W/OVD			

REVISION HISTORY	SIEMENS		NANUET BOND P
R0 2/16/2024 VB ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC. SMART INFRASTRUCTURE	412 MI REMDLE AVE. MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300 Fax: (973) 575-7968	NANUET, NY       ENGINEER     DRAFTER       VB     VB       HIGHPXM03

PHASE3	HIGH SCHO	OL	44OP-366733
HECKED BY	INITIAL RELEASE	LIAST FOIT DATE	
NSK	02/16/24	04/16/24	
(BOM)			
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Control Device	Qty	Product Number	Manufacturer	Document Number	Description			
Existing Equipment To R	Existing Equipment To Remain							
PXCM 5	1	PXC100-PE96.A	SIEMENS	149478	PXC MOD, P2, TX-I/O, 96 NODE, APOGEE			
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485			
	1	TXA1.K24	SIEMENS	149476	@ADDRESS KEY 1-24			
	1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE			
	1	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA			
	2	TXM1.8X-ML	SIEMENS	149476	8 UNIV 1/0 W/ 4-20MA, OVD&LCD			
	1	TXM1.16D	SIEMENS	149476	16 DIGITAL INPUT MODULE			
	1	TXM1.6R-M	SIEMENS	149476	6 RELAY OUTPUT MODULE W/OVD			

	GIEMENS		NANUET BOND PHASES HIGH SCHOOL	4400-966799
R0     2/16/2024     VB     ISSUED FOR APPROVAL		412 MT KEMBLE AVE. MORRISTOWN	NANUET, NY	440F-300733 0
	SIEMENS INDUSTRY, INC.	NJ. 07960 USA Phone: (973) 575-6300	ENGINEER         DRAFTER         CHECKED         BY         INITIAL         RELEASE         LAST         EDIT         DATE           VB         VB         NSK         02/16/24         04/16/24	F03
© COPYRIGHT 1994-24 SIEMENS INCUSTRY, INC. All Richts Reserved	SMART INFRASTRUCTURE	Fax: (973) 575-7968	HIGHPXM05 (BOM)	



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Qty	Product Number	Manufacturer	Document Number	Description
1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
1	PXC24.3-UCM.A	SIEMENS	149837	APOGEE 24 PT, UEC BAC MSTP RS485
1	PXC24.3-UCM.A	SIEMENS	149837	APOGEE 24 PT, UEC BAC MSTP RS485
1	PXC100-E96.A	SIEMENS	149478	PXC MOD, BACNET, TX-I/O, 96 NODE, APOGEE
1	TXA1.K24	SIEMENS	149476	@ADDRESS KEY 1-24
1	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
1	TXM1.6R-M	SIEMENS	149476	6 RELAY OUTPUT MODULE W/OVD
1	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
1	TXS1.EF4	SIEMENS	149476	BUS CONNECTION MODULE, 4A FUSE
1	PXA-SB115V192VA	SIEMENS	588783	SERVICE BOX 115V, 24VAC, 192VA
	Qty           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	Qty         Product Number           1         PXA-ENC19           1         PXC24.3-UCM.A           1         PXC24.3-UCM.A           1         PXC24.3-UCM.A           1         PXC100-E96.A           1         TXA1.K24           1         TXS1.12F4           1         TXM1.6R-M           1         TXS1.EF4           1         PXA-SB115V192VA	QtyProduct NumberManufacturer1PXA-ENC19SIEMENS1PXC24.3-UCM.ASIEMENS1PXC24.3-UCM.ASIEMENS1PXC100-E96.ASIEMENS1TXA1.K24SIEMENS1TXS1.12F4SIEMENS1TXM1.6R-MSIEMENS1TXM1.8XSIEMENS1TXS1.EF4SIEMENS1PXA-SB115V192VASIEMENS	Oty         Product Number         Manufacturer         Document Number           1         PXA-ENC19         SIEMENS         149475           1         PXC24.3-UCM.A         SIEMENS         149837           1         PXC24.3-UCM.A         SIEMENS         149837           1         PXC100-E96.A         SIEMENS         149837           1         TXA1.K24         SIEMENS         149476           1         TXS1.12F4         SIEMENS         149476           1         TXM1.6R-M         SIEMENS         149476           1         TXM1.8X         SIEMENS         149476           1         TXS1.EF4         SIEMENS         149476           1         PXA-SB115V192VA         SIEMENS         588783

REVISION HISTORY	SIEMENS		
R0 2/16/2024 VB ISSUED FOR APPROVAL	412 MI REMOLE AVE MORRISTOWN NJ. 07960 USA SIEMENS INDUSTRY, INC. Phone: (973) 575-630 SMART INFRASTRUCTURE Fax: (973) 575-7968	MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300 Fax: (973) 575-7968	NANUET, NY       ENGINEER     DRAFTER       VB     VB       NAN.HS.BAS.I



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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted De	evices		I		-
ENC 2	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
ENC 3	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
XFMR 1	1	PSH500A	FUNCTIONAL DEVICES	1208cut143	PS FIVE 100VA C2 120-24VAC ENC
Panel Mounted D	evices		I		
PXCM 2	1	РХС100-Е96.А	SIEMENS	149478	PXC MOD, BACNET, TX-1/0, 96 NODE, APOGEE
	1	TXA1.K24	SIEMENS	149476	@ADDRESS KEY 1-24
	2	TXS1.12F4	SIEMENS	149476	24VDC SUPPLY 1200MA, 4 A FUSE
	1	TXM1.6R-M	SIEMENS	149476	6 RELAY OUTPUT MODULE W/OVD
	1	TXM1.8D	SIEMENS	149476	8 DIGITAL INPUT MODULE
	23	TXM1.8X	SIEMENS	149476	8 UNIV I/O MODULE W/ 4-20MA
	1	TXS1.EF4	SIEMENS	149476	BUS CONNECTION MODULE, 4A FUSE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
SB 2	1	PXA-SB115V192VA	SIEMENS	588783	SERVICE BOX 115V, 24VAC, 192VA

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R2	5/21/2024	VB	UPDATED AS PER COMMENTS DATED 5/10/24		MORRISTOWN	NANUE	T, NY
RO	2/16/2024	VB	ISSUED FOR APPROVAL	SIEMENS INDUSTRY, INC.	NJ. 07960 USA Phone: (973) 575-6300	<b>VB</b>	VB
				SMART INFRASTRUCTURE	Fax: (973) 575-7968	NAN.H	<u>IS.PH.PX</u>



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Control Device	Qty	Product Number	Manufacturer	Document Number	Description
Field Mounted De	evices				
ENC 4	1	PXA-ENC19	SIEMENS	149475	ENCLOSURE ASSY 19"
Panel Mounted D	evices				
PXCM 3	1	PXC100-E96.A	SIEMENS	149478	PXC MOD, BACNET, TX-1/0, 96 NODE, APOGEE
	1	PXX-485.3	SIEMENS	149478	PXC MOD EXPANSION MODULE, 3 RS-485
SB 3	1	PXA-SB115V192VA	SIEMENS	588783	SERVICE BOX 115V, 24VAC, 192VA

REVISION HISTORY	SIEMENS		NANUET BOND PH
R2 5/21/2024 VB UPDATED AS PER COMMENTS DATED 5/10/24		412 MI REMOLE AVE. MORRISTOWN NJ. 07960 USA Phone: (973) 575-6300	NANUET, NY       ENGINEER     DRAFTER       VB     VB
	SMART INFRASTRUCTURE	Fax: (973) 575-7968	NAN.HS.FL1.PX



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# SIEMENS WALL SENSOR LOCATION DRAWING

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AND ACTUATOR. PROVIDE DDC SYSTEM EQUIPMENT CONTROLLER WITHIN THE EXISTING ACCESS ENCLOSURE AREA OF EXISTING FLOOR MOUNTED UNIT VENTILATOR AT LOCATION SHOWN. PROVIDE DDC CONTROL POINTS PER CONTROL DRAWING LOCATED ON A10/HS-M602. PROVIDE CONTROL WIRING FROM DDC CONTROLLER TO WALL MOUNTED SPACE TEMPERATURE SENSOR. PROVIDE CONTROL WIRING BETWEEN DDC CONTROLLER AND EXISTING UNIT VENTILATOR HEATING WATER CONTROL VALVE AS REQUIRED. PROVIDE CONTROL WIRING BETWEEN DDC CONTROLLER AND EXISTING UNIT VENTILATOR OA/RA DAMPER ACTUATOR AND FACE&BYPASS DAMPER ACTUATOR.

PROVIDE SENSORS AS OUTLINED AND PROVIDE CONTROL WIRING TO ALLOW START/STOP OPERATION OF EXISTING UNIT VENTILATOR

OBJECTION DISCONNECT AND REMOVE FLOOR MOUNTED UNIT VENTILATOR INTREGRAL MICROTECH II CONTROLLER LOCATED WITHIN THE UNIT VENTILATOR ACCESS ENCLOSURE. DISCONNECT AND REMOVE ALL ASSOCIATED CONTROL WIRING BETWEEN CONTROLLER AND REMOVED SPACE THERMOSTAT AND BETWEEN CONTROLLER AND UNIT VENTILATOR SENSORS, RELAYS, DAMPER ACTUATORS, AND CONTROL VALVE AS REQUIRED. MAINTAIN UNIT VENTILATOR CONTROL VALVE, OA/RA DAMPER AND ACTUATOR, FACE&BYPASS DAMPER

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- 2 PROVIDE REPLACEMENT SPACE TEMPERATURE SENSOR AT LOCATION SHOWN AND UTILIZE FOR SPACE TEMPERATURE CONTROL OF THE UNIT VENTILATOR AS REQUIRED. PROVIDE CONTROL WIRING BETWEEN SENSOR AND UNIT VENTILATOR DDC CONTROLLER AS REQUIRED.
- (1) DISCONNECT AND REMOVE REMOTE SPACE TEMPERATURE SENSOR FOR THE EXISTING UNIT VENTILATOR.
- KEYED NOTES:

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MECHANICAL COOLING SYSTEM.





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	KEYEI	DNOTES:			
		OP RA INLET ON BC-HS-2 MIXING BOX, TACKED ABOVE 36"x18" OUTSIDE AIR D	THEN PROVIDE A TRANSITION EL DUCT AND TERMINATE OPEN-END	BOW TO 36"x8" RA DUCTWORK. ROUTE 36" ED WITH 1/4" GALVANIZED WIRE MESH SCF	x8" RETURN AIR DUCT REEN.
	2 F F	ROVIDE 84"x24" OUTSIDE AIR PLENUM DUTLINED ON THE ARCHITECTURAL DR/ REQUIRED.	CONNECTED TO 84"x24" LOUVER AWINGS. ROUTE OA DUCTWORK F	MOUNTED IN TOP OF EXISTING GLAZING S FROM OA PLENUM TO REAR INLET MIXING	YSTEM PANEL AS BOX ON BC-HS-2 AS
	(3) F F C 5 C C C C C	ROVIDE INLINE FAN F-HS-2 AT LOCATIC ROM EXISTING EXHAUST AIR DUCTWO DUCT TO EXISTING 30"x24" EXHAUST AIF 6"x24" EXHAUST AIR DUCT AT INLET OF DISCONNECT/REMOVE/REINSTALL SUSF DUTLET EA DUCTWORK.	DN SHOWN ABOVE SUSPENDED C RK TO INLET AND OUTLET CONNE R DUCT AT OUTLET OF FAN. CONN FAN AS REQUIRED. PROVIDE A PENDED CEILING SYSTEM IN STOF	EILING SYSTEM IN STORAGE ROOM 47. PR ECTIONS ON F-HS-2 AS REQUIRED. CONNE NECT 22"x22" TO 56"x24" TRANSITION DUCT MOTORIZED DAMPER AT OUTLET OF FAN RAGE 47 AS REQUIRED TO INSTALL FAN AN	OVIDE TRANSITIOINS CT 30"x24" EXHAUST AIR FITTING TO EXISTING IN EA DUCTWORK. ID ASSOCIATED INLET AND
	(4) (4) (4) (4) (4) (4) (4) (4) (4) (4)	CONNECT 48"x8" EXHAUST AIR DUCT TO IOUNTED EA REGISTER WITHIN ART RC	EXISTING 22"x10" EXHAUST AIR D DOM 45, MOUNTED ABOVE THE DC	DUCT MAIN AT CONNECTION POINT SHOWN DORWAY TO STORAGE ROOM 239.	N AND PROVIDE A WALL
	(5) F T H II	ROVIDE A 59" WIDE x 33" HIGH HOT WA RANE MODEL LPCAC14D HORIZONTAL . IANDLING UNIT HEATING COIL SECTION NLET AND OUTLET CONNECTION POINT	TER HEATING COIL HC-HS-3 WITH AIR HANDLING UNIT. COORDINAT I WITH THE LOCAL TRANE REPRES S.	IN EXISTING AIR HANDLER AC-1 HEATING E INSTALLATION OF THE HEATING COIL WI SENTATIVE. PROVIDE 2" HWS/R DROPS DC	COIL SECTION. AC-1 IS A THIN THE EXISTING AIR WN TO THE HEATING COIL
	6	CONNECT 32"x18" OUTSIDE AIR INTAKE I DUTSIDE AIR DUCT TO REAR INLET ON B	DUCT TO EXISTING 32"x24" OUTSI BLOWER COIL BC-HS-1 MIXING BC	DE AIR INTAKE DUCT AT CONNECTION POI X.	NT SHOWN. ROUTE 32"x18"
	(7) F	ROVIDE TOP INLET RA OPENING ON BO	C-HS-1 MIXING BOX.		
	(8) F	ROVIDE EXPOSED CEILING MOUNTED I	RADIATOR UNITS AT LOCATIONS	SHOWN SUPPORTED FROM FLOOR DECK	ABOVE.
	9 E	ALANCE EXISTING EA REGISTER TO AII CAPACITY.	RLFOW AMOUNTS SHOWN WITH I	NLINE EXHAUST FAN F-HS-2 OPERATING A	T FULL AIRFLOW
		ROVIDE 43.75" LONG x 18.875" WIDE V-1 10VEMENT. PROVIDE PIPE GUIDES AND 2ETURN BEND OF THE LOOP PER THE N	TYPE, FLANGED EXPANSION LOOF O ANCHORS AS SHOWN INSTALLE IANUFACTURER'S INSTRUCTIONS	P AT LOCATIONS SHOWN ON THE 4" HWS/F D PER THE MANUFACTURER'S INSTRUCTIO	8 MAINS. CAPABLE OF 3" +/- DNS. SUPPORT THE
		ROVIDE 26.25" LONG x 12" WIDE V-TYPE APABLE OF 3" +/- MOVEMENT. PROVIDE SUPPORT THE RETURN BEND OF THE LO	E, SWEAT CONNECTION EXPANSION E PIPE GUIDES AND ANCHORS AS DOP PER THE MANUFACTURER'S	ON LOOP AT LOCATIONS SHOWN ON THE 1 SHOWN INSTALLED PER THE MANUFACTU INSTRUCTIONS.	I-1/4" HWS/R MAINS. IRER'S INSTRUCTIONS.
		COUTE 2-1/2" HWS/R PIPING MAINS EXPO DUCTWORK ROUTED NORTH-SOUTH TH EROBICS AREA. PROVIDE PVC JACKET	OSED WITHIN AEROBICS AREA 23 ROUGH THE AERBOICS AREA, AN ING OVER THE INSULATED 2-1/2"	6 PARALLEL IN HEIGHT WITH EXISTING EX D ABOVE THE EXPOSED SUPPLY AIR DUCT HWS/R PIPING MAINS.	POSED RETURN IWORK SERVING THE
	(13) L F II	OCATION OF EXISTING 3-FOOT WIDE X IPING BETWEEN BOILER ROOM AND AE NSULATED HWS/R PIPING LINESS WITH	4-FOOT HIGH ACCESS DOOR OPE EROBICS AREA 236 WITHIN CRAWI IN THE CRAWLSPACE.	NING TO CRAWLSPACE AREA FROM BOILE SPACE AREA AS SHOWN. PROVIDE PVC J.	ER ROOM. ROUTE HWS/R ACKETING OVER THE
		OUTE HWS/R PIPING MAINS EXPOSED BLOWER COIL BC-HS-1 HEATING COIL AS VEST SIDE OF ART ROOM 45. PROVIDE RT ROOM 45 BELOW EXISTING NORTH- DUTLET LOCATION ON BLOWER COIL.	WITHIN ART ROOM 45 ALONG EAS S REQUIRED. PROVIDE HEATING ( PVC JACKETING OVER ALL EXPOS -SOUTH CONCRETE BEAM. PROVI	T WALL OF ART ROOM. PROVIDE 1-1/4" HV COIL ON LEFT HAND SIDE OF BLOWER COI SED INSULATED HWS/R PIPING. MOUNT BL DE EXPOSED SPIRAL SA DUCTWORK OUT	VS/R BRANCHES TO L TO ALLOW COIL PULL TO LOWER COIL EXPOSED IN OF FRONT DISCHARGE
		IOUNT BLOWER COIL BC-HS-2 EXPOSEI DUTLET LOCATION ON BLOWER COIL.	D WITHIN WOODSHOP 43. PROVID	E EXPOSED SPIRAL SA DUCTWORK OUT C	OF FRONT DISCHARGE
	(16) F	OUTE 3" HWS/R PIPING APPROXIMATEI	LY 22-FEET VERTICALLY FROM PIL G VERTICAL CHASE OPENING.	PING TUNNEL UP TO GYMNASIUM MEZZAN	INE FAN ROOM. ROUTE

- (17) ROUTE HWS/R PIPING MAINS BELOW EXISTING 28"x6" RA BRANCH AT LOCATION SHOWN, THEN PROVIDE A RISE UP AND ROUTE THE HWS/R PIPING MAINS WITH TOP OF PIPING EVEN WITH TOP OF EXISTING 32"X15" RA MAIN.
- (18) PROVIDE DROP IN ELEVATION ON THE HWS/R PIPING MAINS AT LOCATION SHOWN ONCE PAST THE EXISTING 10"X6" SA BRANCH.
- (19) ROUTE 2" HWS/R PIPING BRANCHES BELOW EXISTING SA DUCTWORK CONNECTED TO EXISTING AC-1 AND PENETRATE MECHANICAL ROOM 240 WALL BELOW AC-1 SA DUCTWORK AS SHOWN.

LEGEND:		
BC-HS-X	BLOWER COIL	
1	BC-WALL SENSOR	
CUH-HS-X	CABINET UNIT HEATER	
T	CUH-WALL SENSOR	
R-1-X	HEATING WATER RADIATION	
T	RAD-WALL SENSOR	
	UNIT HEATER	
T	UH-WALL SENSOR	







# SIEMENS



# **PXC Modular Series for BACnet Networks**





#### Description

The PXC Modular Series for BACnet networks is a high-performance modular Direct Digital Control (DDC) supervisory equipment controller, which is an integral part of the APOGEE Automation System. It is classified as a BACnet Building Controller (B-BC) and supports BACnet/IP and BACnet MS/TP protocols.

The field panel operates stand-alone or networked to perform complex control, monitoring, and energy management functions without relying on a higher level processor.

- Up to 100 PXC Modular field panels communicate on a peer-to-peer network.
- With the addition of TX-I/O modules and a TX-I/O Power Supply on a self-forming bus, the PXC Modular can directly control up to 500 points.

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See the APOGEE Wiring Guidelines for Field Panels and Equipment Controllers (125-3002) for information on setting up this configuration.

 With the addition of an Expansion Module, the PXC Modular also provides central monitoring and control for distributed wireless or wired Field Level Network (FLN) devices.

#### Features

- BACnet Testing Laboratories (BTL) certified Classified as BACnet Building Controllers (B-BC) using the BACnet/IP protocol and/or BACnet MS/TP, or BACnet Advanced Application Controllers (B-AAC) using the BACnet MS/TP protocol for specific models.
- Modular hardware components match initial control requirements while providing for future expansion.
- DIN rail mounted device with removable terminal blocks simplifies installation and servicing.
- Proven program sequences to match equipment control applications.
- Built-in energy management applications and DDC programs for complete facility management.
- Comprehensive alarm management, historical data trend collection, operator control, and monitoring functions.
- Sophisticated Adaptive Control, a closed loop control algorithm that auto-adjusts to compensate for load/seasonal changes (License required with Firmware revision 3.5.1 and higher).
- HMI RS-232 and USB ports, which provide laptop connectivity for local operation and engineering.
- Extended battery backup of Real Time Clock.
- Back-up battery protection eliminating the need for time-consuming program and database reentry in the event of an extended power failure.
- The PXC Modular illuminates a "battery low" status LED and can send an alarm message to selected printers or terminals.
- Optional support for MS/TP or P1 FLN devices.
- Optional support for P1 Wireless FLN.
- Optional operation as a MS/TP or P1 device with default applications.

- PPCL performance during an internal database backup has been significantly improved. PPCL will consistently execute during the backup cycle.
- Unused Ethernet ports are now disabled and do not require the field panel to cold start.
- The handling of COV subscriptions for large databases has been improved.
- The HMI prompt was changed from A, N, M (Application/flNdevice/Mstp) to A, N, B (Application/flNdevice/Bacnet); allowing the configuration of routed FLN types and clarifying that any BACnet device (MS/TP or IP) can be added to the BACnet ALN.
- The Available memory report has been extended to show installed Memory (physical memory installed in hardware), in addition to the existing metrics already provided:
  - Available RAM left
  - Number of Fragments of memory
  - Largest Contiguous memory
- Auto Save allows the database to be backed up to flash memory automatically whenever the database is changed, instead of being an operator-selected function. It does not provide any safeguard or protection against power loss.
- PXM10T and PXM10S support: Optional LCD Local user interface with HOA (Hand-off-auto) capability and point commanding and monitoring features.
- MS/TP Point Pickup Module (PPM) support: Universal Inputs can be configured for analog or digital input. Input/Output type is configured by writing to BACnet object properties.
- The Simple Network Management Protocol (SNMP) Agent allows points in the field panel to communicate with an SNMP manager over Ethernet.

## Hardware

#### **PXC Modular**

- The PXC Modular is a microprocessor-based multi-tasking platform for program execution and communication with other field panels. It scans field data, optimizes control parameters, and manages operator requests for data in seconds.
- The program and database information stored in the PXC Modular memory is protected with a battery backup. This eliminates the need for timeconsuming program and database re-entry in the event of an extended power failure. When battery replacement is necessary, the PXC Modular

illuminates a "battery low" status LED and can send an alarm message to selected printers or terminals.

- The PXC Modular firmware, including the operating system, is stored in non-volatile flash memory.
- The PXC Modular provides both an Ethernet port as well as an RS-485 port for communication on Automation Level Networks supporting either BACnet/IP or BACnet MS/TP.
- LEDs provide instant visual indication of overall operation, network communication, and battery status.
- Two self-forming buses are an integral part of the flexibility of the PXC Modular. A self-forming bus to the right of the controller (see Figure 3) supports up to 500 points through TX-I/O[™] modules. Another self-forming bus to the left of the controller (see Figure 5) supports hardware connection to subsystems through Expansion Modules.

#### TX-I/O Modules

TX-I/O Modules are modular expansion I/O consisting of an electronics module and terminal base. The electronics modules perform A/D or D/A conversion, signal processing and point monitoring and command output through communication with the PXC Modular. The terminal bases provide for termination of field wiring and connection of a self-forming bus. For more information, see the *TX-I/O Product Range Technical Specification Sheet* (149-476).

#### **TX-I/O Power Supply**

The TX-I/O Power Supply provides power for TX-I/O modules and peripheral devices. Multiple Power Modules can be used in parallel to meet the power needs of large concentrations of I/O points (see Figure 2 and Figure 3). For more information, see the *TX I/O Product Range Technical Specification Sheet* (149-476).



Figure 2. TX-I/O Power Supply and TX-I/O Modules.



Figure 3. PXC Modular, TX-I/O Power Supply, and TX I/O Modules.

#### **PXC Modular Expansion Module**

The PXC Modular Expansion Module (see Figure 4) provides the hardware connection for Field Level Network (FLN) devices.

Using the Triple RS-485 Expansion Module, the PXC Modular supports one RS-485 network of BACnet MS/TP devices (see Figure 5). With the Expansion Module the PXC Modular can also provide wireless FLN support.



Figure 4. RS-485 Expansion Module.





## Modular Control Panels with Application Flexibility

The PXC Modular is a high performance controller with extensive flexibility. It can be customized with the exact hardware and program for the application. As a result, the user only purchases what is needed.

For example, in monitoring applications, the control panel can be customized with the number and type of points to match the sensor devices. For monitoring and controlling a large number of (on-off) fans or motors, more digital points can be added (see Figure 6).



Figure 6. PXC Modular, TX-I/O Power Supply, and TX I/O Modules.

Alternately, if no local point control is required, the PXC Modular can be used to monitor and control Field Level Network devices using the Expansion Module (see Figure 7).





Of course, the PXC Modular can be used for both direct point monitoring and control and as a system controller for Field Level Network devices (see Figure 8).



# Figure 8. RS-485 Expansion Module, PXC Modular, TX-I/O Power Supply, and TX-I/O Modules.

In a stand-alone configuration, the PXC Modular can fulfill all requirements of a supervisory network coordinator by managing operation schedules and alarms and communicating for the connected devices.

The control program for each field panel is customized to exactly match the application. Proven Powers Process Control Language (PPCL), a "BASIC" type programming language, provides direct digital control and energy management sequences to precisely control equipment and optimize energy usage.

# **Available Options**

#### Launch Pad

Siemens Launch Pad provides easy access to the applications required for configuring, monitoring, and controlling the Building Automation System. It allows you to deploy the Application MC tool to a field panel, load licenses, add shortcuts to other applications, and access user documentation. The Launch Pad is an Adobe AIR-based application that allows you to do the following:

- Launch Adobe AIR-based UI that allows you to interact with Siemens Ethernet BACnet Field Panels and provides a more intuitive user interface for database interaction in comparison to line-by-line command prompts.
- Deploy browser-based Application MC to field panels.
- Deploy licenses to field panels.
- Add shortcut buttons so that other commonlyused Building Automation System applications are easily accessible and can be launched from Launch Pad.
- A shortcut button is automatically added, if WCIS has been installed along with Launch Pad.

#### **Routed FLNs**

A Routed FLN is a software configured network that allows you to group BACnet IP or MS/TP devices by network number. A network that resides in a field panel but does not have a physical connection to a piece of equipment.



# **Global Information Access**

The HMI port supports operator devices, such as a local user interface or simple CRT terminal, and a phone modem for dial-in service capability. Devices connected to the operator terminal port gain global information access.

# **Multiple Operator Access**

Multiple operators can access the network simultaneously. Multiple operator access ensures that alarms are reported to an alarm printer while an operator accesses information from a local terminal. When using the BACnet/IP ALN option, multiple operators may also access the controller through concurrent Telnet sessions and/or local operator terminal ports.

### Menu Prompted, English Language Operator Interface

The PXC Modular includes a simple, yet powerful, menu-driven English Language Operator Interface that provides, among other things:

- Point monitoring and display
- Point commanding
- Historical trend collection and display for multiple points
- Event scheduling
- Program editing and modification via Powers Process Control Language (PPCL)
- Alarm reporting and acknowledgment
  - Continual display of dynamic information

# Built-in Direct Digital Control Routines

The PXC Modular provides stand-alone Direct Digital Control (DDC) to deliver precise HVAC control and comprehensive information about system operation. It receives information from sensors in the building, processes the information, and directly controls the equipment. The following functions are available in the PXC Modular:

- Adaptive Control, an auto-adjusting closed loop control algorithm, which provides more efficient, adaptive, robust, fast, and stable control than the traditional PID control algorithm. It is superior in terms of response time and holding steady state, and at minimizing error, oscillations, and actuator repositioning.
- Closed Loop Proportional, Integral and Derivative (PID) control.
- Logical sequencing.
- Alarm detection and reporting.
  - Reset schedules.

# Built-in Energy Management Applications

The following applications are programmed in the PXC Modular Series and require simple parameter input for implementation:

- Automatic Daylight Saving Time switchover
- Calendar-based scheduling
- Duty cycling
- Economizer control
- Equipment scheduling, optimization and sequencing
- Event scheduling
- Holiday scheduling
- Night setback control
- Peak Demand Limiting (PDL)
- Temperature-compensated duty cycling
  - Temporary schedule override

### **Modular Series Specifications**

#### Dimensions (L × W × D)

PXC Modular FLN Expansion Module

DIN rail (EN 60715 TH 35-7.5, steel)

#### Processor, Battery, and Memory

Processor

Processor Clock Speed

Memory

Serial EEPROM

Secure Digital (SD) memory card (for future use) Battery backup of SDRAM

Battery backup of Real Time Clock

Real Time Clock Initial Accuracy

#### Communication

BACnet/IP Automation Level Network (ALN)

BACnet MS/TP Automation Level Network (ALN) or Secondary BACnet MS/TP Field Level Network (FLN)

BACnet MS/TP Field Level Network (FLN) on PXX-485.3 Expansion Module

P1 Wired/Wireless Field Level Network (FLN) on PXX-485.3 Expansion Module

TX-I/O self-forming bus connection

Human-Machine Interface (HMI) Advanced User Mode

USB Device port (for non-smoke control applications only)

USB Host port on selected models (for ancillary smoke control applications only).

#### **Electrical Rating**

Power Requirements

Power Consumption (Maximum)

AC Power

Communication

7.56" × 3.54" × 2.76" (192 mm × 90 mm × 70 mm) 1.26" × 3.54" × 2.76" (32 mm × 90 mm × 70 mm) 1.38" × 0.30" × 0.04" (35 mm × 7.5 mm × 1 mm)

MPC885 (PowerPC ) 133 MHz 80 MB (64 MB SDRAM, 16 MB Flash ROM) 4 KB Expandable or removable non-volatile memory

30 days (accumulated), AA (LR6) 1.5 Volt Alkaline (non-rechargeable) 12 months (accumulated), Coin cell (BR2032) 3 Volt lithium ±30 seconds/month typical @ 77°F (25°C)

10Base-T or 100Base-TX compilant

RS-485, 9600 bps to 115.2 Kbps, 1/8 Load

RS-485, 9600 bps to 115.2 Kbps, 1/8 Load

RS-485 x 3, 4800 bps to 38.4 Kbps, 1/8 load

115.2 Kbps, 5 pin connector (middle pin is not connected) RS-232 compliant, 1200 bps to 115.2 Kbps (default)

Standard 1.1 and 2.0 USB device port, Type B female connector

Standard 1.1 and 2.0 USB host port, Type A female connector

24 Vac +/-20% input @ 50/60 Hz 24 VA @ 24 Vac NEC Class 2 NEC Class 2

Modular Series Specifications

Operating Environment	
Ambient operating environment	Operate in a dry location, which is protected from exposure to salt spray or other corrosive elements. Exposure to flammable or explosive vapors must be prevented.
Ambient operating temperature	32°F to 122°F (0°C to 50°C)
Shipping and storage environm	-13°F to 158°F (-25°C to 70°C)
Relative Humidity	5% to 95% rh, non-condensing
Mounting Surface	Building wall or structural member (Do not mount on HVAC components or any other vibrating surface.) <b>CE Compliance</b> Requires installation inside a metal enclosure rated at IP30 minimum. <b>Smoke Control Applications</b> Requires installation inside a PX series enclosure
Vibration	Compliance to IEC 60721, 3M2, and 2M2
Protection to EN60529	IP 20
Agency Listings	
UL	UL 864 UUKL Smoke Control Equipment - Conforms to UL864 9th and 10th Edition. UL 864 UUKL7 Smoke Control Equipment - Conforms to UL864 9th and 10th Edition. CAN/ULC-S527-M8 UL 916 PAZX - Conforms to UL916 9th and 10th Edition. UL 916 PAZX7 - Conforms to UL916 9th and 10th Edition.
Agency Compliance	CFR47 Part 15, Class A; CFR47 Part 15, Class B - with metal enclosure, maximum opening Australian EMC Framework - with metal enclosure, maximum opening size is 34" European EMC Directive (CE) - with metal enclosure, maximum opening size is 34" RoHS Compliant UKCA - Electromagnetic Compatibility Regulations (S.I. 2016 No. 1091 / S.I. 2012 No. 3032)
OSHPD Seismic Certification	Product meets OSHPD Special Seismic Preapproval certification (OSH-0217-10) under California Building Code 2010 (CBC2010) and International Building Code 2009 (IBC2009) when installed within the following Siemens enclosure part numbers: PXA-ENC18, PXA-ENC19, or PXA-ENC34.
BTL	BACnet Testing Laboratories (BTL) Certified, Firmware Revision 3.0 and later
Electrical Disturbance Testin	g

Dips and Interrupts	per EN 61000-4-11
Electrical Fast Transients (EPT)	per EN 61000-4-4, 1 kV signal, 2 kV AC power
Electrical Surge Immunity	per EN 61000-4-5 AC power: 2 kV common mode, 1 kV differential mode Signal lines: 1 kV CM, 5 kV DM
Electrostatic Discharge (ESD)	per EN 61000-4-2, 4 kV contact, 8 kV air discharge
RF Conducted Immunity	per EN 61000-4-6 @ 10V
RF Radiated Immunity	per EN 61000-4-3 @ 10V/m

# **Ordering Information**

#### **PXC Modular Series**

Product Number	Description
(PXC00-E96.A)	PXC Modular, BACnet/IP or MS/TP ALN, P1 or MS/TP FLN. PXX-485.3 is a connection for FLN devices.
(PXC100-E96.A)	PXC Modular, BACnet/IP or MS/TP ALN, P1 or MS/TP FLN, self-forming TX-I/O Island Bus. PXX-485.3 is also required as the connection to the FLN devices.
PXX-485.3	Provides FLN support for the PXC Modular. Includes three RS-485 P1 FLN connections or one MS/TP FLN connection; maximum of 96 devices supported.

#### **Optional Licenses**

Product Number	Description	
PXF-TXIO.A	License to enable the Island Bus on PXC00-E96.A and PXC00-PE96.A.	
LSM-SNMP	License to enable SNMP Agent on Siemens Modular or Compact hardware with BACnet Firmware Revision 3.2.3	
LSM-ADAPT	License to use the Adaptive Control added in FW 3.5.1/2.8.18 and later	

*) Field Panel Web Services are no longer available for sale. Launch Pad is a free download available from X:\StdApps\APOGEE_Products_FW_SW\Integrated_Solutions.

#### Accessories

Product Number	Description
PXM10S	Controller mounted Operator Display module with point monitor and optional blue backlight
PXM10T	Controller mounted Operator Display module
PXA-HMI.CABLEP5	Serial cable required for PXM10T/S connection to PXC Series controllers.
PXA-MOD.CON	PXC Modular Connector Kit - Fits one PXC Modular

#### **Service Boxes and Enclosures**

Product Number	Description
PXA-SB115V192VA	PX Series Service Box—115V, 24 Vac, 50/60 Hz, 192 VA
PXA-SB115V384VA	PX Series Service Box—115V, 24 Vac, 50/60 Hz, 384 VA
PXA-SB230V192VA	PX Series Service Box—230V, 24 Vac, 50/60 Hz, 192 VA
PXA-SB230V384VA	PX Series Service Box—230V, 24 Vac, 50/60 Hz, 384 VA
PXA-ENC18	18" Enclosure (Utility Cabinet) (UL Listed NEMA Type 1 Enclosure)
PXA-ENC19	19" Enclosure (UL Listed NEMA Type 1 Enclosure)
PXA-ENC34	34" Enclosure (UL Listed NEMA Type 1 Enclosure)

#### Documentation

Product Number	Description
125-3582	PXC Modular Series Owner's Manual
125-1896	APOGEE Powers Process Control Language (PPCL) User's Manual

#### Disposal

The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage
<ul> <li>Dispose of the device through channels provided for this purpose.</li> <li>Comply with all local and currently applicable laws and regulations.</li> </ul>

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Siemens strongly recommends to comply with security advisories on the latest security threats, patches and other related measures, published, among others, under https://www.siemens.com/cert/en/cert-security-advisories.htm.

Siemens Industry, Inc. Smart Infrastructure 1000 Deerfield Parkway Buffalo Grove, IL 60089-4513 USA Tel. 1 + 847-215-1000 Your feedback is important to us. If you have comments about this document, please send them to SBT_technical.editor.us.sbt@siemens.com. Document No. 149-487 Printed in the USA Page 9 of 9

# SIEMENS



# **TX-I/O Product Range**



### Description

TX-I/O[™] is a range of I/O modules, with associated power and communication modules, for use within the APOGEE Automation System. The TX-I/O product range includes the following:

- Eight types of I/O modules, which act as signal converters. The I/O modules communicate between the PXC Modular or the PXC-36 and the related devices in the building services plant.
- TX-I/O Power Supply for the TX-I/O modules.
- TX-I/O Bus Connection Module, which bridges communication and power from one DIN rail to another.
- TX-I/O Island Bus Expansion (IBE) module, which bridges communication between the primary field panel and expansion field panels.
- P1 Bus Interface Module (BIM), which connects TX-I/O modules to the P1 FLN. The P1 BIM provides power for TX-I/O modules, but it does not contain applications or perform control; the control database for the TX-I/O points resides in a field panel.

*TX-I/O Modules* provide I/O points for APOGEE based upon TX-I/O Technology. TX-I/O Technology provides flexibility of point types, tremendous flexibility of signal types and support for manual operation.

There are eight types of TX-I/O modules:

- 8 point DI module (TXM1.8D)
- 16 point DI module (TXM1.16D)
- 6 point DO with Relay module (TXM1.6R)
- 6 point DO with Relay and Manual Override module (TXM1.6R-M)
- 8 point Universal module (TXM1.8U)
- 8 point Universal with local override/identification device (LOID) module (TXM1.8U-ML)
- 8 point Super Universal module (TXM1.8X)
- 8 point Super Universal with LOID module (TXM1.8X-ML)

#### Features

- The *self-forming TX-I/O island bus* transmits power as well as communication signals.
  - The TX-I/O island bus can be extended a maximum of 164 feet (50 meters).
  - Adding an Island Bus Expansion (IBE) module expands communication data up to an additional maximum of 200 feet (61 m) in two directions.
- Hot-swappable electronic components allow powered electronics to be disconnected and replaced without removing terminal wiring or disturbing the self-forming bus.

All TX-I/O modules include the following features:

- DIN rail mounting.
- High density (point count to physical dimensions).

- Hardware addressed with address keys.
- Removable label holder that allows for customized point labels.
- LEDs that provide status indication and diagnostic information for the I/O module, as well as for each point on the module.
- Separable into terminal base and plug-in I/O module electronics for:
  - Improved installation workflow, allowing field wiring to be terminated prior to installation of electronics.
  - Optimum diagnostics—connected peripheral devices can be measured without affecting or being affected by the I/O module.
  - Quick replacement of electronics for service.

### **Module Introduction**

# Digital Input Modules (TXM1.8D and TXM1.16D)



The TXM1.8D and TXM1.16D are dedicated to monitoring, respectively, 8 and 16 digital input points.

- They monitor status signals from normally open (NO) or normally closed (NC), latched voltage free/dry contacts.
- All 8 points on the TXM1.8D module, as well as 8 of the 16 points on the TXM1.16D module, may be used as pulse counters up to 10 Hz.
- Each input point has a green LED for status indication.

**NOTE:** No potential (dry contact) for all points.

# Digital Output Modules (TXM1.6R and TXM1.6R-M)



The TXM1.6R and TXM1.6R-M Digital Output Modules provide six NO or NC (form C), maintained or pulsed, voltage free/dry contacts.

- The contacts are rated for a maximum of 250 Vac at 4A.
- Each I/O point has a green LED for status indication.
- The TXM1.6R-M module is also equipped with manual override switches. An orange LED per override switch indicates override status individually per point.

# Universal Modules (TXM1.8U and TXM1.8U-ML)



The TXM1.8U and TXM1.8U-ML Universal I/O modules provide 8 points, which can be individually software configured as digital input, analog input, or analog output to best meet the specific application needs.

All Universal I/O modules provide:

- Class 2 AC distribution voltage for peripheral devices, such as valves and actuators.
- Green LED status per I/O point that varies in intensity according to the voltage and current (directly proportional).

Digital input support includes:

- Voltage free/dry contacts
- Pulse counters up to 25 Hz

Analog input sensor support includes:

- 1K Nickel Landis & Gyr curve
- 1K Platinum 375 and 385 coefficient
- 10K and 100K Thermistor Type II Curve Active input and output support includes:
- Analog input voltage 0-10 Vdc
- Analog output voltage 0-10 Vdc

TXM1.8U-ML modules are also equipped with a local override/identification device (LOID), which includes an LCD signal display. The LCD displays the following information for each I/O point:

- Configured signal type
- Symbolic display of process value
- Notification of faulty operation, short circuit, or sensor open circuit

Orange LEDs indicate override status individually per point.

# Super Universal Modules (TXM1.8X and TXM1.8X-ML)



The TXM1.8X and TXM1.8X-ML Super Universal modules share all of the Universal module features, and also provide:

- Analog input current 4-20 mA
- Analog output current 4-20 mA (four current outputs maximum per module on Points 5 through 8)
- 24 Vdc distribution from power supply for sensors at a maximum of 200 mA per module

#### TX-I/O Power Supply (TXS1.12F4)



The TX-I/O Power Supply generates 24 Vdc at 1.2A to power TX-I/O modules and peripheral devices.

- Up to 4 TX-I/O Power Supplies can be operated in parallel, with a maximum of two per DIN rail.
- It can be located within a row of TX-I/O modules or at the beginning of a new DIN rail.

The TX-I/O Power Supply performs the following functions:

- Transfers 24 Vac at 4A to power TX-I/O modules and peripheral devices.
- Routes CS (+24 Vdc Communication Supply) and CD (Communication Data signal) between DIN rails.
- Provides an input point for 24 Vac to power additional peripheral devices.
- Isolates the 24 Vac peripheral device supply in case of overload or short-circuit with Class 2 distribution. The replaceable AC fuse can be accessed from an installed module.
- Indicates the AC fuse status (via LED) for easy diagnostics.

#### TX-I/O Bus Connection Module (TXS1.EF4)



The Bus Connection Module transfers DC power for TX-I/O modules and peripheral devices and transfers AC power for peripheral devices.

• It can be located within a row of TX-I/O modules or at the beginning of a new DIN rail.

The TX-I/O Bus Connection Module performs the following functions:

- Routes CS (+24 Vdc Communication Supply) and CD (Communication Data Signal) between DIN rails.
- Provides an input point for 24 Vac to power additional peripheral devices.
- Isolates the 24 Vac peripheral device supply in case of overload or short-circuit with Class 2 distribution. The replaceable AC fuse can be accessed from an installed module.
- Indicates the AC fuse status (via LED) for easy diagnostics.

# TX-I/O Island Bus Expansion Module (TXA1.IBE)



The TX-I/O Island Bus Expansion (IBE) module increases the distance between the primary field panel and expansion field panels without affecting the TX-I/O island bus maximum distance.

- An LED provides an indication of island bus communication.
- The IBE converts the TX-I/O island bus signal on the self-forming rail to an RS-485 signal level on the connector.
  - Each IBE module supports a maximum of two RS-485 segments.
  - Each segment may extend up to 200 ft (61 m) from the primary enclosure.
  - The island bus length extended from the primary field panel is added to island bus length extended from any expansion panel. RS-485 segment length between the IBEs does not add to the island bus length.
- The IBE does not transfer power over the RS-485 segment.
- Switches set the IBE as the TX-I/O island bus master (BM) or an RS-485 end-of-line terminator.
- A programming tool is not required.
- A maximum of 5 IBEs may be installed on the island bus: one IBE in the primary enclosure plus one in each expansion enclosure (maximum of 4).

- Only one Island Bus Expansion (IBE) module per enclosure is permitted.
- Expansion enclosures must be supplied using a separate TX-I/O Power Supply. Loss of this power does not affect the primary enclosure.

# P1 Bus Interface Module (TXB1.P1 and TXB1.P1-4)



The P1 Bus Interface Module (P1 BIM) provides P1 FLN communication and power for TX-I/O modules. It does not contain application or control for the TX-I/O modules.

The P1 BIM provides the following features:

- Communication on the P1 FLN or MEC Expansion Bus.
- 24 Vac input.
- Generation of 24 Vdc at 600 mA to power TX-I/O modules and peripheral devices.
- Plug-in screw terminals.
- Isolates the peripheral device supply in case of overload or short-circuit with Class 2 distribution. The replaceable AC fuse can be accessed from an installed module.
- Separate LEDs for module operation, FLN communication activity, 24 Vdc present on the TX-I/O island bus, and monitoring of the 24 Vac fuse.

#### TXB1.P1

- Support for 80 TX-I/O points.
- Support for up to 10 I/O modules.
- Transfer of 24 Vac at a maximum of 4A to power peripheral devices.
- Up to three TX-I/O Power Supplies can be operated in parallel, max of 2 per DIN.

#### TXB1.P1-4

- Support for 64 TX-I/O points.
- Support for up to 4 I/O modules.

### TX-I/O island bus Extension

The following picture shows the TX-I/O island bus extended using a Bus Connection Module and TX-I/O Power Supply. This configuration allows the TX-I/O island bus to extend a maximum of 164 feet (50 meters), and may extend outside an enclosure.



The following picture shows the TX-I/O island bus expanded using five Island Bus Expansion modules.



### I/O Functions by Module

		Module type							
		TXM1.8D	TXM1.16D	TXM1.8U	TXM1.8U-ML	TXM1.8X	TXM1.8X-ML	TXM1.6R	TXM1.6R-M
TX-I/O™ function	Description		Maxin	num I p	numb er me	er of odule	funct	ions	
Digital inputs									
Binary Input	Status indication, voltage-free/dry contact	8	16	8	8	8	8		
Counter	Count/accumulator, voltage-free/dry pulse contact	8	8	8	8	8	8		
Analog Inputs									
	Temperature LG-Ni1000			8	8	8	8		
	Temperature Pt 1000 375			8	8	8	8		
	Temperature Pt 1000 385			8	8	8	8		
	Temperature (NTC) 10 K			8	8	8	8		
	Temperature (NTC) 100 K			8	8	8	8		
	Voltage, DC 0, 10V *			8	8	8	8		
	Current DC 4, 20 mA *					8	8		
Digital outputs									
BO OnOff	Latched contact, AC/DC 250V, 4A							6	6
BO Pulse	Pulse							6	6
Analog Outputs									
	DC 010 V *			8	8	8	8		
	DC 4 20 mA *					4	4		

* Active inputs and active outputs (0-10V and 4-20 mA) must be located on different modules if sensors are externally powered.

Specifications:		
Dimensions (L × W × D)		
TX-I/O Modules		2.52" × 3.54" × 2.75" (64 mm × 90 mm × 70 mm)
TX-I/O P1 BIM		5" × 3.54" × 2.75" (128 mm × 90 mm × 70 mm)
TX-I/O Power Supply		3.78" × 3.54" × 2.75" (96 mm × 90 mm × 70 mm)
TX-I/O Bus Connection Module		1.26" × 3.54" × 2.75" (32 mm × 90 mm × 70 mm)
TX-I/O Island Bus Expansion (IBE	E) Module	1.26" × 3.54" × 2.75" (32 mm × 90 mm × 70 mm)
Electrical		
Power Requirements		24 Vac +/-20% input @ 50 or 60 Hz
Power Consumption		
Power Supply		35 VA with 96 VA pass-thru
Bus Connection Module		0 VA with 96 VA pass-thru
TX-I/O P1 BIM		20 VA with 96 VA pass-thru
With the above power consumption W (0.6A at 24 Vdc) to be used by	on, the Power Supply protect the following:	oduces 28.8 W (1.2A at 24 Vdc) and the P1 BIM provides 14.4
TXM1.8D		1.1 W
TXM1.16D		1.4 W
TXM1.8U		1.5 W
TXM1.8U-ML		1.8 W
TXM1.8X		2.2 W
TXM1.8X-ML		2.3 W
TXM1.6R		1.7 W
TXM1.6R-M		1.9 W
Island Bus Expansion Module		1.2 W
Terminations		
I/O Terminals		20-12 AWG Solid 20-14 AWG Stranded
Power Supply, BCM, P1 BIM, and	1 IBE	2-, 3-, or 4-position screw terminal pluggable blocks
Operating Environment		
Ambient operating environment	Operate in a dry lo corrosive elements. E	ocation, which is protected from exposure to salt spray or other Exposure to flammable or explosive vapors must be prevented.
Operating Temperature		32°F to +122°F (0°C to 50°C)
Shipping & Storage Environment		-13°F to 158°F (-25°C to 70°C)
Relative Humidity		5 to 93% rh, non-condensing
Agency Listings		UL 864 UUKL Smoke Control Equipment ULC/ORD-C100-1992 UUKL7 Smoke Control Equipment

Agency Compliance

FCC Compliance Australian EMC Framework (C-Tick) European EMC Directive (CE) European Low Voltage Directive (LVD) RoHS Compliant UKCA - Electromagnetic Compatibility Regulations (S.I. 2016 No. 1091 / S.I. 2012 No. 3032)

UL 916 PAZX

CSA 22.2 No. 205 PAZX7

### **Ordering Information**

#### TX-I/O I/O Modules

Product Number	Description
TXM1.8D	TX-I/O Module, 8 DI points
TXM1.16D	TX-I/O Module, 16 DI points
TXM1.8U	TX-I/O Module, 8 Universal points
TXM1.8U-ML	TX-I/O Module, 8 Universal points with LOID
TXM1.8X	TX-I/O Module, 8 Super Universal points
TXM1.8X-ML	TX-I/O Module, 8 Super Universal points with LOID
TXM1.6R	TX-I/O Module, 6 DO with Relay points
TXM1.6R-M	TX-I/O Module, 6 DO with Relay points with manual override

#### TX-I/O Power Supply and Bus Modules

Product Number	Description
TXS1.12F4	TX-I/O Power Supply, 1.2 A, 4A Fuse
TXS1.EF4	TX-I/O Bus Connection Module, 4A Fuse
TXA1.IBE	TX-I/O Island Bus Expansion Module with RS-485 connection.
TXB1.P1	TX-I/O Bus Interface Module, P1, 10-module
TXB1.P1-4	TX-I/O Bus Interface Module, P1, 4-module

#### Accessories

Product Number	Description
TXA1.K12	One set of address keys, numbers 1-12
TXA1.K24	One set of address keys, numbers 1-24
TXA1.K-48	One set of address keys, numbers 25-48
TXA1.K-72	One set of address keys, numbers 49-72
TXA1.LLT-P100	Labels for TX-I/O 100 sheets/pack Letter format
TXA1.LH	Replacement label holders

### **Regions where this Product is Sold**

(US, Asia Pacific, Canada, Latin America, UK)

#### Disposal



The devices are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

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DXR2.M18P-101B

Desigo[™] Room Automation

# DXR2 room automation stations, BACnet/MSTP, 24 V

#### DXR2.M18



Automation station with increased functionality and flexibility to support the demands for standard control of terminal HVAC equipment and Total Room Automation (TRA) applications. TRA offers the highest level of flexibility for energy-optimized solutions without sacrificing comfort.

- Compact, programmable room automation stations for HVAC, lighting, and shading.
- BACnet MS/TP Communication (BTL certified).
- KNX PL-Link bus to connect sensors, actuators, and operator units (including bus power).
- USB interface.
- Operating voltage AC 24V.
- Mounted on standard DIN rails or on the wall.
- Plug-in terminal blocks.





A6V10502840 2023-07-12 Smart Infrastructure Building Products

#### Features

- Total Room Automation applications combining multiple disciplines (HVAC, lighting, blinds/shading) into one comprehensive solution.
- BTL Listed as a BACnet Advanced Application Controller (B-AAC) device.
- Fully programmable using block programming.
- Proven, pre-loaded applications.
- Operational modes (Comfort, Standby, Economy, Protection, and so on).

#### Preconfigured applications

Fan Coil Unit (FCU)

- FAN COIL 2-Pipe CW/HW and HW Valves
- FAN COIL 4-Pipe CW and HW Valves
- FAN COIL staged DX Cooling and staged Heating
- FAN COIL with CW and staged Electric Heat
- FAN COIL–UNIT VENT with CW, HW and Outside Air Damper (OAD) control
- FAN COIL-UNIT VENT with CW, ELEC and OAD control
- FAN-COIL-UNIT VENT with DX, HW and OAD control
- FAN COIL-UNIT VENT with DX, ELEC and OAD control

Chilled Beam

• Chilled Beam Passive 2 Pipe Heating/Cooling and Radiator 1-Stage Electric Heat Pump

- HP Variable Speed, Two Stage Elec Heat and One Stage Elec Rad with OAD
- HP Variable Speed, Water Source, HW Heat and Modulating Elec Rad with OAD
- HP Single Stage, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Two Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Ground Source, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD

#### Additional Applications

- Electrical terminal heating coils, PWM, single, multi-stage or analog
- Terminal fans, single, multi-stage or analog
- Chill water, DX or hot water coils and heating/cooling coils (2-pipe or 4-pipe)
- Variable Air Volume (VAV), Dual Duct and Fan Powered VAV (FPB)
- Radiant ceiling including Chilled beams, cooling, heating and heating/cooling (2-pipe or 4-pipe) control
- Radiator/Baseboard: hot water, steam or electric
- Lighting up to four separated or overlapping zones
  - Manual switching and dimming
  - Occupancy control and Vacancy control
  - Automatic Daylight Harvesting step or constant level control
  - Stairwell lighting
  - Scene control

- Blinds one or two separate zones
  - Manual control: Up, Down, Predefined positions
  - Occupancy control and Vacancy control
  - Glare Protection
  - Energy efficiency functions including solar radiation optimization
  - Slat angle
  - Scene control

#### Pre-loaded Application Options

#### Fan coil unit

- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Supply (discharge) air temperature control for modulation heating or cooling coils.
- Dehumidification control.
- Terminal coils: heating (hot water or electric), cooling (chilled water or DX) and heating/cooling coil (2-pipe or 4-pipe).
- Radiant ceiling including Chilled beams and Radiator control.

#### Heat pump

- Heat Pump compressors: Single, multiple or variable speed.
- Air-to-air, water loop or ground water configurations.
- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Dehumidification control.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Terminal heating coil (hot water or electric) or hot gas coil.
- Radiant ceiling including Chilled beams and Radiator control.
- Greenleaf energy efficiency determination and display.
- Configurable plant operating modes (heating, cooling, warm up, cool down, flush/purge, and so on).

#### Functions

The selected application and its parameters as well as input and output configuration determine the room automation station's functionality.

A detailed description of functionality is available in the ABT (Automation Building Tool) online help.

#### Communication

- BACnet MS/TP
- USB connection for service and commissioning, firmware download, and LAN access.
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, switches, sensors, actuators, and luminaires.
  - Plug-and-play connection of Siemens field devices with KNX PL-Link.

#### Type summary

Product Number	SSN	Description	Inputs	Outputs
DXR2.M18-101B (Version with 60 data points*)	S55376-C124	DXR2.M18 Room Automation Station	2 DI, 4 UI	8 DO Triacs, 4 AO 0 to 10V
DXR2.M18-101K (Version with 60 data points)	S55376-C154	Smoke Control DXR2.M18 Room Automation Station	2 DI, 4 UI	8 DO Triacs, 4 AO 0 to 10V

#### Accessories

Product Number	Designation
985-124	499 ohm Resistor Kit

#### **Product Documentation**

Торіс	Title	Document ID
Installation and mounting	DXR Installation Instructions	A6V10550039
Global datasheet*	DXR2 24V IP DXR2 24V MS/TP	N9205 N9207
Setup and commissioning	DXR VAV Start-up Procedures DXR FPB Start-up Procedures DXR FCU Start-up Procedures Balancing Procedures	A6V10665935 A6V10665938 A6V10665941 A6V10665943
Room Unit Datasheet	Wall mounted	A6V10394781
BTL listing	DXR PIC Statement	A6V10665948

Please see the Global datasheets for additional information not found in this submittal sheet.

#### Technical data

*

#### Housing

Color	RAL 7035 (light-gray)
Dimensions	180 mm (7.09 in) x 104.5 mm (4.11 in) x 59.5 mm (2.34 in)
Weight Packaging	ca. 360 g (12.69 oz) ca. 40 g (1.41 oz)

#### **Function data**

Communication	
A/D Resolution (analog in)	14 Bits
D/A Resolution (analog out)	12 Bits

#### Power data

Power supply	
Operating voltage	AC 24V -15%/+20%
Frequency	50/60 Hz
Internal fuse	4 A irreversible
Transformer with secondary current limitation of max. 10 A or external secondary current fuse Non-renewable fuse Circuit breakers	Max. 10 A, slow Max. 13 A, characteristic B, C, D as per EN 60898

Apparent power (VA) for transformer design						
Base Model	Base load	Max. load Triac output AC 24V~ 0.25 A each	Max. load all Aux. outputs AC 24V~	Max. load KNX PL-Link (at 50 mA)	Max. load DC 24V+ (2.4 W) ⁾	Max. Allowed Power consumption including connected field devices
DXR2.M18	6	8 x 6 = 48	18	4	6	70

Power for the Triac outputs must be reduced if the maximum load of 18 VA is required for AC 24V field supply on the DXR2.x18.

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#### NOTE:

To calculate the total VA, add the Base Load + the number of Triacs + field supplies+ KNX PL-Link devices.

This cannot exceed the maximum power consumption. See the *Wiring Guidelines* for more information.

#### Inputs

#### outs

Analog Inputs		
Resistance sensor	Temperature measurement	Voltage measurement
AI 1000 Ω	AI PT1K 375 (NA)*)	AI 0 to 10V
AI 2500 Ω	AI PT1K 385 (EU)*)	AI 0 to 10V (0 to 100%)
ΑΙ 10 ΚΩ	AI (LG-)Ni1000*)	
ΑΙ 100 ΚΩ	AI Ni1000 DIN*)	
	AI T1 (PTC)*)	
	AI NTC10K (Type II)**)	
	AI NTC100K**)	

* A fixed value of 1  $\Omega$  is calibrated to correct line resistance.

** Configurable default.

Digital Inputs		
Contact voltage	Universal input: 18V Digital input: 21V	
Contact current	Universal input: 1.2 mA; 7.4 mA initial current Digital input: 1.6 mA; 9.4 mA initial current	
Contact resistance for closed contacts	Max. 100 Ω	
Contact resistance for open contacts	Min. 50 kΩ	

### Outputs

Analog Outputs	
0 to 10V	Max. 1 mA

Digital Outputs	
Type (Switching outputs triacs)	High side The Triac closes the contact to AC 24V
Switching voltage	AC 24V
Permissible load	250 mA/6 VA per output (cos phi 0.35) (500 mA/12 VA per output with PWM*)
Protection	Short-circuit proof

DC 24V output for field devices (1: V+)		
Output voltage	DC 24V	
Permissible load	100 mA/2.4 W	
Protection against overload	Short-circuit proof	

#### Connections

Interfaces	
MSTP	Interface type: RS485 Galvanic isolation: Yes Baud rates: 9600, 19200, 38400, 76800, 115200 Protocol: BACnet over MS/TP Short-circuit proof Protection against faulty wiring at max. AC 24V
USB (2.0)	Plug: Type B Data rate: 12 Mbps
KNX PL-Link	Type: KNX TP1 PL-Link, galvanic isolation Baud rate: 9.6 kbps Bus power: 50 mA Short-circuit proof Protection against faulty wiring at max. AC 24V
Wiring connections	
Pluggable screw terminals	Copper wire or copper strands with ferrules 1 x 0.6 mm dia. to 2.5 mm2 (22 to 14 AWG) or 2 x 0.5 mm dia. to 1 mm2 (24 to 18 AWG) Copper strands without ferrules 1 x 0.6 mm dia. to 2.5 mm2 (22 to 14 AWG) or 2 x 0.5 mm dia. to 1.5 mm2 (24 to 16 AWG)
Slotted screws	Small 1/8" blade, tightening torque 0.6 Nm (0.44 lb-ft)
Wiring lengths for signals	KNX PL-Link 80 m (260 ft) with internal bus power or 300 m (990 ft) with external power supply MS/TP 1,000 m (3,290 ft) Signal lines 80 m (260 ft) For inputs AI 100 KΩ, AI NTC10K, AI NTC100K: 30 m (100 ft) or 80 m (260 ft), if shielded.

KNX/PL-Link Network and Power Wriring.*	
Cable configuration	1 or 2 twisted pair - Pair 1 red/black - Pair 2 yellow/white
Gauge	20 AWG (solid copper)
Twists per foot	4 Minimum
Capacitance	30 pF/foot or less
Shields	100% foil with drain wire
UL type	300Vrms, CMP (75 °C or higher)
CSA type	300Vrms, FT6 (75 °C or higher)

* Alternative 18 AWG STP CMP (Belden 6320FE 8771000)

## 

National safety regulations



Failure to comply with national safety regulations may result in personal injury and property damage.

Observe national provisions and comply with the appropriate safety regulations.

Ambient Conditions and Protection classification		
Climatic ambient conditions		
Transport and storage	<ul> <li>Temperature -25 to 70°C (-13 to 158°F)</li> <li>Air humidity 5 to 95% rh.</li> </ul>	
Operation	<ul> <li>Temperature -5 to 45°C (23 to 113°F)/ -5 to 50°C (23 to 122°F) Air humidity 5 to 95% rh.</li> </ul>	

Standards, Directives and Approvals	
UL Listing	UL 916 PAZX - Conforms to UL916 9th and 10th Edition. UL 864 UUKL Smoke Control Equipment - Conforms to UL864 9th and 10th Edition. (Smoke Control 'K' variant only)
Suitable for plenum area installation	UL1995
Federal Communications Commission	FCC CFR 47 Part 15 Class B
CSA Compliance and cUL certification	C22.2 No. 205
Environmental compatibility - RoHS Compliant	The product environmental declaration contains data on environmentally compatible product design and assessments (composition, packaging, environmental benefit, and disposal).
BACnet BTL Listing	BTL-AAC
CEC Title 24 Supported	—
ASHRAE Guideline 36 Supported	_
ASHRAE 90.1 Supported	—
Quality	ISO 9001 (Quality)

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DXR2.M11-101B

Desigo[™] Room Automation

# DXR2 room automation stations, BACnet/MSTP, 24 V DXR2.M11



Automation station with increased functionality and flexibility to support the demands for standard control of terminal HVAC equipment and Total Room Automation (TRA) applications. TRA offers the highest level of flexibility for energy-optimized solutions without sacrificing comfort.

- Compact, programmable room automation stations for HVAC, lighting, and shading.
- BACnet MS/TP Communication (BTL certified).
- KNX PL-Link bus to connect sensors, actuators, and operator units (including bus power).
- USB interface.
- Operating voltage AC 24V.
- Mounted on standard DIN rails or on the wall.
- Plug-in terminal blocks.





Smart Infrastructure Building Products

A6V10502834 2023-07-12

#### Features

- Total Room Automation applications combining multiple disciplines (HVAC, lighting, blinds/shading) into one comprehensive solution.
- BTL Listed as a BACnet Advanced Application Controller (B-AAC) device.
- Fully programmable using block programming.
- Proven, pre-loaded applications.
- Operational modes (Comfort, Standby, Economy, Protection, and so on).

#### Preconfigured applications

Fan Coil Unit (FCU)

- FAN COIL 2-Pipe CW/HW and HW Valves
- FAN COIL 4-Pipe CW and HW Valves
- FAN COIL staged DX Cooling and staged Heating
- FAN COIL with CW and staged Electric Heat
- FAN COIL-UNIT VENT with CW, HW and Outside Air Damper (OAD) control
- FAN COIL–UNIT VENT with CW, ELEC and OAD control
- FAN-COIL-UNIT VENT with DX, HW and OAD control
- FAN COIL-UNIT VENT with DX, ELEC and OAD control

Chilled Beam

• Chilled Beam Passive 2 Pipe Heating/Cooling and Radiator 1-Stage Electric Heat Pump

- HP Variable Speed, Two Stage Elec Heat and One Stage Elec Rad with OAD
- HP Variable Speed, Water Source, HW Heat and Modulating Elec Rad with OAD
- HP Single Stage, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Two Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD
- HP Multi Stage, Ground Source, Hot Gas Reheat, One Stage Elec Heat and HW Rad with OAD

#### Additional Applications

- Electrical terminal heating coils, PWM, single, multi-stage or analog
- Terminal fans, single, multi-stage or analog
- Chill water, DX or hot water coils and heating/cooling coils (2-pipe or 4-pipe)
- Radiant ceiling including Chilled beams, cooling, heating and heating/cooling (2-pipe or 4-pipe) control
- Radiator/Baseboard: hot water, steam or electric
- Lighting up to four separated or overlapping zones
  - Manual switching and dimming
  - Occupancy control and Vacancy control
  - Automatic Daylight Harvesting step or constant level control
  - Stairwell lighting
  - Scene control
- Blinds one or two separate zones
  - Manual control: Up, Down, Predefined positions
  - Occupancy control and Vacancy control
  - Glare Protection
  - Energy efficiency functions including solar radiation optimization
  - Slat angle
  - Scene control

# Pre-loaded Application Options

### Fan coil unit

- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Supply (discharge) air temperature control for modulation heating or cooling coils.
- Dehumidification control.
- Terminal coils: heating (hot water or electric), cooling (chilled water or DX) and heating/cooling coil (2-pipe or 4-pipe).
- Radiant ceiling including Chilled beams and Radiator control.

### Heat pump

- Heat Pump compressors: Single, multiple or variable speed.
- Air-to-air, water loop or ground water configurations.
- Single, multiple or variable speed fan control.
- Outside air damper control with economizer.
- Dehumidification control.
- Ventilation Control or Demand Control Ventilation (DCV) with separate outside air damper (OAD) setpoints for each operational mode.
- Terminal heating coil (hot water or electric) or hot gas coil.
- Radiant ceiling including Chilled beams and Radiator control.
- Greenleaf energy efficiency determination and display.
- Configurable plant operating modes (heating, cooling, warm up, cool down, flush/purge, and so on).

### Functions

The selected application and its parameters as well as input and output configuration determine the room automation station's functionality.

A detailed description of functionality is available in the ABT (Automation Building Tool) online help.

# Communication

- BACnet MS/TP
- USB connection for service and commissioning, firmware download, and LAN access.
- The following functions are available with the KNX PL-Link bus:
  - Communication with room operator units, switches, sensors, actuators, and luminaires.
  - Plug-and-play connection of Siemens field devices with KNX PL-Link.

# Type summary

Product Number	SSN	Description	Inputs	Outputs
DXR2.M11-101B (Version with 30 data points)	S55376-C122	DXR2.M11 Room Automation Station	1 Di, 2 UI	6 DO Triacs, 2 AO 0 to 10V
DXR2.M11-101K (Version with 30 data points)	S55376-C151	Smoke Control DXR2.M11 Room Automation Station	1 Di, 2 UI	6 DO Triacs, 2 AO 0 to 10V

### Accessories

Product Number	Designation
985-124	499 ohm Resistor Kit

### **Product Documentation**

Торіс	Title	Document ID
Installation and mounting	DXR Installation Instructions	A6V10550039
Global datasheet*	DXR2 24V IP DXR2 24V MS/TP	N9205 N9207
Setup and commissioning	DXR VAV Start-up Procedures DXR FPB Start-up Procedures DXR FCU Start-up Procedures Balancing Procedures	A6V10665935 A6V10665938 A6V10665941 A6V10665943
Room Unit Datasheet	Wall mounted A6V10394781	
BTL listing	DXR PIC Statement	A6V10665948

Please see the Global datasheets for additional information not found in this submittal sheet.

# Technical data

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# Housing

Color	RAL 7035 (light-gray)
Dimensions	180 mm (7.09 in) x 104.5 mm (4.11 in) x 59.5 mm (2.34 in)
Weight Packaging	ca. 330 g (11.64 oz) ca. 40 g (1.41 oz)

### Function data

Communication	
A/D Resolution (analog in)	14 Bits
D/A Resolution (analog out)	12 Bits

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### Power data

Power supply		
Operating voltage	AC 24V -15%/+20%	
Frequency	50/60 Hz	
Internal fuse	4 A irreversible	
Transformer with secondary current limitation of max. 10 A or external secondary current fuse Non-renewable fuse Circuit breakers	Max. 10 A, slow Max. 13 A, characteristic B, C, D as per EN 60898	

Apparent power (VA) for transformer design Base Model Base load Max. load Max. load Max. load Max. Allowed Max. load all Triac output KNX PL-Link DC 24V+ (2.4 Aux. outputs Power AC 24V~ AC 24V~ **W)**) (at 50 mA) consumption 0.25 A each including connected field devices DXR2.M11 6  $6 \times 6 = 36$ 12 4 58 -

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# NOTE:

To calculate the total VA, add the Base Load + the number of Triacs + field supplies+ KNX PL-Link devices.

This cannot exceed the maximum power consumption. See the *Wiring Guidelines* for more information.

### Inputs

Analog Inputs		
Resistance sensor	Temperature measurement	Voltage measurement
ΑΙ 1000 Ω	AI PT1K 375 (NA)*)	AI 0 to 10V
ΑΙ 2500 Ω	AI PT1K 385 (EU)*)	AI 0 to 10V (0 to 100%)
ΑΙ 10 ΚΩ	AI (LG-)Ni1000*)	
ΑΙ 100 ΚΩ	AI Ni1000 DIN*)	
	AI T1 (PTC)*)	
	AI NTC10K (Type II)**)	
	AI NTC100K**)	

A fixed value of 1  $\Omega$  is calibrated to correct line resistance.

** Configurable default.

Digital Inputs		
Contact voltage	Universal input: 18V Digital input: 21V	
Contact current	Universal input: 1.2 mA; 7.4 mA initial current Digital input: 1.6 mA; 9.4 mA initial current	
Contact resistance for closed contacts	Max. 100 Ω	
Contact resistance for open contacts	Min. 50 kΩ	

# Outputs

Analog Outputs	
0 to 10V	Max. 1 mA

Digital Outputs		
Type (Switching outputs triacs)	High side The Triac closes the contact to AC 24V	
Switching voltage	AC 24V	
Permissible load	250 mA/6 VA per output (cos phi 0.35) (500 mA/12 VA per output with PWM*)	
Protection	Short-circuit proof	

AC 24V outputs for field devices (2: V~)		
Output voltage	AC 24V	
Permissible load	500 mA/12 VA overall	
Protection against overload	Short-circuit proof	

### Connections

Interfaces		
MSTP	Interface type: RS485 Galvanic isolation: Yes Baud rates: 9600, 19200, 38400, 76800, 115200 Protocol: BACnet over MS/TP Short-circuit proof Protection against faulty wiring at max. AC 24V	
USB (2.0)	Plug: Type B Data rate: 12 Mbps	
KNX PL-Link	Type: KNX TP1 PL-Link, galvanic isolation Baud rate: 9.6 kbps Bus power: 50 mA Short-circuit proof Protection against faulty wiring at max. AC 24V	
Wiring connections		
Pluggable screw terminals	Copper wire or copper strands with ferrules 1 x 0.6 mm dia. to 2.5 mm2 (22 to 14 AWG) or 2 x 0.5 mm dia. to 1 mm2 (24 to 18 AWG) Copper strands without ferrules 1 x 0.6 mm dia. to 2.5 mm2 (22 to 14 AWG) or 2 x 0.5 mm dia. to 1.5 mm2 (24 to 16 AWG)	
Slotted screws	Small 1/8" blade, tightening torque 0.6 Nm (0.44 lb-ft)	
Wiring lengths for signals	KNX PL-Link 80 m (260 ft) with internal bus power or 300 m (990 ft) with external power supply MS/TP 1,000 m (3,290 ft) Signal lines 80 m (260 ft) For inputs AI 100 K $\Omega$ , AI NTC10K, AI NTC100K: 30 m (100 ft) or 80 m (260 ft), if shielded.	

KNX/PL-Link Network and Power Wriring.*			
Cable configuration	1 or 2 twisted pair - Pair 1 red/black - Pair 2 yellow/white		
Gauge	20 AWG (solid copper)		
Twists per foot	4 Minimum		
Capacitance	30 pF/foot or less		
Shields	100% foil with drain wire		
UL type	300Vrms, CMP (75 °C or higher)		
CSA type	300Vrms, FT6 (75 °C or higher)		

* Alternative 18 AWG STP CMP (Belden 6320FE 8771000)

# 

National safety regulations



Failure to comply with national safety regulations may result in personal injury and property damage.

Observe national provisions and comply with the appropriate safety regulations.

Ambient Conditions and Protection classification					
Climatic ambient conditions					
Transport and storage	<ul> <li>Temperature -25 to 70°C (-13 to 158°F) Air humidity 5 to 95% rh.</li> </ul>				
Operation	<ul> <li>Temperature -5 to 45°C (23 to 113°F)/ -5 to 50°C (23 to 122°F) Air humidity 5 to 95% rh.</li> </ul>				

Standards, Directives and Approvals				
UL Listing	UL 916 PAZX - Conforms to UL916 9th and 10th Edition. UL 864 UUKL Smoke Control Equipment - Conforms to UL864 9th and 10th Edition. (Smoke Control 'K' variant only)			
Suitable for plenum area installation	UL1995			
Federal Communications Commission	FCC CFR 47 Part 15 Class B			
CSA Compliance and cUL certification	C22.2 No. 205			
Environmental compatibility - RoHS Compliant	The product environmental declaration contains data on environmentally compatible product design and assessments (composition, packaging, environmental benefit, and disposal).			
BACnet BTL Listing	BTL-AAC			
CEC Title 24 Supported	_			
ASHRAE Guideline 36 Supported	_			
ASHRAE 90.1 Supported	_			
Quality	ISO 9001 (Quality)			

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# SIEMENS

# **Compact Series Unitary Equipment Controller**



Figure 1. PXC Compact Series Unitary Equipment Controllers (PXC UEC-16/24).

# Description

The PXC Compact Series Unitary Equipment Controller (Programmable Controller–Compact) for BACnet networks is a high-performance Direct Digital Control (DDC) equipment controller, which is an integral part of the APOGEE Automation System. The controllers are classified as a BACnet Advanced Application Controller (B-AAC) with support for BACnet MS/TP protocol.

The PXC Compact UEC Series offers integrated I/O based on state-of-the-art TX-I/O[™] Technology, which provides superior flexibility of point and signal types, and makes it an optimal solution for Air Handling Unit (AHU) control.

The Unitary Equipment Controller communicates with other field panels or workstations on a peer-to-peer Automation Level Network (ALN), or on the Field Level Network (FLN), and supports the following communication options:

Native BACnet MS/TP on RS-485

# Features

- I BACnet Testing Laboratories (BTL) certified Classified as BACnet Advanced Application Controllers (B-AAC) using the BACnet MS/TP protocol for specific models.
- Sophisticated Adaptive Control, a closed loop control algorithm that auto-adjusts to compensate for load/seasonal changes.
- I Message control for terminals, printers, pagers, and workstations.
- HMI RS-232 and USB port, which provides laptop connectivity for local operation and engineering.
- Extended battery backup of Real Time Clock.
- Auto Save and persistent database backup and restore within the controller.
- I PXM10T and PXM10S support: Optional LCD Local user interface with HOA (Hand-off-auto) capability and point commanding and monitoring features.
- An extended temperature range for the control of rooftop devices.

# Compact Series Unitary Equipment Controller

The PXC Unitary Equipment Controller (UEC) is an MS/TP device, that can be configured as a programmable, stand-alone device or as a networked device on the BACnet MS/TP ALN (Automation Level Network) or FLN (Field Level Network) device.

# PXC UEC-16

The PXC UEC-16 provides control for 16 points, including 8 software-configurable universal points.

Point count includes: 3 Universal Input (UI), 5 Universal I/O (U), 2 Digital Input (DI), 3 Analog Output

(AOV), and 3 Digital Output (DO).

# PXC UEC-24

The PXC UEC-24 provides control for 24 points, including 16 software-configurable universal points.

Point count includes: 3 Universal Input (UI), 9 Universal I/O (U), 4 Super Universal I/O (X), 3 Analog

Output (AOV), 5 Digital Output (DO).

# **Extended Temperature Operation**

The PXC Compact UEC "R" models support extended temperature operation, allowing for rooftop installations.

# Hardware

The PXC Compact Series consists of the following major components:

- I Input/Output Points
- I Power Supply
- I Controller Processor

# Input/Output Points

- I The PXC Compact input/output points perform A/D or D/A conversion, signal processing, point command output, and communication with the controller processor. The terminal blocks are removable for easy termination of field wiring.
- I The Universal and Super Universal points leverage TX-I/O[™] Technology from Siemens Building Technologies to configure an extensive variety of point types.
- Universal Input (UI) and Universal Input/Output (U) points are software-selectable to be:
  - 0-10V input
  - 4-20 mA input
  - Digital Input
  - Pulse Accumulator inputs
  - 1K Ni RTD @ 32°F (Siemens, Johnson Controls, DIN Standard)

- 1K Pt RTD (375 or 385 alpha) @ 32°F
- 10K NTC Thermistor (Type 2 and Type 3) @ 77°F
- 100K NTC Thermistor (Type 2) @ 77°F
- 0-10V Analog Output (Universal Input/Output (U) points only)
- Super Universal (X) points are softwareselectable to be:
  - 0-10V input
  - 4-20 mA input
  - Digital Input
  - Pulse Accumulator inputs
  - 1K Ni RTD @ 32°F (Siemens, Johnson Controls, DIN Standard)
  - 1K Pt RTD (375 or 385 alpha) @ 32°F
  - 10K NTC Thermistor (Type 2 and Type 3) @ 77°F
  - 100K NTC Thermistor (Type 2) @ 77°F
  - 0-10V Analog Output
  - 4-20 mA Analog Output
  - Digital Output (using external relay)
- I Digital Output (DO) points are 110/220V 4 Amp (resistive) Form C relays; LEDs indicate the status of each point.
- All PXC Compact Series models support 0-10 Vdc Analog Output circuits.
- I The Super Universal points may be defined as either 0-10 Vdc or 4-20 mA Analog Output circuits.

# **Power Supply**

- I The 24 volt DC power supply provides regulated power to the input/output points and active sensors. The power supply is internal to the PXC Compact housing, eliminating the need for external power supply and simplifying installation and troubleshooting.
- I The power supply works with the processor to ensure smooth power up and power down sequences for the equipment controlled by the I/O points, even through brownout conditions.

# **Controller Processor**

I The Unitary Equipment Controller includes a microprocessor-based multi-tasking platform for program execution and communications with the I/O points and with other UECs and field panels.

- A Human Machine Interface (HMI) port, with a quick-connect phone jack (RJ-45), uses RS-232 protocol to support operator devices (such as a local user interface or simple CRT terminal), and a phone modem for dial-in service capability.
- I A USB Device port supports a generic serial interface for an HMI or Tool connection. The USB Device port does not support firmware flash upgrades.
- I The program and database information stored in the UEC RAM memory is battery-backed. This eliminates the need for time-consuming program and database re-entry in the event of an extended power failure.
- I The firmware, which includes the operating system, is stored in non-volatile flash ROM memory; this enables firmware upgrades in the field.
- Brownout protection and power recovery circuitry protect the controller board from power fluctuations.
- LEDs provide instant visual indication of overall operation, network communication, and low battery warning.

# Programmable Control with Application Flexibility

The PXC Compact Series of high performance controllers provides complete flexibility, which allows the owner to customize each controller with the exact program for the application.

The control program for each UEC is customized to exactly match the application. Proven Powers Process Control Language (PPCL), a text-based programming structure like BASIC, provides direct digital control and energy management sequences to precisely control equipment and optimize energy usage.

# **Global Information Access**

The HMI port supports operator devices, such as a local user interface or simple CRT terminal. Devices connected to the operator terminal port gain global information access.

# **Multiple Operator Access**

Multiple operators can access the network simultaneously. Multiple operator access ensures that alarms are reported to an alarm printer while an operator accesses information from a local terminal. Multiple operators may also access the controller through concurrent Telnet sessions and/or local operator terminal ports.

# Menu Prompted, English Language Operator Interface

The UEC includes a simple, yet powerful, menudriven English Language Operator Interface that provides, among other things:

- I Point monitoring and display
- I Point commanding
- I Historical trend collection and display for multiple points
- I Event scheduling
- I Program editing and modification via Powers Process Control Language (PPCL)
- I Alarm reporting and acknowledgment
- Continual display of dynamic information

# Built-in Direct Digital Control Routines

The UEC provides stand-alone Direct Digital Control (DDC) to deliver precise HVAC control and comprehensive information about system operation. It receives information from sensors in the building, processes the information, and directly controls the equipment. The following functions are available in the UEC:

- Adaptive Control, an auto-adjusting closed loop control algorithm, which provides more efficient, adaptive, robust, fast, and stable control than the traditional PID control algorithm. It is superior in terms of response time and holding steady state, and at minimizing error, oscillations, and actuator repositioning.
- Closed Loop Proportional, Integral and Derivative (PID) control.
- I Logical sequencing.
- Alarm detection and reporting.
- Reset schedules.

# Built-in Energy Management Applications

The following applications are programmed in the Unitary Equipment Controller and require simple parameter input for implementation:

I Automatic Daylight Saving Time switchover

### Calendar-based scheduling Т

- Duty cycling 1
- Economizer control 1
- Equipment scheduling, optimization and I sequencing
- Event scheduling 1

# **BACnet UEC Specifications**

### Dimensions ( $L \times W \times D$ )

PXC Unitary Equipment Controller, 16 point, BACnet MS/TP

PXC Unitary Equipment Controller, 24 point, BACnet MS/TP

Processor, Battery, and Memory

Processor and Clock Speed

Memory

Battery backup of SDRAM (field replaceable)

Battery backup of Real Time Clock

Holiday scheduling I

- Night setback control I
- Peak Demand Limiting (PDL) 1
- Temperature-compensated duty cycling I
- Temporary schedule override I

10.7" × 5.9" × 2.45" (272 mm × 150 mm × 62 mm)

10.7" × 5.9" × 2.45" (272 mm × 150 mm × 62 mm)

Freescale MPC852T, 100 MHz

24 MB (16 MB SDRAM, 8 MB Flash ROM)

AA (LR6) 1.5 Volt Alkaline (non-rechargeable) 180 days (accumulated)

Rooftop (Extended Temperature) Models: 330 days (accumulated) AA (LR6) 3.6 Volt Lithium (non-rechargeable)

USB 1.1 (12 Mbps) and 2.0 (480 Mbps), Type B female connector.

10 years (32°F to 122°F (0°C to 50°C)) Coin cell (BR2032) 3 Volt lithium

RS-232 compliant, 1200 bps to 115.2 Kbps

USB 1.0 (1.5 Mbps) and 1.1 (12 Mbps)

Self-powered, does not use or supply USB power.

Rooftop (Extended Temperature) Models 18 months

Communication	
A/D Resolution (analog in)	16 bits
D/A Resolution (analog out)	10 bits
BACnet MS/TP Automation Level Network (ALN)	9600 bps to 115.2 Kbps, up to 10 nodes per MS/TP ALN
BACnet MS/TP Field Level Network	9600 bps to 115.2 Kbps

BACnet MS/TP Field Level Network (FLN)

Human-Machine Interface (HMI)

USB Device port (for non-smoke control applications only)

Prior to June 2013

### Electrical

**Power Requirements** 

Power Consumption (Maximum)

A/D Resolution (analog in)

D/A Resolution (analog out)

AC Power and Digital Outputs

Communication and all other I/O

24 Vac ±20% input @ 50/60 Hz 20 VA @ 24 Vac 16 bits 10 bits NEC Class 1 Power Limited NEC Class 2

### Class 1 Relay, Form C (NO and NC contacts)

### Voltage (0-10 Vdc)

### **Digital Inputs**

Pulse Accumulator

Contact Closure Sensing

Dry Contact/Potential Free inputs only

Digital Input (10 ms settling time)

Supports counter inputs up to 20 Hz, minimum pulse duration 20 ms (open or closed)

# Voltage (0-10 Vdc) Current (4-20 mA) 1K Ni RTD @ 32°F (Siemens, JCI, DIN Ni 1K) 1K Pt RTD (375 or 385 alpha) @ 32°F 10K NTC Type 2 or Type 3 Thermistor 100K NTC Type 2 Thermistor

### Analog Outputs

Analog Inputs

0 to 10 Vdc @ 1 mA max Analog Inputs Voltage (0-10 Vdc) Current (4-20 mA) 1K Ni RTD @ 32°F (Siemens, JCI, DIN Ni 1K) 1K Pt RTD (375 or 385 alpha) @ 32°F 10K NTC Type 2 or Type 3 Thermistor

# **Digital Inputs**

**Pulse Accumulator** Contact Closure Sensing Dry Contact/Potential Free inputs only Digital Input (10 ms settling time) Supports counter inputs up to 20 Hz,

minimum pulse duration 20 ms (open or closed)

### **Digital Output**

0 to 24 Vdc, 22 mA max. (using external relay)

# 100K NTC Type 2 Thermistor

### Analog Outputs

0 to 10 Vdc @ 1 mA max 0 to 20 mA @ 650 Ω max

### Electrical

**Digital Output** 

Analog Outputs
Universal Inputs (UI) and
Universal Inputs/Outputs (U)

Super Universal (X)

**Ambient Conditions** 

Shipping & Storage **Operating Temperature** 

Operating temperature with rooftop (extended temperature) option

**Relative Humidity** 

Mounting Surface

### -13°F to 158°F (-25°C to 70°C)

32°F to 122°F (0°C to 50°C)

Operate in a dry location, which is protected from exposure to salt spray or other corrosive elements. Exposure to flammable or explosive vapors must be prevented.

-40°F to 158°F (-40°C to 70°C)

5 to 95% rh non-condensing

Direct equipment mount, building wall, or structural member

CE Compliance Must be installed inside a metal enclosure rated at IP20 minimum

Agency Listings

UL

UL916 PAZX UL916 PAZX7

Agency Compliance

FCC Compliance CFR47 Part 15, Subpart B, Class B Australian EMC Framework European EMC Directive (CE) European Low Voltage Directive (LVD) BACnet Testing Laboratories (BTL) Certified RoHS Compliant

OSHPD Seismic Certification Product meets OSHPD Special Seismic Preapproval certification (OSH-0217-10) under California Building Code 2010 (CBC2010) and International Building Code 2009 (IBC2009) when installed within the following Siemens enclosure part numbers: PXA-ENC18, PXA-ENC19, or PXA-ENC34.

# **Ordering Information**

# **PXC Compact Series**

Part Number	Description
PXC16.3-UCM.A	PXC Unitary Equipment Controller, 16 point, BACnet MS/TP
PXC16.3-UCMR.A	PXC Unitary Equipment Controller, 16 point, BACnet MS/TP, Rooftop Model
PXC24.3-UCM.A	PXC Unitary Equipment Controller, 24 point, BACnet MS/TP
PXC24.3-UCMR.A	PXC Unitary Equipment Controller, 24 point, BACnet MS/TP, Rooftop Model

# Accessories

Product Number	Description
PXM10S	Controller mounted Operator Display module with point monitor and optional blue backlight
PXM10T	Controller mounted Operator Display module
PXA-HMI.CABLEP5	Serial cable required for PXM10T/S connection to non-rooftop variants of the 16-point and 24-point Compact Series (pack of 5)

# Service Boxes and Enclosures

Product Number	Description
PXA-SB115V192VA	PX Series Service Box—115V, 24 Vac, 50/60 Hz, 192 VA
PXA-SB115V384VA	PX Series Service Box—115V, 24 Vac, 50/60 Hz, 384 VA
PXA-SB230V192VA	PX Series Service Box—230V, 24 Vac, 50/60 Hz, 192 VA
PXA-SB230V384VA	PX Series Service Box—230V, 24 Vac, 50/60 Hz, 384 VA
PXA-ENC18	18" Enclosure (Utility Cabinet) (UL Listed NEMA Type 1 Enclosure)
PXA-ENC19	19" Enclosure (UL Listed NEMA Type 1 Enclosure)
PXA-ENC34	34" Enclosure (UL Listed NEMA Type 1 Enclosure)

# Disposal



The devices are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

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# PPM-1U32.BPR PPM-2U3322.BPR

# Siemens MS/TP Point Pickup Module



# Description

The Siemens Point Pickup Modules (PPM) are expansion I/O devices that communicate on a BACnet master-slave/token-passing (MS/TP) network, allowing for the incorporation of a cluster of remote points into the Building Automation Station over the MS/TP network.

The PPM family leverages the MS/TP network to extend the reach of any BTL-listed BACnet Building Controllers application program.

Each Universal Input can be configured for analog or digital input. Input/Output type is configured by writing to BACnet object properties.

# Features

- Wide range of signal type support for flexible IO solutions.
- Device ID and Device name auto-populated for efficient start up (Device ID and Device name are also writable for customization).
- UL and cUL Listed as Enclosed Energy Management Equipment. No additional enclosure required.
- Evaluated and certified by UL¹⁾ as suitable for installation in plenum areas. (Building codes for plenum requirements vary by location; check with local building authority).
- LEDs, visible through the housing, indicate the power, communication, and DO status.
- Default communication at 19200 baud also supports 9600, 38400 and 76800 via DIP switch.
- 8-bit DIP switch to configure MAC address.
- Recover and resume communication on the network after a power interruption without operator intervention.
- Capable of mounting on electrical junction box without field modification or adaptors. (4 in. x 4 in. standard depth US box, 100 mm x 100 mm x 25 mm Asia/Pacific standard box.)
- DIN rail and surface mount installation also possible.
- Assembly has a cover label associated with the LEDs for easy labeling and identification.
- Supports unsolicited COVs when faster data point value updates are required.

1) The current version of PPM-3U63.BPR (for China only) is not certified by BTL or UL.

# Hardware

# **Controller Board**

The controller interfaces with, but does not provide, direct control of the following external devices:

- Digital input devices (dry contacts from motion sensors, alarm and door contacts) or Accumulator (gas, water, electrical)
- Digital output devices (fans, pumps, lighting)
- Analog input devices (temp, humidity, flow, pressure)
- Analog output (valves, actuators)

		РРМ Туре			
		Digital PPM Analog		Combo PPM	
			РРМ	PPM- 2U3322.BPF and PPM- 2U3322.BPR	PPM- 3U63.BPR (for China only)
I/O Function	Description	Maximum nur	nber of funct	ion per module	
Digital inputs					
Binary Inputs	Status indication, voltage-free/dry contact	4	2	5	9
Counter Count/accumulator, voltage-free/dry pulse 3 contact		3			
Analog inputs w/ 12-b	it A/D resolution				
	Temperature Pt 1000 385		4	4	
	Temperature NTC 10K Type II	1			
	Temperature Ni1000 RTD		4	4	
	Voltage, DC 0-10V		4	4	
Current DC 4-20 mA			2		
Universal inputs w/ 12	2-bit A/D resolution				
	Temperature Pt 1000 385			2	3
	Temperature Ni 1000 RTD			2	3
	Voltage, DC 0-10V			2	3
	Digital inputs			2	3
Digital outputs					
BO On/Off	NO Contact, 240 Vac, 5A Resistive/ 2 A General Purpose	2		3	3
Analog outputs					
	DC 0-10 V		2	2	

# MS/TP Point Pickup Modules Specifications

Power Requirements Operating Range Power Consumption	Input power range of 19.2 Vac to 28.8 Vac (50 or 60 Hz) 4 VA to 7 VA			
Universal Inputs	6 Point Digital PPMs (PPM-1U32.BPR and PPM-1U32.BPF)			
	1- 10K $\Omega$ Type II NTC Thermistor or dry contact			
	6 Point Analog PPMs (PPM-2U22.BPF and PPM-2U22.BPR)			
	2- 1000 Nickel RTD, 1000 Pt RTD, 0-10V, or dry contact			
	<b>12 Point Combination PPMs</b> (PPM-2U3322.BPF and PPM-2U3322.BPR)			
	2- 1000 Nickel RTD, 1000 Pt RTD, 0-10V, or dry contact			
	12 Point Combination PPM (PPM-3U63.BPR, for China only)			
	3- 1000 Nickel RTD, 1000 Pt RTD, 0-10V, or dry			
Digital Outputs	6 Point Digital PPMs (PPM-1U32.BPR and PPM-1U32.BPF)			
	2- Form A NO (Normally Open) Relays. 24 to 240 Vac, 5A resistive, 2A General Purpose, 5(2)			
	6 Point Digital PPM (PPM-1U32.BPR)			
	2- Hand-Off-Auto switches provide manual operation of the relays for commissioning			
	<b>12 Point Combination PPMs</b> (PPM-2U3322.BPF, PPM-2U3322.BPR, and PPM-3U63.BPR (for China only) )			
	3- Form A NO (Normally Open) Relays. 24 to 240 Vac, 5A resistive, 2A General Purpose, 5(2)			
Analog Inputs	6 Point Analog PPMs (PPM-2U22.BPF and PPM-2U22.BPR)			
	2- 1000 Nickel RTD, 1000 Pt RTD, 0-10Vdc, or 4-20mA			
	<b>12 Point Combination PPMs</b> (PPM-2U3322.BPFand PPM-2U3322.BPR)			
	2- 1000 Nickel RTD, 1000 Pt RTD, 0-10Vdc			
Analog Outputs	6 Point Analog PPMs (PPM-2U22.BPF and PPM-2U22.BPR)			
	2- 0-10 Vdc			
	<b>12 Point Combination PPMs</b> (PPM-2U3322.BPFand PPM-2U3322.BPR)			
	2- 0-10 Vdc			
Digital Inputs	6 Point Digital PPMs (PPM-1U32.BPR and PPM-1U32.BPF)			
	3- Dry contact or Pulse accumulator			
	12 Point Digital PPM (PPM-3U63.BPR, for China only)			
	6- Dry contact			
Dimensions	6.1 in x 4.5 x 1.4 in (154 mm x 114.4 mm x 34.5 mm)			
Weight	0.8 lb max. including box			
Communications Remote	BACnet MS/TP master or slave			
Local	9600 to 76800 baud set using a DIP switch			
Storage Temperature	-40°F to 158°F (-40°C to 70°C)			
Operating Range 32°F to 122°F (0°C to 50°C)				
Humidity Range	5% to 95% rh (non-condensing)			

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# **Ordering Information**

Part Number	Description		
PPM-1U32.BPF	6 Point Digital BACnet MS/TP Point Pickup Module, Fixed terminal blocks (1UI 3DI 2DO)		
PPM-1U32.BPR	6 Point Digital BACnet MS/TP Point Pickup Module, Removable terminal blocks and HOA switches (1UI 3DI 2DO)		
PPM-2U22.BPF	6 Point Analog BACnet MS/TP Point Pickup Module, Fixed terminal blocks (2UI 2AI 2 AO)		
PPM-2U22.BPR	6 Point Analog BACnet MS/TP Point Pickup Module, Removable terminal blocks (2UI 2AI 2 AO)		
PPM-2U3322.BPF	12 Point Combination BACnet MS/TP Point Pickup Module, Fixed terminal blocks (2UI 3DI 3DO 2AO 2AI)		
PPM-2U3322.BPR	12 Point Combination BACnet MS/TP Point Pickup Module, Removable terminal blocks (2UI 3DI 3DO 2AO 2AI)		
PPM-3U63.BPR (for China only)	12 Point Combination BACnet MS/TP Point Pickup Module, Removable terminal blocks (3UI 6DI 3DO)		
PPM-DIN.RMB	BACnet MS/TP Point Pickup Module DIN rail mounting brackets (5 pair)		
550-975P100	3-wire 120 $\Omega$ 1/2W carbon composition resistor/each end of line terminator (pkg. of 100)		
550-974P10	3-wire RS-485 reference terminator for single earth ground termination at one end of network.		

# BACnet Protocol Implementation Conformance Statement

# Products

Product	Model Number	Protocol Revision	Software Version	Firmware Version
6 Point Analog PPM	PPM-2U22.BPF PPM-2U22.BPR	135-2004	3.0	1.0
6 Point Digital PPM	PPM-1U32.BPF PPM-1U32.BPR	135-2004	3.0	1.0
12 Point Combo PPM	PPM-2U3322.BPF PPM-2U3322.BPR PPM-3U63.BPR (for China only)	135-2004	3.0	1.0

# Vendor Information

Siemens Industry, Inc. Building Technologies Division 1000 Deerfield Parkway Buffalo Grove, IL 60089 www.sbt.siemens.com

# **Product Description**

The Point Pickup Module connects to small point count, remotely located digital IO/. This controller communicates with the APOGEE® Automation System using BACnet MS/TP.

# BACnet Standardized Device Profile (Annex L)

Supported	Device Profile	
	BACnet Operator Workstation (B-OWS)	
	BACnet Building Controller (B-BC)	
	BACnet Advanced Application Controller (B-AAC)	
•	BACnet Application Specific Controller (B-ASC)	
	BACnet Smart Actuator (B-SA)	
	BACnet Smart Sensor (B-SS)	

BACnet Interoperability Building Blocks (BIBB)		Supported
Data Sharing		
DS-RP-A	Data Sharing-ReadProperty-A	
DS-RP-B	Data Sharing-ReadProperty-B	•
DS-RPM-A	Data Sharing-ReadPropertyMultiple-A	
DS-RPM-B	Data Sharing-ReadPropertyMultiple-B	•
DS-RPC-A	Data Sharing-ReadPropertyConditional-A	
DS-RPC-B	Data Sharing-ReadPropertyConditional-B	
DS-WP-A	Data Sharing-WriteProperty-A	
DS-WP-B	Data Sharing-WriteProperty-B	•
DS-WPM-A	Data Sharing-WritePropertyMultiple-A	•
DS-WPM-A	Data Sharing-WritePropertyMultiple-B	
DS-COV-A	Data Sharing-COV-A	
DS-COV-B	Data Sharing-COV-B	•
DS-COVP-A	Data Sharing-COVP-A	
DS-COVP-B	Data Sharing-COVP-B	
DS-COVU-A	Data Sharing-COV-Unsolicited-A	
DS-COVU-B	Data Sharing-COV-Unsolicited-B	•
Scheduling		·
SCHED-A	Scheduling-A	
SCHED-I-B	Scheduling-Internal-B	
SCHED-E-B	Scheduling-External-B	
Alarm and Event Mana	agement	
AE-N-A	Alarm and Event-Notification-A	
AE-N-I-B	Alarm and Event-Notification Internal-B	
AE-N-E-B	Alarm and Event-Notification External-B	
AE-ACK-A	Alarm and Event-ACK-A	
AE-ACK-B	Alarm and Event-ACK-B	
AE-ASUM-A	Alarm and Event-Alarm Summary-A	
AE-ESUM-B	Alarm and Event-Alarm Summary-B	
AE-INFO-A	Alarm and Event-Information-A	
AE-INFO-B	Alarm and Event-Information-B	
AE-LS-A	Alarm and Event-LifeSafety-A	
AE-LS-B	Alarm and Event-LifeSafety-B	
Trending		
T-VMT-A	Trending-Viewing and Modifying Trends-A	

# Supported BACnet Interoperability Building Block (BIBBs)

BACnet Interoperability Building Blocks (BIBB)		Supported
T-VMT-I-B	Trending-Viewing and Modifying Trends-Internal-B	
T-VMT-E-B	Trending-Viewing and Modifying Trends-External-B	
T-ATR-A	Trending-Automated Trend Retrieval-A	
T-ATR-B	Trending-Automated Trend Retrieval-B	
Network Management	t	
NM-CE-A	Network Management-Connection Establishment-A	
NM-CE-B	Network Management-Connection Establishment-B	
NM-RC-A	Network Management-Router Configuration-A	
NM-RC-B	Network Management-Router Configuration-B	
Device Management		
DM-DDB-A	Device Management-Dynamic Device Binding-A	
DM-DDB-B	Device Management-Dynamic Device Binding-B	•
DM-DOB-A	Device Management-Dynamic Object Binding-A	
DM-DOB-B	Device Management-Dynamic Object Binding-B	•
DM-DDC-A	Device Management-DeviceCommunicationControl-A	
DM-DDC-B	Device Management-DeviceCommunicationControl-B	•
DM-PT-A	Device Management-Private Transfer-A	
DM-PT-B	Device Management-Private Transfer-B	
DM-TM-A	Device Management-Text Message-A	
DM-TM-B	Device Management-Text Message-B	
DM-TS-A	Device Management-TimeSynchronization-A	
DM-TS-B	Device Management-TimeSynchronization-B	
DM-UTC-A	Device Management-UTCTimeSynchronization-A	
DM-UTC-B	Device Management-UTCTimeSynchronization-B	
DM-RD-A	Device Management-ReinitializeDevice-A	
DM-RD-B	Device Management-ReinitializeDevice-B	
DM-BR-A	Device Management-Backup and Restore-A	
DM-BR-B	Device Management-Backup and Restore-B	
DM-LM-A	Device Management-List Manipulation-A	
DM-LM-B	Device Management-List Manipulation-B	
DM-OCD-A	Device Management-Object Creation and Deletion-A	
DM-OCD-B	Device Management-Object Creation and Deletion-B	
DM-VT-A	Device Management-Virtual Terminal-A	
DM-VT-B	Device Management-Virtual Terminal-B	

Name		
ReadProperty		Execute
ReadPropertyMultiple		Execute
WriteProperty		Execute
UnconfirmedCOVNotification	Initiate	
DeviceCommunicationContro		Execute
I-Am	Initiate	
I-Have	Initiate	
Who-Has		Execute
Who-Is		Execute

# **BACnet Standard Application Services Support**

# Data Link Layer Options

	BACnet IP, (Annex J)
	BACnet IP, (Annex J), Foreign Device
	ISO 8802-3, Ethernet (Clause 7)
	ANSI/ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
	ANSI/ATA 878.1, RS-485 ARCNET (Clause 8), baud rate(s)
•	MS/TP master (Clause 9), baud rate(s): 9600 bps, 19200 bps, 38400 bps, 76800 bps
•	MS/TP slave (Clause 9), baud rate(s):
	Point-To-Point, EIA 232 (Clause 10), baud rate(s):
	Point-To-Point, modem, (Clause 10), baud rate(s):
	LonTalk, (Clause 11), medium:
	Other:

# Segmentation Capability

Able to transmit segmented messages	Window Size: 32
Able to receive segmented messages	Window Size: 32

# **Device Address Binding**

Is Static Device Binding supported?	No

# **Networking Options**

Router, Clause 6 – List all routing configurations, e.g., ARCNET-Ethernet, Ethernet- MS/TP, etc. BACnet/IP (Annex J) to BACnet MS/TP
Annex H.3, BACnet Tunneling Router over UDP/IP
BACnet/IP Broadcast Management Device (BBMD)
Does the BBMD support registrations by Foreign Devices?

# **Character Sets Supported**

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

•	ANSI X3.4
	ISO 10646 (USC-2)
	IBM [™] /Microsoft [™] DBCS
	ISO 10646 (ICS-4)
	ISO 8859-1
	JIS C 6226

# 6 Point Analog PPM

# Standard Object Types Supported

Object Type	Supported	Creatable	Deletable
Accumulator		No	No
Analog Input	•	No	No
Analog Output	•	No	No
Analog Value		No	No
Averaging		No	No
Binary Input	•	No	No
Binary Output	•	No	No
Binary Value		No	No
Calendar		No	No
Command		No	No
Device	•	No	No
Event Enrollment		No	No
File		No	No
Group		No	No
Life Safety Point		No	No
Life Safety Zone		No	No
Loop		No	No
Multi-state Output		No	No
Multi-state Value		No	No
Notification Class		No	No
Program		No	No
Pulse Converter		No	No
Schedule		No	No
Trend Log		No	No

# **Object Attributes**

# Accumulator Input Object Type

This object type will not be supported in this project.

# Analog Input Object Type

Analog Input Object Type			
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes		
Object_Name	Yes		
Object_Type	Yes		
Present_Value	Yes	W	
Description	No		
Device_Type	No		
Status_Flags	Yes		
Event_State	Yes		
Reliability	Yes		
Out_Of_Service	Yes	W	
Update_Interval	No		
Units	Yes	W	
Min_Pres_Value	No		
Max_Pres_Value	No		
Resolution	No		
COV_Increment	Yes	W	
Time_Delay	No		
Notification Class	No		
High_Limit	No		
Low_Limit	No		
Deadband	No		
Limit_Enable	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		
Analog Output Object Type			
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes		
Object_Name	Yes		
Object_Type	Yes		
Present_Value	Yes	W	
Description	No		
Device_Type	No		

Status_Flags	Yes	
Event_State	Yes	
Reliability	Yes	
Out_Of_Service	Yes	
Units	Yes	
Min_Pres_Value	No	
Max_Pres_Value	No	
Resolution	Yes	
Priority_Array	Yes	
Relinquish_default	Yes	W
COV_Increment	Yes	W
Time_Delay	No	
Notification Class	No	
High_Limit	No	
Low_Limit	No	
Deadband	No	
Limit_Enable	No	
Event_Enable	No	
Acked_Transitions	No	
Notify_Type	No	
Event_Time_Stamps	No	
Profile_Name	No	

# Analog Value Object Type

This object type will not be supported in this project.

# Averaging Object Type

This object type will not be supported in this project.

# Binary Input Object Type

Binary Input Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes			
Object_Name	Yes			
Object_Type	Yes			
Present_Value	Yes	W		
Description	No			
Device_Type	No			
Status_Flags	Yes			
Event_State	Yes			

Reliability	Yes		
Out_Of_Service	Yes	W	
Polarity	Yes		
Inactive_Text	Yes		
Active_Text	Yes		
Change_Of_State_Time	No		
Change_Of_State_Count	No		
Time_Of_State_Count_Reset	No		
Elapsed_Active_Time	No		
Time_Of_Active_Time_Reset	No		
Time_Delay	No		
Notification Class	No		
Alarm_Value	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		
Binary Output Object Type			
Design to the stiff of	- · ·		
Property_identifier	Supported	Access	Notes
Object_Identifier	Yes	Access	Notes
Object_Identifier Object_Name	Yes Yes	Access	Notes
Object_Identifier Object_Name Object_Type	Yes Yes Yes	Access	Notes
Property_Identifier       Object_Identifier       Object_Name       Object_Type       Present_Value	Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description	Yes Yes Yes Yes No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type	Supported       Yes       Yes       Yes       Yes       No       No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags	SupportedYesYesYesNoNoYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State	SupportedYesYesYesYesNoNoYesYesYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability	SupportedYesYesYesNoNoYesYesYesYesYesYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service	SupportedYesYesYesNoNoYesYesYesYesYesYesYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text         Change_Of_State_Time	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesNo	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text         Change_Of_State_Time         Change_Of_State_Count	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No           No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text         Change_Of_State_Count         Time_Of_State_Count_Reset	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No           No           No           No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text         Change_Of_State_Time         Change_Of_State_Count         Time_Of_State_Count_Reset         Elapsed_Active_Time	Supported           Yes           Yes           Yes           Yes           No           No           No           Yes           No           No           No           No           No           No           No           No           No	Access W W	Notes
Property_identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Text         Active_Text         Change_Of_State_Count         Time_Of_State_Count_Reset         Elapsed_Active_Time         Minimum_Off_time	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No           No           No           No           No           No           No           No           No	Access W	Notes

Priority_Array	Yes		
Relinquish_default	Yes	W	
Time_Delay	No		
Notification Class	No		
Feedback_Value	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		

# **Binary Value Object Type**

This object type will not be supported in this project.

# Calendar Object Type

This object type will not be supported in this project.

# Command Object Type

This object type will not be supported in this project.

# **Device Object Type**

Device Object Type			
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes	W	
Object_Name	Yes	W	
Object_Type	Yes		
System_Status	Yes		
Vendor_Name	Yes		
Vendor_Identifier	Yes		
Model_Name	Yes		
Firmware_Revision	Yes		
Application_Software_Version	Yes		
Location	Yes	W	
Description	Yes	W	
Protocol_Version	Yes		
Protocol_Revision	Yes		
Protocol_Services_Support	Yes		
Protocol_Object_Types_Support ed	Yes		
Object_List	Yes		
Max_APDU_Length_Accepted	Yes		

Segementation_Support	Yes	
Max_Segments_Support	No	
VT_Classes_Supported	No	
Active_VT_Sessions	No	
Local_Time	No	
Local_Date	No	
UTC_Offset	No	
Daylight_Savings_Status	No	
APDU_Segment_Timeout	No	
APDU_Timeout	Yes	
Number_Of_APDU_Retries	Yes	
List_Of_Session_Keys	No	
Time_Sync_Recipients	No	
Max_Master	Yes	W
Max_Info_Frames	Yes	W
Device_Address_Binding	Yes	
Database_Revsion	Yes	
Configuration_Files	No	
Last_Restore_Time	No	
Backup_Failure_Time	No	
Active_COV_Subscriptions	No	
Slave_Proxy_Table	No	
Manual_Slave_Address_Binding	No	
Auto_Slave_Discovery	No	
Slave_Address_Binding	No	
Profile_Name	No	

# Event Enrollment Object Type

This object type will not be supported in this project.

# File Object Type

This object type will not be supported in this project.

# Group Object Type

This object type will not be supported in this project.

# Life Safety Point Object Type

This object type will not be supported in this project.

# Life Safety Zone Object Type

This object type will not be supported in this project.

Loop Object Type This object type will not be supported in this project.

Multistate Input Object Type This object type will not be supported in this project.

Multistate Output Object Type This object type will not be supported in this project.

Multistate Value Object Type This object type will not be supported in this project.

Notification Class Object Type This object type will not be supported in this project.

**Program Object Type** This object type will not be supported in this project.

Pulse Converter Object Type This object type will not be supported.

Schedule Object Type This object type will not be supported in this project.

Trend Log Object Type This object type will not be supported in this project.

# 6 Point Digital PPM

# Standard Object Types Supported

Object Type	Supported	Creatable	Deletable
Accumulator	•	No	No
Analog Input	•	No	No
Analog Output		No	No
Analog Value		No	No
Averaging		No	No
Binary Input	•	No	No
Binary Output	•	No	No
Binary Value		No	No
Calendar		No	No
Command		No	No
Device	•	No	No
Event Enrollment		No	No
File		No	No
Group		No	No
Life Safety Point		No	No
Life Safety Zone		No	No
Loop		No	No
Multi-state Output		No	No
Multi-state Value		No	No
Notification Class		No	No
Program		No	No
Pulse Converter		No	No
Schedule		No	No
Trend Log		No	No

# **Object Attributes**

# Accumulator Input Object Type

Accumulator Input Object Type			
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes		
Object_Name	Yes		
Object_Type	Yes		
Present_Value	Yes	W	

Description	No		
Device_Type	No		
Status_Flags	Yes		
Event_State	Yes		
Reliability	Yes		
Out_Of_Service	Yes	W	
Scale	Yes	W	Currently we just support the floatscale.
Units	Yes	W	
Prescale	No		
Max_Pres_Value	Yes		
Value_Change_Time	Yes		
Value_Before_Change	Yes		
Value_Set	Yes	W	
Logging_Record	No		
Logging_Object	No		
Pulse_Rate	No		
High_Limit	No		
Low_Limit	No		
Limit_Monitoring_Interval	No		
Notification Class	No		
Time_Delay	No		
Limit_Enable	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		
Analog Input Object Type	·		·
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes		
Object_Name	Yes		
Object_Type	Yes		
Present_Value	Yes	W	
Description	No		
Device_Type	No		
Status_Flags	Yes		
Event_State	Yes		
Reliability	Yes		

Out_Of_Service	Yes	W
Update_Interval	No	
Units	Yes	W
Min_Pres_Value	No	
Max_Pres_Value	No	
Resolution	No	
COV_Increment	Yes	W
Time_Delay	No	
Notification Class	No	
High_Limit	No	
Low_Limit	No	
Deadband	No	
Limit_Enable	No	
Event_Enable	No	
Acked_Transitions	No	
Notify_Type	No	
Event_Time_Stamps	No	
Profile_Name	No	

# Analog Output Object Type

This object type will not be supported in this project.

# Analog Value Object Type

This object type will not be supported in this project.

# Averaging Object Type

This object type will not be supported in this project.

# Binary Input Object Type

Binary Input Object Type			
Property_Identifier	Supported	Access	Notes
Object_Identifier	Yes		
Object_Name	Yes		
Object_Type	Yes		
Present_Value	Yes	W	
Description	No		
Device_Type	No		
Status_Flags	Yes		
Event_State	Yes		
Reliability	Yes		

Out_Of_Service	Yes	W		
Polarity	Yes			
Inactive_Text	Yes	W		
Active_Text	No			
Max_Pres_Value	Yes			
Change_Of_State_Time	No			
Change_Of_State_Count	No			
Time_Of_State_Count_Reset	No			
Elapsed_Active_Time	No			
Time_Of_Actve_Time_Reset	No			
Time_Delay	No			
Notification Class	No			
Alarm_Value	No			
Event_Enable	No			
Acked_Transitions	No			
Notify_Type	No			
Event_Time_Stamps	No			
Profile_Name	No			
Binary Output Object Type				
Binary Output Object Type				
Binary Output Object Type Property_Identifier	Supported	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier	Supported Yes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name	Supported Yes Yes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type	SupportedYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value	SupportedYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description	SupportedYesYesYesYesYesNo	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type	SupportedYesYesYesYesYesNoNo	Access Access W	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags	SupportedYesYesYesYesNoNoYes	Access Access W	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State	SupportedYesYesYesYesNoNoYesYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYes	Access Access W	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access Access W	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text	SupportedYesYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text	SupportedYesYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text Change_Of_State_Time	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYes	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text Change_Of_State_Time Change_Of_State_Coount	SupportedYesYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesYesNoNoNo	Access	Notes	
Binary Output Object Type Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Text Active_Text Change_Of_State_Coount Time_Of_State_Count_Reset	SupportedYesYesYesYesNoNoYesYesYesYesYesYesYesYesYesYesYesYesNoNoNoNoNoNoNoNoNoNoNoNo	Access	Notes	
Binary Output Object TypeProperty_IdentifierObject_IdentifierObject_NameObject_TypePresent_ValueDescriptionDevice_TypeStatus_FlagsEvent_StateReliabilityOut_Of_ServicePolarityInactive_TextActive_TextChange_Of_State_CoountTime_Of_State_Count_ResetElapsed_Active_Time	Supported           Yes           Yes           Yes           Yes           Yes           Yes           No           No           Yes           No	Access	Notes	
Binary Output Object TypeProperty_IdentifierObject_IdentifierObject_NameObject_TypePresent_ValueDescriptionDevice_TypeStatus_FlagsEvent_StateReliabilityOut_Of_ServicePolarityInactive_TextActive_TextChange_Of_State_CountTime_Of_State_Count_ResetElapsed_Active_TimeTime_Of_Active_Time_Reset	Supported           Yes           No           No	Access	Notes	

Minimum_On_Time	No		
Priority_Array	Yes		
Relinquish_default	Yes	W	
Time_Delay	No		
Notification Class	No		
Feedback_Value	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		

# Binary Value Object Type

This object type will not be supported in this project.

# Calendar Object Type

This object type will not be supported in this project.

# **Command Object Type**

This object type will not be supported in this project.

# **Device Object Type**

Device Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes	W		
Object_Name	Yes	W		
Object_Type	Yes			
System_Status	Yes			
Vendor_Name	Yes			
Vendor_Identifier	Yes			
Model_Name	Yes			
Firmware_Revision	Yes			
Application_Software_Version	Yes			
Location	Yes	W		
Description	Yes	W		
Protocol_Version	Yes			
Protocol_Revision	Yes			
Protocol_Services_Supported	Yes			
Protocol_Object_Tyes_Supporte d	Yes			
Object_List	Yes			

Max_APDU_Length_Accepted	Yes	
Segmentation_Supported	Yes	
Max_Segments_Supported	No	
VT_Classes_Sessions	No	
Local_Time	No	
Local_Date	No	
UTC_Offset	No	
Daylight_Savings_Status	No	
APDU_Segment_Timeout	No	
APDU_Timeout	Yes	
Number_Of_APDU_Retries	Yes	
List_Of_Session_Keys	No	
Time_Sync_Recipients	No	
Max_Master	Yes	W
Max_Info_Frames	Yes	W
Device_Address_Binding	Yes	
Database_Revision	Yes	
Configuration_Files	No	
Last_Restore_Time	No	
Backup_FailureE_Timeout	No	
Active_COV_Subscriptions	No	
Slave_Proxy_Table	No	
Manual_Slave_Address_Binding	No	
Auto_Slave_Discovery	No	
Slave_Address_Binding	No	
Profile_Name	No	

### Event Enrollment Object Type

This object type will not be supported in this project. **File Object Type** This object type will not be supported in this project. **Group Object Type** This object type will not be supported in this project. **Life Safety Point Object Type** This object type will not be supported in this project. **Life Safety Zone Object Type** This object type will not be supported in this project. **Loop Object Type** This object type will not be supported in this project. **Multistate Input Object Type** This object type will not be supported in this project.

### Multistate Output Object Type

This object type will not be supported in this project. Multistate Value Object Type

This object type will not be supported in this project.

Notification Class Object Type

This object type will not be supported in this project.

# Program Object Type

This object type will not be supported in this project. **Pulse Converter Object Type** 

This object type will not be supported in this project. Schedule Object Type

This object type will not be supported in this project.

# Trend Log Object Type

This object type will not be supported in this project.
#### 12 Point Combo PPM

#### Standard Object Types Supported

Object Type	Supported	Creatable	Deletable
Accumulator		No	No
Analog Input	•	No	No
Analog Output	•	No	No
Analog Value		No	No
Averaging		No	No
Binary Input	•	No	No
Binary Output	•	No	No
Binary Value		No	No
Calendar		No	No
Command		No	No
Device	•	No	No
Event Enrollment		No	No
File		No	No
Group		No	No
Life Safety Point		No	No
Life Safety Zone		No	No
Loop		No	No
Multi-state Input		No	No
Multi-state Output		No	No
Multi-state Value		No	No
Notification Class		No	No
Program		No	No
Pulse Converter		No	No
Schedule		No	No
Trend Log		No	No

**Object Attributes** 

#### Accumulator Input Object Type

This object type will not be supported in this project.

#### Analog Input Object Type

Analog Input Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes			
Object_Name	Yes			
Object_Type	Yes			
Present_Value	Yes	W		
Description	No			
Device_Type	No			
Status_Flags	Yes			
Event_State	Yes			
Reliability	Yes			
Out_Of_Service	Yes	W		
Update_Interval	No			
Units	Yes	W		
Min_Pres_Value	No			
Max_Pres_Value	No			
Resolution	No			
COV_Increment	Yes	W		
Time_Delay	No			
Notification Class	No			
High_Limit	No			
Low_Limit	No			
Deadband	No			
Limit_Enable	No			
Event_Enable	No			
Acked_Transitions	No			
Notify_Type	No			
Event_Time_Stamps	No			
Profile_Name	No			
Analog Output Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes			
Object_Name	Yes			
Object_Type	Yes			
Present_Value	Yes	W		
Description	No			
Device_Type	No			

Status_Flags	Yes		
Event_State	Yes		
Reliability	Yes		
Out_Of_Service	Yes		
Units	Yes		
Min_Pres_Value	No		
Max_Pres_Value	No		
Resolution	No		
Priority_Array	Yes		
Relinquish_default	Yes	W	
COV_Increment	Yes	W	
Time_Delay	No		
Notification Class	No		
High_Limit	No		
Low_Limit	No		
Deadband	No		
Limit_Enable	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		

#### Analog Value Object Type

This object type will not be supported in this project.

#### Averaging Object Type

This object type will not be supported in this project.

#### Binary Input Object Type

Binary Input Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes			
Object_Name	Yes			
Object_Type	Yes			
Present_Value	Yes	W		
Description	No			
Device_Type	No			
Status_Flags	Yes			
Event_State	Yes			

Reliability	Yes		
Out_Of_Service	Yes	W	
Polarity	Yes		
Inactive_Text	Yes		
Active_Text	Yes		
Change_Of_State_Time	No		
Change_Of_State_Count	No		
Time_Of_State_Count_Reset	No		
Elapsed_Active_Time	No		
Time_Of_Active_Time_Reset	No		
Time_Delay	No		
Notification Class	No		
Alarm_Value	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		
Binary Output Object Type			
Property_Identifier	Supported	Access	Notes
Property_Identifier Object_Identifier	Supported Yes	Access	Notes
Property_Identifier       Object_Identifier       Object_Name	Yes Yes	Access	Notes
Property_Identifier       Object_Identifier       Object_Name       Object_Type	Yes Yes Yes	Access	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value	Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description	Yes Yes Yes Yes No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type	Supported       Yes       Yes       Yes       Yes       No       No	Access W	Notes
Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags	SupportedYesYesYesNoNoYes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State	Supported Yes Yes Yes Yes No No Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability	Supported Yes Yes Yes Yes No No Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Texxt	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes Yes Yes	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Texxt         Active_Text	Supported Yes Yes Yes Yes No No No Yes Yes Yes Yes Yes Yes Yes Yes	Access W	Notes
Property_Identifier Object_Identifier Object_Name Object_Type Present_Value Description Device_Type Status_Flags Event_State Reliability Out_Of_Service Polarity Inactive_Texxt Active_Text Change_Of_State_Time	Supported Yes Yes Yes Yes No No Yes Yes Yes Yes Yes Yes Yes Yes Yes No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Texxt         Active_Text         Change_Of_State_Time         Change_Of_State_Count	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No           No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Texxt         Active_Text         Change_Of_State_Count         Time_Of_State_Count_Reset	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No           No           No           No	Access W	Notes
Property_IdentifierObject_IdentifierObject_NameObject_TypePresent_ValueDescriptionDevice_TypeStatus_FlagsEvent_StateReliabilityOut_Of_ServicePolarityInactive_TexxtActive_TextChange_Of_State_TimeChange_Of_State_CountTime_Of_State_Count_ResetElapsed_Active_Time	Supported           Yes           No           No           No           No           No           No           No	Access W	Notes
Property_Identifier         Object_Identifier         Object_Name         Object_Type         Present_Value         Description         Device_Type         Status_Flags         Event_State         Reliability         Out_Of_Service         Polarity         Inactive_Texxt         Active_Text         Change_Of_State_Time         Change_Of_State_Count         Time_Of_State_Count_Reset         Elapsed_Active_Time         Time_Of_Active_Time_Reset	Supported           Yes           Yes           Yes           Yes           No           No           Yes           No           No	Access W	Notes

Minimum_On_Time	No		
Priority_Array	Yes		
Relinquish_default	Yes	W	
Time_Delay	No		
Notification Class	No		
Feedback_Value	No		
Event_Enable	No		
Acked_Transitions	No		
Notify_Type	No		
Event_Time_Stamps	No		
Profile_Name	No		

#### Binary Value Object Type

This object type will not be supported in this project.

#### Calendar Object Type

This object type will not be supported in this project.

#### **Command Object Type**

This object type will not be supported in this project.

#### **Device Object Type**

Device Object Type				
Property_Identifier	Supported	Access	Notes	
Object_Identifier	Yes	W		
Object_Name	Yes	W		
Object_Type	Yes			
System_Status	Yes			
Vendor_Name	Yes			
Vendor_Identifier	Yes			
Model_Name	Yes			
Firmware_Revision	Yes			
Application_Software_Version	Yes			
Location	Yes	W		
Description	Yes	W		
Protocol_Version	Yes			
Protocol_Revision	Yes			
Protocol_Services_Supported	Yes			
Protocol_Object_Types_Support ed	Yes			
Object_list	Yes			

Max_APPDU_Length_Accepted	Yes		
Segmentation_Supported	Yes		
Max_Segments_Supported	No		
VT_Classes_Supported	No		
Active_VT_Sessions	No		
Local_Time	No		
Local_Date	No		
UT_Offset	No		
Daylight_Savings_Status	No		
APDU_Segment_Timeout	No		
APDU_Timeout	Yes		
Number_Of_APDU_Retries	Yes		
List_Of_Session_Keys	No		
Time_Sync_Recipients	No		
Max_Master	Yes	W	
Max_Info_Frames	Yes	W	
Device_Address_Binding	Yes		
Database_Revision	Yes		
Configuration_Files	No		
Last_Restore_Time	No		
Backup_Failure_Timeout	No		
Active_COV_Subscriptions	No		
Slave_Proxy_Table	No		
Manual_Slave_Address_Binding	No		
Auto_Slave_Discovery	No		
Slave_Address_Binding	No		
Profile_Name	No		

#### Event Enrollment Object Type

This object type will not be supported in this project.

#### File Object Type

This object type will not be supported in this project.

#### Group Object Type

This object type will not be supported.

#### Life Safety Point Object Type

This object type will not be supported.

#### Life Safety Zone Object Type

This object type will not be supported in this project.

Loop Object Type This object type will not be supported in this project.

Multistate Input Object Type This object type will not be supported in this project.

Multistate Output Object Type This object type will not be supported in this project.

Multistate Value Object Type This object type will not be supported in this project.

Notification Class Object Type This object type will not be supported in this project.

Program Object Type This object type will not be supported in this project.

Pulse Converter Object Type This object type will not be supported in this project.

Schedule Object Type This object type will not be supported in this project.

Trend Log Object Type This object type will not be supported in this project.



RDB160BNU

# Fan Coil Unit Room Thermostat with BACnet MS/TP Communication

#### RDB160BNU



#### The RDB160BNU controls fan coil units with the following features:

- HVAC applications: 2-pipe, 2-pipe with electric heater, and 4-pipe
- Communication: BACnet MS/TP
- Operating voltage: AC 24 V
- Fan: 1, 2, 3-speed or DC 0...10 V (automatic or manual)
- Valve actuators: On/off, 3-position or DC...10 V
- Electric heater: On/off
- Built-in temperature sensor
- Three configurable inputs for external room/return air temperature, supply air temperature limitation, heating/cooling changeover, window contact, and occupancy sensor.
- Operating modes: Comfort, Standby (Economy), OFF, and mold protection
- Room temperature control: Based on built-in temperature sensor or room/return air temperature
- Heating/cooling changeover: manual, or automatic via water temperature sensor or digital input
- Supply air temperature limitation
- Automatic valve exercise
- Backlit LCD



A6V12045445_en--_a 2022-04-26 Use

The RDB160BNU is suitable for commercial applications where communication to a building management system is required, such as offices, healthcare, education, retail, shopping malls or other commercial facilities.

#### Functions

#### **Temperature control**

- Built-in temperature sensor or
- External room/return air temperature

#### **Operating modes**

- Comfort
- Standby (Economy)
- OFF mode
- Mold protection (optional in OFF mode)

#### Additional functions

- Heating/cooling changeover
  - Manual: via thermostat (P02) or BACnet object
  - Automatic: via water temperature sensor or digital input
- Supply air temperature limitation function

#### Security functions

- Lock buttons
- Lock parameter menu access
- Block device during fire alarms
- Valve exercising feature

#### **Energy efficiency functions**

- Setpoint limitation
- Window state
- Occupancy

#### Fan operation

- Automatic and manual modes
- Fan operation in dead zone (fan kick)
- Fan over-run for electric heater

#### Fan blocking functions

- Block fan speed control in Auto mode
- Block fan speed control in Manual mode

#### **BACnet MS/TP communication**

- BACnet MS/TP MAC address: set from 0 to 127. Factory setting is 127.
- BACnet MS/TP device instance number: set from 0 to 4194302. Factory setting is 0.
- Baud rate: selectable between 9600, 19200, 38400 and 76800 (default setting) bps.

2

#### **HVAC** applications

The RDB160BNU can control fan coil units of the following types:

- 2-pipe system
- 2-pipe system with electric heater
- 4-pipe system

The applications can be configured using the local parameter menu or via BACnet objects:



YHC	Heating/cooling valve actuator	M1	Fan
ΥH	Heating valve actuator	B1	Return air temperature sensor or external room temperature sensor (optional)
YC	Cooling valve actuator	B2	Changeover sensor (optional)
YE	Electric heater		

#### **Control applications**

The RDB160BNU can control 29 different FCU control applications with up to 2 DC 0...10 V control outputs i.e., the control of a DC fan, DC cooling valve, and DC heating valve is not possible.

	2-	pipe	2-pipe with e	lectric heater		4-pipe	
Fan	1/2/3-speed	DC 010 V	1/2/3-speed	DC 010 V	1/2/3-speed	DC	010 V
Output #1	On/Off, PW DC 0	M, 3-position, …10 V	On/Off, PWM, DC 010 V		On/Off, PWM,	On/Off, PWM	DC 010 V
Output #2	Ν	I/A	On	/Off	DC 0 10 V	On/0	Off, PWM

#### Mechanical design

The RDB160BNU consists of 3 parts:

- Mounting plate with screw terminals
- Plastic housing with electronics, buttons, display, and room temperature sensor
- Frame

#### **Buttons**



On/Off

1 2

3

- Up/down
- Fan

#### Display



- 1 'AUTO/MAN': Automatic or manual mode indication for the fan
- 2 Current fan speed (Low, Medium, High)
- 3 Up/Down buttons to adjust setpoints and parameters
- 4 Occupancy indication
- 5 Current room temperature or setpoint in °F or °C (one decimal point)
- 6 Open window
- 7 'COOL/HEAT': Shows the current control mode
- STANDBY': Economy mode indication
   'SERVICE': Commissioning mode (setting parameters)
- 9 'OFF': OFF mode
- 10 Indoor / outdoor temperature
- 11 Setpoint temperature
- 12 Fan status

#### Type summary

Туре	Order number	Designation
RDB160BNU	S55770-T437	RDB160BNU BACnet FCU Room Thermostat

#### **Equipment combinations**

The thermostat can be combined with sensors and actuators with compatible signal types as listed in chapter 'Technical data'.

#### Product documentation

Торіс	Document ID:
Installation instructions	A6V12045441
Commissioning instructions	A6V12045450

The Installation instructions document is available in English, Spanish, and French.

It is included with the thermostat in the same packaging box.

Related documents such as environmental declarations, CE declarations, etc., can also be downloaded at the following Internet address:

www.siemens.com/bt/download

The BTL listing can be found at https://www.bacnetinternational.net/btl/.

#### Notes

#### Safety

#### 



Failure to comply with national safety regulations may result in personal injury and property damage.

• Observe national provisions and comply with the appropriate safety regulations.

#### Mounting



- The thermostat is suitable for mounting directly on the wall or on a 4" x 4" conduit box (using the ARG70 adapter plate).
- Recommended height: 1.5 m above the floor.
- Do not mount the devices in recesses, shelves, behind curtains or doors, or above or near heat sources.
- Avoid direct solar radiation and drafts.

National safety regulations

- Seal the conduit box or the installation tube if any, as air currents can affect sensor readings.
- Adhere to allowed ambient conditions.

	No internal line protection for supply lines to external consumers	
	Risk of fire and injury due to short-circuits	
$\bigwedge$	• The AC 24 V mains supply line must have an external circuit breaker with a rated current of no more than 10 A.	
	<ul> <li>Adapt the supply line cable diameters as per local regulations to the rated value of the installed over-current protection device.</li> </ul>	
	<ul> <li>Disconnect the thermostat from the power supply before removing it from the mounting plate.</li> </ul>	

Â	<ul> <li>Relay outputs (DO1, DO2, DO3, DO4 or UO1) connected to mains voltage</li> <li>Injuries caused by electric shock when touching the device</li> <li>Adapt the relay cable diameters as per local regulations to the rated value of the installed over-current protection device.</li> <li>Use only valve actuators rated for AC 24 V.</li> </ul>	

#### Commissioning

The RDB160BNU thermostat is delivered with pre-programmed control sequences. The relevant application and its parameters can be selected using the buttons on the thermostat. This can be done through:

- Setup Wizard: Only appears the first time the thermostat is powered on. It enables rapid system configuration of the most important parameters. For a list of these parameters, please refer to the installation instructions. See chapter 'Product documentation [> 6]'.
- Parameter Menu: Available anytime. Used to access and change the complete parameter set. For a list of these parameters, please refer to the commissioning instructions. See chapter 'Product documentation [> 6]'.

#### Disposal



The symbol with the crossed-out waste container means that electrical and electronic products and batteries may not be disposed of in normal household waste. They must be placed in separate collection and recycling containers according to the applicable laws. Please also refer to any applicable national labelling requirements. Proper disposal helps save valuable resources and prevents potentially harmful effects to people and the environment. Spent batteries and accumulators that can be removed from old devices for disposal, must be removed and placed in the indicated disposal channels. You are responsible for deleting any personal data from old devices for disposal. The registered manufacturers or distributors of electrical and electronic devices have established a common system for returning old devices. Suppliers of electrical devices must accept the returned devices at no charge. You can return old devices. Please contact your regional or municipal offices/authorities for information on recycling centers or collection centers for old electrical devices.

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Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

General		
Operating voltage	AC 1830 V	
Frequency	5060 Hz	
Power consumption	2.5 VA	
No internal fuse!		

External preliminary protection with max. C 10 circuit breaker required in all cases.

Ambient conditions, environmental conditions	
Ambient temperature	32122 °F (050 °C)
Storage temperature	-4+158 °F (-20+70 °C)
Ambient humidity	Max. 90%

Communication	
Communication	BACnet MS/TP
Communication speed	9600, 19200, 38400 or 76800 bps

Inputs	
Analog input (AI1)	PT1000-sensor, 32122 °F (050 °C)
Universal input (UI1)	<ul> <li>Analog input: PT1000 sensor, 32212 °F (0100 °C)</li> <li>Digital input: potential-free contact</li> </ul>
Digital input (DI1)	Potential free contact
Common ('C') power output (for UI1 and DI1 only)	DC 24 V, max. 10 mA, short circuit-protected

Outputs		
Digital outputs (Dox)	AC 24 V, max. 0.5 A	
<b>Do NOT connect fans in parallel.</b> Connect one fan directly. For additional fans, install one relay for each speed.		
Universal outputs (UOx)	<ul> <li>Digital output (DO): AC 24 V, max. 2.0 A</li> <li>Analog output (AO): DC 010 V, max. 5 mA</li> </ul>	

Operational data	
Built-in temperature sensor	
Technology	NTC linearized 15 kΩ
Measuring range	32122 °F (050 °C)
Accuracy	±0.9 °F (±0.5 °C) at 5986 °F (1530 °C)
Setpoint range	4195 °F (535 °C)

Standards and directives	
UL certificates	UL916 ^{*)}
BACnet BTL Listing	BACnet Application Specific Controller (B-ASC)
EU conformity (CE)	See EU declaration of conformity $^{*)}$
UK conformity (UKCA)	See UK declaration of conformity $^{\star)}$
The product environmental declaration contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal)	See product environmental declaration *)

General	
Mounting	Indoor, wall (directly, or on a 4" x 4" conduit box using the ARG70 adapter plate).
Terminal blocks	Lift type for max. cable cross-section: 2.1 mm ²
Display	Backlit LCD
Casing material	Polycarbonate, PC
Color	Signal white RAL 9003
Safety class	IP20
Net weight	3.88 ounces (110 g)

*) The documents can be downloaded at <a href="http://siemens.com/bt/download">http://siemens.com/bt/download</a>

No.	Label	Description
10	G	Supply voltage (AC 24 V~)
11	G0	Supply voltage (AC 24 V $_{\perp}$ )
12	DO1	Digital Output 1 (AC 24 V⊥, max. 0.5 A): Fan speed low
13	DO2	Digital Output 2 (AC 24 V⊥, max. 0.5 A): Fan speed medium
14	DO3	Digital Output 3 (AC 24 V⊥, max. 0.5 A): Fan speed high
20	CDO	<b>C</b> ommon (AC 24 V~) for <b>D</b> igital <b>O</b> utputs: for DOs or UO1 (when configured as DO)
21	MUO	<b>M</b> easuring ground for <b>U</b> niversal <b>O</b> utputs (-DC 0…10 V): for UOs (when configured as AOs)
22	DO4	<ul> <li>Digital Output 4 (AC 24 V⊥, max. 0.5 A):</li> <li>Electric heater (2-pipe FCU with electric heater)</li> <li>Cooling valve (4-pipe FCU)</li> </ul>
23	UO1	<ul> <li>Universal Output 1 (AC 24 V⊥, max. 2.0 A or +DC 010 V, max. 5 mA):</li> <li>Heating or cooling valve (2-pipe FCU and 2-pipe FCU with electric heater)</li> <li>Heating valve (4-pipe FCU)</li> </ul>
24	UO2	<ul> <li>Universal Output 2 (+DC 010 V):</li> <li>Fan (all applications with DC fan)</li> <li>Cooling valve (4-pipe FCU with 3-speed fan)</li> </ul>
30	Al1	<ul> <li>Analog Input 1 (PT1000 sensor, 32122 °F (050 °C)):</li> <li>External room temperature sensor</li> <li>Supply air temperature sensor</li> </ul>
31	UI1	<ul> <li>Universal Input 1 (PT1000 sensor, 32212 °F (0100 °C) or contact):</li> <li>Change-over temperature sensor or contact</li> <li>Window contact</li> </ul>
32	DI1	<ul><li>Digital Input 1 (Contact):</li><li>Presence detector</li><li>Window contact</li></ul>
33	М	Measuring ground: for AI1 or UI1 (when configured as AI)

40	С	<b>C</b> ommon (DC 24 V): for DI1 and UI1 (when configured as DI)
41	REF	BACnet MS/TP Reference
42	-	BACnet MS/TP -
43	+	BACnet MS/TP +

#### Connection diagrams

Inputs



#### **BACnet MS/TP**



	DC 010 V fan						
	$\begin{array}{c c} G & GO & MUO & UO2 \\ \hline 0 & 10 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 10 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 10 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 10 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 11 & 0 & 21 & 0 & 24 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 0 \\ \hline 0 $						
HVAC application	Control application	Wiring					
2-pipe	Heating/cooling valve (V1): On/Off or PWM	U01 CDO Ø23 Ø20 V 1					
2-pipe	Heating/cooling valve (V1): 3-position • UO1 = Open ▲ • DO4 = Close ▼	↓ ↓ UO1 DO4 CDO Ø23 Ø22 Ø20 Open Close V1					
2-pipe	Heating/cooling valve (V1): DC 010 V	U01 MU0 Ø23 Ø21 V 1					
2-pipe with electric heater	Heating/cooling valve (V1): On/Off or PWM Electric heater (V2): On/Off	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					

	1	
2-pipe with electric heater	Heating/cooling valve (V1): DC 010 V Electric heater (V2): On/Off	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
4-pipe	Heating valve (V1): On/Off or PWM Cooling valve (V2): On/Off or PWM	U01 D04 CD0 Ø23 Ø22 Ø20 V1 V2
4-pipe	Heating valve (V1): DC 010 V Cooling valve (V2): On/Off or PWM	U01 MUO D04 CDO Ø23 Ø21 Ø22 Ø20 V1 V2

	3-/2-1-speed fan					
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
HVAC application	Control application	Wiring				
2-pipe	Heating/cooling valve (V1): On/Off or PWM	$ \begin{array}{c} \text{UO1}  \text{CDO} \\ \text{O23}  \text{O20} \\ \text{V1} \\ \text{V1} \end{array} $				
2-pipe	Heating/cooling valve (V1): 3-position • UO1 = Open ▲ • DO4 = Close ▼	UO1 DO4 CDO ⊘23 ⊘22 ⊘20 Open Close V1				
2-pipe	Heating/cooling valve (V1): DC 010 V	U01 MU0 Ø23 Ø21 V1				
2-pipe with electric heater	Heating/cooling valve (V1): On/Off or PWM Electric heater (V2): On/Off	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				
2-pipe with electric heater	Heating/cooling valve (V1): DC 010 V Electric heater (V2): On/Off	U01       MU0       D04       CD0         Ø23       Ø21       Ø22       Ø20         V1       V2				

4-pipe	Heating valve (V1): On/Off or PWM Cooling valve (V2): On/Off or PWM	$\begin{array}{c cccc} UO1 & DO4 & CDO \\ \hline O23 & O22 & O20 \\ \hline V1 & V2 \\ \hline \end{array}$
4-pipe	Heating valve (V1): DC 010 V Cooling valve (V2): On/Off or PWM	U01 MU0 D04 CD0 Ø23 Ø21 Ø22 Ø20
4-pipe	Heating valve (V1): On/Off or PWM Cooling valve (V2): DC 010 V	UO1 CDO UO2 MUO Ø23 Ø20 Ø24 Ø21 V1 V2
4-pipe	Heating valve (V1): DC 010 V Cooling valve (V2): DC 010 V	U01 MUO U02 Ø23 Ø21 Ø24 V1 V2



All dimensions in mm

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## QMX3 Room Sensors for Siemens DXR Series Controllers





QMX3.P30/P40/P70 Sensing Only

QMX3.P02 Sensor/Room Operator

#### Description

The QMX3 Series includes sensors, switches and room operator units exclusively for use with Siemens DXR Series Controllers. The devices communicate with the controller using PL-Link protocols. All units can be installed on a standard 2" × 4" electrical box with no additional back plates required. No-logo versions are available for some units.

#### QMX3.P02

- Temperature sensor.
- Configurable touch keys for light and shade control.

#### QMX3.P30

• Temperature sensor.

#### QMX3.P34

- Temperature sensor.
- Backlit LCD display and touch keys for HVAC control.
- Green Leaf active energy management.

#### QMX3.P37

- Temperature sensor.
- Backlit LCD display and configurable touch keys for light and shade control.
- Green Leaf active energy management.

#### QMX3.P40

• Temperature and humidity sensor

#### QMX3.P44

- Temperature and humidity sensor
- Backlit LCD display and touch keys for HVAC control

#### QMX3.P70

- Temperature, humidity and air quality sensor.
- LED air quality indicator.





QMX3.P34/P44/P74 Sensor with Full Display

QMX3.P37 Room Sensor/Operator with Display

#### QMX3.P74

- Temperature, humidity and CO₂ sensor.
- Backlit LCD HMI and touch keys for HVAC control.
- Green Leaf active energy management.

#### Specifications*

Temperature	
Measuring range	32°F to 122°F (0°C to 50°C)
Accuracy	± 0.36°F @ 77°F (0.2°C @ 25°C)
Humidity (P4x and P7x)	
Measuring Range	0 to 95% rh
Accuracy	± 4% (20 to 80% rh)
CO ₂ (P70 and P74)	
Measuring Range	400 to 10,000 PPM
Accuracy < 2K ppm	± (30 ppm +4% measured CO ₂ ) @ 73°F (23°C) and 101.3 kPa
Temp. dependency	± 2 ppm/°C typical
Pressure dependency	0.14% of value/hPa
Long-term drift	± 20 ppm per year
Calibration	Not required
Operating voltage range	PL-Link DC 21 to 30V Max.
Power consumption	15 mA at 24 Vdc
Agency Listings	UL 916
	FCC Part 15
	CSA C22.2 #0 and #205
Color	White or black
Dimensions	5.25" × 3.5" × 0.71"
	(133.4 mm × 88.4 mm × 18 mm)
Shipping Weight	7.6 oz. (216 g)

*Accuracies shown are for sensing elements; actual system accuracy may vary.

#### Display (QMX3.P34 and QMX3.P74 Only)



#### NOTES:

- User-accessible values and settings will vary based on overall system configuration.
- Some values (for example, open window indicator, and outdoor air temperature) require additional

	Current Room Temperature/Humidity/Air Quality
/	Indicates indoor or outdoor temperature (User-selectable).
$\mathbf{\overline{W}}$	Indicates that a window is open.
<u>∭</u> /✿	Heating/cooling mode indicator
$\varnothing$	Green leaf indicates optimum settings are active. (One-touch resets to optimum setpoints.)
< ^B	Displays temperature setpoint (User- adjustable)
	Displays current fan speed (User- adjustable)
© auto ☆k (	Displays current room operating mode (User-selectable)
<b>∢ ♠<u>↓</u>發</b>	Displayed value selector (RH/Temp/Air Quality) (User-selectable)
[ŧ]/□ ŧ▶	Room occupancy indicator
	Start-up/commissioning mode indicators (See start-up and commissioning documents)
1	Indicates parameters are locked

Category	Model Number	Orderable Part Number	Temperature Sensor	Humidity Sensor	CO2 Sensor	Air Quality Indicator LED	Backlit Display and Touch Keys	Green Leaf LED	Configurable Touch Keys	Window for Labels	Color
	QMX3.P30*	S55624-H103-A*	•	-	_	-	_	-	-	-	White
	QMX3.P30-1WNB	QMX3.P30-1WNB	•	-	-	-	-	-	-	-	White (no logo)
s	QMX3.P30-1BSC	S55624-H123	•	-	-	-	_	-	-	-	Black
osu	QMX3.P40	S55624-H116	•	•	-	-	-	-	-	-	White
Se	QMX3.P40-1BSC	S55624-H124	•	•	-	-	-	-	-	-	Black
	QMX3.P70	S55624-H104-A	•	•	•	•	_	-	-	-	White
	QMX3.P70-1BSC	S55624-H125	•	•	•	•	-	-	-	-	Black
	QMX3.P02	QMX3.P02	•	-	_	_	_	_	•	•	White
	QMX3.P02-1BSC	S55624-H128	•	-	-	-	-	-	•	•	Black
	QMX3.P34*	S55624-H105-A*	•	-	-	-	•	•	-	-	White
nits	QMX3.P34-1WNB	QMX3.P34-1WNB	•	-	-	-	•	•	-	-	White (no logo)
, L	QMX3.P34-1BSC	S55624-H126	•	-	-	-	•	•	-	-	Black
rator Ur	QMX3.P34-1BSC QMX3.P44	S55624-H126 S55624-H143-A	•	-	-	-	•	•	_	-	Black White
Operator Ur	QMX3.P34-1BSC QMX3.P44 QMX3.P44-1BSC	S55624-H126 S55624-H143-A S55624-H144	• • •	- •	-	_ _ _	•	•	_ _ _	-	Black White Black
om Operator Ur	QMX3.P34-1BSC QMX3.P44 QMX3.P44-1BSC QMX3.P74*	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A*	• • • •	- • •	-	- - -	• • • •	• • • • •	-	- - -	Black White Black White
Room Operator Ur	QMX3.P34-1BSC QMX3.P44 QMX3.P44-1BSC QMX3.P74* QMX3.P74-1WNB	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB	• • •	- • •	- - -	- - - -	• • • •	• • • • • • •	- - -	- - - -	Black White Black White White (no logo)
Room Operator Ur	QMX3.P34-1BSC QMX3.P44 QMX3.P44-1BSC QMX3.P74* QMX3.P74-1WNB QMX3.P74-1BSC	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127	• • • •	- • •	- - - ·	- - - -	• • • •	• • • •	-	- - - - -	Black White Black White White (no logo) Black
Room Operator Ur	QMX3.P34-1BSC QMX3.P44 QMX3.P44-1BSC QMX3.P74* QMX3.P74-1WNB QMX3.P74-1BSC QMX3.P37	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127 QMX3.P37	• • • • •	- • • •	- - · ·	- - - - -	• • • • • •	• • • • •	-	- - - - - -	Black White Black White White (no logo) Black White
Room Operator Ur	QMX3.P34-1BSC         QMX3.P44         QMX3.P74-1BSC         QMX3.P74*         QMX3.P74-1WNB         QMX3.P74-1BSC         QMX3.P37         QMX3.P37-1BSC	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127 QMX3.P37 S55624-H129	• • • • •	- • • • -	- - · ·	- - - - - - -	• • • • • •	• • • • • •	- - - - -	- - - - - - - -	Black White Black White White (no logo) Black White Black
s Room Operator Ur	QMX3.P34-1BSC         QMX3.P44         QMX3.P74+1BSC         QMX3.P74*         QMX3.P74-1WNB         QMX3.P74-1BSC         QMX3.P37         QMX3.P37-1BSC         QMX3-GSKT	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127 QMX3.P37 S55624-H129 QMX3-GSKT	• • • • • • • • • • • • • • •	- • • • - 3 Insulat	- - • • -	- - - - - - - - - - - - - - - - - - -	• • • • • • • • • • • • • • • • •	• • • • • • • • • • • •		_ _ _ _ _ _	Black White Black White White (no logo) Black White Black Ollow wall.
ories Room Operator Ur	QMX3.P34-1BSC         QMX3.P44         QMX3.P74-1BSC         QMX3.P74*         QMX3.P74-1WNB         QMX3.P74-1BSC         QMX3.P37         QMX3.P37-1BSC         QMX3.GSKT         OCI702	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127 QMX3.P37 S55624-H129 QMX3-GSKT S55800-Y101	• • • • • • • • • • • • • • • • • • •	- • • - 3 Insulat	- - • • - - ing Ga	- - - - - - - - - - - - - - - - - - -	• • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • •	- - - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - -	Black White Black White White (no logo) Black White Black ollow wall.
essories Room Operator Ur	QMX3.P34-1BSC         QMX3.P44         QMX3.P74+1BSC         QMX3.P74*         QMX3.P74-1WNB         QMX3.P74-1BSC         QMX3.P37         QMX3.P37-1BSC         QMX3-GSKT         OCI702         QMX3-BP	S55624-H126 S55624-H143-A S55624-H144 S55624-H106-A* QMX3.P74-1WNB S55624-H127 QMX3.P37 S55624-H129 QMX3-GSKT S55800-Y101 QMX3-BP	• • • • • • • • • • • • • • • • • • •	- • • - 3 Insulat o PL-LII 3 Replace	– – • • • ing Ga NK Inte	- - - - - - - - - - - - - - - - - - -	• • • • • • • • • • • • • • • • • • •	• • • • • • • • • • • • • • • • • • •	- - - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - -	Black White Black White White (no logo) Black White Black ollow wall.

* For COO = USA, add suffix "-1WSB" to the model number to create the orderable part number (for example: QMX3.P30-1WSB).

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Siemens Industry, Inc. Smart Infrastructure 1000 Deerfield Parkway Buffalo Grove, IL 60089-4513 USA +1-847-215-1000 Your feedback is important to us. If you have comments about this document, please send them to <u>SBT_technical.editor.us.sbt@siemens.com</u>

#### **Product Ordering Information**

SIEMENS

### Series QAA2200 Room Temperature Sensors & Series QFA3200 Room Humidity Sensors



QxAx2xx.EWSN Sensing Only

#### Description

Series QAA2200 Room Temperature and Series QFA3200 Room Humidity + Temperature sensors are engineered to enable accurate and efficient control of room comfort. A wide variety of output signals is available for compatibly with nearly any control system. The patented housing design seamlessly blends into any décor and features strategically placed ventilation slots to maximize airflow and optimize accuracy.

The QFA3200 units combine a temperature sensor with a relative humidity sensor in a single housing to reduce installation time and improve overall room aesthetics.

Installation is quick and straightforward with all hardware included for mounting on a standard 2" × 4" electrical box. Screws and anchors are provided for mounting the sensor directly to a wall. Matching gaskets and trim rings are also available.

The "E" versions have a blank front to prevent unauthorized adjustments and are ideal for high traffic areas or remote spaces that are not supervised.

The "F" versions feature a full HMI that can display room conditions and temperature setpoint. The display is easily configured to limit the information that is available to the occupant. Temperature setpoint can be adjusted using soft touch plus (+) and minus (-) keys, and an override key enables the user to manually signal to the controller that the space is occupied.



QxAx2xx.FWSN Full HMI

#### Specifications

Temperature	
Measuring range	32°F to 122°F (0°C to 50°C)
Accuracy	
1K Ω Pt	± 0.54°F (0.3°C) @ 32°F (0°C)
1K Ω (32°F) Ni	± 0.72°F (0.4°C) @ 32°F (0°C)
	± 0.4°F (0.22°C) @ 77°F (25°C)
$100K \Omega$ Type II 4 to 20 mA/0 to 10V	± 0.36°F (0.2°C) @ 77°F (25°C)
4 to 20 mA/0 to 10V	± 0.9°F (0.5°C)
Humidity	
(QFA32XX ONIY)	0 to 100% rb
	+ 2% between 10 to 90%
Long-Term Stability	$\leq 0.5\%$ rb/year
Resolution	0.03% rh
Repeatability	+/-0.1% rh
Setpoint/Override	
("F" versions only)	
Setpoint Signal	
QxAx2 <b>SS</b> .FWSN	4 to 20 mA or 0 to 10V/0 to 5V
All others	0 to 10V/0 to 5V
Setpoint Range	$55^{\circ}F$ to $95^{\circ}F$ (13°C to $35^{\circ}C$ )
Overnde Contact	
Input Power	18 to 36 Vdc or 24 Vac ± 20%
VA Rating	1.5 VA, max.
Agency Listing	UL 916 CSA C22.2 No. 205
Color	White
Dimensions	4.5" × 2.75" × 1.18"
	(115 mm × 70 mm × 30 mm)
Shipping Weight	6 oz. (170 g)

#### **Product Ordering Information**

Part Number ¹	Temperature Output	Humidity Output	Display	Setpoint Adjustment			
QAA2212.EWSN			—	—			
QAA2212.FWSN			•	•			
QAA2220.EWSN			—	—			
QAA2220.FWSN			•	•			
QAA2230.EWSC ²							
QAA2230.EWSN	10K O Type II Thermister	—	_	—			
QAA2230.FWSC ²			•				
QAA2230.FWSN		-		•			
QAA2235.EWSN	100K $\Omega$ Type 2 Thermistor						
QAA22SS.EWSN	0 to 10V/4 to 20 mA			—			
QAA22SS.FWSN	(Selectable)		•	•			
QFA3212.EWSN			—	—			
QFA3212.FWSN	FUR 12 (363a) RID	4 - 20 mA or					
QFA3230.FWSN	10K $\Omega$ Type II Thermistor	0 - 10V/	·	•			
QFA32SS.EWSN	$0 = 10 \sqrt{4} = 20 m \Lambda$	0 - 5V (Selectable)	—	—			
QFA32SS.FWSN	0 10 100/4 10 2011A	(00.0010.000)	•	•			
¹ For no-logo version	¹ For no-logo version, change "S" to "N" in Part Number position 10.						
² For use with TALO	N [®] LON controllers.						

#### **Accessories Ordering Information**

Part Number
AQA2200-INTL
AQA2200-2X4
563-102 GSKT KIT

* For use when installing Series 2200/3200 Sensors on conduit boxes other than U.S. style 2" x 4". Back plate measures 3-1/4" x 5" (82.55 mm x 127 mm).

#### Disposal



The devices are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

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Siemens Industry, Inc. Smart Infrastructure 1000 Deerfield Parkway Buffalo Grove, IL 60089-4513 USA +1-847-215-1000 Your feedback is important to us. If you have comments about this document, please send them to <u>SBT technical.editor.us.sbt@siemens.com</u> Document No. 149-714 Printed in the USA Page 2 of 2

## SIEMENS

QAM2030.010 544-339-18 544-339-8 544-342-16 544-342-24

Technical Specification Sheet Document No. 149-915 March 25, 2022

## **Duct Temperature Sensors**







Rigid Probe

Rigid Probe - Bracket Mount

Flexible Probe

#### Description

Siemens Duct Temperature Sensors monitor and transmit changes in duct air temperature to the HVAC control system. They provide an accurate, reliable indication of duct air temperature. The sensor resistance varies proportionally to the actual temperature being measured.

Sensors are offered with a variety of probe lengths to fit almost any size duct. Longer probes are typically flexible for easier handling and installation (see *Product Ordering Information* on the following page for details).

Multiple output signals are available to ensure compatibility with most common HVAC control systems.

#### Features

- Variety of sensing elements.
- Suitable for multiple duct applications.
- Responsive to temperature change.
- Accurate and reliable indication of duct temperature.
- Familiar installation process does not require special tools.

#### **Specifications**

•	
Output Signals	100K Ω Thermistor
	10K Ω Type 2 Thermistor
	1K Ω @ 32°F Ni RTD
	1K Ω Pt RTD (375a)
	1K Ω Pt RTD (385a)
	4 to 20 mA
	<ul> <li>-4°F to 122°F</li> </ul>
	<ul> <li>20°F to 120°F</li> </ul>
	<ul> <li>30°F to 250°F</li> </ul>
	10K $\Omega$ Matched Pair Thermistor
	<ul> <li>(For use with Siemens TEC only)</li> </ul>
Probe Material	0.028 Wall SAE J526 ZTEW or Galfan steel tubing
Housing*	Standard NEC approved
Ū	$2 \times 4$ inch ( $5 \times 10$ cm) utility box with
	1/2-inch (13 mm) knockouts
Screw Head	Standard slotted
Туре	

* Bracket-mounted units do not include housing.

#### Disposal



The devices are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

•

- Dispose of the devices through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

#### **Product Ordering Information**

100K Ω Thermistic         Point         18 inches (rigid) 4 inches (rigid) 8 inches (rigid) 18 inches (rigid) 36 indes (rigid) 72 inches (fiexble) 72 inches (fiexble) 74 inches (fiexble) 75 inches (fiexble) 74 inches (fiexble) 74 inches (fiexble) 75 inches (fiexble) 74 inches (fiexble) 75 inches (fiexbl	Output Signal	Туре	Probe Length	Measuring Range	Accuracy	PN
100 K Ω Thermistic         Point         4 inches (rigid) 8 inches (rigid)         40.50°F (±0.2°C)         535.741.4 336.811           10 K Ω Type II Thermistic         Averaging         36 inches (fiexble)         77.9         540.244.718           10 K Ω Type II Thermistic         Point         8 inches (rigid)         40.36°F (±0.2°C)         536.741.4           10 K Ω Weraging         9         16 feet (fiexble)         9         77.7         640.244.18           10 K Ω Weraging         9         16 feet (fiexble)         40.4°F (±0.2°C)         0.404030.026           24 inches (rigid)         4 inches (rigid)         40.4°F (±0.2°C)         0.404030.026           24 inches (rigid)         4 inches (rigid)         40.4°F (±0.2°C)         0.404030.026           24 inches (rigid)         4 inches (rigid)         40.4°F (±0.2°C)         0.404020.026           24 inches (rigid)         4 inches (rigid)         40.4°F (±0.2°C)         0.404020.026           40.4°F (±0.2°C)         0.404020.026         0.404020.026			18 inches (rigid)			535-741-18
100K Ω Themistor         - B inches (figid)         - 4 inches figid)         - 536-811         - 536-811           4 inches (figid)         - 36 inches (figid)         - 36 inches (figid)         - 542-326         - 540-224-18         - 540-224-18         - 540-224-36           10K Ω Type II Themistor         - 4 inches (figid)         - 4 inches (figid)         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-224-36         - 540-226-36         - 540-226-36         - 540-226-36         - 540-226-36         - 540-226-36         - 540-226-36         - 540-226-36         - 540-230-260-20         - 540-226-26         - 540-226-26         - 540-226-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26         - 540-320-26<		Point	4 inches (rigid)		±0.50°F (±0.28°C)	535-741-4
Thermistor         4 inches (rigid), Bracket 18 inches (rigid)         540-244-38           Averaging         36 inches (rigid)         540-244-38         540-246-38           10K Ω Type II         Point         8 inches (rigid)         640-246-38         0400203.025           10K Ω Type II         Point         8 inches (rigid)         0400203.025         0400203.025           24 feet (flexible)         24 feet (flexible)         0400203.025         0400203.025           24 feet (flexible)         24 feet (flexible)         0400203.025         0400203.025           28 32F Ni         8 inches (rigid)         24 feet (flexible)         0400203.025           28 32F Ni         16 inches (rigid)         24 feet (flexible)         -40°F to 180°F         ±0.75°F (±0.4°C)         040020.020           10K Ω Pt RTD (375a)         Point         16 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         040020.020           18 inches (rigid)         18 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         040020.020           18 inches (rigid)         18 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         040020.200           1K Ω Pt RTD (385a)         Point         18 inches (rigid)         -40°F to 120°F         ±0.54°F (±0.3°C)         0400212.010      <	100K O		8 inches (rigid)		@ 77°F (25°C)	535-741-8
Intermination         Averaging         18 inches (figid) 36 inches (figid) 72 inches (figid) 4 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 24 iteet (fiexible) 24 iteet (fiexible) 24 iteet (fiexible) 18 inches (figid) 24 iteet (fiexible) 24 iteet (fiexible) 18 inches (figid) 24 iteet (fiexible) 24 iteet (fiexi	Thermistor		4 inches (rigid), Bracket			536-811
Averaging 10 K Ω Type II Thermistor         Averaging 4 (a hoches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 16 feet (flexible) 24 feet (flexible) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 18 inches (figid) 16 feet (flexible) 24 feet (flexible) 16 feet (flexible) 16 feet (flexible) 16 feet (flexible) 16 feet (flexible) 24 feet (flexible) 16 feet (flexible) 24 feet (flexible) 24 feet (flexible) 16 feet (flexible) 24 feet (flexible) 24 feet (flexible) 16 feet (flexible) 24 feet (fl	mennistor		18 inches (rigid)		+0.36°E (+0.2°C)	540-244-18
10K Ω Type II Thermistor         Point         4 inches (figid) 8 inches (figid)         6 HT (EO C)         540-246-72 (AM2030.020)           11K Ω @ 32F Ni RTD         Averaging         16 feet (flexible)         0 AM2030.250 (AM2030.250)         0 AM2030.250 (AM2030.250)           11K Ω @ 32F Ni RTD         Point         16 feet (flexible)         24 feet (flexible)         -40°F to 180°F (-40°C to 82°C)         ±0.72°F (±0.4°C)         0 AM2020.250 (AM2030.250)           11K Ω @ 32F Ni RTD         Point         18 finches (figid)         -40°F to 180°F (-40°C to 82°C)         ±0.72°F (±0.4°C)         0 AM2020.150 (AM2020.2020.202)           11K Ω Pt RTD (375a)         Point         18 inches (figid)         -40°F to 180°F (-40°C to 82°C)         ±0.72°F (±0.4°C)         0 AM2020.150 (AM2020.150)           11K Ω Pt RTD (375a)         Point         18 inches (figid)         -40°F to 180°F (-40°C to 82°C)         ±0.75°F (±0.4°C)         0 AM2020.150 (AM2020.1500)           11K Ω Pt RTD (375a)         Point         18 inches (figid)         -40°F to 180°F (-40°C to 82°C)         ±0.54°F (±0.3°C)         0 AM2020.10.45 (-44°C 4)           118 inches (figid)         24 feet (flexible)         -44°F to 122°F (-4°C to 120°F (-4°C to 120°C)         ±0.54°F (±0.4°C)         0 AM2012.010 (-4M2012.020           118 inches (figid)         24 feet (flexible)         -44°F to 122°F (-4°C to 120°F         ±0.54°F (±0.4°C)		Averaging	36 inches (flexible)		±0.30 F (±0.2 C) @ 77°F (25°C)	540-245-36
10K Ω Type II Thermistor         Point         4 inches (figid) 18 inches (figid) 24 feet (flexible) 4 inches (figid) 24 feet (flexible) 24 feet (flexible) 4 inches (figid) 8 inches (figid) 8 inches (figid) 18 feet (flexible) 4 inches (figid) 24 feet (flexible) 4 inches (figid) 18 feet (flexible) 24 feet (flexible) 4 inches (figid) 18 feets (flexible) 24 feet (flexible) 20°F to 120°F (-20°C to 50°C)         ±0.54°F (±0.4°C) (±0.54°F (			72 inches (flexible)		@ // 1 (25 0)	540-246-72
10K Ω Type II Thermistor         Point         8 inches (rigid)         244 (fextble)           Averaging @ 32F Ni RTD         Point         8 feet (flexble)         24 feet (flexble)         24 feet (flexble)           1K Ω @ 32F Ni RTD         Point         8 inches (rigid)         44 inches (rigid)         40°F to 180°F (40°C to 82°C)         40.72°F (±0.4°C)         QAM2030.250 QAM2030.500           1K Ω @ 32F Ni RTD         Point         18 inches (rigid)         40°F to 180°F (40°C to 82°C)         40.72°F (±0.4°C)         QAM2020.050 QAM2020.050           18 inches (rigid)         18 inches (rigid)         40°F to 180°F (40°C to 82°C)         40.72°F (±0.4°C)         QAM2020.050 QAM2020.050           18 inches (rigid)         24 feet (flexble)         40°F to 180°F (40°C to 82°C)         40.75°F (±0.4°C)         QAM2020.050 QAM2020.750           18 inches (rigid)         24 feet (flexble)         40.75°F (±0.4°C)         QAM2020.750 QAM2020.750           24 feet (flexble)         24 feet (flexble)         40.75°F (±0.4°C)         QAM2020.750 QAM2012.050           36 inches (rigid)         36 inches (rigid)         40.75°F (±0.4°C)         QAM2012.050 QAM2012.050           24 feet (flexble)         24 feet (flexble)         40.75°F (±0.4°C)         QAM2012.050 QAM2012.050           18 inches (rigid)         18 inches (rigid)         -4°F to 122°F (-2°C to 50°C)			4 inches (rigid)			QAM2030.010
Type II Thermistor	10K O	Point	8 inches (rigid)			QAM2030.020
Thermistor         Averaging         6 feet (flex/ble)         6 feet	Type II		18 inches (rigid)		±0.4°F (±0.2°C)	QAM2030.045
Averaging (β) 32F Ni RTD         Averaging (β) 32F Ni RTD         16 feet (flexible) (β) 4072 (β) (β) (β) 32F Ni RTD         (β)	Thermistor		8 feet (flexible)		@ 77°F (25°C)	QAM2030.250
1K Ω         24 feet (flexible)         4 inches (rigid)           1K Ω         4 inches (rigid)         8 inches (rigid)         4 inches (rigid)           1K Ω Pt         Averaging         24 feet (flexible)         -40°F to 180°F         -40°F to 180°F           16 inches (rigid)         16 inches (rigid)         -40°F to 180°F         -40°F to 180°F         -40°F to 180°F           1K Ω Pt         16 inches (rigid)         -40°F to 180°F         -40°F to 180°F         -40°F to 180°F           1K Ω Pt         16 inches (rigid)         -80°F to 180°F         -40°F to 180°F         -40°F to 180°F           1K Ω Pt         16 inches (rigid)         -80°F (rigid)         -40°F to 180°F         -40°F to 180°F           1K Ω Pt         16 inches (rigid)         -80°F (rigid)         -40°F to 180°F         -40°F to 180°F           11K Ω Pt         16 inches (rigid)         -81°F (rigid)         -544-342-8         -544-343-8           124 inches (rigid)         18 inches (rigid)         -41°F to 122°F         -40.54°F (±0.3°C)         -544-342-8           18 inches (rigid)         -41°F to 122°F         -40.75°F (±0.4°C)         0AM2012.250         0AM2012.250           24 feet (flexible)         -41°F to 122°F         -40.75°F (±0.4°C)         0AM2012.250         0AM2012.250           4 i		Averaging	16 feet (flexible)			QAM2030.500
H Ω @ 32F Ni RTD         Point         4 inches (rigid) 18 inches (rigid) 24 feet (flexible)         -40°F to 180°F (-40°C to 82°C)         ±0.72°F (±0.4°C) @ 32°F (0°C)         CAM2020.020 0AM2020.020           Moreaging         24 feet (flexible)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.020           Point         4 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.020           Marca         18 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.020           Point         4 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.050           Marca         8 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.050           Marca         8 inches (rigid)         -40°F to 180°F         ±0.54°F (±0.3°C)         ±0.54°F (±0.3°C)           Marca         16 inches (rigid)         -40°F to 120°F         ±0.54°F (±0.3°C)         ±0.54°F (±0.3°C)           Marca         18 inches (rigid)         -40°F to 120°F         ±0.54°F (±0.3°C)         ±0.54°F (±0.3°C)           Marca         18 inches (rigid)         -4°F to 122°F         -20°F to 120°F         ±0.54°F (±0.3°C)         534-360-18           Marca         18 inches (rigid)         -4°F to 122°F         :20°F to 120°F         ±0.54°F (±0.3°C)			24 feet (flexible)			QAM2030.750
1K Ω (@ 32F Ki)         Point         3 inches (rigid)         -40°F to 180°F         (= 3.2°F (0°C)         CAM2020.20 (= 3.2°F (0°C)         CAM2020.20 (= 3.2°F (0°C)           Averaging RTD         16 feet (flexible)         -40°F to 180°F         (= 40°C to 82°C)         (= 3.2°F (0°C)         CAM2020.2050           Averaging         16 feet (flexible)         -40°F to 180°F         (= 40°C to 82°C)         (= 3.2°F (0°C)         CAM2020.750           1K Ω Pt RTD (375a)         Point         16 inches (rigid)         -40°F to 180°F         (= 40°C to 82°C)         (= 3.2°F (0°C)         CAM2020.750           Averaging         16 inches (rigid)         -8 inches (rigid)         -40°F to 180°F         (= 40°C to 82°C)         (= 40°C to 82°C)         (= 40°C to 82°C)         (= 544-330-8)         544-332-8           Averaging         16 inches (rigid)         -8 inches (rigid)         -40°F to 180°F         (= 0.54°F (±0.3°C)         (= 0.54°F (±0.3°C)         (= 0.48°C)         (=			4 inches (rigid)		+0.72°E (+0.4°C)	QAM2020.010
(@) 32F Ni RTD	1K Ω	Point	8 inches (rigid)		@ 32°F (0°C)	QAM2020.020
K1D         Averaging         16 teet (flexible) (e40°C to 82°C)         -40°F to 180°F (±0.75°F (±0.4°C)         QAM2022.500 QAM2022.500           Name         18 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.750           Name         18 inches (rigid)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.750           Name         16 feet (flexible)         -40°F to 180°F         ±0.75°F (±0.4°C)         QAM2020.750           Name         16 feet (flexible)         -40°F to 180°F         ±0.54°F (±0.3°C)         544-339-8           Averaging         18 inches (rigid)         -24 feet (flexible)         544-342-8         544-342-8           Averaging         18 inches (rigid)         -40°F to 120°F         ±0.54°F (±0.3°C)         544-342-8           Averaging         18 inches (rigid)         -40°F to 120°F         ±0.54°F (±0.3°C)         544-343-24           Name         -40°F to 120°F         ±0.54°F (±0.4°C)         QAM2012.250         QAM2012.200           Averaging         16 feet (flexible)         -4°F to 122°F         ±0.75°F (±0.4°C)         QAM2012.250           Averaging         18 inches (rigid)         -4°F to 122°F         (-20°C to 50°C)         ±0.54°F (±0.3°C)         533-3376-8           Averaging         18 inches (rigid)         <	@ 32F Ni		18 inches (rigid)			QAM2020.045
Horney of Markey of Ma	RID	Averaging	16 feet (flexible)	-40°F to 180°F	±0.75°F (±0.4°C)	QAM2020.500
H Ω Point         18 inches (rigid) 8 inches (rigid)         544-339-18           1K Ω Pt RTD (375a)         8 inches (rigid)         544-339-4           4 veraging         16 feet (flexible)         544-342-24           8 feet (flexible)         544-342-24           24 inches (rigid)         544-342-8           24 inches (rigid)         544-343-24           24 inches (rigid)         544-343-38           24 inches (rigid)         544-343-38           48 inches (rigid)         544-343-38           48 inches (rigid)         544-343-38           48 inches (rigid)         544-343-38           41 inches (rigid)         544-343-38           44 inches (rigid)         544-343-38           90 int         8 feet (flexible)           18 inches (rigid)         -4°F to 122°F (-2°C)           24 feet (flexible)         -4°F to 122°F (-2°C to 50°C)           90 int         18 inches (rigid)           18 inches (rigid)         -4°F to 122°F (-2°C to 50°C)           18 inches (rigid)         -4°F to 122°F (-2°C to 50°C)           90 int         18 inches (rigid)           18 inches (rigid)         -4°F to 120°F (-2°C to 50°C)           18 inches (rigid)         -4°F to 120°F (-2°C)           18 inches (rigid)			24 feet (flexible)	(-40°C to 82°C)	@ 75°F (24°C)	QAM2020.750
4 to 20 mA         Point         4 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F           4 to 20 mA         Averaging         16 feet (flexible)         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F           4 to 20 mA         -8 feet (flexible)         -4°F to 122°F         -4°F to 122°F         -544*36-4           4 to 20 mA         Averaging         16 feet (flexible)         -4°F to 122°F         -4°F to 122°F           Averaging         18 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -544*540-24           4 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F           4 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F           4 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F         -4°F to 122°F           4 inches (rigid)         -4°F to 122°F         -4°F to 122°F         -4°F to 123°F         -4°F to 123°F           4 inches (rigid)         -4°F to 120°F         -4°F to 120°F         -533-330-6         -533-337-6-8           533-337-6         18 inches (rigid)         -4°F to 120°F         -4°F to 120°F         -533-330-16           533-337-6         18 inches (rigid)		<b>D</b> : /	18 inches (rigid)			<u>544-339-18</u>
HK Ω Pt RTD (375a)         B inches (figld) 24 feet (flexible)         ±0.54°F (±0.3°C) 24 inches (figld)         544-342-26 544-342-24           Averaging         A feet (flexible)         8 feet (flexible)         544-342-80           24 inches (figld)         24 inches (figld)         544-342-80           24 inches (figld)         24 inches (figld)         544-343-18           24 inches (figld)         24 inches (figld)         544-343-38           4 inches (figld)         44 inches (figld)         544-343-38           4 inches (figld)         44 inches (figld)         644-342-26           Averaging         4 inches (figld)         644-343-38           Averaging         16 feet (flexible)         24 feet (flexible)           Averaging         16 feet (flexible)         44 inches (figld)           4 inches (figld)         -4°F to 122°F (-20°C to 50°C)         20°F to 120°F (-20°C to 50°C)           9 point         18 inches (figld)         -4°F to 120°F (-20°C to 50°C)         533-330-16           4 to 20 mA         18 inches (figld)         20°F to 120°F (-20°C to 50°C)         ±0.54°F (±0.3°C)         533-330-16           4 to 20 mA         18 inches (figld)         30°F to 250°F (-20°C to 50°C)         533-330-16         533-330-16           4 to 20 mA         18 inches (figld)         30°F to 250°F		Point	4 inches (rigid)			544-339-4
IK Ω Pt RTD (375a)         Ib itel (lifkxible)         Ib itel (lifkxible)         Ib itel (lifkxible)         Ib itel (lifkxible)           Averaging         48 feet (flexible)         8 feet (flexible)         544-342-24           18 inches (rigid)         36 inches (rigid)         544-343-24           36 inches (rigid)         36 inches (rigid)         544-343-24           48 inches (rigid)         64-342-26         544-343-24           48 inches (rigid)         64-342-26         544-343-24           49 inches (rigid)         44 inches (rigid)         544-343-24           44 inches (rigid)         64-342-26         544-360-26           44-34-343-24         64-34-34-34         64-34-34-34           41 inches (rigid)         -4°F to 122°F         60-75°F (±0.4°C)         60AM2012.250           Averaging         18 inches (rigid)         -4°F to 122°F         534-560-18         533-376-18           41 inches (rigid)         -4°F to 120°F         533-3376-18         533-3376-18         533-3376-18           41 inches (rigid)         24 feet (flexible)         20			8 Inches (rigid)			544-339-8
IK Ω P1 RTD (375a)         24 tet (text)te) 18 inches (rigid)         24 tet (text)te) 18 inches (rigid)         544-342-8 544-343-36           Averaging         18 inches (rigid)         36 fred.f(text)te) 44 inches (rigid)         544-343-36           48 inches (rigid)         48 inches (rigid)         544-343-36           48 inches (rigid)         64 inches (rigid)         544-343-36           48 inches (rigid)         64 inches (rigid)         64 inches (rigid)           1K Ω Pt RTD (385a)         Averaging         18 inches (rigid)         64 inches (rigid)           Averaging         18 inches (rigid)         64 inches (rigid)         0AM2012.020           24 feet (flexible)         24 feet (flexible)         0AM2012.020         0AM2012.020           24 feet (flexible)         24 feet (flexible)         0AM2012.020         0AM2012.020           24 feet (flexible)         24 feet (flexible)         -4°F to 122°F (-20°C to 50°C)         0AM2012.750           9 point         18 inches (rigid)         -4°F to 120°F (-20°C to 50°C)         533-376-8           4 to 20 mA         8 feet (flexible)         20°F to 120°F (-30°C to 49°C)         ±0.54°F (±0.3°C)         533-3376-8           33 376-8         18 inches (rigid)         30°F to 250°F (-1°C to 49°C)         533-3376-8         533-3377-8           4 inches (rigid)			24 feet (flexible)			544-342-10
K1D (3/Sd)         Averaging         3 beet (flexible)         344-342-8         544-343-18           24 inches (rigid)         36 inches (rigid)         544-343-18         544-343-18           24 inches (rigid)         48 inches (rigid)         544-343-18         544-343-36           48 inches (rigid)         48 inches (rigid)         544-343-36         544-343-36           90int         8 inches (rigid)         64 inches (rigid)         544-343-36           1K Ω Pt RTD (385a)         8 feet (flexible)         0AM2012.00         0AM2012.200           Averaging         16 feet (flexible)         0AM2012.200         0AM2012.250           24 feet (flexible)         -4°F to 122°F (-20°C to 50°C)         0AM2012.250         0AM2012.250           90int         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.4°C)         0AM2012.250           90int         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.54°F (±0.3°C)         533-376-8           18 inches (rigid)         24 feet (flexible)         -4°F to 120°F (-20°C to 50°C)         533-376-8         533-376-8           18 inches (rigid)         24 feet (flexible)         20°F to 120°F (-7°C to 49°C)         ±0.54°F (±0.3°C)         535-490-18           535-490-18         18 inches (rigid)         30°F to 250°F	$1K \Omega Pt$	Averaging Point	24 leet (llexible)			<u>544-342-24</u>
4 to 20 mA         Averaging         10 incluses (rigid)         344-343-324           4 inches (rigid)         36 inches (rigid)         544-343-324           4 inches (rigid)         48 inches (rigid)         544-343-324           4 inches (rigid)         68 inches (rigid)         0AM2012.010           1K Ω Pt RTD (385a)         Point         8 inches (rigid)         0AM2012.010           Averaging         16 feet (flexible)         0AM2012.020         0AM2012.020           24 feet (flexible)         24 feet (flexible)         0AM2012.020         0AM2012.045           4 inches (rigid)         24 feet (flexible)         -4°F to 122°F (-20°C to 50°C)         0AM2012.045           9 point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         544-560-18           18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         533-376-18           18 inches (rigid)         -4°F to 120°F (-20°C to 50°C)         533-376-8           18 inches (rigid)         20°F to 120°F (-20°C to 50°C)         ±0.54°F (±0.3°C)         533-376-8           533-376-4         533-376-4         533-376-4         533-376-8           533-376-4         36 inches (rigid)         535-490-38         535-490-38           24 feet (flexible)         20°F to 120°F (-1°C to 121°C)         © 32°F (0°C) <td>RTD (375a)</td> <td></td> <td>±0.54°F (±0.3°C)</td> <td>544-342-8</td>	RTD (375a)				±0.54°F (±0.3°C)	544-342-8
4 to 20 mA         Averaging         24 inches (rigid)         40°F to 120°F         40.54°F (±0.3°C)         044-343-36           4 inches (rigid)         48 inches (rigid)         44-343-36         544-343-36         544-343-36           1K Ω Pt RTD (385a)         Point         8 inches (rigid)         04M2012.010         0AM2012.020           Averaging         16 feet (flexible)         04 inches (rigid)         04M2012.045         0AM2012.045           Averaging         16 feet (flexible)         -4°F to 122°F         0AM2012.500         0AM2012.250           Point         18 inches (rigid)         -4°F to 122°F         0AM2012.500         0AM2012.750           4 inches (rigid)         -4°F to 122°F         544-560-18         533-376-18         533-376-18           18 inches (rigid)         -4°F to 120°F         533-376-18         533-376-18         533-376-18           4 inches (rigid)         20°F to 120°F         ±0.54°F (±0.3°C)         533-376-18         533-376-18           4 inches (rigid)         24 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-376-18           36 inches (rigid)         24 inches (rigid)         -4°F to 120°F         ±0.54°F (±0.3°C)         533-377-18           753-540-24         36 inches (rigid)         30°F to 250°F <t< td=""><td></td><td>24 inches (rigid)</td><td>@ 32°F (0°C)</td><td>544-343-10</td></t<>			24 inches (rigid)		@ 32°F (0°C)	544-343-10
4 to 20 mA         A inches (rigid)         544-33-34           4 inches (rigid)         6 feet (flexible)         24 inches (rigid)           Averaging         16 feet (flexible)         24 feet (flexible)           Averaging         16 feet (flexible)         24 feet (flexible)           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         QAM2012.250           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         QAM2012.250           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         QAM2012.250           A inches (rigid)         -4°F to 122°F (-20°C to 50°C)         544-560-4           A inches (rigid)         -4°F to 122°F (-20°C to 50°C)         544-560-4           A inches (rigid)         -4°F to 120°F (-20°C to 50°C)         533-376-4           A inches (rigid)         -4°F to 120°F (-20°C to 49°C)         533-376-8           Averaging         16 feet (flexible)         20°F to 120°F (-20°C to 49°C)         © 33°F (0°C)           Averaging         18 inches (rigid)         20°F to 120°F (-27°C to 49°C)         © 33°-377-8           Averaging         18 inches (rigid)         20°F to 120°F (-27°C to 49°C)         © 33°-377-8           Point         18 inches (rigid)         30°F to 250°F (-27°C to 49°C)         © 33°-377-			36 inches (rigid)			511-313-36
H to 10 montes (rigid)         4 inches (rigid)         QAM2012.010           1K Ω Pt RTD (385a)         Point         8 inches (rigid)         QAM2012.020         QAM2012.045           Averaging         8 feet (flexible)         0 feet (flexible)         QAM2012.050         QAM2012.500           24 feet (flexible)         24 feet (flexible)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.4°C)         QAM2012.500           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.4°C)         QAM2012.500           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.4°C)         QAM2012.500           4 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.4°C)         QAM2012.500           4 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         ±0.75°F (±0.3°C)         533-376-8           333-376-4         8 inches (rigid)         -4°F to 120°F (-7°C to 49°C)         ±0.54°F (±0.3°C)         533-380-16           4 inches (rigid)         24 feet (flexible)         20°F to 120°F (-7°C to 49°C)         ±0.54°F (±0.3°C)         533-380-24           353-490-24         36 inches (rigid)         30°F to 250°F (-1°C to 121°C)         ±0.54°F (±0.3°C)         533-377-4           For Use with Siemens TEC Only         Point         4 inches (ri			48 inches (rigid)			544-343-48
Home (rigid)         Averaging         B inches (rigid)         Averaging         B inches (rigid)         Averaging         B inches (rigid)         Averaging         Averaging         B inches (rigid)         Averaging         Averaging         B inches (rigid)         Averaging         Averaging         Averaging         B inches (rigid)         Averaging         Averaging         Averaging         Averaging         Averaging         Averaging         Averaging         Averaging         A inches (rigid)         -4°F to 122°F         QAM2012.750         QAVERA         QAVERA			4 inches (rigid)			OAM2012 010
1K Ω Pt RTD (385a)         18 inches (rigid)         QAM2012.250           Averaging         16 feet (flexible)         ±0.75°F (±0.4°C)         QAM2012.250           24 feet (flexible)         24 feet (flexible)         @75°F (24°C)         QAM2012.250           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         @75°F (24°C)         QAM2012.750           Point         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         §33-376-4         \$544-560-4           18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         \$544-560-4         \$544-560-4           18 inches (rigid)         -4°F to 120°F (-20°C to 50°C)         \$533-376-4         \$533-376-4           18 inches (rigid)         16 feet (flexible)         \$20°F to 120°F (-7°C to 49°C)         ±0.54°F (±0.3°C)         \$533-380-46           4 inches (rigid)         24 feet (flexible)         \$20°F to 120°F (-7°C to 49°C)         ±0.54°F (±0.3°C)         \$533-380-46           330°F to 250°F (-1°C to 49°C)         18 inches (rigid)         \$535-490-18         \$533-380-46         \$535-490-36           24 inches (rigid)         30°F to 250°F (-1°C to 121°C)         \$33-377-4         \$533-377-4         \$533-377-4           18 inches (rigid)         30°F to 250°F (-40°C to 82°C)         ±0.50°F (±0.28°C)         \$33-377-8 <t< td=""><td></td><td>8 inches (rigid)</td><td></td><td>QAM2012.020</td></t<>			8 inches (rigid)			QAM2012.020
RTD (385a)         Averaging         8 feet (flexible)         ±0.75°F (±0.4°C)         QAM2012.250           24 feet (flexible)         24 feet (flexible)         -4°F to 122°F         QAM2012.750         QAM2012.750           24 feet (flexible)         18 inches (rigid)         -4°F to 122°F         544-560-4         544-560-4           4 inches (rigid)         -4°F to 122°F         544-560-4         533-376-18         533-376-8           18 inches (rigid)         4 inches (rigid)         -4°F to 120°F         ±0.54°F (±0.3°C)         533-380-16           4 to 20 mA         Averaging         16 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-380-16           24 feet (flexible)         24 feet (flexible)         6.7°°C to 49°C)         @ 32°F (0°C)         533-380-24           4 to 20 mA         Averaging         18 inches (rigid)         20°F to 250°F         (-7°C to 49°C)         @ 32°F (0°C)         533-380-18           535-490-24         36 inches (rigid)         23°F to 250°F         (-1°C to 121°C)         @ 32°F (0°C)         533-377-4           For Use with Siemens TEC Only         Point         18 inches (rigid)         30°F to 250°F         (-1°C to 121°C)         533-377-4           For Use with Siemens TEC Only         Point         18 inches (rigid)         -40°F to 18	1K Ω Pt		18 inches (rigid)			QAM2012.045
Averaging         16 feet (flexible)         40.75°F (±0.4°C)         QAM2012.500           24 feet (flexible)         24 feet (flexible)         @ 75°F (24°C)         QAM2012.500           QAM2012.750         @ 375°F (24°C)         QAM2012.750           90int         18 inches (rigid)         -4°F to 122°F         544-560-8           18 inches (rigid)         -4°F to 122°F         533-376-4           18 inches (rigid)         4 inches (rigid)         533-376-8           4 inches (rigid)         24 feet (flexible)         533-376-8           16 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-380-16           533-380-16         533-380-16         533-380-24         533-380-24           8 feet (flexible)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-8           4 inches (rigid)         30°F to 250°F         533-377-4         533-377-4           36 inches (rigid)         30°F to 250°F         533-377-4         533-377-4           18 inches (rigid)         30°F to 250°F         533-377-4         533-377-4           533-377-8         18 inches (rigid)         -40°F to 180°F         ± 0.50°F (± 0.28°C)         538-871           For Use with         Yinches (rigid)         4 inches (rigid)         -40°F to 180°F <t< td=""><td>RTD (385a)</td><td rowspan="3">Averaging</td><td>8 feet (flexible)</td><td></td><td rowspan="3">±0.75°F (±0.4°C) @ 75°F (24°C)</td><td>QAM2012.250</td></t<>	RTD (385a)	Averaging	8 feet (flexible)		±0.75°F (±0.4°C) @ 75°F (24°C)	QAM2012.250
Image: Construct of the state of t	. ,		16 feet (flexible)			QAM2012.500
4 to 20 mA         18 inches (rigid)         -4°F to 122°F (-20°C to 50°C)         544-560-18           9 point         4 inches (rigid)         533-376-18           4 inches (rigid)         -4°F to 120°F (-20°C to 50°C)         533-376-18           18 inches (rigid)         -4°F to 120°F         533-376-18           4 inches (rigid)         -4°F to 120°F         533-376-18           4 inches (rigid)         -4°F to 120°F         533-380-16           16 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-380-24           533-380-16         533-380-24         533-380-24         533-380-24           533-380-24         533-380-24         533-380-24         533-380-24           535-490-18         -18 inches (rigid)         -7°C to 49°C)         @ 32°F (0°C)         533-380-24           535-490-24         36 inches (rigid)         -1°C to 121°C)         533-337-4         533-337-4           18 inches (rigid)         30°F to 250°F (-1°C to 121°C)         533-3377-8         533-3377-8           For Use with Siemens TEC Only         Point         4 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871           540-128         18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871 <td></td> <td>24 feet (flexible)</td> <td></td> <td>QAM2012.750</td>			24 feet (flexible)			QAM2012.750
$ 4 \text{ to } 20 \text{ mA} \\ \begin{array}{c} 4 \text{ inches (rigid)} \\ \text{Point} \end{array} \\ \begin{array}{c} 4 \text{ inches (rigid)} \\ 8 \text{ inches (rigid)} \\ 4 \text{ inches (rigid)} \\ 4 \text{ inches (rigid)} \\ 4 \text{ inches (rigid)} \\ \hline \\ 4 \text{ inches (rigid)} \\ \hline \\ 4 \text{ inches (rigid)} \\ \hline \\ 24 \text{ feet (flexible)} \\ 24 \text{ feet (flexible)} \\ 24 \text{ feet (flexible)} \\ \hline \\ 24 \text{ feet (flexible)} \\ \hline \\ 24 \text{ feet (flexible)} \\ \hline \\ 24 \text{ inches (rigid)} \\ \hline \\ \hline \\ 24 \text{ inches (rigid)} \\ \hline \\ \hline \\ \hline \\ 24 \text{ inches (rigid)} \\ \hline \\ $			18 inches (rigid)	1°E to 122°E		544-560-18
Point         8 inches (rigid)         (20 ° K 0 30 ° C)         544-560-8           18 inches (rigid)         4 inches (rigid)         533-376-18         533-376-18           4 to 20 mA         4 inches (rigid)         6 feet (flexible)         533-376-18         533-376-18           Averaging         16 feet (flexible)         24 feet (flexible)         6 feet (flexible)         533-380-16           24 feet (flexible)         24 feet (flexible)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-24           8 feet (flexible)         18 inches (rigid)         24 inches (rigid)         535-490-18         535-490-18           24 inches (rigid)         30°F to 250°F         (-1°C to 121°C)         533-377-4         533-377-4           For Use with Siemens         18 inches (rigid)         30°F to 250°F         (-1°C to 121°C)         538-871           For Use with Siemens         Point         4 inches (rigid)         30°F to 180°F         ± 0.50°F (± 0.28°C)         538-871           540-739         18 inches (rigid)         -40°F to 180°F         ± 0.50°F (± 0.28°C)         538-871			4 inches (rigid)	(-20°C to 50°C)		544-560-4
4 to 20 mA         18 inches (rigid)         533-376-18           4 to 20 mA         4 inches (rigid)         533-376-4           Averaging         16 feet (flexible)         24 feet (flexible)         533-376-4           24 feet (flexible)         24 feet (flexible)         6.6 feet (flexible)         533-380-16           24 feet (flexible)         24 feet (flexible)         6.7°C to 49°C)         0.32°F (0°C)         533-380-8           36 inches (rigid)         36 inches (rigid)         535-490-18         535-490-18           24 inches (rigid)         30°F to 250°F         533-377-4           4 inches (rigid)         30°F to 250°F         533-377-4           753-377-4         8 inches (rigid)         30°F to 250°F           For Use with         4 inches (rigid)         30°F to 120°C         533-377-4           533-377-4         8 inches (rigid)         533-377-4           533-377-4         8 inches (rigid)         533-377-4           533-377-4         8 inches (rigid)         538-871           540-739         18 inches (rigid)         ± 0.50°F (± 0.28°C)		Point	8 inches (rigid)	(20010000)		544-560-8
4 inches (rigid)         533-376-4           8 inches (rigid)         6 feet (flexible)           24 feet (flexible)         20°F to 120°F           24 feet (flexible)         20°F to 120°F           8 feet (flexible)         (-7°C to 49°C)           8 feet (flexible)         6 feet (flexible)           24 inches (rigid)         20°F to 120°F           24 inches (rigid)         533-380-8           24 inches (rigid)         533-380-8           24 inches (rigid)         535-490-18           24 inches (rigid)         535-490-18           535-490-24         535-490-48           535-490-48         535-490-48           533-377-18         533-377-4           9 point         18 inches (rigid)         30°F to 250°F           4 inches (rigid)         30°F to 250°F           9 point         4 inches (rigid)         533-377-4           9 point         4 inches (rigid)         540-128           9 point         4 inches (rigid)         -40°F to 180°F           9 point         4 inches		1 On R	18 inches (rigid)			533-376-18
4 to 20 mA         8 inches (rigid)         24 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-380-16           Averaging         16 feet (flexible)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-24           Averaging         18 inches (rigid)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-24           Point         18 inches (rigid)         36 inches (rigid)         535-490-24         535-490-24           Point         18 inches (rigid)         30°F to 250°F         533-377-18         533-377-4           For Use with Siemens TEC Only         Point         4 inches (rigid)         -40°F to 180°F         ± 0.50°F (± 0.28°C)         538-871           Siemens TEC Only         18 inches (rigid)         18 inches (rigid)         -40°F to 180°F         ± 0.50°F (± 0.28°C)         540-128			4 inches (rigid)			533-376-4
4 to 20 mA         Averaging         16 feet (flexible)         20°F to 120°F         ±0.54°F (±0.3°C)         533-380-16           Averaging         8 feet (flexible)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-24           Averaging         18 inches (rigid)         (-7°C to 49°C)         @ 32°F (0°C)         533-380-24           Point         18 inches (rigid)         36 inches (rigid)         535-490-18         535-490-24           Point         18 inches (rigid)         30°F to 250°F         533-377-18         533-377-4           For Use with Siemens         4 inches (rigid)         30°F to 121°C)         533-377-8         533-377-8           For Use with Siemens         Point         4 inches (rigid)         -40°F to 180°F         ± 0.50°F (± 0.28°C)         538-871           TEC Only         18 inches (rigid)         18 inches (rigid)         -40°F to 82°C)         @ 77°F (25°C)         540-128			8 inches (rigid)			533-376-8
4 to 20 mA         Averaging              24 feet (flexible)             8 feet (flexible)             18 inches (rigid)             24 inches (rigid)             24 inches (rigid)             24 inches (rigid)             36 inches (rigid)             36 inches (rigid)             48 inches (rigid)             48 inches (rigid)             48 inches (rigid)             70°F to 250°F             (-7°C to 49°C)             (-7°C to 20°C)             (-7°C to 49°C)             (-30°F to 250°F             (-1°C to 121°C)             (-40°C to 82°C)             (-40°C to 82°C)             (-7°F (25°C)             (-538-871             (-40°C to 82°C)             (-			16 feet (flexible)			533-380-16
Averaging         8 feet (flexible)         (-/°C to 49°C)         @ 32°F (0°C)         533-380-8           Averaging         18 inches (rigid)         24 inches (rigid)         535-490-18         535-490-24           24 inches (rigid)         36 inches (rigid)         535-490-24         535-490-24           36 inches (rigid)         48 inches (rigid)         535-490-24         535-490-24           Point         18 inches (rigid)         535-490-48         533-377-4           Binches (rigid)         30°F to 250°F (-1°C to 121°C)         533-377-4           For Use with Siemens TEC Only         4 inches (rigid)         -40°F to 180°F (-1°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871           18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         540-128	4 to 20 mA		24 feet (flexible)	20°F to 120°F	±0.54°F (±0.3°C)	533-380-24
Averaging         18 inches (rigid)         535-490-18           24 inches (rigid)         24 inches (rigid)         535-490-24           36 inches (rigid)         36 inches (rigid)         535-490-24           36 inches (rigid)         535-490-36         535-490-48           48 inches (rigid)         633-377-48         533-377-4           Point         18 inches (rigid)         30°F to 250°F (-1°C to 121°C)         533-377-4           For Use with Siemens TEC Only         4 inches (rigid)         -40°F to 180°F (-1°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871           18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         540-128			8 feet (flexible)	(-7°C to 49°C)	@ 32°F (0°C)	533-380-8
For Use with Siemens TEC Only         Point <u>24 inches (rigid)</u> <u>36 inches (rigid)</u> <u>48 inches (rigid)</u> <u>48 inches (rigid)</u> <u>4 inches (rigid)</u> <u>4 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>4 inches (rigid)</u> <u>18 inches (rigid)</u> <u>4 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>18 inches (rigid)</u> <u>4 inches (rigid)</u> <u></u>		Averaging	18 inches (rigid)			535-490-18
Siemens         Point         A inches (rigid)         30°F to 250°F (-1°C to 121°C)         ± 0.50°F (± 0.28°C)         533-490-36 535-490-48           For Use with Siemens         Point         4 inches (rigid)         30°F to 250°F (-1°C to 121°C)         533-377-4           For Use with Siemens         4 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871           TEC Only         18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         540-128			24 inches (rigid)			535-490-24
Homes         Homes <th< td=""><td></td><td></td><td>36 inches (rigid)</td><td></td><td></td><td>535-490-36</td></th<>			36 inches (rigid)			535-490-36
Point         18 inches (rigid)         30°F to 250°F         533-377-18           4 inches (rigid)         30°F to 250°F         533-377-4           533-377-8         533-377-8           For Use with Siemens TEC Only         4 inches (rigid)         -40°F to 180°F           18 inches (rigid)         -40°F to 180°F           18 inches (rigid)         -40°C to 82°C)           0 77°F (25°C)         540-739			48 Inches (figid)			535-490-48
For Use with Siemens TEC Only         Point         4 inches (rigid) 4 inches (rigid)         (-1°C to 121°C)         533-377-4 533-377-8           For Use with Siemens TEC Only         4 inches (rigid) 18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C) @ 77°F (25°C)         538-871		Point	A inches (rigid)	30°F to 250°F		533-377-A
For Use with Siemens TEC Only         4 inches (rigid) 4 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         538-871           538-871         540-128         540-128         540-128         540-128		1 Unit	8 inches (rigid)	(-1°C to 121°C)		533-377-8
Siemens TEC Only         Point         4 inches (rigid), Bracket 18 inches (rigid)         -40°F to 180°F (-40°C to 82°C)         ± 0.50°F (± 0.28°C)         540-128 540-128	For Use with		4 inches (rigid)			538-871
TEC Only 18 inches (rigid) (-40°C to 82°C) @ 77°F (25°C) 540-739	Siemens	Point	4 inches (rigid). Bracket	-40°F to 180°F	± 0.50°F (± 0.28°C)	540-128
	TEC Only		18 inches (rigid)	(-40°C to 82°C)	@ 77°F (25°C)	540-739

#### Accessories

Flange and Gasket Kit for Variable Insertion Depth of Rigid Point Sensors

AQM2000

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### **Immersion Well Temperature Sensors**



Thermistor/RTD



#### Description

Siemens Immersion Well Temperature Sensors monitor and transmit changes in liquid temperature to the HVAC control system. The sensor resistance varies proportionally to the actual temperature being measured.

All sensors are fully assembled with stainless steel thermowells, and are available in 2.5-inch, 4-inch and 6-inch insertion depths.

Multiple output signals are available to ensure compatibility with most common HVAC control systems.

#### Features

- Variety of sensing elements.
- Suitable for hot or chilled fluids.
- Responsive to temperature changes.
- Accurate and reliable indication of temperature.
- Familiar installation requires no special tools.

#### Specifications

Output Signals	100k Ω Thermistor
	10k Ω Type 2 Thermistor
	1k Ω @ 32°F Ni RTD
	1k Ω Pt RTD (375a)
	1k Ω Pt RTD (385a)
	4 to 20 mA
	<ul> <li>20°F to 70°F</li> </ul>
	<ul> <li>30°F to 250°F</li> </ul>
	<ul> <li>32°F to 212°F</li> </ul>
Well Material	300 Series Stainless Steel
	Lead-free
External Connection Threads	1/2-inch – 14 NPT
Conduit Connection Threads	1/2-inch – 14 NPSMI

**NOTE:** Not for use in potable water systems.

Output Signal	Insertion Depth	Measuring Range	Accuracy	Product Number
1001 0	2.5 inches			536-777-25
	4 inches		$\pm 0.50^{\circ}F(\pm 0.28^{\circ}C)$	536-777-40
mermistor	6 inches		@ // T (25 C)	536-777-60
10K Ω	2.5 inches		10 4°E (10 22°C)	QAE2030.005
Type II	4 inches		±0.4 F (±0.22 C)	QAE2030.010
Thermistor	6 inches		@ // T (25 C)	QAE2030.015
1K Ω	2.5 inches	0°E to 250°E	10 72°E (10 4°C)	QAE2020.005
@ 32°F Ni	4 inches	$0 = 10 \times 200 \text{ F}$	$\pm 0.72 \text{ F} (\pm 0.4 \text{ C})$	QAE2020.010
RTD	6 inches	(-10 0 10 121 0)	₩ 32 T (0 C)	QAE2020.015
	2.5 inches			<mark>544-577-25</mark>
PTD (275a)	4 inches			544-577-40
KTD (375a)	6 inches			544-577-60
1K Ω Pt	2.5 inches			QAE2012.005
	4 inches			QAE2012.010
KTD (303a)	6 inches			QAE2012.015
	2.5 inches	20°E to 70°E	+0.54°E (+0.3°C)	536-774-25
	4 inches	$(-7^{\circ} \text{ to } 21^{\circ} \text{C})$	±0.34 T (±0.3 C) @ 32°E (0°C)	536-774-40
	6 inches	(-7 10 21 0)	@ 32 T (0 C)	536-774-60
	2.5 inches	20°E to 250°E		536-767-25
4 to 20 mA	4 inches	(-1°C to 121°C)		536-767-40
	6 inches	(-10101210)		536-767-60
	2.5 inches	22°E to 212°E		544-562-25
	4 inches	$32 = 10 212 = (0^{\circ}C)$		544-562-40
	6 inches			544-562-60

Table 1. Product Ordering Information.

#### Table 2. Accessories Information.

	Description	Part Number
Repair Kits*	Repair Kit, 4 to 20 mA, 30°F to 250°F	536-767-RK
	Repair Kit, 4 to 20m A, 20°F to 70°F	536-774-RK
	Repair Kit, 100k ohm Thermistor	536-777-RK
	Repair Kit, 4 to 20 mA, 32°F to 212°F	544-562-RK
	Repair Kit, PT 1k Ohm RTD (375)	544-577-RK
	Repair Kit, PT 1k Ohm RTD (385)	AQE2012
	Repair Kit, NI 1k Ohm @ 32°F RTD	AQE2020
	Repair Kit, 10k Ohm Type 2 Thermistor	AQE2030
	Immersion Well, 2.5-inch	AQE2000.005
Thermowells	Immersion Well, 4-inch	AQE2000.010
	Immersion Well, 6-inch	AQE2000.015

* Repair kits include replacement sensing element, temperature transmitter (4 to 20 mA models only), and related hardware.

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## SIEMENS



### **Technical Instructions**

Document No. 155-016P25 ET 134-22 April 12, 2018

## Powersä Controls

Low Temperature Detection Thermostat



Description	The electric Low Temperature Detection Cut-out and Alarm Thermostat is a remote bulb instrument which opens an electrical circuit to stop the supply fan motor and/or closes an outside air damper when the temperature at the sensing element falls below the setting of the instrument. Simultaneously, it closes a circuit to indicate an alarm condition.					
Features	Manual reset					
	Easy temperature setting with adjusting screw on top of enclosure					
	Mounting bracket and two screws included					
	Main and separate reverse-acting auxiliary contacts					
Product Number	<mark>134-1504</mark>					

#### **Warning/Caution Notations**

WARNING	Â	Personal injury or loss of life may occur if a procedure is not performed as specified.
CAUTION		Equipment damage or loss of data may occur if you do not follow a procedure as specified.

Application

This instrument should only be used on those applications where the ambient temperature to which the instrument case and bellows are exposed remains above the temperature setting of the thermostat. This thermostat should be used in areas protected from the weather.

Prerequisites	rerequisites WARNING:			
	This low temperate an operating contr in personal injury a responsibility to ac supervisory system	This low temperature detection thermostat is designed for use only as an operating control. Where an operating control failure would result in personal injury and/or loss of property, it is the installer's responsibility to add devices (safety, limit controls) or systems (alarm, supervisory systems) that protect against, or warn of control failure.		
	CAUTION:			
	The switch contact closed state upon temperatures durin reset button be may to restore the switch proceeding to insta- tripped state.	t position (LINE-M2) may be in either an open or receipt due to possible exposure to freezing ng shipping. It is strongly recommended that the anually pressed down and released before initial use ch position to a normal operating state before allation; otherwise, the unit could remain in the		
Specifications	Switch Action	Main (LINE-M2) contacts open on temperature drop, simultaneously auxiliary contacts close		
	Range	15 to 55°F (-9 to 13°C)		
	Maximum bulb temperature	400°F (204°C)		
	Minimum differential	5°F (2.8°C) Non-adjustable		
	Sensing element	Vapor filled		
	Bulb length	1/8-inch OD × 20 feet (6 m)		
	Reset action	Manual		
	Electrical rating	See Table 1		
	Weight	2.4 lb (1.1 kg)		
	Dimensions	See Figures 2 and 5		
	Approvals	UL file SA 10816 CSA file LR948		
Operation	Dperation         This thermostat incorporates a temperature sensing element of the v           which actuates a heavy duty contact through a rugged link mechanis			
	Any one-foot length of the eleme temperature setting of the therm regardless of the temperature be makes the thermostats ideal for cause freezing conditions in a lo	ent subjected to temperatures below the ostat will actuate the thermostat switch mechanism ing sensed by the remainder of the element. This protecting large coils where air stratification could calized area.		
	The thermostat has a main and auxiliary contact unit. The main load circuit (LINE-M2) opens on temperature drop and simultaneously, an auxiliary or alarm circuit (LINE-MI) closes on temperature drop.			
	NOTE: The reset button must normal fan system ope	be manually pressed down and released to resume ration.		

#### **Electrical Ratings**

Table	1.
-------	----

Pole Number	Line-M2 (Main)				Line-M1 (Auxiliary)			
Motor Rating	120V	208V	240V	277V	120V	208V	240V	277 V
AC Full Load Amps	16.0	9.2	8.0	3/4	6.0	3.3	3.0	3⁄4
AC Locked Rotor Amps	96.0	55.2	48.0	3/4	36.0	19.8	18.0	3⁄4
AC Non-Ind Amps	16.0	9.2	8.0	7.2	6.0	6.0	6.0	6.0
Pilot Duty-Both Poles 125 VA, 24 to 600 Vac 57.5 VA, 120 to 300 Vdc								

Mounting and Installation	
General Guidelines	Locate the sensing element in the downstream side of the coil.
	<ul> <li>Locate the case and bellows where the ambient temperature is always warmer than the setpoint.</li> </ul>
	<ul> <li>Install the thermostat so that the reset button is readily accessible and the element bellows points down.</li> </ul>
	<ul> <li>Install as much of the bulb as possible in a horizontal plane. If too much of the bulb is vertical, it will not operate properly.</li> </ul>
	<ul> <li>Avoid sharp bends or kinks in the sensing element.</li> </ul>
Large walk-in Ducts (Figure 1)	<ol> <li>Attach the mounting bracket to the thermostat with the two round head screws provided.</li> </ol>

- 2. Mount the two perforated steel strap hangers inside the duct with the wide part of the hanger strap parallel to the air flow.
- 3. Drill a hole in the side of the duct. With the bulb still coiled, thread the bulb through the hole using a rotary movement.
- 4. Mount the thermostat on the outside of the duct.
- 5. Carefully uncoil the bulb avoiding sharp bends or kinks in the sensing element.
- 6. Mount the bulb in a horizontal, serpentine manner, attaching the bulb to the strap as shown in detail in Figure 1.

The installation is complete.


#### Mounting and Installation, Continued



Figure 1. Typical Mounting in Walk-in Duct.

### **Limited Access Ducts** (Figure 2)

- 1. Attach the mounting bracket to the thermostat with the two round head screws provided.
- 2. Attach a mounting flange (Part Number 808-412) on the opposite side of the duct (near the bottom) from where the thermostat will be mounted.
- 3. Mount a second flange on an 8-inch by 4-inch sheet metal plate. Cut an access opening for the bulb on the duct diagonally across from the duct-mounted flange. Drill mounting screw holes for the sheet metal plate.
- 4. Cut a length of copper tubing to fit diagonally across the duct. Stretch out the bulb and wrap it around the tubing. See Figure 2.
- 5. Insert the tubing and bulb through the access hole and into the duct-mounted flange. Fasten the 8-inch by 4-inch sheet metal plate to the duct.
- 6. Mount the thermostat on the outside of duct.





Wiring

#### WARNING:

Disconnect the power supply before wiring connections are made to avoid possible electrical shock or damage to the equipment.

Make all wiring connections using copper conductors only and in accordance with the National Electrical Code and local regulations. Loads exceeding the rating of the thermostat should be handled by means of a relay or motor starter.

An opening for 1/2-inch conduit is provided in the bottom of the thermostat enclosure.

See Figure 3 for a typical wiring diagram.



Figure 3. Typical Wiring Diagram.



#### CAUTION:

Use terminal screws furnished (#8-32  $\times$  1/4-inch binder head screw). Longer terminal screws can interfere with switch mechanism and damage the switch.

#### Adjustment

After mounting the thermostat, adjust the temperature setting using the setpoint adjusting screw on the top of the enclosure. See Figure 4.

Observe a complete operating cycle to be sure that all components function correctly.



#### Figure 4. Setpoint Adjustment Screw.

Calibration	There is no field calibration required for the thermostat.
Troubleshooting	Observe a complete operating cycle to be sure that all components function correctly.
Service	There is no servicing of the thermostat. Replace if inoperative.

#### Dimensions



Figure 5. Dimensions in Inches (Millimeters).

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Document No. 155-016P25 Printed in the USA Page 6





### **Technical Instructions**

Document No. 155-115P25 ET 134-20 November 18, 2021

## Powers[™] Controls

### ET 134 Low Temperature Detection Control



Description	The Electric Low Temperature Detection Control has a remote bulb and a Single Pole Double Throw (SPDT) switch that closes and opens a circuit in both directions.
Features	Compact and sturdy
	Adjustable range with fixed differential
	Unaffected by ambient temperature at case
	Manual or automatic reset available
	<ul> <li>The set point adjustment screw is accessible at the bottom of the control or at the top with the cover removed</li> </ul>
	Mounting bracket standard
Product Numbers	

Description	Product Numbers
Low Temperature Detection Control Automatic reset	134-1510
Manual reset	134-1511

#### Warning/Caution Notations

WARNING:	Personal injury/loss of life may occur if a procedure is not performed as specified.
CAUTION:	Equipment damage or loss of data may occur if the user does not follow a procedure as specified

#### Application

The electric low temperature detection controls are especially suited for sensing low temperature conditions to avoid freeze-up of hydronic heating coils, cooling coils, liquid heating pipes and similar applications. Typically, the switch opens an electrical circuit to stop the supply fan motor when the temperature at the sensing element falls below the setting of the instrument.



#### WARNING:

The low temperature detection control is designed for use only as an operating control. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add devices (safety, limit controls) or systems (alarm, supervisory systems) that protect against, or warn of control failure.

Specifications	Switch action	SPDT
-	Control purpose	Low temperature
	Control construction	Electromechanical independently
		mounted
	Cycles	30K auto reset, 6K manual reset
	Mounting method	Permanently attached through
	-	mounting bracket hole
	Grounding method	Wire bound screw terminal
	Type 1 or Type 2 action	Type 1.B (micro-disconnection)
	Pollution solution	External - Degree 3, Internal Degree 2
	Rated impulse voltage	4,000 Vac
	Ball pressure temperature	Switch component 302°F (150°C)
	Range	35 to 45°F (2 to 7°C)
	Maximum bulb temperature	250°F (121°C)
	Ambient temperature at thermostat	0 to 140°F (-18 to 60°C)
	Differential	
	134-1510	12°F (6.7°C)
	134-1511	Temperature must be 12°F (6.7°C)
		above cutout point before control can
		be reset
	Bulb	1/8-inch (3.2 mm) × 20 feet (6 m)
	Capillary length	4 feet (1.2 m)
	Sensing element	Vapor filled
	Reset type	See Product Number
	Electrical ratings	See Table 1
	Enclosure	UL: Type 1 (NEMA)
	Conduit opening	7/8-inch (22 mm) for 1/2-inch conduit
		for 1/2" trade size (or PG16) conduit
	Wiring connection	3 color-coded screw terminals (SPDT
		only) and one ground terminal
	Wiring rating	Copper conductors only, rated at least
		194°F (90°C)
	Finish	Galvanized steel
	Weight	1.8 lbs. (0.8 kg)
	Dimensions	See Figure 4
	Approvals	-
	North America	cULus listed; UL60730, CSA E60730
		UL File: SA10816

#### Operation

Any 1-foot length of the element subjected to temperatures below the temperature setting of the control will actuate the control switch mechanism regardless of the temperature being sensed by the remainder of the element. The sensing element is unaffected by the ambient temperature at the control body if it is warmer than the set point temperature.

The 134-1511 control has a manual reset feature. (See Figure 5.)

**NOTES**: 1. The reset lever must be pressed manually and released to resume normal fan system operation.

. . .

2. The manual reset may have tripped during shipping and may need to be reset prior to installation for normal operation.

				CULUS					
		VOITS AC 50/60HZ	120	208	240				
		Full Load Amps	16	9.2	8				
		Lock Rotor Amps	96	55.2	48				
		Resistive Amps	16	9.2	8				
		Pilot Duty	125	VA, 24 to 277	' Vac				
Mounting and	٠	Locate the sensing e	element in th	e downstrea	am side of th	ne coil.			
Installation	•	Locate the case and	bellows wh	ere the ambi	ient tempera	ature is always warmer than			
General Guidelines		the set point.							
	•	Install the control cas bellows point down.	se so that th	e reset butto	on is readily	accessible and the element			
	<ul> <li>Avoid sharp bends or kinks in the sensing element.</li> </ul>								
	<ul> <li>Install as much of the bulb as possible in a horizontal plane. If too much of the bulb is vertical, it will not operate properly.</li> </ul>								
Large Walk-in Ducts (Figure 1)	1.	. Attach the mounting bracket to the control case with the two round head screws provided.							
	2.	<ol><li>Mount the two perforated steel strap hangers inside the duct with the wide part of the hanger strap parallel to the air flow.</li></ol>							
	3.	3. Drill a hole through the side of the duct. With the bulb still coiled, thread the bulb through the hole using a rotary movement.							
	4.	4. Mount the control case on the outside of the duct.							
	5.	Carefully uncoil the b	oulb avoiding	g sharp bend	ds or kinks i	n the sensing element.			
	6.	Mount the bulb in a h shown in the detail ir	norizontal se n <i>Figure 1</i> .	erpentine ma	inner. Attacl	hing the bulb to the strap as			
	The installation is now complete.								
	For an alternate method of mounting, use coil clips (part number 356-115) in the fins to hold the bulb in a horizontal serpentine pattern.								

Table 1. Electrical Ratings.



6. Mount the control case on the outside of the duct.

The installation is now complete.

### Mounting and Installation,

#### continued



Figure 2. Bulb Mounting for Limited Access Ducts with Mounting Flange.

#### Wiring



#### WARNING:

Disconnect the power supply before wiring connections are made to avoid possible electrical shock or damage to the equipment.

All wiring should conform to the National Electrical Code and local regulations. Loads exceeding the rating of the control should be handled by means of a relay or motor starter.

Red is common. See *Figure 3* for terminal identification.



Red to Yellow opens on temp. decrease below set point.

Red to Blue closes on temp. decrease below set point.



Red to Blue closes on temp. decrease below set point.

Red to Yellow opens on temp. decrease below set point.

Figure 3. Terminal Identification.



#### CAUTION:

Use terminal screws furnished (M4 x 8 mm combo binder head screw). Substitution of other screws can cause problems in making proper connections.

#### Dimensions



Figure 4. Dimensions of the 134-1510 and 134-1511 Control.

#### Adjustment

Change the set point by turning the adjusting screw until the pointer is opposite the desired cutout point.

The adjusting screw is accessible at the bottom of the control or at the top when the cover is removed. See *Figure 5* for the location of the adjusting screw.

The direct reading scale was calibrated at 800 feet (244 m) above sea level at  $35^{\circ}F$  (2°C). For critical installations in higher altitudes raise the set point by 1°F (0.56°C) for each 1,800 feet (549 m) of elevation.



Figure 5. Internal View of Control.

**Troubleshooting** Observe a complete operating cycle to be sure that all components function correctly.

Service

There is no servicing of the control. Replace if inoperative.

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# SIEMENS

# Powermite 599, ANSI Class 250

262-02029 262-02047 262-02051 262-02053 262-02055 262-02058 262-02058

Submittal Sheet Document No. 154-010P25 May 30, 2023



#### Description

The Powermite 599 Series ANSI Class 250 MT Series 2-way valve bodies work with any MT Series pneumatic or electronic actuator with a 7/32-inch (5.5-mm) stroke. They are suitable for normally open or normally closed control. Typical applications include control of hot or chilled water, water-glycol solutions up to 50% and steam up to 15 psi (steam only with stainless steel trim). Compatible actuators deliver a minimum of 67 lbs (300 N) of force.

#### Features

- Direct-coupled universal bonnet
- Internal thread NPT end connections with either brass trim or stainless steel trim.
- ANSI Leakage Class IV (0.01% of Cv)

#### **Product Numbers**

Use the product numbers in the tables to order the valve and the actuator assembled together. The product number consists of a 3-digit prefix code, a hyphen, and a 5-digit suffix code. The prefix specifies an actuator. The suffix specifies the valve body.



	Tab	ole 1. 2	2-Way Va	alve and A	Actuator	Assembli	ies with Brass Trim and Internal Thread NPT Connections.								
				2-Inch P Spring	Pneumatic Ac Return (Fail-	tuators, -safe *)	Electro-mechanical, 24V								
	Valve Body	Valve Size	Cv	10-15 psi (69-103 kPa)	3-8 psi (21-55 kPa)	8-13 psi (55-90 kPa)	SSC81U Floating, NSR	SSC131.39U Floating, SR	SSC161.05U 0-10V, NSR	SSC161.35U 0-10V, SR	SAS81.03U Floating, NSR	SAS81.33U Floating, SR	SAS61.03U 0-10V/ 4-20 mA NSR	SAS61.33U 0-10V/ 4-20 mA SR	
		Inch (Kvs)	(Kvs)		NE										
								Actuat	or Prefix Co	de					
	500 02000	1/2	0.4 (0.34)	256 256 02000	257 257-02000B	258 258-02000C	259 250 02000	260	261 261 02000	262	363	366 366 02000	364 364 02000	365	
	500 02002	1/2	0.63 (0.54)	256 02002	257-02000B	258-020000	253-02000	200-02000	201-02000	202-02000	363 02000	366 02002	364 02000	365 02002	
Closed	500.02004	1/2	1 (0.85)	256 02002	257-02002D	250-020020	253-02002	200-02002	201-02002	202-02002	262 02002	266 02002	264 02002	265 02004	
	599-02004	1/2	1.6 (1.37)	256 02004	257-02004D	250-020040	259-02004	200-02004	201-02004	202-02004	363-02004	300-02004	364-02004	265 02004	
ly C	599-02000	1/2	2.5 (2.14)	250-02000	257-020000	250-020000	259-02000	200-02000	201-02000	202-02000	303-02000	300-02000	304-02000	303-02000	
mal	599-02008	1/2	2.3 (2.14)	256-02008	257-02008B	258-020080	259-02008	260-02008	261-02008	262-02008	363-02008	366-02008	364-02008	365-02008	
Nor	599-02010	1/2	4 (3.42)	256-02010	257-02010B	258-020100	259-02010	260-02010	261-02010	262-02010	363-02010	366-02010	364-02010	365-02010	
	599-02012	3/4	6.3 (5.38)	256-02012	257-02012B	258-02012C	259-02012	260-02012	261-02012	262-02012	363-02012	366-02012	364-02012	365-02012	
	599-02014	1	10 (8.55)	256-02014	257-02014B	258-02014C	259-02014	260-02014	261-02014	262-02014	363-02014	366-02014	364-02014	365-02014	
	599-02030	1/2	0.4 (0.34)	256-02030A	257-02030	258-02030C	259-02030	260-02030	261-02030	262-02030	363-02030	366-02030	364-02030	365-02030	
	599-02032	1/2	0.63 (0.54)	256-02032A	257-02032	258-02032C	259-02032	260-02032	261-02032	262-02032	363-02032	366-02032	364-02032	365-02032	
pen	599-02034	1/2	1 (0.85)	256-02034A	257-02034	258-02034C	259-02034	260-02034	261-02034	262-02034	363-02034	366-02034	364-02034	365-02034	
ly O	599-02036	1/2	1.6 (1.37)	256-02036A	257-02036	258-02036C	259-02036	260-02036	261-02036	262-02036	363-02036	366-02036	364-02036	365-02036	
mall	599-02038	1/2	2.5 (2.14)	256-02038A	257-02038	258-02038C	259-02038	260-02038	261-02038	262-02038	363-02038	366-02038	364-02038	365-02038	
Nor	599-02041	1/2	4 (3.42)	256-02041A	257-02041	258-02041C	259-02041	260-02041	261-02041	262-02041	363-02041	366-02041	364-02041	365-02041	
	599-02044	3/4	6.3 (5.38)	256-02044A	257-02044	258-02044C	259-02044	260-02044	261-02044	262-02044	363-02044	366-02044	364-02044	365-02044	
	599-02046	1	10 (8.55)	256-02046A	257-02046	258-02046C	259-02046	260-02046	261-02046	262-02046	363-02046	366-02046	364-02046	365-02046	

* Product numbers in gray shading are available as assemblies only.

Table 2. Two-Way Valve and Actuator Assemblies with Stainless Steel Trim and Internal Thread NPT Comparison									d NPT Co	nnection	s.			
	Valve Size, Inches			2-Inch P Spring	Pneumatic Ac Return (Fail	tuators, Safe) *			Ele	ectro-mech	anical, 24 V	ac		
		Valve Size.	Cv	10-15 psi (69-103 kPa)	3-8 psi (21-55 kPa)	8-13 psi (55-90 kPa)	SSC81U Floating, NSR	SSC131.39U Floating SR	SSC161.05U 0-10V, NSR	SSC161.35U 0-10V, SR	SAS81.03U Floating, NSR	SAS81.33U Floating, SR	SAS61.03U 0-10V/ 4-20 mA NSR	SAS61.33U 0-10V/ 4-20 mA SR
		Inches	hes (Kvs)		NE				an -					
								Actuate	or Prefix Co	de				
	599-02015	1/2	0.4 (0.34)	256 256-02015	257 257-02015B	258 258-02015C	259 259-02015	260-02015	261 261-02015	262 262-02015	363-02015	366-02015	364-02015	365-02015
	599-02017	1/2	0.63 (0.54)	256-02017	257-02017B	258-020170	259-02017	260-02017	261-02017	262-02017	363-02017	366-02017	364-02017	365-02017
ed	599-02019	1/2	1 (0.85)	256-02019	257-02019B	258-02019C	259-02019	260-02019	261-02019	262-02019	363-02019	366-02019	364-02019	365-02019
Clos	599-02021	1/2	1.6 (1.37)	256-02021	257-02021B	258-02021C	259-02021	260-02021	261-02021	262-02021	363-02021	366-02021	364-02021	365-02021
ily (	599-02023	1/2	2.5 (2.14)	256-02023	257-02023B	258-02023C	259-02023	260-02023	261-02023	262-02023	363-02023	366-02023	364-02023	365-02023
rma	599-02025	1/2	4 (3.42)	256-02025	257-02025B	258-02025C	259-02025	260-02025	261-02025	262-02025	363-02025	366-02025	364-02025	365-02025
Ň	599-02027	3/4	6.3 (5.38)	256-02027	257-02027B	258-02027C	259-02027	260-02027	261-02027	262-02027	363-02027	366-02027	364-02027	365-02027
	599-02029	1	10 (8.55)	256-02029	257-02029B	258-02029	259-02029	260-02029	261-02029	262-02029	363-02029	366-02029	364-02029	365-02029
	599-02047	1/2	0.4 (0.34)	256-02047A	257-02047	258-02047C	259-02047	260-02047	261-02047	262-02047	363-02047	366-02047	364-02047	365-02047
	599-02049	1/2	0.63 (0.54)	256-02049A	257-02049	258-02049C	259-02049	260-02049	261-02049	262-02049	363-02049	366-02049	364-02049	365-02049
en	599-02051	1/2	1 (0.85)	256-02051A	257-02051	258-02051C	259-02051	260-02051	261-02051	262-02051	363-02051	366-02051	364-02051	365-02051
, op	599-02053	1/2	1.6 (1.37)	256-02053A	257-02053	258-02053C	259-02053	260-02053	261-02053	<mark>262-02053</mark>	363-02053	366-02053	364-02053	365-02053
llau	599-02055	1/2	2.5 (2.14)	256-02055A	257-02055	258-02055C	259-02055	260-02055	261-02055	262-02055	363-02055	366-02055	364-02055	365-02055
Vorn	599-02058	1/2	4 (3.42)	256-02058A	257-02058	258-02058C	259-02058	260-02058	261-02058	262-02058	363-02058	366-02058	364-02058	365-02058
-	599-02061	3/4	6.3 (5.38)	256-02061A	257-02061	258-02061C	259-02061	260-02061	261-02061	262-02061	363-02061	366-02061	364-02061	365-02061
	599-02063	1	10 (8.55)	256-02063A	257-02063	258-02063C	259-02063	260-02063	261-02063	262-02063	363-02063	366-02063	364-02063	365-02063

* Product numbers in gray shading are available as assemblies only.

#### **Technical Data**

Valve Size	1/2-inch to 1-inch	Con	trolled Me	dium V	Water, water-glycol solutions to				
Body	Globe style, ANS 1/2- and 3/4-inch 1-inch	l Class 250 C37700 Forged brass. UNS CA 844 Bronze	Med	ia Temper	5 (\ ature 3	50%, low pressure steam <15 PS (with stainless steel trim only). 35°F to 250°F (2°C to 120°C)			
Trim	Brass or Stainless	s Steel	Max	imum Diffe	erential Pressure	ssure for Modulating Service:			
Stem	Stainless steel			Media	Brass Trim	Stainless Steel Trim			
	ASTM A582 Type		Liquid	25 psi (173 kPa	i) 50 psi (345 kPa)				
	7/32-inch (5.5-mn	n) stroke		Steam	—	15 psi ( 103 kPa)			
Seat	Metal-to-metal								
Packing	Ethylene propyler	ne O-ring	Ran	geability	C	Cv <1 = >50:1,			
Close-off Ratings	According to ANS	J/FCI 70-2	5 5			Cv >1 = >100:1			
J	See Table 3.	Leakage Rate			Class IV (0.01% of Cv)				
			Flow Characteristics Mounting			Modified equal percentage NEMA 1 (interior only)			

			Fleetrenie	Actuator	Close-Off Ratings @ 20 psi (138 kPa) 2-Inch Pneumatic Actuator			
Action	Valve	Flow Rate,	Electronic	Actuator				
Action	Inches	Cv (Kvs)	SAS	SSC	3-8 psi (69-103 kPa)	8-13 psi (21-55 kPa)	10-15 psi (55-90 kPa)	
	1/2	0.4 to 1.6 (0.34 to 1.37)	95 (655)	95 (655)	40 (276)	95 (655)	95 (655)	
NC	1/2	2.5 to 4 (2.15 to 3.44)	50 (345)	50 (345)	28 (193)	50 (345)	50 (345)	
	3/4 and 1	6.3 to 10 (5.43 to 8.6)	40 (276)	40 (276)	18 (124)	40 (276)	40 (276)	
	1/2	0.4 to 1.6 (0.34 to 1.37)	160 (1103)	120 (868)	95 (655)	45 (310)	20 (138)	
NO	1/2	2.5 to 4 (2.15 to 3.44)	85 (586)	65 (448)	45 (310)	25 (172)	15 (103)	
	3/4 and 1	6.3 to 10 (5.43 to 8.6)	70 (482)	55 (379)	35 (241)	10 (69)	_	

Typical Specifications

encountered.

Automatic control valves shall have NPT threaded type fittings, 1/2 through 1-inch sizes, and shall be ANSI rated to withstand the pressures and temperatures

Valves shall have metal-to-metal seats, stainless steel stems, and Ethylene propylene O-ring packing.

Valves shall be ANSI Leakage Class IV (0.01% of Cv).

For complete technical details on valves with stainless steel trim, or union internal thread, angle internal thread, or union external thread end connections, see *Powermite 599 Series, MT Series Terminal Unit Twoway Valves* Technical Instructions, 155-196P25.

Valves shall have >50:1 rangeability for Cv<1

All two-way valves shall be provided with equal-

rangeability and >100:1 for Cv>1.

percentage contoured throttling plugs.

Table 3. Close-0	Off Ratings	in	psi	(kPa)
------------------	-------------	----	-----	-------



Internal Thread NPT × Internal Thread NPT

Valve Size	Δ	В			Weight	
Inches	~	NO	NC	NO	NC	lbs (kg)
1/2	1-3/8 (35)	2-1/4	2-1/4 (57)		6 (33)	0.96 (.44)
3/4	1-5/8 (41)	2-3/8	2-3/8 (59) 1-5/16 (33)		6 (33)	1.13 (.51)
1	1-15/16 (49)	2-3/4	2-3/4 (69)		6 (39)	1.7 (.77)

Figure 1. Two-way Valve Dimensions in Inches (mm).

#### Disposal

Do not dispose of valves as household waste.

- Special handling of individual components may be mandated by law or make ecological sense.
- Observe all local and currently applicable laws and regulations.



The actuators are considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the actuators through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

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SIEMEN	<b>S</b>	299-03108 299-03110 274-03113 274-03146 274-03147 274-03148 274-03150 274-03151	<b>Technical Bulletin</b> Document No. 155-772 TB 255 June 1, 2023					
Flowrite™	599 Series		1					
1/2 to 2-Inch and Actuator	Valve (2-Way & Assembly Sele	3-Way) ection						
Description	This Technical Bulletin will aid in selecting a 1/2-inch to 2-inch Flowrite 599 Series valve and actuator assembly. Begin with the graph of water capacity and the chart of ANSI Class IV close-off pressures to select a valve and actuator according to specifications.							
	Use Tables 1 through 15 Tables 16 through 18 to i tables show all the possil valves and compatible ac from the factory.	to identify two-wa dentify three-way ble combinations ctuators that can b	ay valve and actuator product numbers. Use valve and actuator product numbers. These of the 1/2-inch to 2-inch Flowrite 599 Series be ordered as complete valve assemblies					
	The dimensions of all 1/2 each actuator are include	The dimensions of all 1/2-inch to 2-inch valves and the service envelope required for each actuator are included in Table 19 through Table 21.						
How to Use the Selection Graphs	Use Figure 1, the Water ( rate on the vertical axis. I with the specified pressu across the graph.	Capacity graph, to Follow across on t re drop. Choose t	o select a valve. Locate the specified flow the horizontal line to the point of intersection he valve size from the heavy diagonal lines					
Use Figure 2, the Close-Off Pressure graph, to select an actuator. First loca graph for the valve action and actuator power source specified. Locate the represents the valve line size. The top of the bar indicates the maximum clo pressure for tight close-off ANSI Class IV. Use the legend at the bottom of t identify the actuator.								
How To Use The Valve Tables	Tables have been organized to help select a valve and actuator combination using additional specifications.							
	Moving from left to right, identify the valve needed. Continue to the right to match the valve to a desired actuator.							
	A valve and actuator assert prefix code with the suffix	embly part numbe of the valve proc	er is determined by combining the actuator luct number.					

NOTES:

No valve will combine with all actuators.

The symbol "---" indicates a combination is not available.

Selection Example Specification	Select a two-way normally-open valve and pneumatic actuator assembly that will deliver 20 gpm (5 m ³ /h) chilled water with linear flow characteristic with no more than 5 psi (35 kPa) pressure drop across the fully-open valve. The valve must have standard packing and a internal thread-to-internal thread (IT×IT) connection.					
	The valve shall be operated by a standard 8-inch pneumatic actuator and must close off tightly against a pump head pressure of 50 psi (300 kPa).					
Valve Sizing	Use Figure 1, the water capacity graph, to begin valve sizing.					
	1. Locate 20 gpm (5 m ³ /h) on the vertical axis to find the required flow.					
	<ol> <li>Read across the horizontal axis to find 5 psi (35 kPa), the maximum allowable pressure drop across the open valve.</li> </ol>					
	<ol> <li>Select a 1-inch (25 mm), 10 Cv (8.6 Kvs) line size valve, because the point of intersection falls between the 3/4 inch and 1-inch line sizes.</li> </ol>					
Actuator Selection	Use Figure 2, the close-off pressure graph, to choose an actuator.					
	<ol> <li>Locate the graph for pneumatic actuators for NO valves in the lower right side of the figure.</li> </ol>					
	<ol> <li>Locate the bar for 1-inch valves. The gray-shaded bar represents an 8-inch pneumatic actuator.</li> </ol>					
	<ol> <li>Notice that the 8-inch pneumatic actuator has the sufficient force to provide tight close-off (ANSI C IV) against more than 50 psi (300 kPa) differential. For a 1-inch valve, select an 8-inch, standard pneumatic actuator, with a 20 mm stroke.</li> </ol>					
Product Number Selection	Use Table 1, Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing. Begin at the left and select the specifications necessary.					
	<ol> <li>Select a standard packed valve, with an F×F connection according to the above specifications.</li> </ol>					
	<ol> <li>Select the 1-inch line size determined from the sizing example above. The valve part number is 599-03167.</li> </ol>					
	3. Read across table to the 8-inch Standard Pneumatic actuator.					
	The actuator part number is 599-01050. The actuator code number is 277.					
	<ol> <li>Read down the column to determine the valve and actuator assembly product number is 277-03167.</li> </ol>					
	<b>NOTE:</b> The valve and actuator can be ordered separately by using the part numbers from Steps 2 and 3.					
References	Two-Way Valves, 1/2 to 2-inch Bronze Body, ANSI 250 Technical Instructions (155-184).					
	Three-Way Valves 1/2 to 2-inch Bronze Body Technical Instructions (155-185).					





							Pneumatic	Actuators		
							4-inch	8-inch Standard Temp.		
*						Description	3-8 psi	Without	With	
io I	Flow	Rate	Valve	alve Size g		Description	(21-55 kPa)	Positioner	Positioner	
ect					ro,		155-183P25	155-10	61P25	
Conn					St	Actuator P/N	599-01081	599-01050	599-01051 & 599-00426	
								Actuator Code		
	Cv	Kvs	In	mm		Valve P/N	268	277	283	
	1	0.9	0.5	15	20	599-03162	268-03162	277-03162	283-03162	
	1.6	1.4	0.5	15	20	599-03163	268-03163	277-03163	283-03163	
	2.5	2.2	0.5	15	20	599-03164	268-03164	277-03164	283-03164	
⊢	4	3.4	0.5	15	20	599-03165	268-03165	277-03165	283-03165	
Ž	6.3	5.4	0.75	20	20	599-03166	268-03166	277-03166	283-03166	
	10	8.6	1	25	20	599-03167	268-03167	277-03167	283-03167	
	16	14	1.25	32	20	599-03168	268-03168	277-03168	283-03168	
	25	22	1.5	40	20	599-03169	268-03169	277-03169	283-03169	
	40	34	2	50	20	599-03170	268-03170	277-03170	283-03170	

Table 2. Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing.

							Electro	-Mechanical –	24 Vac	
							Non-Spri	ng Return	Spring Return	
*uo	Flow	Rate	Va	alve		Description	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc
nnecti		nute	Size		Stroke	Technical Instructions	155-507	155-506	155-54	1P25
Ŝ						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609
	<u></u>	Kura					Actuator Code			
	Cv	rvs	IN	mm		valve P/N	373	371	299	298
	1	0.9	0.5	15	20	599-03162	373-03162	371-03162	299-03162	298-03162
	1.6	1.4	0.5	15	20	599-03163	373-03163	371-03163	299-03163	298-03163
	2.5	2.2	0.5	15	20	599-03164	373-03164	371-03164	299-03164	298-03164
L_	4	3.4	0.5	15	20	599-03165	373-03165	371-03165	299-03165	298-03165
L×I	6.3	5.4	0.75	20	20	599-03166	373-03166	371-03166	299-03166	298-03166
-	10	8.6	1	25	20	599-03167	373-03167	371-03167	299-03167	298-03167
	16	14	1.25	32	20	599-03168	373-03168	371-03168	299-03168	298-03168
	25	22	1.5	40	20	599-03169	373-03169	371-03169	299-03169	298-03169
	40	34	2	50	20	599-03170	373-03170	371-03170	299-03170	298-03170

							E	lectro-Hydra	ulic – 24 Vac									
						Description	NSR	Spring Return	NSR	Spring	Return							
tion *	FI R	ow ate	Val Si	Valve Size		Valve Size		Valve Size		Valve Size		Valve Size		Description	Floating			
nnec					Stro	Technical Instructions	155-18	31P25	155-1	155-163P25								
ŏ					SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U									
						Actuator P/N			Actuator Co	de								
	Cv	Kvs	In	mm		Valve P/N	275	276	267	274	291							
	1	0.9	0.5	15	20	599-03162	275-03162	276-03162	267-03162	274-03162	_							
	1.6	1.4	0.5	15	20	599-03163	275-03163	276-03163	267-03163	274-03163	_							
	2.5	2.2	0.5	15	20	599-03164	275-03164	276-03164	267-03164	274-03164	_							
⊢	4	3.4	0.5	15	20	599-03165	275-03165	276-03165	267-03165	274-03165								
ž	6.3	5.4	0.75	20	20	599-03166	275-03166	276-03166	267-03166	274-03166	_							
<u> </u>	10	8.6	1	25	20	599-03167	275-03167	276-03167	267-03167	274-03167	291-03167							
	16	14	1.25	32	20	599-03168	275-03168	276-03168	267-03168	274-03168	291-03168							
	25	22	1.5	40	20	599-03169	275-03169	276-03169	267-03169	274-03169	291-03169							
	40	34	2	50	20	599-03170	275-03170	276-03170	267-03170	274-03170	291-03170							

Table 3. Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing.

* IT = Internal Thread NPT

Table 4. Two-Way, Normally Open (NO), Equal Percentage Valves, Stainless Steel Trim, Standard Packing.

						Description	Pneumatic Actuators				
						•	4-inch	8-inch- Standard Temp.			
sn*	FI	ow		<u>.</u>		Taskaiast	3-8 psi	Without	With		
ži	Ra	ate	vaiv	e Size	ke	Tecnnical	(21-55 kPa)	Positioner	Positioner		
nec					tro	Instructions	155-183P25	155-161P25	155-162P25		
Con					0)	Actuator P/N	599-01081	599-01050	599-01051 & 599-00426		
	Cv	Kvs	In	mm			A	Actuator Code			
	_	_				Valve P/N	268	277	283		
	1	0.9	0.5	15	20	599-03108	268-03108	277-03108	283-03108		
	1.6	1.4	0.5	15	20	599-03109	268-03109	277-03109	283-03109		
	2.5	2.2	0.5	15	20	599-03110	268-03110	277-03110	283-03110		
⊢	4	3.4	0.5	15	20	599-03111	268-03111	277-03111	283-03111		
Ľ	6.3	5.4	0.75	20	20	599-03112	268-03112	277-03112	283-03112		
<u> </u>	10	8.6	1	25	20	599-03113	268-03113	277-03113	283-03113		
	16	14	1.25	32	20	599-03114	268-03114	277-03114	283-03114		
	25	22	1.5	40	20	599-03115	268-03115	277-03115	283-03115		
	40	34	2	50	20	599-03116	268-03116	277-03116	283-03116		

						Electro-Mechanical – 24 Vac														
							Non-Spri	ng Return	Spring Return											
tion *	Fle Ra	ow ate	Va Si	Valve Size		Valve Size		Valve Size		Valve Size		Valve Size		Valve Size		Description	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc
onnec						Technical Instructions	155-507	155-506	155-541P25											
ŭ						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609										
	Cv	Kve	In mm			Valve P/N		Actuator Code												
	5	1.12				valve i /it	373	371	299	298										
	1	0.9	0.5	15	20	599-03108	373-03108	371-03108	299-03108	298-03108										
	1.6	1.4	0.5	15	20	599-03109	373-03109	371-03109	299-03109	298-03109										
	2.5	2.2	0.5	15	20	599-03110	373-03110	371-03110	<mark>299-03110</mark>	298-03110										
	4	3.4	0.5	15	20	599-03111	373-03111	371-03111	299-03111	298-03111										
Ľ	6.3	5.4	0.75	20	20	599-03112	373-03112	371-03112	299-03112	298-03112										
<u>-</u>	10	8.6	1	25	20	599-03113	373-03113	371-03113	299-03113	298-03113										
	16	14	1.25	32	20	599-03114	373-03114	371-03114	299-03114	298-03114										
	25	22	1.5	40	20	599-03115	373-03115	371-03115	299-03115	298-03115										
	40	34	2	50	20	599-03116	373-03116	371-03116	299-03116	298-03116										

Table 5. Two-Way, Normally Open (NO), Equal Percentage Valves, Stainless Steel Trim, Standard Packing.

Table 6.	Two-Way, Normally	/ Open (NO),	Equal Percentage	Valves,	Stainless Steel	Trim,	Standard Packing.
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						Electro-Hydra	ulic – 24 Vac					
						Description	NSR	Spring Return	NSR	Spring Return		
tion *	Fl Ra	ow ate	Va S	Valve Size		Description	Floating		0-10V 4-20 mA			
onnec					Stro	Technical Instructions	155-1	81P25	155-180P25		155-163P25	
O						Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U	
	Cv Kvs In							Actuator Code				
			In	mm		Valve P/N	275	276	267	274	291	
	1	0.9	0.5	15	20	599-03108	275-03108	276-03108	267-03108	274-03108	—	
	1.6	1.4	0.5	15	20	599-03109	275-03109	276-03109	267-03109	274-03109	—	
	2.5	2.2	0.5	15	20	599-03110	275-03110	276-03110	267-03110	274-03110	—	
⊢	4	3.4	0.5	15	20	599-03111	275-03111	276-03111	267-03111	274-03111	—	
хĽ	6.3	5.4	0.75	20	20	599-03112	275-03112	276-03112	267-03112	274-03112	—	
	10	8.6	1	25	20	599-03113	275-03113	276-03113	267-03113	274-03113	291-03113	
	16	14	1.25	32	20	599-03114	275-03114	276-03114	267-03114	274-03114	291-03114	
1	25	22	1.5	40	20	599-03115	275-03115	276-03115	267-03115	274-03115	291-03115	
	40	34	2	50	20	599-03116	275-03116	276-03116	267-03116	274-03116	291-03116	

									Pneumat	ic Actuators											
								4-Inch			8-Inch										
						Description		3-8 psi	Standard	Hi-Temp	Standard	Hi-Temp									
6	* uo	FI	ow	Va	lve			(21-55 kPa)	otanidara	mercmp	With Pos	itioner									
Packin	nnectio	Ra	ate	SI	Size		Size		Size		Size		Size		Technical Instructions	155-183P25		155-161P25			
-	ပိ										599-01050	599-01051									
							Actuator P/N	599-01081	599-01050	599-01051	and 599-00426	and 599-00426									
							Value D/N			Actuator C	ode	000 00420									
		Cv	Kvs	In	mm		Valve P/N	268	277	278	283	284									
		1	0.9	0.5	15	20	599-03000	268-03000	277-03000	_	283-03000	—									
		1.6 1.4 0.5 15 2		20	599-03001	268-03001	277-03001	—	283-03001	—											
		2.5	2.2	2.2 0.5 15 2		20	599-03002	268-03002	277-03002	_	283-03002	—									
ē		4	3.4	0.5	15	20	599-03003	268-03003	277-03003	—	283-03003	—									
Inda		6.3	5.4	0.75	20	20	599-03004	268-03004	277-03004	_	283-03004	—									
Ste		10	8.6	1	25	20	599-03005	268-03005	277-03005	_	283-03005	—									
		16	14	1.25	32	20	599-03006	268-03006	277-03006	_	283-03006	_									
		25	22	1.5	40	20	599-03007	268-03007	277-03007	_	283-03007	_									
	×	40	34	2	50	20	599-03008	268-03008	277-03008	—	283-03008	—									
		1	0.9	0.5	15	20	599-03054	268-03054	277-03054	278-03054	283-03054	284-03054									
		1.6	1.4	0.5	15	20	599-03055	268-03055	277-03055	278-03055	283-03055	284-03055									
		2.5	2.2	0.5	15	20	599-03056	268-03056	277-03056	278-03056	283-03056	284-03056									
đ		4	3.4	0.5	15	20	599-03057	268-03057	277-03057	278-03057	283-03057	284-03057									
i-Ter		6.3	5.4	0.75	20	20	599-03058	268-03058	277-03058	278-03058	283-03058	284-03058									
Ξ		10	8.6	1	25	20	599-03059	268-03059	277-03059	278-03059	283-03059	284-03059									
		16	14	1.25	32	20	599-03060	268-03060	277-03060	278-03060	283-03060	284-03060									
		25	22	1.5	40	20	599-03061	268-03061	277-03061	278-03061	283-03061	284-03061									
		40	34	2	50	20	599-03062	268-03062	277-03062	278-03062	283-03062	284-03062									

Table 7. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.

Table 8. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.

								Electro-Mechanical Actuators 24 Vac				
								Non-Spi	ring Return	Spring I	Return	
бu	ion *	Fle Ra	ow ate	Va Si	lve ze	e	Description	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc	
Packi	onnect						Technical Instructions	155-507	155-506	155-54	1P25	
	ပ						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609	
		<u></u>	Kua	In			Valva D/N		Actuator	Code		
		Š	rvs		mm		valve P/N	373	371	299	298	
		1	0.9	0.5	15	20	599-03000	373-03000	371-03000	299-03000	298-03000	
		1.6	1.4	0.5	15	20	599-03001	373-03001	371-03001	299-03001	298-03001	
		2.5	2.2	0.5	15	20	599-03002	373-03002	371-03002	299-03002	298-03002	
P		4	3.4	0.5	15	20	599-03003	373-03003	371-03003	299-03003	298-03003	
anda		6.3	5.4	0.75	20	20	599-03004	373-03004	371-03004	299-03004	298-03004	
Sta		10	8.6	1	25	20	599-03005	373-03005	371-03005	299-03005	298-03005	
		16	14	1.25	32	20	599-03006	373-03006	371-03006	299-03006	298-03006	
		25	22	1.5	40	20	599-03007	373-03007	371-03007	299-03007	298-03007	
	Ξ×	40	34	2	50	20	599-03008	373-03008	371-03008	299-03008	298-03008	
	F	1	0.9	0.5	15	20	599-03054	-	_	-	_	
		1.6	1.4	0.5	15	20	599-03055	—	_	-	-	
		2.5	2.2	0.5	15	20	599-03056	-			-	
đ		4	3.4	0.5	15	20	599-03057	-		_	_	
Ter		6.3	5.4	0.75	20	20	599-03058	—	_	_	—	
Ξ		10	8.6	1	25	20	599-03059	-	_	—	—	
		16	14	1.25	32	20	599-03060	—	_	_	—	
		25	22	1.5	40	20	599-03061	-	_	_	_	
		40	34	2	50	20	599-03062	—	_	-	_	

								Electi	ro-Hydraulic A	Actuators 24	Vac	
							Description	NSR	Spring Return	NSR	Spring	ı Return
g	* uo	Fl	ow	Va	lve	ā		Floa	ting	0-	10 Vdc, 4-20	mA
Packin	nnecti	Ra	ate	51	ze	Stroke	Technical Instructions	155-18	31P25	155-1	80P25	155-163P25
	ŏ						Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U
		<u></u>	Kura	In			Value D/N		A	ctuator Code	9	
		CV	rvs	IN	mm		valve P/N	275	276	267	274	291
		1	0.9	0.5	15	20	599-03000	275-03000	276-03000	267-03000	274-03000	—
		1.6	1.4	0.5	15	20	599-03001	275-03001	276-03001	267-03001	274-03001	—
		2.5	2.2	0.5	15	20	599-03002	275-03002	276-03002	267-03002	274-03002	_
p		4	3.4	0.5	15	20	599-03003	275-03003	27036-003	267-03003	274-03003	_
anda		6.3	5.4	0.75	20	20	599-03004	275-03004	276-03004	267-03004	274-03004	_
Ste		10	8.6	1	25	20	599-03005	275-03005	276-03005	267-03005	274-03005	291-03005
		16	14	1.25	32	20	599-03006	275-03006	276-03006	267-03006	274-03006	291-03005
		25	22	1.5	40	20	599-03007	275-03007	276-03007	267-03007	274-03007	291-03007
	×	40	34	2	50	20	599-03008	275-03008	276-03008	267-03008	274-03008	291-03008
	F	1	0.9	0.5	15	20	599-03054	275-03054	276-03054	267-03054	274-03054	_
		1.6	1.4	0.5	15	20	599-03055	275-03055	276-03055	267-03055	274-03055	—
		2.5	2.2	0.5	15	20	599-03056	275-03056	276-03056	267-03056	274-03056	_
đ		4	3.4	0.5	15	20	599-03057	275-03057	276-03057	267-03057	274-03057	-
-Ter		6.3	5.4	0.75	20	20	599-03058	275-03058	276-03058	267-03058	274-03058	—
Ξ		10	8.6	1	25	20	599-03059	275-03059	276-03059	267-03059	274-03059	291-03059
		16	14	1.25	32	20	599-03060	275-03060	276-03060	267-03060	274-03060	291-03060
		25	22	1.5	40	20	599-03061	275-03061	276-03061	267-03061	274-03061	291-03061
		40	34	2	50	20	599-03062	275-03062	276-03062	267-03062	274-03062	291-03062

Table 9. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.

Table 10. Two-Way, Normally Closed (NC), Equal Percentage Valves, Standard Packing.

							Туре		Pneumatic	
*								4-Inch	8-Inch- Sta	indard Temp.
*	=	Flo	w	Va	lve		Description	10-15 psi	Without Positioner	With Positioner
-	IIIecno	Ra	te	Si	ze	Stroke	Technical Instructions	155-183P25	155-	161P25
Č	5						Actuator P/N	599-01083	599-01050	599-01050 & 599-00426
									Actuator Code	)
		Cv	Kvs	In	mm		Valve P/N	270	277	283
		1	0.9	0.5	15	20	599-03180	270-03180	277-03180	283-03180
		1.6	1.4	0.5	15	20	599-03181	270-03181	277-03181	283-03181
		2.5	2.2	0.5	15	20	599-03182	270-03182	277-03182	283-03182
s		4	3.4	0.5	15	20	599-03183	270-03183	277-03183	283-03183
ras		6.3	5.4	0.75	20	20	599-03184	270-03184	277-03184	283-03184
ш		10	8.6	1	25	20	599-03185	270-03185	277-03185	283-03185
		16	14	1.25	32	20	599-03186	270-03186	277-03186	283-03186
		25	22	1.5	40	20	599-03187	270-03187	277-03187	283-03187
	Ê	40	34	2	50	20	599-03188	270-03188	277-03188	283-03188
	Ê	1	0.9	0.5	15	20	599-03126	270-03126	277-03126	283-03126
		1.6	1.4	0.5	15	20	599-03127	270-03127	277-03127	283-03127
<u>e</u>		2.5	2.2	0.5	15	20	599-03128	270-03128	277-03128	283-03128
Ste		4	3.4	0.5	15	20	599-03129	270-03129	277-03129	283-03129
ess		6.3	5.4	0.75	20	20	599-03130	270-03130	277-03130	283-03130
ainl		10	8.6	1	25	20	599-03131	270-03131	277-03131	283-03131
St		16	14	1.25	32	20	599-03132	270-03132	277-03132	283-03132
		25	22	1.5	40	20	599-03133	270-03133	277-03133	283-03133
		40	34	2	50	20	599-03134	270-03134	277-03134	283-03134

							Туре		Electro-Mech	anical-24 Vac	
*							Non-Spi	ring Return	Spring	Return	
*	LION	Flo Ra	w te	Va Si	lve	е	Description	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc
	onnec	, ia			20	Stro	Technical Instructions	155-507	155-506	155-5	41P25
	د						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609
		•							Actuato	or Code	
		CV	KVS	In	mm		Valve P/N	373	371	299	298
		1	0.9	0.5	15	20	599-03180	373-03180	371-03180	299-03180	298-03180
		1.6	1.4	0.5	15	20	599-03181	373-03181	371-03181	299-03181	298-03181
		2.5	2.2	0.5	15	20	599-03182	373-03182	371-03182	299-03182	298-03182
s		4	3.4	0.5	15	20	599-03183	373-03183	371-03183	299-03183	298-03183
ras		6.3	5.4	0.75	20	20	599-03184	373-03184	371-03184	299-03184	298-03184
m		10	8.6	1	25	20	599-03185	373-03185	371-03185	299-03185	298-03185
		16	14	1.25	32	20	599-03186	373-03186	371-03186	299-03186	298-03186
		25	22	1.5	40	20	599-03187	373-03187	371-03187	299-03187	298-03187
	Ê	40	34	2	50	20	599-03188	373-03188	371-03188	299-03188	298-03188
	£	1	0.9	0.5	15	20	599-03126	373-03126	371-03126	299-03126	298-03126
		1.6	1.4	0.5	15	20	599-03127	373-03127	371-03127	299-03127	298-03127
ē		2.5	2.2	0.5	15	20	599-03128	373-03128	371-03128	299-03128	298-03128
Ste		4	3.4	0.5	15	20	599-03129	373-03129	371-03129	299-03129	298-03129
ess		6.3	5.4	0.75	20	20	599-03130	373-03130	371-03130	299-03130	298-03130
aink		10	8.6	1	25	20	599-03131	373-03131	371-03131	299-03131	298-03131
St		16	14	1.25	32	20	599-03132	373-03132	371-03132	299-03132	298-03132
		25	22	1.5	40	20	599-03133	373-03133	371-03133	299-03133	298-03133
		40	34	2	50	20	599-03134	373-03134	371-03134	299-03134	298-03134

Table 11. Two-Way, Normally Closed (NC), Equal Percentage Valves, Standard Packing.

Table 12. Two-Way, Normally Closed (NC), Equal Percentage Valves, Brass and Stainless Steel Trim, Standard Packing.

								Electr	o-Hydraulic Ac	tuators – 24 V	/ac	
*		Г		Ve	h.a		Description	NSR	Spring Return	NSR	Spring	ı Return
-		FIC Ra	to to	va	70	e		Floa	ating	0 to1	0 Vdc, 4 to 2	20 mA
	JUNECT	ι τα	10		20	Strok	Technical Instructions	155-1	81P25	155-18	0P25	155-163P25
ć	3						Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U
		•	K.						A	ctuator Code		
		CV	KVS	IN	mm		valve P/N	275	276	267	274	291
		1	0.9	0.5	15	20	599-03180	275-03180	276-03180	267-03180	274-03180	_
		1.6	1.4	0.5	15	20	599-03181	275-03181	276-03181	267-03181	274-03181	
		2.5	2.2	0.5	15	20	599-03182	275-03182	276-03182	267-03182	274-03182	
s	Т	4	3.4	0.5	15	20	599-03183	275-03183	276-03183	267-03183	274-03183	
Brass	Γ×Ι	6.3	5.4	0.75	20	20	599-03184	275-03184	276-03184	267-03184	274-03184	
ш		10	8.6	1	25	20	599-03185	275-03185	276-03185	267-03185	274-03185	291-03185
		16	14	1.25	32	20	599-03186	275-03186	276-03186	267-03186	274-03186	291-03186
		25	22	1.5	40	20	599-03187	275-03187	276-03187	267-03187	274-03187	291-03187
		40	34	2	50	20	599-03188	275-03188	276-03188	267-03188	274-03188	291-03188
		1	0.9	0.5	15	20	599-03126	275-03126	276-03126	267-03126	274-03126	_
		1.6	1.4	0.5	15	20	599-03127	275-03127	276-03127	267-03127	274-03127	_
ē		2.5	2.2	0.5	15	20	599-03128	275-03128	276-03128	267-03128	274-03128	_
Ste	μ	4	3.4	0.5	15	20	599-03129	275-03129	276-03129	267-03129	274-03129	_
ess	Γ×Ι	6.3	5.4	0.75	20	20	599-03130	275-03130	276-03130	267-03130	274-03130	_
ainl	<u> </u>	10	8.6	1	25	20	599-03131	275-03131	276-03131	267-03131	274-03131	291-03131
S		16	14	1.25	32	20	599-03132	275-03132	276-03132	267-03132	274-03132	291-03132
0)		25	22	1.5	40	20	599-03133	275-03133	276-03133	267-03133	274-03133	291-03133
		40	34	2	50	20	599-03134	275-03134	276-03134	267-03134	274-03134	291-03134

							Туре		Pne	umatic Actuat	or	
								4-Inch		8-li	nch	
							Description	10-15 psi	Chandard	II: Toma	Standard	Hi-Temp
_	*	FI	ow	Va	lve			(69-103 kPa)	Standard	HI-Temp	W/Pos	itioner
Packing	onnectio	R	ate	Si	ze	Stroke	Technical Instructions	155-183P25		155-1	61P25	
	ö						Actuator P/N	599-01083	599-01050	599-01051	599-01050 & 599-00426	599-01051 & 599-00426
		<b>C</b> 14	Kua	In	1		Value D/N		A	ctuator Code		
		CV	rvs	m			valve F/IN	270	277	278	283	284
		1	0.9	0.5	15	20	599-03018	270-03018	277-03018	-	283-03018	_
		1.6	1.4	0.5	15	20	599-03019	270-03019	277-03019		283-03019	I
		2.5	2.2	0.5	15	20	599-03020	270-03020	277-03020		283-03020	I
ard		4	3.4	0.5	15	20	599-03021	270-03021	277-03021		283-03021	I
anda		6.3	5.4	0.75	20	20	599-03022	270-03022	277-03022		283-03022	I
Sta		10	8.6	1	25	20	599-03023	270-03023	277-03023		283-03023	_
		16	14	1.25	32	20	599-03024	270-03024	277-03024		283-03024	
		25	22	1.5	40	20	599-03025	270-03025	277-03025		283-03025	
	Ê	40	34	2	50	20	599-03026	270-03026	277-03026	I	283-03026	
	Ê	1	0.9	0.5	15	20	599-03072	270-03072	277-03072	278-03072	283-03072	284-03072
		1.6	1.4	0.5	15	20	599-03073	270-03073	277-03073	278-03073	283-03073	284-03073
		2.5	2.2	0.5	15	20	599-03074	270-03074	277-03074	278-03074	283-03074	284-03074
đ		4	3.4	0.5	15	20	599-03075	270-03075	277-03075	278-03075	283-03075	284-03075
-Ter		6.3	5.4	0.75	20	20	599-03076	270-03076	277-03076	278-03076	283-03076	283-03076
Ξ		10	8.6	1	25	20	599-03077	270-03077	277-03077	278-03077	283-03077	284-03077
		16	14	1.25	32	20	599-03078	270-03078	277-03078	278-03078	283-03078	284-03078
		25	22	1.5	40	20	599-03079	270-03079	277-03079	278-03079	283-03079	284-03079
		40	34	2	50	20	599-03080	270-03080	277-03080	278-03080	283-03080	284-03080

Table 13. Two-Way, Normally Closed (NC), Linear Valves.

#### Table 14. Two-Way, Normally Closed (NC), Linear Valves, Stainless Steel Trim.

Electro-Mechanic Non-Spring R					anical Actuator	s 24 Vac					
								Non-Sprin	g Return	Spring	Return
Ð	ion *	Fle	ow ate	Va Si	lve ze	e	Description	Floating	0 to 10 Vdc, 4 to 20mA	2-Position	0 to 10 Vdc
Packir	Connect					Strok	Technical Instructions	155-507	155-506	155-54	1P25
	0						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609
		•	Ku	la.			Makes D/N		Actuator	Code	
		CV	rvs	IN	mm		valve P/IN	373	371	299	298
		1	0.9	0.5	15	20	599-03018	373-03018	371-03018	299-03018	298-03018
		1.6	1.4	0.5	15	20	599-03019	373-03019	371-03019	299-03019	298-03019
		2.5	2.2	0.5	15	20	599-03020	373-03020	371-03020	299-03020	298-03020
p		4	3.4	0.5	15	20	599-03021	373-03021	371-03021	299-03021	298-03021
anda		6.3	5.4	0.75	20	20	599-03022	373-03022	371-03022	299-03022	298-03022
Sta		10	8.6	1	25	20	599-03023	373-03023	371-03023	299-03023	298-03023
		16	14	1.25	32	20	599-03024	373-03024	371-03024	299-03024	298-03024
		25	22	1.5	40	20	599-03025	373-03025	371-03025	299-03025	298-03025
	Ê	40	34	2	50	20	599-03026	373-03026	371-03026	299-03026	298-03026
	Ê	1	0.9	0.5	15	20	599-03072	—	—	—	—
		1.6	1.4	0.5	15	20	599-03073	-	—	—	—
		2.5	2.2	0.5	15	20	599-03074	_	—	-	—
đ		4	3.4	0.5	15	20	599-03075	_	-	-	—
-Ter		6.3	5.4	0.75	20	20	599-03076	_	_	_	—
Ξ		10	8.6	1	25	20	599-03077	_	_	_	_
		16	14	1.25	32	20	599-03078		_	_	_
		25	22	1.5	40	20	599-03079		_	-	—
		40	34	2	50	20	599-03080		_	_	—

	10				.,,,,		.,	,, בווופט				
								Electro	-Hydraulic A	ctuators -24	Vac	
		_					Description	NSR	Spring Return	NSR	Spring	Return
b	, uo	FI	0W ate	Va	live ize	a		Float	ting	0 to ⁻	10 Vdc, 4 to 2	20mA
Packin	onnecti		ale		126	Strok	Technical Instructions	155-18	1P25	155-1	80P25	155-163P25
	Ö						Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U
		•	14						Α	ctuator Code	•	
		CV	Kvs	In	mm		Valve P/N	275	276	267	274	291
		1	0.9	0.5	15	20	599-03018	275-03018	276-03018	267-03018	274-03018	_
		1.6	1.4	0.5	15	20	599-03019	275-03019	276-03019	267-03019	274-03019	_
		2.5	2.2	0.5	15	20	599-03020	275-03020	276-03020	267-03020	274-03020	_
P		4	3.4	0.5	15	20	599-03021	275-03021	276-03021	267-03021	274-03021	_
Inda		6.3	5.4	0.75	20	20	599-03022	275-03022	276-03022	267-03022	274-03022	_
Ste		10	8.6	1	25	20	599-03023	275-03023	276-03023	267-03023	274-03023	291-03023
		16	14	1.25	32	20	599-03024	275-03024	276-03024	267-03024	274-03024	291-03024
		25	22	1.5	40	20	599-03025	275-03025	276-03025	267-03025	274-03025	290-03025
	L ×	40	34	2	50	20	599-03026	275-03026	276-03026	267-03026	274-03026	291-03026
	Ë	1	0.9	0.5	15	20	599-03072	275-03072	276-03072	267-03072	274-03072	_
		1.6	1.4	0.5	15	20	599-03073	275-03073	276-03073	267-03073	274-03073	_
		2.5	2.2	0.5	15	20	599-03074	275-03074	276-03074	267-03074	274-03074	—
đ		4	3.4	0.5	15	20	599-03075	275-03075	276-03075	267-03075	274-03075	—
-Ter		6.3	5.4	0.75	20	20	599-03076	275-03076	276-03076	267-03076	274-03076	_
Ξ		10	8.6	1	25	20	599-03077	275-03077	276-03077	267-03077	274-03077	291-03077
		16	14	1.25	32	20	599-03078	275-03078	276-03078	267-03078	274-03078	291-03078
		25	22	1.5	40	20	599-03079	275-03079	276-03079	267-03079	274-03079	291-03079
		40	34	2	50	20	599-03080	275-03080	276-03080	267-03080	274-03080	291-03080

Table 15. Two-Way, Normally Closed (NC), Linear Valves, Stainless Steel Trim.

								Pneu	matic		
*								4-Inch		8-inch- Sta	ndard Temp.
nnection	Flow	Rate	Valve	e Size	oke	Description	3-8 psi (21-55 kPa)	5-10 psi (34-69 kPa)	10-15 psi (69-103 kPa)	Without Positioner	With Positioner
m & Col					Stro	Technical Instructions	· · ·	155-183P25	;	155-1	61P25
Tri		-				Actuator P/N	599-01081	599-01082	599-01083	599-01050	599-01050 & 599-00426
	Cv	Kve	In	mm		Valve P/N			Actuator Code	)	
	01	NV3				valve F/IN	268	269	270	277	283
	1	0.9	0.5	15	20	599-03198	268-03198	269-03198	270-03198	277-03198	283-03198
	1.6	1.4	0.5	15	20	599-03199	268-03199	269-03199	270-03199	277-03199	283-03199
1 E	2.5	2.2	0.5	15	20	599-03200	268-03200	269-03200	270-03200	277-03200	283-03200
ļĘ.	4	3.4	0.5	15	20	599-03201	268-03201	269-03201	270-03201	277-03201	283-03201
Lin	6.3	5.4	0.75	20	20	599-03202	268-03202	269-03202	270-03202	277-03202	283-03202
Ize 1	10	8.6	1	25	20	599-03203	268-03203	269-03203	270-03203	277-03203	283-03203
Bror	16	14	1.25	32	20	599-03204	268-03204	269-03204	270-03204	277-03204	283-03204
	25	22	1.5	40	20	599-03205	268-03205	269-03205	270-03205	277-03205	283-03205
	40	34	2	50	20	599-03206	268-03206	269-03206	270-03206	277-03206	283-03206
	1	0.9	0.5	15	20	599-03144	268-03144	269-03144	270-03144	277-03144	283-03144
	1.6	1.4	0.5	15	20	599-03145	268-03145	269-03145	270-03145	277-03145	283-03145
F	2.5	2.2	0.5	15	20	599-03146	268-03146	269-03146	270-03146	277-03146	283-03146
Ě	4	3.4	0.5	15	20	599-03147	268-03147	269-03147	270-03147	277-03147	283-03147
Ē	6.3	5.4	0.75	20	20	599-03148	268-03148	269-03148	270-03148	277-03148	283-03148
S Trir	10	8.6	1	25	20	599-03149	268-03149	269-03149	270-03149	277-03149	283-03149
SS	16	14	1.25	32	20	599-03150	268-03150	269-03150	270-03150	277-03150	283-03150
	25	22	1.5	40	20	599-03151	268-03151	269-03151	270-03151	277-03151	283-03151
	40	34	2	50	20	599-03152	268-03152	269-03152	270-03152	277-03152	283-03152

Table 16. Three-Way, Normally Closed (NC), Equal Percentage Valves, Normally Open, Linear, Standard Packing.

						I	Electro-Mecha	nical Actuato	ors 24 Vac	
							Non-Sprin	ig Return	Spring	Return
ion *	FI	ow ate	Va Si	lve ize	e	Description	Floating	0-10 Vdc, 4-20mA	2-Position	0-10 Vdc
Connect		uto			Strok	Technical Instructions	155-507	155-506	155-54	41P25
0						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609
	CV	Kve	In			Valvo D/N		Actuato	r Code	
	CV	rvs	ш	mm		valve F/IN	373	371	299	298
	1	0.9	0.5	15	20	599-03198	373-03198	371-03198	299-03198	298-03198
	1.6	1.4	0.5	15	20	599-03199	373-03199	371-03199	299-03199	298-03199
Ê	2.5	2.2	0.5	15	20	599-03200	373-03200	371-03200	299-03200	298-03200
Ê	4	3.4	0.5	15	20	599-03201	373-03201	371-03201	299-03201	298-03201
Trin	6.3	5.4	0.75	20	20	599-03202	373-03202	371-03202	299-03202	298-03202
nze	10	8.6	1	25	20	599-03203	373-03203	371-03203	299-03203	298-03203
Bro	16	14	1.25	32	20	599-03204	373-03204	371-03204	299-03204	298-03204
	25	22	1.5	40	20	599-03205	373-03205	371-03205	299-03205	298-03205
	40	34	2	50	20	599-03206	373-03206	371-03206	299-03206	298-03206
	1	0.9	0.5	15	20	599-03144	373-03144	371-03144	299-03144	298-03144
	1.6	1.4	0.5	15	20	599-03145	373-03145	371-03145	299-03145	298-03145
⊢	2.5	2.2	0.5	15	20	599-03146	373-03146	371-03146	299-03146	298-03146
Ě	4	3.4	0.5	15	20	599-03147	373-03147	371-03147	299-03147	298-03147
ا ع	6.3	5.4	0.75	20	20	599-03148	373-03148	371-03148	299-03148	298-03148
S Tri	10	8.6	1	25	20	599-03149	373-03149	371-03149	299-03149	298-03149
Sc	16	14	1.25	32	20	599-03150	373-03150	371-03150	299-03150	298-03150
	25	22	1.5	40	20	599-03151	373-03151	371-03151	299-03151	298-03151
	40	34	2	50	20	599-03152	373-03152	371-03152	299-03152	298-03152

Table 17. Three-way normally closed (NC), Linear valves, Staimess Steel, Standard Fack	Table	17.	Three-Way	Normally	Closed	(NC), Line	ar Valves,	<b>Stainless</b>	Steel,	Standard	Packin	g.
----------------------------------------------------------------------------------------	-------	-----	-----------	----------	--------	------------	------------	------------------	--------	----------	--------	----

								E	Electro-Hydraulio	Actuators		
	*	_					Description	NSR	Spring Return	NSR	S F	Spring Return
۲	tion	FI R	ow ate	Va Si	lve ze	ée	•	Flo	pating	0 to 1	0 Vdc, 4 to 2	20 mA
Trin	nnect		uic	0.	20	Stro	Technical Instructions	155-	181P25	155-18	0P25	155-163P25
	ပိ						Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U
		Cv	Kvs	In	mm		Valve P/N		Ac	tuator Code		
		•••						275	276	267	274	291
		1	0.9	0.5	15	20	599-03198	275-03198	276-03198	267-03198	274-03198	—
		1.6	1.4	0.5	15	20	599-03199	275-03199	276-03199	267-03199	274-03199	—
		2.5	2.2	0.5	15	20	599-03200	275-03200	276-03200	267-03200	274-03200	—
e	Г	4	3.4	0.5	15	20	599-03201	275-03201	276-03201	267-03201	274-03201	—
ronz	T×I	6.3	5.4	0.75	20	20	599-03202	275-03202	276-03202	267-03202	274-03202	_
В	-	10	8.6	1.0	25	20	599-03203	275-03203	276-03203	267-03203	274-03203	291-03203
		16	14	1.25	32	20	599-03204	275-03204	276-03204	267-03204	274-03204	291-03204
		25	22	1.5	40	20	599-03205	275-03205	276-03205	267-03205	274-03205	291-03205
		40	34	2.0	50	20	599-03206	275-03206	276-03206	267-03206	274-03206	291-03206
		1	0.9	0.5	15	20	599-03144	275-03144	276-03144	267-03144	274-03144	—
		1.6	1.4	0.5	15	20	599-03145	275-03145	276-03145	267-03145	274-03145	—
ē		2.5	2.2	0.5	15	20	599-03146	275-03146	276-03146	267-03146	<mark>274-03146</mark>	—
Ste	Г	4	3.4	0.5	15	20	599-03147	275-03147	276-03147	267-03147	<mark>274-03147</mark>	—
less	T×I	6.3	5.4	0.75	20	20	599-03148	275-03148	276-03148	267-03148	274-03148	—
Stainles	-	10	8.6	1.0	25	20	599-03149	275-03149	276-03149	267-03149	274-03149	291-03149
		16	14	1.25	32	20	599-03150	275-03150	276-03150	267-03150	<mark>274-03150</mark>	291-03150
		25	22	1.5	40	20	599-03151	275-03151	276-03151	267-03151	274-03151	291-03151
		40	34	2.0	50	20	599-03152	275-03152	276-03152	267-03152	274-03152	291-03152

#### Table 18. Three-Way, Normally Closed (NC), Equal Percentage Valves, Normally Open (NO), Linear, Standard Packing.



Figure 3. Actuator Dimensions. See Table 19.

			•	•	
Actuator	Actuator Prefix Code	Actual Height of Actuator H1	Service Height H	Actual Width or Diameter of Actuator W1	Service Width W
4-inch Pneumatic	268, 269 270	5-3/4 (146)	14 (350)	5-1/2 (137) diameter	18 (450)
8-inch Pneumatic	277, 278, 283, 284	14-1/8 (359)	26 (660)	8-3/4 (222) diameter	21 (533)
SKB with handle closed	289, 290, 291	14-3/4 (375)	22-3/4 (578)	7 (178) width × 8-15/16 (226) depth	25 (635)
SKD	267, 274, 275, 276	11-13/16 (300)	19-3/4 (500)	5 (127) width × 6-5/8 (169) depth	14-1/2 (360)
SAX	371, 373	9-9/16 (242)	17-1/4 (442)	4-7/8 (124) width × 5-7/8 (150) depth	17-3/4 (450)
El/Mech with linkage	298, 299	14-1/2 (368)	10 (254)	5 (127) width × 5-1/8 (121) depth	8 (203)

Table 19.	Dimensions of the Actuator and	Recommended	Service Envelope
	Dimensions in Inches	(Millimeters).	



Figure 4. Two-Way Internal Thread NPT × Internal Thread NPT (IT×IT) Valves.

Valve Action	Valve Size inch (mm)	А	В	с	Weight Ibs (kg)
Normally	1/2 (15)	1-7/16 (36)	2-15/16 (74)	1-1/4 (31)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-15/16 (99)	1-7/16 (36)	4 (1.8)
	1 (25)	2 (50)	3-3/4 (96)	1-1/4 (32)	5 (2.3)
Open	1-1/4 (32)	2-1/2 (62)	4-1/4 (108)	2 (51)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	4-1/4 (108)	2 (51)	9 (4.1)
	2 (50)	3-1/8 (79)	4-9/16 (116)	2-1/4 (57)	13 (5.9)
	1/2 (15)	1-7/16 (36)	3-13/16 (97)	2-3/16 (55)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-13/16 (97)	2-3/16 (55)	4 (1.8)
Normally	1 (25)	2 (50)	3-13/16 (97)	2-3/16 (55)	5 (2.3)
Closed	1-1/4 (32)	2-1/2 (62)	3-13/16 (97)	2-3/16 (55)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	3-7/8 (99)	2-1/4 (58)	8 (3.6)
	2 (50)	3-1/8 (79)	4-1/2 (114)	2-9/16 (65)	16 (7.3)

Table 20. Two-Way Valve Dimensions.



Figure 5. Three-Way Internal Thread NPT × Internal Thread NPT (IT×IT) Valves.

Valve	Valve Size	Dimensions in Inches (mm)			Weight
	Inches (mm)	Α	В	С	lb (kg)
3-Way	1/2 (15)	2-7/8 (72)	4-5/16 (110)	2-11/16 (68)	3 (1.4)
	3/4 (20)	3-3/8 (85)	4-5/16 (110)	2-3/4 (69)	4 (1.8)
	1 (25)	3-15/16 (100)	4-1/2 (114)	2-7/8 (72)	5 (2.3)
	1-1/4 (32)	4-15/16 (125)	4-5/8 (116)	2-15/16 (74)	7 (3.2)
	1-1/2 (40)	5-1/8 (130)	4-5/8 (117)	3 (76)	9 (4.1)
	2 (50)	6-1/4 (158)	4-3/4 (121)	3-3/16 (81)	13 (5.9)

Table 21. Three-Way Valve Dimensions.

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## SIEMENS



Technical Bulletin Document No. 155-776 TB 256 December 26, 2017

## Flowrite[™] 599 Series

# 2-1/2 to 6-Inch Valve, Two-Way & Three-Way, and Actuator Assembly Selection

Description	This Technical Bulletin will aid in the selection of a Flowrite 599 Series 2-1/2 inch to 6- inch valve and actuator assembly. Begin with the graph of water capacity and the chart of close-off pressures to select a valve and actuator according to specifications. Use Tables 1 through 4 to identify product numbers.
	compatible actuators that can be ordered as complete valve assemblies from the factory.
	The dimensions of all valves and the service envelope required for each actuator are included in Tables 5 through 7.
How to Use the Selection Graphs	Use Figure 1, the water capacity graph, to select a valve. Locate the specified flow rate on the vertical axis. Follow across on the horizontal line to the point of intersection with the specified pressure drop. Choose the valve size from the heavy diagonal lines across the graph.
	Use Figure 2, the close-off pressure graph, to select an actuator. First locate the valve action and actuator power source specified. Locate the bar that represents the valve line size. The top of the bar indicates the maximum close-off pressure for tight close-off.
	Use the legend at the bottom of the graph to identify the actuator.
How To Use The Valve Tables	Tables have been organized to help select a valve and actuator combination using additional specifications.
	Moving from left to right, identify the valve by selecting the combination of parameters needed. Continue to the right to match the selected valve to a desired actuator.
	A valve and actuator assembly part number is determined by combining the actuator prefix code with the suffix of the valve product number.
	NOTES:
	1. No valve will combine with all actuators.
	2. The symbol "—" indicates a combination is not available.

#### Selection Example Specification

Select a two-way normally closed valve and actuator assembly for an ANSI 125 piping system that will deliver 500 gpm (113 m³/h) chilled water with an equal percentage flow characteristic with no more than 5 psi (35 kPa) pressure drop across the fully open valve.

The valve shall be operated by a 24 Vac powered, 0 to 10 Vdc control signal, spring return electronic actuator, and must close off tightly against a pump head pressure of 15 psi (1 bar).

#### Valve Sizing

Use Figure 1, the water capacity graph, to begin valve sizing.

- 1. Locate 500 gpm (113  $m^3/h$ ) on the vertical axis to find the required flow.
- 2. Read across the horizontal axis to find 5 psi (35 kPa), the maximum allowable pressure drop across the open valve.
- 3. Select a 5-inch (125 mm) 250 Cv (214 Kvs) line size valve because the point of intersection falls close to the 5-inch line.

#### **Actuator selection**

Use Figures 2, the close-off pressure graph, to choose an actuator.

- 1. Locate the graph for electronic actuators for NC valves in the upper left side of the figure.
- 2. Locate the bar for 5-inch valves. The black bar represents an SKB/C actuator.
- 3. Notice that the SKB/C has the sufficient force to provide tight close-off against more than 20 psi (1.4 bar) differential. For a 5-inch valve, select an SKC actuator with a 40 mm stroke.

#### **Product Number Selection**

Use Table 1 for ANSI Class 125 valves. Begin at the left and select the specifications necessary.

- 1. Select a two-way, normally closed, equal percentage flow characteristic according to the specifications.
- 2. Select bronze trim for the low pressure water application and standard packing for chilled water.
- 3. Select the 5-inch line size determined from the sizing example above. Note the 40 mm stroke of the valve. The valve part number is 599-05993.
- Read across the top of the table to Electronic-hydraulic, 40 mm, and 24 Vac, 0-10 Vdc control signal.
   The actuator part number is SKC62U.
   The actuator code number is 294.
  - 5. Read down the column to determine the valve and actuator assembly product number is 294-05993.
    - **NOTE:** A valve and actuator can be ordered separately by using the part numbers from Steps 3 and 4.

Two-Way Valves 2-1/2 to 6-inch Flanged Iron Body Technical Instructions (155-159)

Three-Way Valves 2-1/2 to 6-inch Flanged Iron Body Technical Instructions (155-160)

References





Figure 2. Close-off Pressures for 2-1/2 through 6-Inch Valves.
									Table 1	. Two-Way	and Thre	e-Way Fla	nged Valve	s, ANSI C	lass 125.				
			1	r				1	Charles				Ele	ectro-Hydraul	ic – 24 Vac		1	10 mm Charles	
									Stroke			4	20 mm Stroke					40 mm Stroke	9
	tic									No	n-Spring Retu	urn		Spring	Return		NSR	Spring	Return
uo	racteris	E	ing	Flo Ra	ow ate	Va S	alve ize	ke	Description	Float	ing	0 to10 Vdc, 4 to20 mA	Float	ling	0 to10 Vdc,	4 to20 mA	Floa	iting	0 to10 Vdc, 4 to20 mA
Acti	& Cha	Tri	Pack					Stro	Technical Instructions	155-181P25	155-171P25	155-180P25	155-181P25	155-171P25	155-180P25	155-163P25	155-1	71P25	155- 163P25
	Port								Actuator P/N	SKD82.50U	SKB82.50U	SKD60U	SKD82.51U	SKB82.51U	SKD62U	SKB62U	SKC82.60U	SKC82.61U	SKC62U
	-			Cv	Kvs	In	mm		Valve P/N			-	-	Actuator (	Code	1	-		
				01	IN S				Valverin	275	290	267	276	289	274	291	293	292	294
				63	54	2.5	65	20	599-05980	275-05980	290-05980	267-05980	276-05980	289-05980	274-05980	291-05980	_	_	-
	e	ze		100	86	3	80	20	599-05981	275-05981	290-05981	267-05981	276-05981	289-05981	274-05981	291-05981	—	—	-
	ntag	Bron		160	140	4	100	40	599-05982	_	—	—	—	—	—	—	293-05982	292-05982	294-05982
	ercel			250	215	5	125	40	599-05983	-	_	_	_	-	_	-	293-05983	292-05983	294-05983
	al Pi			400	340	6	150	40	599-05984	-	-	-	-	-	-	-	293-05984	292-05984	294-05984
	Equ			63	54	2.5	65	20	599-05960	275-05960	290-05960	267-05960	276-05960	289-05960	274-05960	291-05960	—	—	_
	Vay	less eel	dard	100	80	3	8U 100	20	599-05961	275-05961	290-05961	207-05901	276-05961	289-05961	274-05961	291-05961			
Ę	2-/	stain Ste	stan	100	140	4 E	100	40	599-05962			_		_		_	293-05902	292-03902	294-05902
Ope		0,	0,	200	210	с 6	120	40	599-05903		_			_		_	293-05963	292-03903	294-05903
ally				400	540	0	45	40 20	500.06060	275.06060	200 06060	267 06060	276.06060	200 06060	274 06060	201 06060	273-03704	272-03704	274-03704
, Line				100	94 86	2.5	80	20	599-06061	275-06061	290-06061	207-00000	276-06061	207-00000	274-00000	291-00000			
ž				160	140	<u>л</u>	100	40	599-06062	273 00001	270 00001	207 00001	270 00001	207 00001	214 00001	271 00001	293-060962	202-060062	294-060962
	_			250	215	5	125	40	599-06063	_	_		_	_		_	293-06063	292-06063	294-06063
	inea	ess S		400	340	6	150	40	599-06064	_	_	_	_	_	_	_	293-06064	292-06064	294-06064
	ay L	Stee		63	54	2.5	65	20	599-06040	275-06040	290-06040	267-06040	276-06040	289-06040	274-06040	291-06040	_	_	_
	2-W	St	d	100	86	3	80	20	599-06041	275-06041	290-06041	267-06041	276-06041	289-06041	274-06041	291-06041	_	_	_
			ſem	160	140	4	100	40	599-06042	_	_	_	_	_	_	_	293-06042	292-06042	294-06042
			÷	250	215	5	125	40	599-06043	_	_	_	_	_	_	_	293-06043	292-06043	294-06043
				400	340	6	150	40	599-06044	_	_	_	_	_	_	_	293-06044	292-06044	294-06044
				63	54	2.5	65	20	599-05990	275-05990	290-05990	267-05990	276-05990	289-05990	274-05990	291-05990	_	-	_
		e		100	86	3	80	20	599-05991	275-05991	290-05991	267-05991	276-05991	289-05991	274-05991	291-05991	_	_	_
	tage	ZUO.		160	140	4	100	40	599-05992	-	_	_	_	_	_	-	293-05992	292-05992	294-05992
	rcen	B		250	215	5	125	40	599-05993	_	—	_	_	—	_	—	293-05993	292-05993	294-05993
	I Pe			400	340	6	150	40	599-05994	-	-	-	-	-	_	—	293-05994	292-05994	294-05994
	Equa	el		63	54	2.5	65	20	599-05970	275-05970	290-05970	267-05970	276-05970	289-05970	274-05970	291-05970	—	-	-
	ay f	Ste	ard	100	86	3	80	20	599-05971	275-05971	290-05971	267-05971	276-05971	289-05971	274-05971	291-05971	—	—	-
σ	2-W	less	and	160	140	4	100	40	599-05972	_	—	_	—	—	—	—	293-05972	292-05972	294-05972
ose		Stair	St	250	215	5	125	40	599-05973	-	_	_	_	_	_	-	293-05973	292-05973	294-05973
y CI		•,		400	340	6	150	40	599-05974	-	—	—	—	—	_	—	293-05974	292-05974	294-05974
mal				63	54	2.5	65	20	599-06070	275-06070	290-06070	267-06070	276-06070	289-06070	274-06070	291-06070	_	_	_
Nor				100	86	3	80	20	599-06071	2/5-060/1	290-060/1	267-06071	2/6-060/1	289-060/1	2/4-060/1	291-060/1	-	-	-
				160	140	4 r	100	40	599-06072	-	—	—	_	—	_	_	293-06072	292-06072	294-06072
	near	SS		250	215	5	125	40	599-06073	-	_	_	_	_	_	_	293-06073	292-06073	294-06073
	y Li	ainle Steel		400	340 E 4	0 2 E	150	40	599-00074	275 04050	200.04050	247.04050	274 04050	200.04050	274.04050	201.04050	293-00074	292-00074	294-00074
	-Wa	Sta	_	03 100	04 96	2.0	00	20	599-00050	275-00000	290-00030	207-00000	276-00000	209-00000	274-00030	291-00030			
	2		emp	100	140	Л	100	20	500.06052	275-00051	270-00031	207-00031	270-00031	207-00001	274-00031	271-00031	202.06052	202.06052	204.06052
			Ξ	250	215	4 5	100	40	509-06053								293-06052	292-00032	294-00032
				400	340	6	120	40	599-06053		_			_		_	293-06053	292-06053	294-06053
				63	540	25	65	20	599-06160	275-06160	290-06160	267-06160	276-06160	289-06160	274-06160	291-06160	273 00034		274 00034
				100	86	3	80	20	599-06161	275-06161	290-06161	267-06161	276-06161	289-06161	274-06161	291-06161	_	_	_
		onze		160	140	4	100	40	599-06162	_	_	_	_	_	_	_	293-06162	292-06162	294-06162
bu		Br		250	215	5	125	40	599-06163	_	_	_	_	_	_		293-06163	292-06163	294-06163
Mixi	ear		dard	400	340	6	150	40	599-06164	—	—	_	_	—	-	—	293-06164	292-06164	294-06164
Vay	Lin		Stan	63	54	2.5	65	20	599-06165	275-06165	290-06165	267-06165	276-06165	289-06165	274-06165	291-06165	_	_	_
3-4		\$		100	86	3	80	20	599-06166	275-06166	290-06166	267-06166	276-06166	289-06166	274-06166	291-06166	_	_	_
		nles:		160	140	4	100	40	599-06167	-					_	-	293-06167	292-06167	294-06167
		Stail Stee		250	215	5	125	40	599-06168	-				_	_	—	293-06168	292-06168	294-06168
				400	340	6	150	40	599-06169	—	—	—	—	—	—	—	293-06169	292-06169	294-06169

										Pneumatic			Pneur	matic with Factor	y Mounted Posit	tioner
								Stroke		20 mm		40 mm		20 mm		40 mm
0				low	Va	luo		Description	8-in	ch	12-	inch	8-i	nch	12-i	nch
istic		g		Rate	va S	ize			Standard	нітетр			Standard	HI-Temp		
racter	Trim	ackin			-		Stroke	l echnical Instructions	155-16	1P25	155-1	162P25	155-1	l61P25	155-16	62P25
Cha		<u>а</u>						Actuator P/N	599-01050	599-01051	599-01010	599-01000	599-01050 & 599-00426	599-01051 & 599-00426	599-01010 & 599-00423	599-01000 & 599-00423
												Actu	ator Code			
			Cv	Kvs	In	mm		Valve P/N	277	278	279	281	283	284	285	287
			63	54	2.5	65	20	599-05980	277-05980	_	279-05980	—	283-05980	_	285-05980	—
0	n.		100	86	3	80	20	599-05981	277-05981	_	279-05981	_	283-05981	_	285-05981	_
e. N	onz(		160	140	4	100	40	599-05982	_	_	_	281-05982	_	_	_	287-05982
ntag	В		250	215	5	125	40	599-05983	_	-	_	281-05983	_	_	_	287-05983
rcer			400	340	6	150	40	599-05984	_	-	_	281-05984	_	_	_	287-05984
IРе	_		63	54	2.5	65	20	599-05960	277-05960	_	279-05960	_	283-05960	_	285-05960	_
dua	otee	-	100	86	3	80	20	599-05961	277-05961	_	279-05961	_	283-05961	_	285-05961	_
ЪE	ss S	darc	160	140	4	100	40	599-05962		_	_	281-05962			_	287-05962
-M3	inle	òtan	250	215	5	100	10	500.05063				281-05963				287-05963
	Sta	0,	100	210	6	120	40	500.05064				281-05064				287-05964
			400	540	0	150	40	577-05704	277.0(0(0	_	270.04040	201-03704	202.04040		205.04040	207-03704
			03	04 04	2.0	00	20	599-06060	277-06060	_	279-00000		283-06060	_	285-06060	_
			100	86	3	80	20	599-0606 I	277-06061	_	279-06061	_	283-06061		285-0606 I	_
0			160	140	4	100	40	599-06062	_	—	-	281-06062	_	-	_	287-06062
I N	itee		250	215	5	125	40	599-06063	_	-	_	281-06063	_	_	_	287-06063
inea	ss S		400	340	6	150	40	599-06064	_	—	_	281-06064	_	_	_	287-06064
ay L	inle		63	54	2.5	65	20	599-06040	277-06040	278-06040	279-06040	_	283-06040	284-06040	285-06040	_
-W	Sta	đ	100	86	3	80	20	599-06041	277-06041	278-06041	279-06041	_	283-06041	284-06041	285-06041	_
~		Terr	160	140	4	100	40	599-06042	_	_	_	281-06042	_	_	_	287-06042
		÷	250	215	5	125	40	599-06043		_	_	281-06043	_	_	_	287-06043
			400	340	6	150	40	599-06044	_	_	_	281-06044	_	_	_	287-06044
			63	54	2.5	65	20	599-05990	277-05990	_	279-05990	_	283-05990	_	285-05990	
0			100	86	3	80	20	599-05991	277-05991	_	279-05991	_	283-05991		285-05991	_
ž	nze		160	140	4	100	40	599-05992		_		281-05002				287-05992
tage	Bro		250	215	т Б	100	40	500 05002				201 05772				207 05772
cen.			200	210	2	120	40	577-05775				201-03773				207-05775
Per			400	540	0	100	40	599-05994		_		201-03994	202.05070			207-03994
pual	Ge		03	54	2.5	65	20	599-05970	277-05970		2/9-05970		283-05970		285-05970	
Ē /	s St	lard	100	86	3	80	20	599-05971	277-05971	_	2/9-059/1		283-05971		285-05971	_
Way	lesa	tand	160	140	4	100	40	599-05972	-	-	-	281-05972	_	_	_	287-05972
2-	Stair	Ś	250	215	5	125	40	599-05973	_	-	_	281-05973	_	_	_	287-05973
	0,		400	340	6	150	40	599-05974	_	-	-	281-05974	—	—	-	287-05974
			63	54	2.5	65	20	599-06070	277-06070	—	279-06070	_	283-06070	_	285-06070	_
			100	86	3	80	20	599-06071	277-06017	—	279-06071	_	283-06070		28506070	_
0			160	140	4	100	40	599-06072	-	-	-	281-06072	—	—	-	287-06072
ž	ee		250	215	5	125	40	599-06073	_	-	-	281-06073	_	_	_	287-06073
nea	s St		400	340	6	150	40	599-06074	_	_	_	281-06074	_	_	_	287-06074
	nles		63	54	2.5	65	20	599-06050	277-06050	278-06050	279-06050	_	283-06050	284-06050	285-06050	_
Vay	Stai	d	100	86	3	80	20	599-06051	277-06051	278-06051	279-06051	_	283-06050	284-06051	285-06051	_
2-1		em	160	140	4	100	40	599-06052	_	_	_	281-06052	_	_	_	287-06052
		÷	250	215	5	125	40	599-06053		_	_	281-06053	_	_		287-06053
			400	340	6	150	40	599-06054		_		281-06954				287-06054
			400	540	25	65	20	500-06160	277-06160		270-06160	201 00734	283-06160		285-06160	207 00034
			100	86	2.5	80	20	500_04141	277_06161		277-00100		203-00100	<u> </u>	203-00100	
<u> </u>			100	140	3 4	100	20	500 04140	211-00101	_	217-00101	201 04142	203-00101		203-00101	207 04140
nea	nze		100	14U 215	4	100	40	500_04142	_		_	201-00102			_	207-00102
j Li	Bro	Ird	200	210	5	120	40	500 04144	_			201-00103				207-00103
ixin	<u> </u>	ndâ	400	540	0 2 F	100	40	500 0414E				201-001/4				207-00174
y M		Sta	100	04	2.0	00	20	500 04144	211-00100		2/9-00100	_	203-00100		200-00100	_
-Wa	ss		100	00	3	8U 100	20	577-U0100	211-00100	_	219-00100	201 0/1/7	203-00100		203-00100	- 207 0/1/7
33	el es		100	140	4 c	100	40	577-U010/	—	—	_	201-0010/	_		_	207-0010/
	Sta. Ste		250	215	э 4	125	40	244-00108	_		_	201-00108	_	—	_	207-00108
			400	340	6	150	40	599-06169	_		_	281-06169		_	_	287-06169

#### Table 2. Two-Way and Three-Way, Flanged Valves, ANSI Class 125.

Electronic-Hydraulic – 24 Vac

		ر							Stroke	e 20 mm							40 mm		
	tic									Nor	n-Spring Re	turn		Sprir	ng Return		NSR	Spring	g Return
u	acteris	u	ng	FI	0W ate	Va Si	lve ze	ke	Description	Floa	iting	0 to 10 Vdc, 4 to 20 mA	Floa	ting	0 to 10 4 to 2	) Vdc, 0 mA	Float	ing	0 to 10 Vdc, 4 to 20 mA
Actio	rt & Char	Trin	Pack				20	Stro	Technical Instructions	155-181P25	155-171P25	155-180P25	155-181P25	155-171P25	155-180P25	155-163P25	155-17	1P25	155-163P25
	Pol								Actuator P/N	SKD82.50U	SKB82.50U	SKD60U	SKD82.51U	SKB82.51U	SKD62U	SKB62U	SKC82.60U	SKC82.61U	SKC62U
												l		Act	uator Code				
				Cv	Kvs	In	mm		Valve P/N	275	290	267	276	289	274	291	293	292	294
				63	54	2.5	65	20	599-05940	275-05940	290-05940	267-05940	276-05940	289-05940	274-05940	291-05940	_	-	—
	сD	cD		100	86	3	80	20	599-05941	275-05941	290-05941	267-05941	276-05941	289-05941	274-05941	291-05941	_	-	_
	tag	DNZ		160	140	4	100	40	599-05942	_	_	_	_	_	_	_	293-05942	292-05942	294-05942
	cen	Bro		250	215	5	125	40	599-05943	_	_	_	_	_	_	_	293-05943	292-05943	294-05943
	Per			400	340	6	150	40	599-05944	_	_	_	_	_	_	_	293-05944	292-05944	294-05944
	lal			63	54	2.5	65	20	599-05920	275-05920	290-05920	267-05920	276-05920	289-05920	274-05920	291-05920	_	_	
	Equ	St	φ	100	86	3	80	20	599-05921	275-05921	290-05921	267-05921	276-05921	289-05921	274-05921	291-05921	_	_	
	/ay	ess	dar	160	140	1	100	40	500.05022	210 00721	270 00721	207 00721	210 00721	207 00721	27100721	2/1 00/21	203-05022	202,05022	204_05022
E.	2-V	ainle	tan	250	215	5	100	40	500.05022								293-03922	272-03722	294-03922
ð		Sta	S	200	210	4	120	40	577-05725					_		_	273-03723	272-03723	294-03923
<u>ا</u>				400	540	0	150	40	599-05924		200.0/140				274.0(140		293-03924	292-05924	294-05924
ГШŐ				03	54	2.5	65	20	599-06140	275-06140	290-06140	267-06140	276-06140	289-06140	274-06140	291-06140	_	_	_
No				100	86	3	80	20	599-06141	275-06141	290-06141	267-06141	276-06141	289-06141	2/4-06141	291-06141	—	—	—
	_			160	140	4	100	40	599-06142	_	-	-	_	-	_	_	293-06142	292-06142	294-06142
	lear	St		250	215	5	125	40	599-06143	—	—	—	—	—		—	293-06143	292-06143	294-06143
	Ľ	ess		400	340	6	150	40	599-06144	-	_	-	_	-	_	—	293-06144	292-06144	294-06144
	Nay	ainl		63	54	2.5	65	20	599-06120	275-06120	290-06120	267-06120	276-06120	289-06120	274-06120	291-06120	-	-	—
	2-/	St	dm	100	86	3	80	20	599-06121	275-06121	290-06121	267-06121	276-06121	289-06121	274-06121	291-06121	-	-	—
			Це	160	140	4	100	40	599-06122	—	-	—	-	-	_	—	293-06122	292-06122	294-06122
			÷	250	215	5	125	40	599-06123	_	_	_	_	_	_	_	293-06123	292-06123	294-06123
				400	340	6	150	40	599-06124	—	_	—	_	—	—	—	293-06124	292-06124	294-06124
				63	54	2.5	65	20	599-05950	275-05950	290-05950	267-05950	276-05950	289-05950	274-05950	291-05950	-	-	_
	ige	ze		100	86	3	80	20	599-05951	275-05951	290-05951	267-05951	276-05951	289-05951	274-05951	291-05951	_	-	—
	enta	ZUO.		160	140	4	100	40	599-05952	—		—		—	-	—	293-05952	292-05952	294-05952
	erce	B		250	215	5	125	40	599-05953	_		—		_		_	293-05953	292-05953	294-05953
	μĐ			400	340	6	150	40	599-05954	_	-	—	-	_	_	_	293-05954	292-05954	294-05954
	gup	t.		63	54	2.5	65	20	599-05930	275-05930	290-05930	267-05930	276-05930	289-05930	274-05930	291-05930	_	_	—
	-Ε	SS S	ard	100	86	3	80	20	599-05931	275-05931	290-05931	267-05931	276-05931	289-05931	274-05931	291-05931	—	-	—
8	Nay	nles	and	160	140	4	100	40	599-05932	—	_	—	—	—	_	—	293-05932	292-05932	294-05932
los(	2-/	Stai	St	250	215	5	125	40	599-05933	—	-	-	-	-	_	—	293-05933	292-05933	294-05933
УC		• /		400	340	6	150	40	599-05934	_	_	—	_	-	_	_	293-05934	292-05934	294-05934
nall				63	54	2.5	65	20	599-06150	275-06150	290-06150	267-06150	276-06150	289-06150	274-06150	291-06150	—	-	—
lor				100	86	3	80	20	599-06151	275-06151	290-06151	267-06151	276-06151	289-06151	274-06151	291-06151	—	-	—
~	JL			160	140	4	100	40	599-06152	-	-	-	-	-	_	_	293-06152	292-06152	294-06152
	nea	s St		250	215	5	125	40	599-06153	_	_	_	_	-		—	293-06153	292-06153	294-06153
	1	les		400	340	0	150	40	599-06154	-	—	—	-	-		—	293-06154	292-06154	294-06154
	Nay	tain	~	63	54	2.5	65	20	599-06130	275-06130	290-06130	267-06130	276-06130	289-06130	274-06130	291-06130	_	-	—
	2-\	S	amp	100	86	3	80	20	599-06131	275-06131	290-06131	267-06131	276-06131	289-06131	274-06131	291-06131	-	-	-
			i-Te	160	140	4	100	40	599-06132	-	_	-	-	-	_	—	293-06132	292-06132	294-06132
			Т	250	215	5	125	40	599-06133	_	_	_	_	-		—	293-06133	292-06133	294-06133
				400	340	0	150	40	599-06134	-	-	-	-	-	_	—	293-06134	292-06134	294-06134
				63	54	2.5	65	20	599-06170	2/5-061/0	290-06170	267-06170	276-06170	289-06170	2/4-061/0	291-06170	_	-	—
		Jze		100	86	3	80	20	599-06171	2/5-061/1	290-06171	267-06171	276-06171	289-06171	2/4-061/1	291-06171		-	-
þ		Bror		100	140	4 E	100	40	599-06172	_	_	_	_	—	—	—	293-06172	292-061/2	294-06172
lixir	٦	-	ard	200	210	о 6	120	40	577-001/3	—	_	—	_	_		—	293-001/3	292-001/3	294-001/3
γN	nea		nda	400	34U 54	0 2 E	100	40	500 04175		200 04175			200 04175		201 04175	293-001/4	292-001/4	294-00174
Wa		St	Sta	100	04 86	2.0	80	20	500_06176	275-06175	290-001/0	207-00173	276-06175	207-001/0	274-00173	271-001/0			
Ϋ́		SSS		160	140	л Л	100	20	500.04177	2/0-001/0	270-001/0	201-001/0	2/0-001/0	207-001/0	2/4-001/0	271-001/0	202_04177	202,06177	201_06177
		ainlé		250	215	4 5	100	40	500_04170	<u> </u>		— <u> </u>					273-00177	272-00177	274-00177
		Sté		200	210	5 6	120	40	500_04170					_		_	273-001/0	292-001/8	274-00178
		S		400	340	U	150	40	377-001/7	. —				. —			275-00117	274-001/9	274-00177

Table 3. Two-Way and Three-Way, Flanged Valves, ANSI Class 250.

											Pneumatic			Pneum	natic with Factor	y Mounted Pos	itioner
									Stroke		20 mm		40 mm		20 mm	-	40 mm
									Description	8-in	ch	10		8-i	nch	10.1	
	stic			FI	ow	Va	lve			Standard	Hi-Temp	12-	Inch	Standard	Hi-Temp	12-1	nch
	teris	Ε	king	R	ate	S	ize	oke	Technical	166 14	1025	166 1	42025	166.1	41D25	155 1	42025
	Irac	T	act					Stro	Instructions	100-10	0120	100-1	02P23	100-1	01P23	100-10	02P20
	Cha								Actuator P/N	599-01050	599-01051	599-01010	599-01000	599-01050 &	599-01051 &	599-01010 &	599-01000 &
													Δctuz	tor Codes	077 00 120	077 00 120	077 00 120
				Cv	Kvs	In	mm		Valve P/N	277	278	279	281	283	284	285	287
				62	54	25	45	20	500.05040	277 05040	270	270 05040	201	203	204	205	207
				100	96	2.5	00	20	500.050/1	277-05940		277-03740		203-03740		205-05940	
	ge	nze		160	140	Л	100	20	500.05042	277-03741		2/7-03741	201 05042	203-03741		203-03741	207 05042
	enta	Bro		250	215	4 5	100	40	500 05042	—	_		201-03942				207-03942
	erc			200	340	6	120	40	599-05944				281-05944				287-05944
	ial F			400	540	25	45	20	500 05020	277 05020		270 05020	201 03744	202 05020		205 05020	207 03744
	Egu		9	100	04	2.5	00	20	500.05021	277-05920		279-03920		203-03920		205-05920	_
c	Vay		Idari	160	140	Л	100	20	500 05022	277-03921		2/7-03721	201 05022	203-03721		203-03721	207 05022
be	2-V		Star	250	215	4	100	40	500.05022	_			201-03922				207-03922
0			• /	200	210	6	120	40	500.05024	—	_		201-05923				207-03923
l le				400	540	25	65	20	500-061/0	277-06140		270_06140	201-03924	283-06140		285-06140	207-03924
Ĕ		teel		100	86	2.5	80	20	599-06141	277-00140	_	279-06141		283-06140		285-06140	
ē		ss S		160	140	4	100	40	599-06142				281-06142	203 00141			287-06142
~	_	inle		250	215	5	125	40	599-06143	_		_	281-06143				287-06143
	inea	Sta		400	340	6	150	40	599-06144	_	_	_	281-06144				287-06144
	ay L			63	54	2.5	65	20	599-06120	277-06120	278-06120	279-06120		283-06120	284-06120	285-06120	
	2-Wi		d	100	86	3	80	20	599-06121	277-06121	278-06120	279-06121		283-06121	284-06121	285-06121	_
			ſem	160	140	4	100	40	599-06122		_	_	281-06122	_	_	_	287-06122
			Η	250	215	5	125	40	599-06123	_	_	_	281-06123	_	_	_	287-06123
				400	340	6	150	40	599-06124	_	_	_	281-06124	_	_	_	287-06124
				63	54	2.5	65	20	599-05950	277-05950	_	279-05950		283-05950	_	285-05950	
		0		100	86	3	80	20	599-05951	277-05951	_	279-05951	_	283-05951	_	285-05951	_
	age	ONZE		160	140	4	100	40	599-05952	_	_	_	281-05952	_	_	_	287-05952
	cent	Br		250	215	5	125	40	599-05953	_	_	_	281-05953	_	_	_	287-05953
	Pero			400	340	6	150	40	599-05954	_	_	_	281-05954	_	_	_	287-05954
	lual			63	54	2.5	65	20	599-05930	277-05930	_	279-05930	_	283-05930	_	285-05930	-
	Щ		9	100	86	3	80	20	599-05931	277-05931	_	279-05931	_	283-05931	_	285-05931	_
σ	Vay		Idari	160	140	4	100	40	599-05932	_	_	_	281-05932	_	_	_	287-05932
se	2-1		Star	250	215	5	125	40	599-05933	_	_	_	281-05933	_	_	_	287-05933
ö				400	340	6	150	40	599-05934	_	_	_	281-05934	_	_	_	287-05934
Ň				63	54	2.5	65	20	599-06150	277-06150	_	279-06150	_	283-06150	_	285-06150	_
nal		teel		100	86	3	80	20	599-06151	277-06151		279-06151		283-06151		285-06151	_
or		ss S		160	140	1	100	40	500-06152	277 00101		277 00101	281-06152	200 00101		200 00101	287-06152
ž	-	inles		250	215	4 5	100	40	500.06152				201-00132				207-00152
	inea	Sta		200	210	6	120	40	500.06153	_	_	_	201-00155				207-00155
	y L			400	540	0	100	40	577-00104 E00.0/100		270 0/120	270.0/120	201-00104	202.0/120			207-00104
	-Wa			100	04	2.0	00	20	599-00130	277-00130	270-00130	279-00130		263-00130	204-00130	260-00130	
	2		dme	100	80	3	8U 100	20	599-06131	277-00131	278-00131	279-00131		283-00131	284-00131	283-00131	
			li-Te	160	140	4	100	40	599-06132	—	_	-	281-06132				287-06132
			-	250	215	5	125	40	599-06133	-	-	-	281-06133	_	_	_	287-06133
				400	340	6	150	40	599-06134	_	_	_	281-06134	—	_	_	287-06134
				63	54	2.5	65	20	599-06170	277-06170	_	279-06170	_	283-06170	_	285-06170	_
				100	86	3	80	20	599-06171	277-06171	_	279-06171	—	283-06171	_	285-06171	—
		Зe		160	140	4	100	40	599-06172	-	_	-	281-06172	_	—	_	287-06172
ing		ron;	-	250	215	5	125	40	599-06173	_	_	-	281-06173	_	_	_	287-06173
Mix	ear	В	darc	400	340	6	150	40	599-06174			_	281-06174	_		_	287-06174
Vay	Ľ		Stan	63	54	2.5	65	20	599-06175	277-06175	_	279-06175	_	283-06175	—	285-06175	-
3-V		St.	5,	100	86	3	80	20	599-06176	277-06176	_	279-06176	_	283-06176	_	285-06176	_
		SSS :		160	140	4	100	40	599-06177	_	_	-	281-06177	_	_	_	287-06177
		aink		250	215	5	125	40	599-06178	_	—	-	281-06178	_	_	_	287-06178
		St		400	340	6	150	40	599-06179	-	-	-	281-06179	-	-	-	287-06179

Table 4.	Two-Way	and Three	-Way,	Flanged	Valves,	ANSI Clas	s 250.

Note: Spring start point NO = 3 to 8 psi (21 to 55 kPa), NC = 10 to 15 psi (69 to 103 kPa), 3-Way = 8 to 13 psi (55 to 90 kPa).



Figure 3. Actuator Dimensions.

Table 5.	Dimensions of the Actuator and Recommended Service Envelope.
	Dimensions in Inches (Millimeters).

Actuator	Actuator Prefix Code	Actual Height of Actuator H1	Service Height H	Actual Width or Diameter of Actuator W1	Service Width W
8-inch	277, 278,	14-1/8	26	8-3/4 (222) diameter	21
Pneumatic	283, 284	(359)	(660)		(533)
12-inch	279, 281,	17-7/8	30	15-1/8 (384) diameter	27
Pneumatic	285, 287	(454)	(762)		(686)
SKB/C with handle closed	289, 290, 291, 292, 293, 294	14-3/4 (375)	22-3/4 (578)	7 (178) width × 8-15/16 (226) depth	25 (635)
SKD	267, 274,	11-13/16	19-3/4	5 (127) width ×	14-1/2
	275, 276	(300)	(500)	6-5/8 (169) depth	(360)



Table 6.	Three-Way	/ Valve	Dimensions.
	111100-110		Difficitorio

Nominal	Di	imensions in	s)	Weight			
Valve Size		Α			D	lb (	kg)
Inches (mm)	ANSI Class 125	ANSI Class 250	В	С	Service Flange	ANSI Class 125	ANSI Class 250
2-1/2	10-7/8	11-1/2	9-3/8	3-3/4	6-1/2	104	117
(65)	(276.4)	(292)	(239.2)	(95)	(165)	(47)	(53)
3	11-3/4	12-1/2	10-3/4	4-3/8	7	114	132
(80)	(298.5)	(318)	(272)	(111)	(178)	(52)	(60)
4	13-7/8	14-1/2	12-1/2	5-1/8	7-1/2	146	174
(100)	(352.4)	(368)	(317.6)	(131.6)	(191)	(66)	(79)
5	15-3/4	16-5/8	13-3/4	5-3/4	8-1/2	170	215
(125)	(400)	(422)	(349.2)	(146.2)	(216)	(77)	(99)
6	17-3/4	18-5/8	15-1/2	6-5/8	9-1/2	199	261
(150)	(451)	(473)	(393)	(167)	(241)	(90)	(119)

Figure 4. Dimensions.

	Nominal		ANSI C	lass 125		ANSI Class 250					
Action	Valve Size	Dimensi	ions in Inch	es (mm)	Weight	Dimensi	Weight				
Action	Inches (mm)	Α	A B C		lb (kg)	Α	В	С	lb (kg)		
	2-1/2	10-7/8	11	4-7/8	107	11-1/2	11	4-7/8	121		
	(65)	(276)	(281)	(123)	(49)	(292)	(281)	(123)	(55)		
Open	3	11-3/4	12-1/4	5-5/16	118	12-1/2	12-1/4	5-5/16	139		
	(80)	(299)	(312)	(135)	(53)	(318)	(312)	(135)	(63)		
ally (	4	13-7/8	13-9/16	6-5/16	153	14-1/2	13-5/8	6-5/16	183		
	(100)	(352)	(345)	(160)	(70)	(368)	(344.7)	(160)	(83)		
Norn	5	15-3/4	15-3/16	7	176	16-5/8	15-3/16	7	222		
	(125)	(400)	(385)	(177)	(80)	(422)	(385)	(177)	(101)		
	6	17-3/4	16-3/4	7-7/8	211	18-5/8	16-3/4	7-7/8	277		
	(150)	(451)	(426)	(200)	(96)	(473)	(426)	(200)	(126)		
	2-1/2	10-7/8	10-5/8	4-7/8	107	11-1/2	11	5-3/8	120		
	(65)	(276)	(269)	(125)	(48)	(292)	(279)	(135)	(55)		
losed	3	11-3/4	11-15/16	5-5/8	117	12-1/2	12-7/16	6	136		
	(80)	(299)	(303)	(142)	(53)	(318)	(315)	(154)	(62)		
ally C	4	13-7/8	13-15/16	6-5/8	154	14-1/2	14-3/8	7	184		
	(100)	(352)	(354)	(168)	(70)	(368)	(364)	(178)	(84)		
Norma	5	15-3/4	15-1/4	7-1/2	175	16-5/8	15-3/4	7-3/4	221		
	(125)	(400)	(388)	(185)	(79)	(422)	(399)	(196)	(101)		
	6	17-3/4	171/16	8-3/16	210	18-5/8	17-1/2	8-5/8	275		
	(150)	(451)	(433)	(207)	(95)	(473)	(444)	(218)	(125)		

#### Table 7. Two-Way Valve Dimensions.

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#### 274-06626

Technical Data

## SIEMENS

#### Flowrite[™] 599 Series High Pressure Close-off , 2-Way Valves, 2-1/2 to 6-Inch, Flanged Iron Body, ANSI Classes 125 & 250



Submittal Sheet

#### Description

The Flowrite 599 Series high pressure close-off, two-way flanged valve iron bodies, are designed to work with either pneumatic or electronic actuators with 3/4-inch (20 mm) or 1-1/2-inch (40 mm) stroke. They are available in both ANSI Class 125 and 250 for normally open or normally closed action.

Typical applications include control of hot or chilled water; or 50% water-glycol solution.

#### Features

- Universal bonnet, for direct-coupled actuators
- Equal percentage flow characteristic
- Stainless steel trim
- ANSI Class IV leakage (≤ 0.01% of Cv)
- EPDM O-ring packing

#### **Product Numbers**

Use the product numbers in the tables to order the valve and the actuator assembled together. The product number consists of a 3-digit prefix code, a hyphen, and a 5-digit suffix code. The prefix specifies an actuator. The suffix specifies the valve body.

287-xxxxx 3-Digit Actuator Prefix Code



#### **Typical Specifications**

Automatic high pressure close-off control valves shall have flanged connections, 2-1/2-inch through 6-inch (65 mm through 150 mm) sizes, and shall be ANSI 125 or ANSI 250 rated to withstand the pressures and temperatures encountered.

Valves shall have metal-to-metal seats, stainless steel trim and stems, and EPDM O-ring packing.

Valve shall be ANSI Leakage Class IV (0.01% of Cv) at a close-off differential up to 200 psi. Valves shall have a 100:1 rangeability or better.

Technical Dala	
Valve Size	2-1/2 in. to 6-in. (65 mm to 150 mm)
Body	Cast iron ASTM A126 Class B
Trim	Stainless Steel
Stem	Stainless steel ASTM A582 Type 303
Stem Travel: 2-1/2 and 3-inch 4, 5, and 6-inch	3/4-inch (20mm) stroke 1-1/2-inch (40mm) stroke
Seat	Metal-to-metal
Packing:	EPDM O-ring
Close-off Ratings	According to ANSI/FCI 70-2 See Tables 2 and 4.
Controlled Medium	Water, 50% water-glycol solution
Medium Temperature:	20°F to 250°F (-7°C to 120°C)
Maximum Recommend Differential Pressure for Modulating Service	led 50 psi (345 kPa)

#### Table 1. Flowrite Valve and Pneumatic Actuator.

NOTE: If an 8-inch or 12-inch pneumatic actuator without position relay is required, order the valve and actuator separately.

					8-Inch	12-Inch	
lass	Б		Valve	Су		T	
SIC	ctic		Inch	Cv	Stroke	599-01050	599-01000
AN:	٩	Valve Body	(mm)			W/Position Relay 599-00426	W/Position Relay 599-00423
						Actuato	r Codes
						283	287
		599-06610	2-1/2 (65)	63	3/4 (20)	283-06610	_
	λĮ μ	599-06611	3 (80)	100	3/4 (20)	283-06611	_
	rma Deel	599-06612	4 (100)	160	1-1/2 (40)	_	287-06612
10	2°	599-06613	5 (125)	250	1-1/2 (40)	_	287-06613
12!		599-06614	6 (150)	400	1-1/2 (40)	_	287-06614
ISN		599-06615	2-1/2 (65)	63	3/4 (20)	283-06615	
•	, ₽ ₽	599-06616	3 (80)	100	3/4 (20)	283-06616	
	rma lose	599-06617	4 (100)	160	1-1/2 (40)	_	287-06617
	δ SΩ	599-06618	5 (125)	250	1-1/2 (40)	_	287-06618
		599-06619	6 (150)	400	1-1/2 (40)	_	287-06619
		599-06620	2-1/2 (65)	63	3/4 (20)	283-06620	-
	کار م	599-06621	3 (80)	100	3/4 (20)	283-06621	
	rma	599-06622	4 (100)	160	1-1/2 (40)	_	287-06622
0	2°	599-06623	5 (125)	250	1-1/2 (40)	—	287-06623
il 25		599-06624	6 (150)	400	1-1/2 (40)	—	287-06624
ANS		599-06625	2-1/2 (65)	63	3/4 (20)	283-06625	_
	lly bd	599-06626	3 (80)	100	3/4 (20)	283-06626	—
	Iose	599-06627	4 (100)	160	1-1/2 (40)	_	287-06626
	βŪ	599-06628	5 (125)	250	1-1/2 (40)	_	287-06628
		599-06629	6 (150)	400	1-1/2 (40)	—	287-06629

Table 2. Pneumatic Close-Off Ratings in PSI (kPa).

			Spring F	Return	
	Valve	8- I	nch	12-Ir	nch
Action	Size, Inch (mm)	3 to 8 psi (21 to 55 kPa)	10 to 15 psi (69 to 103 kPa)	3 to 8 psi (21 to 55 kPa)	10 to 15 psi (69 to 103 kPa)
				15 psi (103 kPa)	0 psi (0 kPa)
	2-1/2 (65)	200 (1378)	—	_	—
ully n	3 (80)	200 (1378)			—
rma Dpe	4 (100)	—	—	200 (1378)	—
°N o	5 (125)	—	—	200 (1378)	—
	6 (150)			200 (1378)	—
	2-1/2 (65)	—	200 (1378)	—	—
ylla be	3 (80)		200 (1378)		—
rma	4 (100)				200 (1378)
δΩ	5 (125)				200 (1378)
	6 (150)				200 (1378)

#### Table 3. Flowrite Valve and 24 Vac Electro-Hydraulic Actuator Assemblies.

eristic	ISS	_	a di s	Valve					
aract	I CI ⁸	tior		Size	Cv	Stroke	Spring	Return	
СР	NS	Ă	Valve	(mm)			0 to 1	0 Vdc	
NO	۷		Бойу	()			SKD62U	SKC62U	
Ц							Actuato	r Codes	
							274	294	
		٧	599-06610	2-1/2 (65)	63	3/4 (20)	274-06610	_	
		lla u	599-06611	3 (80)	100	3/4 (20)	274-06611	—	
		n a	599-06612	4 (100)	160	1-1/2 (40)	—	294-06612	
	25	δO	599-06613	5 (125)	250	1-1/2 (40)	—	294-06613	
	Ξ	2	599-06614	6 (150)	400	1-1/2 (40)	—	294-06614	
	NS		599-06615	2-1/2 (65)	63	3/4 (20)	274-06615	—	
е	A	ll y	599-06616	3 (80)	100	3/4 (20)	274-06616	—	
ag		ose OSe	599-06617	4 (100)	160	1-1/2 (40)	—	294-06617	
ent		<u>S</u> D	599-06618	5 (125)	250	1-1/2 (40)	—	294-06618	
rce.			599-06619	6 (150)	400	1-1/2 (40)	—	294-06619	
Ре			599-06620	2-1/2 (65)	63	3/4 (20)	274-06620	—	
al			599-06621	3 (80)	100	3/4 (20)	274-06621	_	
nb		¥	599-06622	4 (100)	160	1-1/2 (40)	—	294-06622	
ш	0	~	599-06623	5 (125)	250	1-1/2 (40)	—	294-06623	
	25		599-06624	6 (150)	400	1-1/2 (40)	—	294-06624	
	NSI		599-06625	2-1/2 (65)	63	3/4 (20)	274-06625	_	
	A	~	599-06626	3 (80)	100	3/4 (20)	<del>274-26626</del> —		→ 274-06626
		¥	599-06627	4 (100)	160	1-1/2 (40)		294-06627	2 00020
		-	599-06628	5 (125)	250	1-1/2 (40)		294-06628	
			599-06629	6 (150)	400	1-1/2 (40)	_	294-06629	

NOTE: If a SKD/C82...U actuator is required, order the valve and actuator separately.

#### Table 4. Close-Off Ratings in PSI (kPa).

Action	Valve Size	Electro-Hyd	raulic 24 Vac
Action	In (mm)	SKD	SKC
	2-1/2 (65)	200 (1378)	—
ully n	3 (80)	200 (1378)	_
pe	4 (100)	_	200 (1378)
Ň	5 (125)	_	200 (1378)
	6 (150)	_	200 (1378)
	2-1/2 (65)	200 (1378)	_
ed y	3 (80)	200 (1378)	—
ose	4 (100)	_	200 (1378)
Ω	5 (125)	_	200 (1378)
_	6 (150)	_	200 (1378)

#### Dimensions



#### Table 5. Flanged 2-Way Valve Dimensions.

	Valvo Sizo		ANSI CI	ass 125			ANSI C	lass 250	
Valve	inch	L	nches (mm	)	Weight		Inches (mm	)	Weight
Valve Action	(mm)	Α	В	С	lbs. (kg)	Α	В	С	lbs. (kg)
	2-1/2	10-7/8	11	4-7/8	62	11-1/2	11	4-7/8	78
	(65)	(276)	(281)	(123)	(28)	(292)	(281)	(123)	(35)
	3	11-3/4	12-1/4	5-5/16	79	12-1/2	12-1/4	5-5/16	102
	(80)	(299)	(312)	(135)	(35)	(318)	(312)	(135)	(46)
Normally	4	13-7/8	13-9/16	6-5/16	129	14-1/2	13-5/8	6-5/16	168.68
Open	(100)	(352)	(345)	(160)	(58.12)	(368)	(344.7)	(160)	(75)
	5	15-3/4	15-3/16	7	162	16-5/8	15-3/16	7	215
	(125)	(400)	(385)	(177)	(73)	(422)	(385)	(177)	(97)
	6	17-3/4	16-3/4	7-7/8	222	18-5/8	16-3/4	7-7/8	312
	(150)	(451)	(426)	(200)	(101)	(473)	(426)	(200)	(142)
	2-1/2	10-7/8	10-5/8	4-7/8	58	11-1/2	11	5-3/8	74
	(65)	(276)	(269)	(125)	(26)	(292)	(279)	(135)	(34)
	3	11-3/4	11-15/16	5-5/8	72	12-1/2	12-7/16	6	100
	(80)	(299)	(303)	(142)	(35)	(318)	(315)	(154)	(45)
Normally	4	13-7/8	13-15/16	6-5/8	128	14-1/2	14-3/8	7	16
Closed	(100)	(352)	(354)	(168)	(58)	(368)	(364)	(178)	(72)
	5	15-3/4	15-1/4	7-1/2	159	16-5/8	15-3/4	7-3/4	214
	(125)	(400)	(388)	(185)	(72)	(422)	(399)	(196)	(97)
	6	17-3/4	17-1/16	8-3/16	219	18-5/8	17-1/2	8-5/8	309
	(150)	(451)	(433)	(207)	(100)	(473)	(444)	(218)	(141)

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	Valve		ANSI Cla	ass 125			ANSI CI	ass 250	
Action	Size inch (mm)	C Ir	)imension: hches (mm	s I)	Weight Ibs. (kg)		Dimension Inches (mn	s 1)	Weight Ibs. (kg)
		Α	В	С		Α	В	С	
	2-1/2	11	11	4-7/8	62	11-1/2	11	5	78
	(65)	(276)	(281)	(123)	(28)	(292)	(281)	(123)	(35)
	3	11-3/4	12-1/4	5-5/16	79	12-1/2	12-1/4	5-5/16	102
	(80)	(299)	(312)	(135)	(35)	(318)	(312)	(135)	(46)
Normally	4	14	13-9/16	6-5/16	129	14-1/2	13-5/8	6-5/16	165
Open	(100)	(352)	(345)	(160)	(58)	(368)	(344.7)	(160)	(75)
	5	15-3/4	15-3/16	7	162	16-5/8	15-3/16	7	215
	(125)	(400)	(385)	(177)	(73)	(422)	(385)	(177)	(97)
	6	17-3/4	16-3/4	8	222	18-5/8	16-3/4	8	312
	(150)	(451)	(426)	(200)	(101)	(473)	(426)	(200)	(142)
	2-1/2	11	10-5/8	5	60	11-1/2	11	5-3/8	76
	(65)	(276)	(269)	(125)	(27)	(292)	(279)	(135)	(35)
	3	11-3/4	12	5-5/8	78	12-1/2	12-7/16	6	101
	(80)	(299)	(303)	(142)	(35)	(318)	(315)	(154)	(45)
Normally	4	14	14	6-5/8	128	14-1/2	14-3/8	7	164
Closed	(100)	(352)	(354)	(168)	(58)	(368)	(364)	(178)	(74)
	5	15-3/4	15-1/4	7-1/2	160	16-5/8	15-3/4	7-3/4	214
	(125)	(400)	(388)	(185)	(72)	(422)	(399)	(196)	(97)
	6	17-3/4	17-1/16	8-3/16	219	18-5/8	17-1/2	8-5/8	309
	(150)	(451)	(433)	(207)	(100)	(473)	(444)	(218)	(141)

Table 11. Valve Dimensions and Weight.

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## SIEMENS

Technical Specification Sheet Document No. A6V11858963 October 18, 2023

B304FB-HA266.600 A266.600

## **Resilient Seat Butterfly Valves**



#### Description

Designed to last longer with minimal downtime, Siemens resilient seat butterfly valves are available in sizes from 2 to 24 inches (DN 50 to 600) built with the highest temperature and chemical resistance available in the market.

Available in 2-way and 3-way configurations, 2" through 20" butterfly valves are lug style. 24" valves are double-flanged. All have ANSI 125 rated bodies. 3way valves can be used for mixing and diverting applications and are available in multiple configurations to match job site needs.

These valves are compatible with Siemens A-Series Industrial Electric, and OpenAir[®] Commercial Electric actuators. OpenAir actuators are available in in both spring return and non-spring return variants for twoposition (On/Off), Floating and Modulating control. All Industrial actuators include a heater to prevent condensation.

Resilient seat butterfly valves provide bubble-tight shut off (leakage class better than ANSI Class VI) up to 175 PSI (Full Cut) and 50 PSI (Under Cut) requirements.

#### Application

Siemens Resilient Seat butterfly valves are suitable for standard temperature (intermittent 250°F) or high temperature applications (continuous 250°F). Standard temperature assemblies can be field upgraded to high temperature at any time by updating the actuator. There is no need to remove the valve from the piping.

These valves can be used for isolation purposes or as modulating valves. Siemens butterfly valves are optimized for use in Chilled Water, Hot Water and Open Loop Cooling Tower applications.

#### Features

- High purity, peroxide cured, high temperature EPDM seats to ensure continuous operation at 250°F (121°C)
- Corrosion-resistant, 316 Stainless Steel disc (2" through 12")
- Corrosion-resistant Electroless Nickel Plated Ductile Iron (14" through 24")
- Internal disc-to-stem connection to eliminate leakage through the stem
- Wide variety of direct mount actuators.
- Full 175 PSI and 50 PSI close-off pressure ratings available.

Specifications		
Material	Body Disc for sizes 2" 12"	ASTM A126 Class A Cast Iron
	Disc for sizes 14" and above	Flectroless Nickel Plated Ductile
		Iron
	Seat	High purity, peroxide-cured, high
		temperature EPDM
	Stem	416 Stainless Steel
	Stem Bearing Packing	Nitrile Butadiene Rubber (NBR)
	Tee	Ductile Iron (3-Way valves only)
Operating	Body cold working pressure rating	250 psi (17.2 bar)
1 0	Media temperature	-20 to 250°F [continuous] (-28 to 121°C)
	Controlled medium	Hot water, chilled water, condenser water up to 50% Glycol
	Flow characteristic	Modified equal percentage
	Flow Coefficients	Table 1.
	Close-off (for electric actuator assemblies on	ly) 2" to 12", 175 PSI. full cut 14" to 24", 150 PSI, full cut 50 PSI dead end service, full cut 50 PSI, all under cut discs
	Angle of rotation	0° to 90°
	Leakage	Bubble tight at 175 PSI close- off (better than ANSI class VI)
	Maximum fluid velocity	30 feet/second (9 m/second)
	Max recommended differential pressure with	flow 29 psi (2 bar)
Size Range	2-inch through 24-inch (DN 50 to 600)	
Body Style	Lug (2" through 20") or double flange (24"), 2	-way and 3-way, ANSI 125 rated
Miscellaneous	Dimensions, service envelope, weight	See Tables 5 through 8
	Agency Certification (for actuators)	UL Meets UL 873 or UL 508 CUL Certified to Canadian Standard C22.2 No. 24.93 or C22.2 No. 14
	Agency Certification (for valves)	CE European standard SIL

#### NOTE:

These performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult your local Siemens office. Siemens, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Valve				Disc	Opening A	ngle			
Size (Inches)	10°	<b>20°</b>	30°	40°	50°	60°	70°	80°	90°
2	1	7	16	27	43	61	84	114	144
2.5	1.5	11	24	43	67	107	163	223	282
3	2	15	35	61	96	154	267	364	461
4	3	27	62	109	171	274	496	701	841
5	5	43	98	170	268	428	775	1,146	1,376
6	6	56	129	225	354	567	1,025	1,542	1,850
8	12	102	241	421	680	1,081	1,862	2,842	3,316
10	19	162	382	667	1,076	1,710	2,948	4,525	5,430
12	27	353	555	1,005	1,594	2,563	4,393	6,731	8,077
14	34	299	756	1,320	2,149	3,384	5,939	9,974	10,538
16	45	397	1,001	1,749	2,847	4,483	7,867	11,761	13,966
18	58	507	1,281	2,237	3,643	5,736	10,062	14,496	17,214
20	72	632	1,595	2,786	4,536	7,144	12,535	1,812	22,339
24	259	1,028	2,387	4,244	6,962	11,040	18,235	27,186	33,154

Table 1. Cv at Opening Angles, Two-Way Valves.

#### **Sizing and Selection**

1. Determine the designed Cv as follows:

$$Cv = \frac{Q\sqrt{SG}}{\sqrt{\Delta P}}$$

Q = Flow in gallons per minute (GPM) required to pass through the valve

SG = Specific gravity of the fluid (water = 1)

 $\Delta P$  = Designed pressure drop across the valve in PSI

Cv = Flow coefficient

**NOTE**: For modulating butterfly valves, size for design flow at 60° rotation.

2. Determine if the valve should be line sized or sized to match the designed pressure drop:

Option 1: On/Off Valves

Select the valve size to equal the pipe size

Option 2: Modulating Valves

Size the valve for design flow at 60° open

3. Determine actual pressure drop as follows:

$$\Delta P = \left(\frac{Q\sqrt{SG}}{Cv}\right)^2$$

Pressure drop is recommended to be no higher than 29 PSI or match the designed pressure drop. For modulating applications 3, 4, 5, and 6 PSI are commonly accepted.

4. Ensure that close-off requirements are met.

#### **Actuator Product Numbers**

Product	Operating	Voltage	Torque		90° Stroke	Current Draw	(Amps)
Number	Mode	50/60 Hz	(lb-in)	(Nm)	Time*	Full Load	Locked Rotor
A126.530			530	60	31 sec. AC 40 sec. DC	1.0	1.7
A126.600	On/Off	24 Vac	600	68	60 sec. AC 40 sec. DC	1.80	
A126.2K			2,000	226	60 sec.	2.00	
A126.5K			5,000	565	60 sec.	4.00	
A166.530			530	60	31 sec.	1.0	1.7
A166.600	Modulating	24 \/20	600	68	60 sec.	1.80	
A166.2K	iviouulatility	∠4 vac	2,000	226	60 sec.	2.00	
A166.5K	1		5,000	565	60 sec.	4.00	

 Table 2. A-Series Industrial Electric Actuators, 24V.

* Operating times shown are with 60 Hz power supply. Actuators with 50 Hz power supply will be 20% slower.

Table 3. A-Series Industrial Electric Actuators, 120V.

Product	Operating	Voltage	Tore	que	90° Stroke	Current Drav	w (Amps)
Number	Mode	50/60 Hz	(lb-in)	(Nm)	Time*	Full Load	Locked Rotor
A266.530			530	60	31 sec.	0.20	0.34
A226.600			600	68	30 sec.	0.80	1.00
A226.1K			1,200	135	30 sec.	0.78	2.10
A226.2K			2,000	226	30 sec.	1.00	2.10
A226.3K			3,000	339	30 sec.	1.20	3.00
A226.5K	On/Off	120 Vac	5,000	565	30 sec.	1.60	3.00
A226.6K			6,500	734	30 sec.	2.30	3.10
A226.13K			13,000	1,470	110 sec.	2.30	3.10
A226.18K			18,000	2,034	110 sec.	2.50	3.10
A226.21K			21,300	2,406	60 sec.	6.5	14
A226.41K			40,680	4,596	60 sec.	6.5	14
A266.530			530	60	31 sec.	0.20	0.34
A266.600			600	68	30 sec.	0.80	1.00
A266.1K			1,200	135	30 sec.	0.78	2.10
A266.2K			2,000	226	30 sec.	1.00	2.10
A266.3K			3,000	339	30 sec.	1.20	3.00
A266.5K	Modulating	120 Vac	5,000	565	30 sec.	1.60	3.00
A266.6K			6,500	734	30 sec.	2.30	3.10
A266.13K			13,000	1,470	110 sec.	2.30	3.10
A266.18K			18,000	2,034	110 sec.	2.50	3.10
A266.21K			21,300	2,406	60 sec.	6.5	14
A266.41K			40,680	4,496	60 sec.	6.5	14

* Operating times shown are with 60 Hz power supply. Actuators with 50 Hz power supply will be 20% slower.

#### **Ordering a Valve/Actuator Assembly**

Use the product numbers in the following table to order a valve or a valve and actuator assembly. The valve product number consists of the type, action, valve size, disc type, and valve configuration.

To order an assembly, add a (-) after the valve product number and then choose the application, actuator, voltage, control signal, end switches followed by a separator (.) and the actuator torque.

Sample: B	2	02	F	С	-	S	Α	1	2	6		530
Valve Type:												
Action:	J											
2 = 2-Way												
3 = 3-Way					ļ							
Valve Size:	04											
02=2, 25=2.5, 03=3	, <mark>04=4</mark> 0=10"	<b>⊦</b> ,										
12=12", 14=14", 16=1	6",	,										
18=18", 20=20", 24=2	4"											
Disc Type:			J									
F = Full Cut												
U = Under Cut												
Valve Configuration:												
2-Way - A, B, C, D												
O = Normally Open												
C = Normally Closed				- 1								
NI = Valve assembly	with h	nanua	i oper	ator	J							
Application:						l						
S = Standard Temp -	Intern	nittent	250°F	- Ope	ration							
H = High Temperature	<mark>e – Co</mark>	ntinuc	us 25	0°F O	perati	on						
Blank = Siemens Corr	merci	al Act	uator				ļ					
Actuator:												
GCA = Siemens SR C	omme	ercial	Actuat	tor								
GIB = Siemens NSR (	Comm	ercial	Actua	tor				J				
Voltage:												
1 = 24V 2 = 120V												
Control Signal:									1			
2 = 2-Position												
3 = Floating (Commer  6 = Modulating (0.10)	cial A	ctuato	rs only	y)								
										J		
1 = No switches												
6 = Switches											ļ	
Separator												
Actuator Torque (lb-in):												
530=530, <mark>600=600</mark> , 11 13K=13000_18K=180	120 00 21	0, 2K K=21	=2000 300 4	), 3K= I1K=4	3000, 0680	5K=5	000, 6 Shaft	adan [.]	00, ter wit	h 3-fo	ot cah	le
(Commercial Actuator	s only	)				50 -	Shart	uuup			01 000	

Table 4. Product Numbers.

	Table 5.       2-Way, 2" to 6", Resilient Seat Butterfly Valve Bodies.												
S	ize	C	v	•	B	C	П	F	Lι	ıg Boltin	g Data	Weight ¹	
In.	mm	90°	60°		5	C	U		BC	Holes	Threads	lbs	kg
2	50	144	61	3.69	1.62	2.00	2.30	5.50	4.75	4	5/8-11	7.0	3.12
2.5	65	282	107	4.19	1.75	2.50	2.57	6.00	5.50	4	5/8-11	8.0	3.63
3	80	461	154	4.88	1.75	3.00	2.81	6.25	6.00	4	5/8-11	9.0	4.08
4	100	841	274	6.06	2.00	4.00	4.09	7.00	7.50	8	5/8-11	15.0	6.80
5	125	1376	428	7.06	2.12	5.00	4.61	7.50	8.50	8	3/4-10	20.0	9.07
6	150	1850	567	8.12	2.12	5.75	5.06	8.00	9.50	8	3/4-10	23.0	10.43
1- W	1- Weights are for valve bodies only.												

Dimensions – 2-Way, OpenAir Commercial Electric Actuators



#### **Commercial Actuators**

Model	F	G	ц	Weight ¹				
Number	•	0	GH		kg			
GIB	7.43	10.96	3.95	4.4	2.0			
GCA	7.43	10.96	3.95	4.9	2.2			
Dual Actuator	11.75	18.00	4.00	12.8	5.8			
Largest actuator dimension shown								









Figure 1. 3-Way Valve Configurations.

Dimensions – 3-Wa	av. Oi	benAir	Commercial	Electric	Actuators
	.,		••••••••		/

	Table 6. 3-Way, 2" to 6", Resilient Seat Butterfly Valve Bodies.														
Siz	ize Cv		/	Δ	в	C	П	F	Lug Bolting Data						
In.	mm	90°	60°		AB			-	BC	Holes	Threads				
2	50	144	61	2.00	4.50	2.30	1.62	5.50	4.75	4	5/8-11				
2.5	65	282	107	2.50	5.00	2.57	1.80	6.00	5.50	4	5/8-11				
3	80	461	154	3.00	5.50	2.81	1.80	6.25	6.00	4	5/8-11				
4	100	841	274	4.00	6.50	4.09	2.00	7.00	7.50	8	5/8-11				
5	125	1376	428	5.00	7.50	4.61	2.12	7.50	8.50	8	3/4-10				
6	150	1850	567	6.00	8.00	5.06	2.12	8.00	9.50	8	3/4-10				



#### Dimensions – 3-Way, OpenAir Commercial Electric Actuators, Continued

3-Way Tee Weights										
Siz	е	We	ight							
Inches	mm	lbs	kg							
2	50	19	8.6							
2.5	65	27	12.2							
3	80	39	17.7							
4	100	62	28.1							
5	125	79	35.8							
6	150	96	43.5							
8	200	155	70.3							
10	250	270	122.5							
12	300	380	172.4							
14	350	435	197.3							
16	400	550	249.5							
18	450	665	301.6							
20	500	855	387.8							
24	609	1330	603.3							

#### **OpenAir Commercial Electric Actuators**

Model	F	G	Weight ¹							
Number	•	9	lbs	kg						
GIB	7.43	10.96	4.4	2.0						
GCA	7.43	10.96	4.9	2.2						
Dual Actuator	11.75	18.00	12.8	5.8						
Largest actuator dimension shown										





#### **Dimensions – Industrial Actuators**

			Table	7. 2-W	ay, 2" to	o 24", Re	silient S	eat Butte	erfly Valv	e Bodie	es.			
S	ize	С	v	•	P	C		E	Lug	g Bolting	g Data	W	Weight ¹	
In.	mm	90°	60°		Б	C		E	BC	Holes	Threads	lbs	kg	
2	50	144	61	3.69	1.62	2.00	2.30	5.50	4.75	4	5/8-11	7	3.12	
2.5	65	282	107	4.19	1.75	2.50	2.57	6.00	5.50	4	5/8-11	8	3.63	
3	80	461	154	4.88	1.75	3.00	2.81	6.25	6.00	4	5/8-11	9	4.08	
4	100	841	274	6.06	2.00	4.00	4.09	7.00	7.50	8	5/8-11	15	6.80	
5	125	1376	428	7.06	2.12	5.00	4.61	7.50	8.50	8	3/4-10	20	9.07	
6	150	1850	567	8.12	2.12	5.75	5.06	8.00	9.50	8	3/4-10	23	10.43	
8	200	3316	1081	10.59	2.50	7.75	6.05	9.50	11.75	8	3/4-10	42	19.05	
10	250	5430	1710	12.75	2.50	9.75	7.69	10.75	14.25	12	7/8-9	66	29.94	
12	300	8077	2563	14.88	3.00	11.75	9.02	12.25	17.00	12	7/8-9	88	39.92	
14	350	10538	3384	17.05	3.00	13.25	9.93	13.62	18.75	12	1-8	114	51.71	
16	400	13966	4483	19.21	4.00	15.25	11.30	14.75	21.25	16	1-8	166	75.30	
18	450	17214	5736	21.12	4.25	17.25	12.16	16.00	22.75	16	1 1/8-7	226	102.51	
20	500	22339	7144	22.25	5.00	19.25	14.00	17.25	25.00	20	1 1/8-7	305	138.35	
24	600	33154	11040	33.00	5.94	23.28	17.56	19.50	29.50	4	1 1/4-7	500	226.80	
1- W	/eights	are for va	lve bodie	s only.										



VE0461R1

A-Series Actuators												
Model Number	F	G	Н	Weight (lbs)								
Axxx.530	6.4	4.8	6.5	10								
Axxx.600	5.6	7.5	5.8	13								
Axxx.1K/Axxx.2K	6.6	10.1	7.8	28								
Axxx.3K/Axxx.5K/ Axxx.6K	7.2	12.1	9.5	48								
Axxx.13K/Axxx.18K	12.1	18.8	9.5	118								
Axxx.21K	12.3	32.1	28.9	195								
Axxx.41K	12.3	32.1	28.9	195								





#### **Dimensions – Industrial Actuators**

	Table 8. 3-Way, 2" to 24", Resilient Seat Butterfly Valve Bodies.														
S	ize	C	v	•	P	C	р	E	Lug Bolting Data						
In.	mm	90°	60°	~	В	C	U	E	BC	Holes	Threads				
2	50	144	61	2.00	4.50	2.30	1.62	5.50	4.75	4	5/8-11				
2.5	65	282	107	2.50	5.00	2.57	1.80	6.00	5.50	4	5/8-11				
3	80	461	154	3.00	5.50	2.81	1.80	6.25	6.00	4	5/8-11				
4	100	841	274	4.00	6.50	4.09	2.00	7.00	7.50	8	5/8-11				
5	125	1376	428	5.00	7.50	4.61	2.12	7.50	8.50	8	3/4-10				
6	150	1850	567	6.00	8.00	5.06	2.12	8.00	9.50	8	3/4-10				
8	200	3316	1081	8.00	9.00	6.05	2.50	9.50	11.75	8	3/4-10				
10	250	5430	1710	10.00	11.00	7.69	2.50	10.75	14.25	12	7/8-9				
12	300	8077	2563	12.00	12.00	9.02	3.00	12.25	17.00	12	7/8-9				
14	350	10538	3384	14.00	14.00	9.93	3.00	13.62	18.75	12	1-8				
16	400	13966	4483	16.00	15.00	11.30	4.00	14.75	21.25	16	1-8				
18	450	17214	5736	18.00	16.50	12.16	4.20	16.00	22.75	16	1-1/8-7				
20	500	22339	7144	20.00	18.00	14.00	5.00	17.25	25.00	18	1-1/8-7				
24	610	33154	11044	24.00	22.00	16.00	5.94	19.50	29.50	20	1-1/4-7				



A-Series Actuator	ſS					ALLOW 4.00 FOR COVER REMOVAL
Model Number	F	G	н	Weight (lbs)		i 1.36
Axxx.530	9.4	8.0	6.5	10		
Axxx.600	8.6	7.5	5.8	12		Br
Axxx.1K/Axxx.2K	10.73	10.1	7.8	28	G	
Axxx.3K	11.33	12.10	3.50	48		
Axxx.5K	13.2	12.10	9.50	48	н	
Axxx.6K	13.2	12.10	9.50	118		
Axxx.13K/Axxx.18K	20.5	12.10	9.50	118		
Axxx.21K	22.3	32.1	28.9	195		
Axxx.41K	22.3	32.1	28.9	195		

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## SIEMENS

A266.600

# A-Series Industrial Electric Actuator (600 to 18,000 lb-in)



#### Description

The A-Series quarter-turn industrial electric actuator features a compact, reliable design that mounts directly to Siemens resilient seat butterfly valves without the need for brackets and linkages. Available in torque outputs from 600 to 18,000 lb-in (68 to 2,033 Nm), 24V and 120 Vac, Two-position (On/Off) and Modulating units all in NEMA 4x and IP65-rated housings.

#### Features

- Compact, lightweight design and direct mounting
- High visibility Beacon position indicator
- Manual, declutchable override handwheel
- Terminal strip for cable terminations
- Servo NXT option for modulating control
- Travel limit cams adjustable by hand or screwdriver
- UL-approved (120 Vac only)
- On/off or modulating control
- Available in 120, 24 Vac 50/60 Hz, single-phase, 24 Vdc voltages
- Output torque 600 lb-in (68 Nm) to 18,000 lb-in (2,033 Nm)
- ISO 5211 for direct mounting
- All actuators include a heater to prevent condensation build-up
- All modulating units include a feedback potentiometer

Servo NXT Features (for Modulating Actuators)

- Provides precise modulating control of valve position
- Single Finger Technology (SFT) menu driven, pushbutton, programming with LED confirmation of all settings:
  - Input Control 4 to 20 mA, 0 to 10 Vdc, 0 to 5 Vdc or 2 to 10 Vdc
  - $\circ$  Position Feedback 4 to 20 mA, 0 to 10 Vdc, or 0 to 5 Vdc
  - Auto Calibrating
  - Fail Position:
    - Loss of supply power fail-in-place
    - Loss of control signal selectable
    - Adjustable Speed Control
- Including:

0

- o Manual mode
- Onboard signal generator to simplify field set-up
- Fault display Simplifies troubleshooting
- Stall detection Eliminates mechanical damage in case of obstruction or bad switch settings
- Optical isolation of all inputs/outputs
  - o Provides interoperability with all controllers
  - o Earth ground tolerant
  - o Allows for parallel operation

#### Applications

These actuators are ideal for use on valves for chillers, cooling towers, boilers, heat exchangers and other outdoor applications. The actuators' advanced electronics assure reliable compatibility with virtually any analog control signal used in today's building automation and temperature control systems.

Specifications		
Operating Conditions	Ambient Temperature	-20°F to 150°F (-29°C to 65°C)
	Fail Position	Loss of supply power - fail-in-place
	Motor Insulation	
	120 Vac:	Class F, 311°F (155°C) thermal trip at 275°F (135°C)
	24 Vac/dc:	Class B, Slow Blow Fuse 5A @ 250 Vac
Physical Description	Housing	ASTM B85 Pressure Die Cast Aluminum, Polyester Powder Coated
	Motor	
	120 Vac	Single-Phase, Reversible, Permanent Split Capacitor Induction Motor
	24 Vac/Vdc	Single-Phase, Permanent Magnet-Brush D.C. Motor
	Auxiliary/Limit Switches SPDT	
	120 Vac	10A- 1/3 HP
	12 Vdc	2A
	Terminal Strip	
	Switch Plate	12 to 22 AWG (2.0 to 0.65 mm)
	Servo	14 to 24 AWG (1.63 to 0.51 mm)
	Heater	5-Watt, PTC style
	Dimensions and weight	See Dimensions.
	Enclosure	Designed to meet NEMA Type 4, 4x and IP65 specifications
	Travel stops	Externally adjustable at both 0 and 90 degrees.
	Conduit entries	· · · · · ·
	600 lb-in	Two 1/2" NPT (BSP)
	1200 lb-in and higher	Two 3/4" NPT
	Manual operation	Pull to engage, push to disengage -
		30:1 drive ratio, 12 and 18K lbin. models are 90:1
Certifications		UL508 certified (120 Vac only)

Siemens Industry, Inc.

Power Requirements		120 Vac 50/60 Hz +/- 10% 24 Vac 50/60 Hz +/- 10% 24 Vdc -10%, +30% 5 VA average (no load) Fuse: 5A Slow Blow 5 mm × 20 mm
Input Signal	Control Signal	4 to 20 mA, 0 to 10 Vdc, 0 to 5 Vdc, 2 to 10 Vdc
	Input Impedance	>100 Meg Ohms (0 to 10V, 2 to 10V, 0 to 5V)
Output Signal	Operating Modes	4 to 20 mA, 0 to 10 Vdc, 0 to 5 Vdc
	Output Impedance	<10 Ohms (0 to 5 Vdc, output, 0 to 10 V output) 200 Ohms (4 to 20 mA output mode)
	Loop Voltage	12 Vdc (4 to 20 mA output mode)
Resolution	Absolute Position Accuracy	<1%
	Dead Band Adjustment	1% (+/- 0.5%) to 6% (+/-3%) (3% default) 1% minimum increment
Potentiometer Feedback Signal	Supply Voltage External Feedback Potentiometer	3.3 Vdc 1K to 10K Ohms
Speed Control	Open/Close Speed	0% to 100% (default). Step size: 20%. Actuator open/close speed as a percentage of full speed. (See motor speed specification for maximum 90° run times.)
Operating Mode	Normal Mode	Modulating – follow setpoint
	Loss of Control Signal	Selectable to Open, Close, or Last
	Loss of Supply Power	Fail-in-place
	Reverse Acting Mode	Configurable for inverted input signal
	Autocalibration	Automatic endpoint detection
	Manual Operation	Keypad electrical manual operation of actuator (Open, Stop, Close)
Torque Protection	Stall Detection	Motor detected stationary >2 seconds (600 to 6500 lb-in units only)
	Torque Limit	(Optional) externally connected Open/Close torque limit switch
	Electronic Torque Limit	(Optional) factory-programmable current/torque limit switch
Environmental	Ambient Temperature	-20°F to 150°F (-29°C to 65°C)
	Compliance	120V units comply with UL, cUL, and CSA. All models are CE certified.

#### Servo Specifications (for Use with Modulating Actuators)



#### CAUTION:

Do not install or use the A-Series Industrial Electric Actuator in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device and will void the warranty.

#### **Ordering Information**

Product	Operating	Voltage	Tor	que	90° Stroke	Current Draw	(Amps)	
Number	Mode	50/60 Hz	(lb-in)	(Nm)	Time*	Full Load	Locked Rotor	
A126.600		24 Vac/dc	600	68	60 sec. AC 40 sec. DC	1.80		
A126.2K	01/01		2,000	226	60 sec.	2.00		
A126.5K		24 Vac	5,000	565	60 sec.	3.00		
A166.600	Modulating	24 Vac	600	68	60 sec.	1.80		
A166.2K			2,000	226	60 sec.	2.00		
A166.5K			5,000	565	60 sec.	3.00		
A226.600			600	68	30 sec.	0.80	1.00	
A226.1K				135	30 sec.	0.78	2.10	
A226.2K			2,000	226	30 sec.	1.00	2.10	
A226.3K	On/Off	120 \/20	3,000	339	30 sec.	1.20	3.00	
A226.5K		120 Vac			565	30 sec.	1.60	3.00
A226.6K				734	30 sec.	2.30	3.10	
A226.13K			13,000	1,470	110 sec.	2.30	3.10	
A226.18K			18,000	2,034	110 sec.	2.50	3.10	
A266.600			600	68	30 sec.	0.80	1.00	
A266.1K			1,200	135	30 sec.	0.78	2.10	
A266.2K			2,000	226	30 sec.	1.00	2.10	
A266.3K	Modulating	120 \/20	3,000	000 339 30 sec.		1.20	3.00	
A266.5K	wouldurating	120 Vac	5,000	565	30 sec.	1.60	3.00	
A266.6K			6,500	734	30 sec.	2.30	3.10	
A266.13K			13,000	1,470	110 sec.	2.30	3.10	
A266.18K			18,000	2,034	110 sec.	2.50	3.10	

* Operating times shown are with 60 Hz power supply. Actuators with 50 Hz power supply will be 20% slower. **NOTE:** 13K and 18K torque models are available starting July 2020.



#### NOTE:

Use this A-Series Industrial Electric Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the electric actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices such as supervisory or alarm systems or safety or limit controls intended to warn of, or protect against, failure or malfunction of the electric actuator.







Figure 3. 120 Vac Wiring, All Models.

#### Wiring, Continued



Figure 4. 24 Vac Modulating.

#### NOTES:

- Command signal and feedback wires must be shielded and grounded for proper servo operation.
- The command signal input (-) terminal is internally connected to the Servo neutral terminal. DO NOT connect the live to the neutral terminal on the servo.
- Command signal and feedback signal must be isolated from each other and any other circuits. When using 0 to 10 Vdc, 0 to 5 Vdc, and 2 to 10 Vdc, the common of the command signal should NOT be ground/earth referenced.
- Feedback loop is powered by the servo. Do NOT supply external power.
- 5. Command signal and feedback signal wires should be shielded properly, and shield should be grounded on one end only, preferably the controller end.
- The 24V Servo (NXT) can be wired 3 or 4 wire configured.



Figure 5. 120 Vac Modulating.

#### Dimensions

Actuator Model Number	A	В	с	D	E	F	G	н	J	к	L	Μ	N	Р	Q	R	S	Wt Ibs (kgs)
Axx6.600	7.5 (191)	5.8 (147)	5.6 (141)	1 (48)	1.94 (49.2)	.19 (4.7)	1/2	2.2 (55)	5/16-18 ר 2.76 (F07)	-	L75 (19)	.51 (31)	1.75 (44.5)	3.5 (89)	-	-	-	13 (6)
Axx6.1K Axx6.2K	10.1 (256)	7.8 (198)	6.6 (168)	2.4 (62)	2.69 (68.3)	.56 (14.3)	3/4	2.6 (66)	5/16-18 ר 2.76 (F07)	1/2-13 x ø4.92 (F12)	1.18 (30)	.87 (22)	2.22 (56.3)	8.0 (203)	8.0	8.0	8.0	28 (13)
Axx6.3K Axx6.5K Axx6.6K	12.1 (308)	9.5 (242)	7.2 (183)	2.9 (73)	3.19 (80.9)	.56 (14.3)	3/4	3.1 (78)	1/2-13 x ø4.92 (F12)	3/4-10 x ø6.50 (F16)	Se	e Detail	A1	12 (304.8)	-	-	-	48 (22)
Axx6.13K Axx6.18K	12.1 (308)	9.5 (242)	12.5 (317)	8.1 (206)	9.2 (234)	.56 (14.2)	3/4	8.3 (211)	1/2-13 x ø4.92 (F12)	3/4-10 x ø6.50 (F16)	Se	e Detail .	A1	12 (305)	6.1 (155)	12.7 (323)	8 (203)	118 (54)



Figure 6. Models Axx6.600 to Axx6.6K.





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Your feedback is important to us. If you have comments about this document, please send them to <u>sbt_technical.editor.us.sbt@siemens.com</u> Document No. A6V11775657 Printed in the USA Page 7 of 7

## SIEMENS

SSC161.35U

### Electromotoric actuator

SSC161.05U, SSC161.35U, SSC131.39U



#### For Powermite MT Series 2-way and 3-way globe valves

- SSC161.05U (fail-in-place), and SSC161.35U (fail-safe): Operating voltage AC/DC 24 V, modulating control signal DC 0...10 V
- SSC131.39U (fail-safe): Operating voltage AC 24 V, 3-position (floating) control signal
- All actuators are self-calibrating to the valve stroke
- Modulating variants have position feedback signal
- Direct mounting with coupling nut, no tools required
- Manual override
- Position and actuator motion indication (LED)
- Positioning force 67 lbf (300 N)
- Parallel operation of multiple actuators possible



#### Use

- For 2-way and 3-way Powermite 599 MT Series, 599-02000 599-02079
- Typical application in chilled ceiling, VAV, unit ventilators, fan coil unit and other terminal unit applications
- Max.10 units of SSC161.05DU, SSC161S.35DU are able to operate in parallel, provided the controller output suffices.
- For 3-position actuator, SSC131.39U, 24 actuators can run in parallel.

	NOTICE
!	<ul> <li>SSC131.39U floating fail-safe actuators cannot be run in parallel with legacy SSC81.5U actuators.</li> <li>For parallel operation of floating fail-safe SSC actuators all actuators in parallel must be the same part number.</li> </ul>

#### Technical design

When the actuator is driven by DC 0...10 V positioning signal, it produces a stroke, which is transmitted to the valve stem.

#### 3-position control signal (for SSC131.39U only)

<ul> <li>Voltage at Y1:</li> </ul>	Stem extends	Normally open valve closes, normally closed valve opens
Voltage at Y2:	Stem retracts	Normally open valve opens, normally closed valve closes
No voltage at Y1 or Y2:	Actuator maintains its current	position
• Voltage applied to both Y1 and Y2 (not recommended):	Stem moves to Y2	
When no power is supplied, the SSC131.39U actuator fails with the stem fully retracted.		

2

- The valve opens / closes in proportion to the control signal at Y.
- At DC 0 V, actuator stem is retracted, the normally closed valve is fully closed and the normally open valve is fully open.
- When no power is supplied, the SSC161.05U actuator maintains its current position and the SSC161.35U actuator fails with the stem fully retracted.
- This actuator provides a DC 0...10 V position feedback signal proportional to the stroke of the actuator stem.

Y = Control signal Y [V]

H = Percentage of calibrated valve stroke

#### LED indication

Status	LED indication patterns
Variants	SSC161.35U, SSC161.35U, SSC131.39U
Modulation: Stem retracting	Flashing green in sequence: LED1>LED2>LED3 (500 ms each)
Modulation: Stem extending	Flashing green in sequence: LED3>LED2>LED1 (500 ms each)
Stem position	At H0 - H40: Constant green (LED3) At H40 - H60: Constant green (LED2) At H60 - H100: Constant green (LED1)
Fail-safe*	Flashing red (LED2): 500 ms on, 500 ms off
Calibration	Flashing green (LED2): 100 ms on, 100 ms off
Error	Constant red (LED2)
Manual operation	Flashing green/red alternatively (LED2): Green 500 ms, red 500 ms
Ultra-cap initial charging*	Constant green & red simultaneously (LED2): Constant orange

Н

393D01

Y [V]

10

8

100 %

80 %

60 %

40 %

20 %

0 %

0

2

4 6

* Only available for SSC161.35U, SSC161.35U, SSC131.39U.

#### Type summary

Туре	Stock number	Operating voltage	Running speed	Running time 5.5 mm	Control signal	Actuator characteristic
SSC161.05U	S55155-A110	AC/DC 24 V	5 s/mm	27.5 s ± 25 %	DC 010 V	Linear
SSC161.35U	S55155-A111	AC/DC 24 V	5 s/mm	27.5 s ± 25 %	DC 010 V	Linear
SSC131.39U	S55155-A109	AC 24 V	16 s/mm	88 s ± 25 %	AC 24 V	-

#### Ordering

When ordering, specify both type and quantity. Example:

Туре	Stock number	Designation	Quantity
SSC161.05U	S55155-A110	Electromotoric actuator	2

#### Delivery

Valves and actuators can be ordered assembled in the factory or ordered separately. For easier valve assembly, actuators ordered separately have the actuator stem fully retracted.

#### Valve combinations

#### Valves

## Combinable valves for SSC161.05U, SSC161.35U, SSC131.39U, 2-way Powermite 599 MT Series (Stainless Steel)

Action	Nominal Line Size		Flow Rate		Connection		
	Inch	mm	Cv	Kvs	FxF	FxUM	AFxUM
Normally	0.5	15	0.4	(0.34)	599-02015	599-02016	-
Closed	0.5	15	0.63	(0.54)	599-02017	599-02018	_
	0.5	15	1.0	(0.85)	599-02019	599-02020	_
	0.5	15	1.6	(1.37)	599-02021	599-02022	_
	0.5	15	2.5	(2.15)	599-02023	599-02024	_
	0.5	15	4	(3.44)	599-02025	599-02026	_
	0.75	20	6.3	(5.43)	599-02027	599-02028	_
	1	25	10	(8.6)	599-02029	_	_
Normally	0.5	15	0.4	(0.34)	599-02047	599-02048	-
Open	0.5	15	0.63	(0.54)	599-02049	599-02050	-
	0.5	15	1.0	(0.85)	599-02051	599-02052	_
	0.5	15	1.6	(1.37)	599-02053	599-02053	_
	0.5	15	2.5	(2.15)	599-02055	599-02056	599-02057
	0.5	15	4	(3.44)	599-02058	599-02059	599-02060
	0.75	20	6.3	(5.43)	599-02061	599-02062	-
	1	25	10	(8.6)	599-02063	_	_

## Combinable valves for SSC161.05U, SSC161.35U, SSC131.39U, 2-way Powermite 599 MT Series (Brass)

Action	Nominal Line Size		ion Nominal Line Size Flow Rate		Connection		
	Inch	mm	Cv	Kvs	FxF	FxUM	AFxUM
Normally	0.5	15	0.4	(0.34)	599-02000	599-02001	-
Closed	0.5	15	0.63	(0.54)	599-02002	599-02003	-

Action Nominal Line Size		Flow Rate	Flow Rate		Connection		
	Inch	mm	Cv	Kvs	FxF	FxUM	AFxUM
	0.5	15	1.0	(0.85)	599-02004	599-02005	-
	0.5	15	1.6	(1.37)	599-02006	599-02007	-
	0.5	15	2.5	(2.15)	599-02008	599-02009	-
	0.5	15	4	(3.44)	599-02010	599-02011	-
	0.75	20	6.3	(5.43)	599-02012	599-02013	-
	1	25	10	(8.6)	599-02014	-	-
Normally	0.5	15	0.4	(0.34)	599-02030	599-02031	-
Open	0.5	15	0.63	(0.54)	599-02032	599-02033	-
	0.5	15	1.0	(0.85)	599-02034	599-02035	-
	0.5	15	1.6	(1.37)	599-02036	599-02037	-
	0.5	15	2.5	(2.15)	599-02038	599-02039	599-02040
	0.5	15	4	(3.44)	599-02041	599-02042	599-02043
	0.75	20	6.3	(5.43)	599-02044	599-02045	-
	1	25	10	(8.6)	599-02046	-	-

## Combinable valves for SSC161.05U, SSC161.35U, SSC131.39U, 3-way Powermite 599 MT Series

Nominal Line Size		Flow Rate		Connection	
Inch	mm	Cv	Kvs	Brass Trim	Stainless Steel Trim
0.5	15	0.4	(0.34)	599-02064	599-02072
0.5	15	0.63	(0.54)	599-02065	599-02073
0.5	15	1.0	(0.85)	599-02066	599-02074
0.5	15	1.6	(1.37)	599-02067	599-02075
0.5	15	2.5	(2.15)	599-02068	599-02076
0.5	15	4	(3.44)	599-02069	599-02077
0.75	20	6.3	(5.43)	599-02070	599-02078
1	25	10	(8.6)	599-02071	599-02079

**Note:** To ensure trouble-free operation of third-party valves with the SSC.. actuators, the valves must satisfy the following requirements:

- Threaded connections with coupling nut ³/₄".
- Nominal force F > 67 lbf (300 N)
- Dimension  $X \ge 0.35$  in (8.8 mm)
- Dimension  $Y \le 0.56$  in (14.3 mm)





#### Product documentation

Торіс	Title	Document ID
Installation	Mounting instruction	A6V13122038
Standards and directives	CE declarations	A5W00254962A
	RCM conformity	A5W00254983A
Environmental compatibility	Environmental declarations for SSC161.05U	A5W00242127A
	Environmental declarations for SSC131.39U, SSC161.35U	A5W00244689A

Related documents such as the environmental declarations, declarations of conformity, etc., can be downloaded from the following Internet address:

www.siemens.com/bt/download

#### Notes

#### Mounting

<ul> <li>Do not use pipe wrenches, pliers or similar tools.</li> <li>Avoid lateral pressure or (cable) tension on the mounted actuator!</li> </ul>

Valve and actuator are easy to assemble on site before commissioning:

- Remove protective cover from the valve body.
- Position the actuator and tighten the connection nut manually.
- See "Mounting instruction" for graphical instructions.

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#### Orientation



#### Engineering

The actuators must be electrically connected in accordance with local regulations (see "Connection diagrams [▶ 16]").

<b>National safety regulations</b> Failure to comply with national safety regulations may result in personal injury and property damage.
Observe national provisions and comply with the appropriate safety regulations.

Observe permissible temperatures (see "Technical data [► 12]").

#### Commissioning

When commissioning, check both wiring and functioning of the actuator.

- Actuator stem extends Normally open valve closes, normally closed valve opens
- Actuator stem retracts Normally open valve opens, normally closed valve closes

	NOTICE
!	The actuator must be commissioned only with a correctly mounted valve in place!

#### Self-calibration

When operating voltage is applied, the actuator self-calibrates (fully retracted  $\rightarrow$  fully extended  $\rightarrow$  setpoint).





NOTICE	
!	<ul> <li>Correct calibration is only possible with valve stroke &gt; 0.05 inch (1.2 mm). Valve stroke &lt; 1.2 mm results in calibration failure.</li> <li>If calibration fails, the actuator performs another calibration automatically after 10 seconds.</li> <li>After three failed calibration attempts, the actuator stem remains in the extended position and the valves are open.</li> </ul>

#### Electrical fail-safe function (for SSC161.35U, SSC131.39U only)

When first connected to power, or after a power failure, the capacitor which stores energy for the fail-safe function will be charged. This process takes up to 180 seconds. While the capacitor is being charged, the actuator cannot respond to any control signals.

In the event of a power failure of more than 5 seconds, the actuator will return to its fail-safe position within 30 seconds.


A 3-mm Allen wrench can be used to move the actuator to any position.

### To move the actuator stem manually

- 1. Open the cover using a proper screwdriver.
- 2. Press and hold down button (a) illustrated below for at least three seconds.
  - The actuator ignores any control signal from the controller.
- 3. Adjust the position of the actuator stem by rotating Allen wrench (b) illustrated below clockwise or counter-clockwise.
  - The actuator stem moves down if you rotate clockwise; it moves up if you rotate counter-clockwise. The manually set position is retained.
- 4. To release the actuator from manual operation mode, press and hold down button (a) illustrated below again for at least three seconds.
  - The actuator runs a self-calibration automatically. Control signal sent from the controller takes effect.
- 5. Close the cover.





- 1. Unscrew cover screw
- 2. Remove cover
- 3. Remove terminal block and connect or disconnect wire terminals.
- 4. Re-install the terminal block
- 5. Install the cover
- 6. Screw in the cover screw



### Maintenance

The actuators require no maintenance.



NOTICE		
	<ul> <li>When carrying out service work on the plant, note the following:</li> <li>Switch off operating voltage.</li> <li>If necessary, disconnect electrical connections from the terminals.</li> <li>The actuator must be commissioned only with a correctly mounted valve in place!</li> </ul>	

### Repair

The actuators cannot be repaired; the complete unit must be replaced.



#### Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

### Open Source Software (OSS)

#### Software license overview

These devices use Open Source Software (OSS). All Open Source Software components used in the product (to include copyrights and licensing agreement) are available at <a href="http://siemens.com/bt/download">http://siemens.com/bt/download</a>.

Firmware version	OSS document		
	Document ID	Title	
2.10.0 or above	A6V13503690	Readme OSS for Modulating Room Actuator 200N, 300N	All

Power supply				
Operating voltage	SSC161.05U, AC 24 V (± 15 % SSC161.35U		5) or DC 24 V (± 20 %)	
	SSC131.39U AC 24 V (± 20 %		)	
Frequency	50/60 Hz			
Power consumption	wer consumption SSC161.05U		Normal Operation: 3.5 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): N/A	
SSC161.35U			Normal Operation: 3.5 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): 8 VA (AC); 4 W (DC)	
	SSC131.39U		Normal Operation: 3 VA (AC); 1.5 W (DC) Peak (Ultra cap recharge): 6 VA (AC); 4 W (DC)	
Primary fuse or breaker rating	External, 2 A quick blow			

Signal input		
Control signal	Modulating: DC 010 V to Y Floating: AC 24 V to Y1 or Y2	
Input impedance	100 kOhm	
Parallel operation (number of actuators)	Max. 10 modulating or 24 floating actuators ¹⁾	

¹⁾ Provided that the controller output is sufficient.

Signal output		
Feedback signal (modulating actuators only)	DC 010 V	
Max. output current	1 mA	
Max. output voltage	-	
Resolution	1:100	

Operating data		
Position with de-energized contact Y	See "Technical design [▶ 2]"	
Running speed (time for 5.5 mm)	SSC161.05U, SSC161.35U: 5 s/mm ± 25 % (27.5 s ± 25 %)	
	SSC131.39U: 16 s/mm ± 25 % (88 s ± 25 %)	
Positioning force	67 lbf (300 N )	
Stroke	0.05" to 0.25" inch (1.26.5 mm )	
Permissible temperature of medium in the connected valve	34 to 248°F (1120°C)	

Electrical connection (connecting cable integral)		
Permissible length for signal lines	65 ft (20 m)	
Wire cross section	1820 AWG (0.50.75 mm ² )	
Cable diameter	<0.22 inch (5.5 mm)	

Mounting	
Connection to valve	Brass coupling nut 3/4" inch
Orientation	above horizontal

Standards		
EU conformity declaration (CE)	A5W00254962A	
RCM conformity declaration	A5W00254983A	
UK conformity declaration (UKCA)	A5W00257055A	
Housing protection degree	NEMA 2 / IP20 (EN 60529)	
Protection class according to EN 60730	ш	
Pollution degree	2	
Overvoltage category	I	
Environmental compatibility	The product environmental declaration (SSC161.05U: A5W00242127A; SSC131.39U, SSC161.35U: A5W00244689A) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
UL Approval Federal Communications Commission	UL as per UL60730-1, UL60730-2-14 http://ul.com/database cUL as per CSA – CAN E60730-1, E730-2-14 FCC CFR 47 Part 15 Class B	
ICES003	CAN ICES-3 (B)/NMB-3(B)	

### **FCC regulations**

### Modification of this device to receive cellular radio telephone service signals is prohibited under FCC rules and federal law.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Housing color	
Cover/base	2003, Ti-Gray

General ambient conditions			
	Operation	Transport	Storage
Temperature	34 to 122°F (150 °C)	-13 to 158°F (-2570 °C)	-13 to 158°F (-2570 °C)
Humidity	595 % r.h. non condensing	<95 % r.h. non condensing	595 % r.h. non condensing
Atmospheric pressure	Min. 700 hPa, corresponding to max. 3,000 m above sea level	-	-

Material		
Cover/base	PC + ABS	
Connecting nut	Brass	

Weight	
SSC161.05U	9.7 ounces (276 g)
SSC161.35U	10.5 ounces (298 g)
SSC131.39U	10.5 ounces (298 g)

**Connection terminals** 

### Connection terminals for SSC161.05U, SSC161.35U



- System potential (AC/DC 24 V)
- G0 System neutral

G

- Υ Control signal DC 0...10 V
- U Feedback signal
- Measurement reference Μ

### **Connection terminals for SSC131.39U**



- G System potential (AC 24 V)
- System neutral G0
- Y1 Stem extends
- Y2 Stem retracts

### Connection diagrams for SSC161.05U, SSC161.35U



- N = Controller
- Y = Actuator
- SP, G = System potential AC/DC 24 V
- SN, G0 = System neutral
- Y = Control signal
- U = Feedback signal
- M = Measurement reference

### Connection diagrams for SSC131.39U





- SP, G = System potential AC 24 V
- SN, G0 = System neutral
- Y1, Y2 = Control signal OPEN, CLOSE
- Q1, Q2 = Controller contacts



- Y = Actuator
- SP, G = System potential AC 24 V
- SN, G0 = System neutral
- Y1, Y2 = Control signal OPEN, CLOSE
- Q1, Q2 = Controller contacts

	NOTICE
!	<ul> <li>SSC131.39U floating fail-safe actuators cannot be run in parallel with legacy SSC81.5U actuators.</li> <li>For parallel operation of floating fail-safe SSC actuators all actuators in parallel must be the same part number.</li> </ul>



### **Revision numbers**

Туре	Valid from rev. no.
SSC161.05U	A
SSC161.35U	A
SSC131.39U	A

www.siemens.com/buildingtechnologies





## **Technical Instructions**

Document No. 155-163P25 September 25, 2018

## Flowrite[™] 599 Series SKB/C Electronic Valve Actuator Proportional Control





The Flowrite 599 Series SKB/C Electronic Valve Actuator requires a 24 Vac supply and receives a 0 to 10 Vdc or a 4 to 20 mA control signal to proportionally control a valve. This actuator is designed to work with Flowrite 599 Series valves with a 3/4-inch (20 mm) or 1-1/2-inch (40 mm) stroke.	
Direct-coupled installation requires no special tools or adjustments	
Visual and electronic stroke indication	
Die-cast aluminum housing	
Manual override	
Spring return to fail-safe position	
Automatic stroke calibration	
Maintenance-free	
These electronic actuators are designed to be used with Flowrite 599 Series valves with 3/4-inch (20 mm) stroke (SKB) and 1-1/2 inch (40 mm) stroke (SKC) in liquid and steam service applications.	

### **Product Numbers**

Actuator Stroke	Order Number	Actuator Prefix Code
3/4-inch (20 mm)	SKB62U	291
1-1/2 inch (40 mm)	SKC62U	294

warning/Caution No	olalions				
	WARNING:		Personal injury/loss of perform a procedure a	f life may occur if as specified.	you do not
	CAUTION:		Equipment damage o do not follow a proced	r loss of data may dure as specified.	y occur if you
Spacifications	Operating volta	ge SKI	B/C62U	24 Vac ±20%	
Specifications	Frequency SKE	3/C62U	l	50/60 Hz	
Power Supply	Power consum	ption			
	SKB62U	•		18 VA/12W	
	SKC62U			28 VA/20W	
Control signal	Control input ()	/) SKB/	/C62		
oontion signal	Voltage			0 to 10 Vdc or	r 4 to 20 mA
	Maximum	mpeda	ince	0 to 10 Vdc, 1 4 to 20 mA, 2	00K ohms 50 ohms
	Control input (Z	) SKB/	/C62U		
	Resistance Voltage	•		0 to 1000 ohm 0 to 1.6 Vdc	ns
Feedback signal	Control output	(U) SKI	B/C62U		
0	Voltage			0 to 10 Vdc	
	Load impe	dance		>500 ohms	
	Current			4 to 20 mA	
	Load impe	dance		<500 ohms	
Equipment rating	Rating SKB/C62U		Class 2 accor	ding to UL, CSA	
Function	Nominal stroke				
	SKB62U			3/4-inch (20 m	nm)
	SKC62U			1-1/2 inches (	40 mm)
	Run time with o SKB62U	control	operation (full stroke)	<u>Open/Close</u> 120 seconds	<u>Spring Return</u> 15 seconds
	SKC62U			120 seconds	20 seconds
	Nominal Force	SKB/C	62U	Stroke	Force
	NC and 3-v	vay upp	ber	0%	640 lbs (2800 N)
	NO and 3-v	way by-	pass	100%	1000 lbs (4400 N)
Housing	Mounting locat	on		NEMA 1 (inter	rior only)
				NEMA TYPE with 599-1006 <i>Accessories.</i>	3R rated when installed 55 weather shield. See
Ambient conditions	Ambient temperature (Operation)		(Operation)	5°F to 130°F (-15°C to 55°C)	
	Media tempera	ture		20°F to 337°F (-7°C to 170°C)	
Agency certification	UL			UL873	
	cUL Certifie	ed to Ca	anadian standard	C22.2 No. 24-93	
	CE Conformity	as per	the EMC directive	89/336/EEC	
	Low voltage dir	ective		78/23/EEC	

### Warning/Caution Notations

Specifications.	Conduit opening	1/2-inch NPSM	
continued	Dimensions	See Figure 18	
	Weight		
Miscellaneous	SKB62U	18.9 lbs (8,6 kg)	
	SKC62U	22 lbs (10,0 kg)	
Accessories	Installation instructions are included with ea	ach accessory.	
		<b>ASC1.6</b> Auxiliary switch sends a signal to indicate the valve is in the 0% stroke position. Switching point is fixed at the 0% stroke position.	
		Switching capacity	24 Vac 4A resistive, 2A inductive
	E 4017	Lowest recommended current	10 mA
	Figure 1. Auxiliary Switch.		
	Figure 2. Stem Heating Element.	ASZ6.6 The stem heating prevents the formation of when the medium temper below 32°F (0°C). It is survise with valves having a diameter of 10 or 14 mm	ng element f ice on the stem arature drops uited for universal stem or spindle
		Operating voltage Power consumption	24 Vac/dc ± 20% ≤ 40 VA/30W
	EADT2BEZ	<b>599-10065</b> The SKB/C a listed to meet NEMA Typ requirements (a degree of against rain, sleet, and d external ice formation) w Weather Shield and out of fittings in the vertical pose <i>Kits</i> for replacement ultracable ties.	Actuator is UL be 3R of protection amage from hen installed with loor-rated conduit ition. See Service aviolet resistant

Figure 3. Weather Shield.

Service Kits	Circuit board replacement	4 668 5748 8
	Circuit board replacement4 668 5748 8Manual override kit4268 5510 8Plastic wiring compartment cover4 104 5582 8Stem retainer kitContains one stem nut (Figure 7, Item 6) and one stem retainer clip. 2-1/2 and 3-inch valves2-1/2 and 3-inch valves599-100484, 5, and 6-inch valves599-10049Retainer clamp kit599-10200Ultraviolet (UV) resistant cable ties (pkg. of 8)538-994	
	Plastic wiring compartment cover	4 104 5582 8
	Stem retainer kit Contains one stem nut (Figure 7, Item 6) an 2-1/2 and 3-inch valves	nd one stem retainer clip. 599-10048 599-10049
	Retainer clamp kit	599-10200
	Ultraviolet (UV) resistant cable ties (pkg. of 8)	538-994
	WARNING:	



This product contains a spring under high compression. Do not attempt to disassemble the actuator.

```
Operation
```

A 0 to 10 Vdc or a 4 to 20 mA control signal controls the actuator. The actuator, mounted on a valve, produces a stroke proportional to the input signal. When power is turned off or in the event of a power failure, the actuator spring returns the valve to its normal position.





Figure 4. Input Signal.

Figure 5. Spring Return.

### **SKB/C** Details



Legend

- 1. Pressure cylinder
- 2. Piston
- 3. Oscillating pump
- 4. **Return springs**
- 5. Bypass valve
- Coupling piece (stem nut) 6.
- 7. Manual setting knob
- 8. Position indicator

Figure 6. Actuator Design.

### Mounting and Installation

The vertical position is the required position for mounting and the only position for NEMA Type 3R rating with the Weather Shield. Acceptable mounting positions are shown in Figure 7.



Figure 7. Acceptable Mounting Positions.

Allow four inches (100 mm) around the sides and back of the actuator and eight inches (200 mm) above and to the front of the actuator.

See dimensions in Figure 17 and Figure 18.

Detailed installation instructions for field mounting are shipped with the actuator.

### CAUTION:



Use care when removing the knockout. Do not damage the circuit board. Use the top knockout position, if possible.

Start up

Check the wiring for proper connections.

**NOTE:** The valve body assembly determines the complete assembly action.

**Override Control** 

The override control input (Z) has three modes of operation:



NOTE: The Z-modes have a direct acting factory setting.

## Start-up, continued

Stroke Calibration

To determine the stroke positions 0% and 100% in the valve, calibration is required when the valve/actuator are commissioned for the first time. The actuator must be mechanically connected to a valve and must have a supply voltage of 24 Vac. Repeat the calibration procedure as often as necessary

### CAUTION:

Before starting calibration, be sure that the manual adjuster is set to **Automatic** for the actual values to register.

There is a slot on the printed circuit boards for the actuators. To initiate the calibration procedure, the contacts inside this slot must be short-circuited (possibly with a screwdriver). See Figure 8.

Automatic calibration proceeds as follows (see Figure 9):

- Actuator runs to the 0% stroke position (1), green LED flashes.
- Actuator then runs to the 100% stroke position (2), green LED flashes.
- Measured values are stored in the EPROM.
- The actuator now moves to the position defined by control signal Y or Z (3), and the green LED now glows steady (normal operation).
- Throughout this procedure, output U is inactive, meaning the values only represent actual positions when the green LED stops flashing and remains on continuously.



Figure 8.



Figure 9. Automatic Calibration

LED	Display	Function	Action
	ON	Normal Operation	Automatic operation
Green	Floching	Stroke calibration In	Wait for calibration to be
	Flashing	Progress	completed (LED stops flashing)
		Faulty stroke calibration	- Check mounting
ON			- Restart stroke calibration (by
			short-circuiting calibration slot)
Red		Internal Error	- Replace electronics
	Flashing	Inner valve jammed	Check the valve
[	OFF	No power supply	-Check mains
		Faulty electronics	-Replace electronics

### Table 1. LED Status.

### Start-up, Continued

**Standard Features** 



Figure 10. DIP Switches.

<b>DIP Switches</b> (From Left to Right)	1 Selection of Control Signal	2 Selection of Flow Characteristic
ON	4 to 20 mA	Modified*
OFF (Factory Settings)	0 to 10 Vdc	Default

* Changing the default setting will modify an equal percentage valve to a linear flow characteristic. When set to default, the flow characteristic is determined by the valve body.

Normally Closed Valve	Actuator pressure cylinder moves:
	<ul> <li>Outward (0 to 1): Valve opens.</li> <li>Inward (1 to 0): Valve closes.</li> </ul>
Normally Open Valve	Actuator pressure cylinder moves:
	• Outward (0 to 1): Valve closes.
	• Inward (1 to 0): Valve opens.

Actuator pressure cylinder moves:

### Start-up, continued

Outward (0 to 1): Valve opens between ports NC and C.

**Three-way Valve** 

Inward (1 to 0): Valve opens between ports NO and C.



Figure 11. Valve Stem Travel Indication.

Manual operation Release the crank arm of the manual setting knob located on the top of the actuator. See Figure 12.

> A red scale appears in a window in the manual setting knob as you turn the crank clockwise, (see Figure 12). This scale indicates the effective valve stroke in millimeters.

Each complete revolution (360°) is equal to 2 mm of stroke. The numbers 2 to 20 or 2 to 40 are visible depending on the stroke of the actuator.

If a signal is sent to the actuator while it is in manual operation, the actuator will move but the control will not be accurate. The valve cannot be commanded to its 0% position while in manual operation.







### CAUTION:

Do not attempt automatic operation of the actuator when the red scale is visible.

Automatic operation When returning to automatic control, turn the crank arm of the manual setting knob counterclockwise until the red numbers disappear. It is essential that the window is clear and the crank arm is snapped into position. See Figure 13.

**NOTE:** It is possible to secure the manual override handle in place by inserting a  $\# 8 \times 1-1/4$ -inch or M5  $\times 30$  mm thread-forming screw through the handle.



Figure 13. Automatic Operation.

### Wiring

Do not use autotransformers. Use earth ground isolating step-down Class 2 transformers.

Determine supply transformer rating by summing total VA of all actuators used. The maximum rating for Class 2 step-down transformer is 100 VA.

Actuator	Power Consumption	Actuators per Class 2 Supply Circuit* (80% of transformer VA)
SKB62U	17 VA	4
SKC62U	28 VA	2

* Operating more actuators requires additional transformers or separate 100 VA power supplies.

### **Wiring Diagrams**

The position output signal U will switch from 0 to 10 Vdc to 4 to 20 mA when a 4 to 20 mA input signal is selected and used on the Y terminal.



Figure 14. Connecting Terminals.

24 Vac		
G	System potential (SP)	
G0	System neutral (SN)	
Y	Control input 0 to 10 Vdc or 4 to 20 mA	
	(DIP switch selectable)	
Z	Override control	
М	Measuring neutral	
U	Output for 0 to 10 Vdc or 4 to 20 mA measuring voltage. See Table 1.	

Table 1.	Actuator	Output	Signal.
----------	----------	--------	---------

Actuator Innut Signal	Receiving Impedance		
Actuator input Signal	Low (<500 ohm)	High (>10K ohm)	
0 to 10 Vdc	0 to 20 mA	0 to 10 Vdc	
4 to 20 mA	4 to 20 mA	2 to 10 Vdc	



Figure 15. Auxiliary Switch ASC1.6.



24 Vac/30W

Figure 16. Stem Heating Element ASZ6.6.



Figure 17. Dimensions of the 599-10065 Weather Shield in Inches (Millimeters).

### Dimensions, Continued



Figure 18. Dimensions of SKB/C in Inches (Millimeters).

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# SIEMENS



### **Technical Instructions**

Document No. 155-180P25 September 25, 2018

## Flowrite[™] 599 Series

SKD6xU Electronic Valve Actuators 24 Vac Proportional Control



Description	The Flowrite 599 Series SKD6xU Electronic Valve Actuators require a 24 Vac supply and receive a 0 to 10 Vdc or a 4 to 20 mA control signal to proportionally control a valve. These actuators are designed to work with Flowrite 599 Series valves with a 3/4-inch (20 mm) stroke.		
Features	Direct-coupled installation requires no special tools or adjustments		
	Visual and electronic stroke indication		
	Die-cast aluminum housing		
	Manual override		
	Spring return to fail-safe position or non-spring return fail-in-place		
	Automatic stroke calibration		
	Maintenance-free		
Application	These electronic actuators are designed to be used with Flowrite 599 Series valves with a 3/4-inch (20 mm) stroke in liquid and steam service applications.		
Product Number	SKD62U, Spring Return(Actuator Prefix Code 274)SKD60U, Non-Spring Return(Actuator Prefix Code 267)		

### Warning/Caution Notations

WARNING:		Personal injury or loss of life may occur if you do not perform a procedure as specified.
CAUTION:		Equipment damage or loss of data may occur if you do not perform a procedure as specified.

Specifications				
Power supply       Operating voltage         Frequency       Power consumption		24 Vac -20%/+30% 50/60 Hz 17 VA/12W		
Control signals	Control input (Y)			
-	Voltage	0 to 10 Vdc (DIP switch	or 4 to 20 mA selectable)	
	Maximum Impedance 0 to 10 Vdc 100K ohms 4 to 20 mA: 240 ohm		100K ohms 240 ohm	
	Signal resolution	<1%		
	Hysteresis	1%		
	Control input (Z)			
	Resistance	0 to 1000 ohms		
	Voltage	0 to 1.6V		
	Control output (U) – position feedback			
	Voltage	0 to 9.8 Vdc + 2%		
	Load Impedance	>10K ohm	>10K ohm	
	Current	4 to 19.6 m/	4 to 19.6 mA <u>+</u> 2%	
	Load impedance	< 500 ohms		
Function	Nominal stroke	3/4-inch	n (20 mm)	
	Run time with control operation (full stroke)			
	Pushing stroke, 0 to 100% 30 seconds			
	Pulling and Spring return stroke, 100 to	0% 15 seco	onds	
	Nominal Force	<u>Stroke</u>	Force	
	NC and 3-way upper	0%	225 lbs (1000 N)	
	NO and 3-way by-pass	100%	258 lbs (1150 N)	
Agency Certification	UL approval	UL873		
	cUL	Certified to C22.2 No. 2	Certified to Canadian standard C22.2 No. 24-93	
	CC conformity per the EMC directive	89/336/EEC	89/336/EEC	
	Low voltage directive	73/23/EEC	73/23/EEC	
Ambient conditions	Ambient temperature (Operation)	5°F to 122°F	F (-15°C to 50°C)	
	Media temperature	-13°F to 300 <32°F (0°C)	-13°F to 300°F (-25°C to 150°C) <32°F (0°C) requires a Stem Heater	
Housing	NEMA Rating	NEMA 1 (interior only) See Accessories.		
Miscellaneous	Dimensions	See Figure 17		
	Conduit opening	1/2-inch NPSM		
	Weight			
	SKD60U	7.9 lbs (3.6	kg)	
	SKD62U	8.5 lbs (3.85 kg)		

# Accessories NOTE: Installation instructions are included with each accessory.

EA0170R2

Figure 1. Auxiliary Switch.



Figure 2. Stem Heating Element.



Figure 3. Weather Shield.

Service Kits	The only field serviceable part is the circuit board.		
	Circuit board replacement	4-668-5748-8	
	Plastic wiring compartment cover	4-104 5634-8	
	Manual Override Kit for SKD	4-268 5504-8	
	Ultraviolet (UV) resistant cable ties (pkg. of 10)	538-996	



### WARNING:

This product contains a spring under high compression. Do not attempt to disassemble the actuator.



Sends a signal to indicate the valve is in the 0% stroke position. Switching point is fixed

> 24 Vac 4A resistive 2A inductive

10 mA

Operating voltage Power consumption

### 24 Vac/dc ± 20% ≤ 40 VA/30W

### 599-10071 Weather Shield.

ASC1.6 Auxiliary switch.

at the 0% stroke position.

Switching capacity

Lowest recommended

current

See Service Kits for replacement ultraviolet resistant cable ties.

### SKD Details



#### Legend

- 1 Pressure cylinder
- 2 Piston
- 3 Oscillating pump
- 4 Return spring
- 5 Bypass valve
- 6 Valve stem retainer
- 7 Manual override knob
- 8 Position indicator



### Operation

The actuator accepts a 0 to 10 Vdc or a 4 to 20 mA control signal. The actuator mounted on a valve, produces a stroke proportional to the input signal. When power is turned off or in the event of a power failure, the SKD62U Actuator spring returns the valve to its normal position, and the SKD60U Actuator fails in place.



Figure 5.



Spring return: When power is turned off or in the event of a power failure, the actuator spring returns the valve to its normal position. Non-spring return: When power is turned off or in the event of a power failure, the actuator maintains its position.



Figure 7. Valve Stem Travel Indication.

## Mounting and Installation



Figure 8. Acceptable Mounting Positions.

The vertical position is the recommended position for mounting. Other positions are allowed. When using the Weather Shield for NEMA 3R rating, the vertical position is required. See Weather Shield installation instructions and Figure 8.

Allow four inches (100 mm) around the sides and back of the actuator and eight inches (200 mm) above and to the front of the actuator.

See dimensions in Figure 16 and Figure 17.

Detailed installation instructions for field mounting are shipped with the actuator.

**Start-up** Check the wiring for proper connections.

**NOTE:** The valve body assembly determines the complete assembly action.

**Stroke Calibration** To determine the stroke positions 0% and 100% in the valve, calibration is required when the valve/actuator are commissioned for the first time.

The actuator must be mechanically connected to a valve and must have a 24 Vac power supply. The calibration procedure can be repeated as often as necessary.



### CAUTION:

Before starting calibration, be sure the manual adjuster is set to **Automatic** to register the actual values.

There is a slot on the printed circuit boards of the actuators. To initiate the calibration procedure, the contacts inside this slot must be short-circuited, for example, with a screwdriver (see Figure 9).

Automatic calibration proceeds as follows (see Figure 10):

- Actuator runs to the 0 stroke position (1), green LED flashes.
- Actuator then runs to the 100 stroke position (2), green LED flashes.
- Measured values are stored in the EPROM.
- The actuator now moves to the position defined by control signal Y or Z (3), and the green LED now glows steadily (normal operation).
- Throughout this procedure, output U is inactive; meaning, the values only represent actual positions when the green LED stops flashing and remains on continuously.



Figure 9.



Figure 10.

## Stroke Calibration, Continued

#### Table 1. LED Status. LED Function Action Display ON Normal Operation Automatic operation Wait for calibration to be Green Flashing Stroke calibration In Progress completed (LED stops flashing) Faulty stroke calibration - Check mounting - Restart stroke calibration (by ON short-circuiting calibration slot) Internal Error - Replace electronics Red Flashing Inner valve jammed Check the valve -Check mains No power supply ٠ OFF -Replace electronics Faulty electronics

### **Override Control**

The override control input (Z) has three modes of operation:



The Z-modes have a "direct acting" factory setting.



Figure 11. SKD Electronic Features.

DIP Switches (Left to right)	1 Selection of Control Signal	2 Selection of Flow Characteristic
ON	4 to 20 mA	Modified*
OFF Factory Setting	0 to 10 Vdc	Default

*Changing the default setting will modify an equal percentage valve to a linear flow characteristic. When set to default, the flow characteristic is determined by the valve body.

Normally Closed Valve	Actuator pressure cylinder moves:		
	• Outward (0 to 1): Valve opens.		
	• Inward (1 to 0): Valve closes.		
Normally Open Valve	Actuator pressure cylinder moves:		
	• Outward (0 to 1): Valve closes.		
	• Inward (1 to 0): Valve opens.		
Three-Way Valve	Actuator pressure cylinder moves		
	• Outward (0 to 1): Valve opens between port NC and C.		
	• Inward (1 to 0): Valve opens between ports NO and C.		
	The measuring voltage at terminal <b>U</b> provides valve stem position feedback to an indicating instrument or building automation system.		

### **Manual Operation**

	Events		
	Figure 12. The Manual Setting Knob in Manual and Automatic Position.		
	- Turn the manual setting knob clockwise for manual operation.		
	<ul> <li>A red indicator becomes visible as you begin to crank. Each complete revolution (360°) is equal to 3/32-inch (2.5 mm) stroke.</li> </ul>		
	<ul> <li>If a signal is sent to the actuator while it is in manual operation, the actuator will move but the control will not be accurate.</li> </ul>		
	- The valve cannot be commanded to its 0% position while in manual operation.		
Automatic operation	For automatic operation the manual override knob must be in the fully closed position.		
	Turn the manual override knob counterclockwise until the red indicator disappears.		
Wiring	Do not use autotransformers. Use earth ground isolating step-down Class 2 power supplies.		
	Determine supply transformer rating by summing total VA of all actuators used.		
	The maximum rating for Class 2 step-down transformer is 100 VA.		
	<ul> <li>Since SKD6xU actuators require ≈20 VA, a maximum of four actuators can be powered by one transformer (80% of transformer VA).</li> </ul>		
	<ul> <li>Operating more than four SKD6xU actuators requires additional transformers or separate 100 VA power supplies.</li> </ul>		
	<ul> <li>The position output signal U will switch from 0 to 10 Vdc to 4 to 20 mA when a to 20 mA input signal is selected and used on the Y terminal.</li> </ul>	a 4	

2

➡ >3x360°

### **Wiring Diagrams**



Figure 13. Connecting Terminals.

24 Vac		
G	System Potential (SP)	
G0	System Neutral (SN)	
Y	Control input 0 to 10 Vdc or 4 to 20 mA (DIP switch selectable)	
М	Measuring neutral	
U	Position indication 0 to 10 Vdc or 4 to 20 mA, (see Table 2.	
Z	Override control	

### Table 2.

Actuator input signal	Receiving Impedance		
Actuator input signal	Low (<500 Ohm)	High (>10K Ohm)	
0 to 10 Vdc	0 to 20 mA	0 to 10 Vdc	
4 to 20 mA	4 to 20 mA	2 to 10 Vdc	



Figure 14. Auxiliary Switch ASC1.6.

Troubleshooting	•	Check that the wires are connected correctly and attached securely.
	•	Check for adequate power supply.
	٠	Check that the actuator is set for automatic operation. See the Start-Up section.

ASZ6.6.

Technical Instructions Document Number 155-180P25 September 25, 2018

### Dimensions





Figure 16. Dimensions of 599-10071 Weather Shield in Inches (Millimeters).

### Dimensions, Continued

NOTE: The top knockout position should be used when installing the Weather Shield.



Figure 17. Dimensions of SKD6xU Actuators in Inches (Millimeters).

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# SIEMENS



### **Technical Instructions**

Document No. 155-541P25 October 15, 2018

### Flowrite[™] 599 Series Rack & Pinion Valves



Description	The Flowrite 599 Series Rack & Pinion Valve couples the OpenAir™ Actuator to a 1/2- to 2-inch Flowrite 599 Series two- or three-way valve via a linkage. The linkage transforms the actuator rotary movement into the linear motion required to position the valve.					
Features	Brushless DC motor technology with stall protection					
	Bi-directional fail-safe spring return (actuator dependent)					
	Direct or reverse acting selectable by field installation					
	All metal housing					
Application	The Flowrite valves are used to control water and glycol solutions to 50 percent in small to large air handling units and central plant applications.					
Warning/Caution Notations	<b>WARNING:</b> Personal injury or loss of life may occur if you do not perform a procedure as specified.					
	<b>CAUTION:</b> Equipment damage may occur if you do not perform a procedure as specified.					

### Product Numbers

Table 1 provides a complete description of the product numbers.

Product Number	Description
298-XXXXX 299-XXXXX	Assembly consisting of: OpenAir Electronic Actuator, linkage, and 1/2- inch to 2-inch Flowrite two-way or three-way valve body. 298-XXXXX includes: OpenAir GCA161.1U Electronic Actuator for 0 to 10 Vdc modulating control with a 24 Vac or 24 Vdc supply voltage. Product number 299-XXXXX includes: OpenAir GCA121.1U Electronic Actuator for 2-position on/off control with a 24 Vac or 24 Vdc supply voltage. The XXXXX of the product number specifies a particular Flowrite two or three-way valve body. For details and complete product numbers, see TB249, <i>Flowrite 599</i> <i>Series Valve and Actuator Assembly Selection</i> Technical Bulletins
599-03609	Assembly consisting of: OpenAir GCA161.1U Electronic Actuator and linkage. The assembly is ready for field installation on a 1/2- to 2-inch Flowrite two- or three-way valve. For details on the actuator, see <i>OpenAir GCA Series Spring Return 142</i> <i>Ib in Electronic Damper Actuators Technical Instructions</i> (155-173P25).
599-03611	Assembly consisting of: OpenAir GCA121.1U Electronic Actuator and linkage. The assembly is ready for field installation on a 1/2- to 2-inch Flowrite two- or three-way valve. For details on the actuator, see <i>OpenAir GCA Series Spring Return 142</i> <i>Ib in Electronic Damper Actuators Technical Instructions</i> (155-173P25).
599-03610	Linkage only. For mounting of an alternate OpenAir electronic actuator on the linkage and installation of that linkage/actuator assembly on 1/2-inch to 2-inch Flowrite two-way or three-way valve.

### Table 1. Flowrite 599 Series Rack & Pinion Valve Product Numbers.

### **Specifications**

Power supply	Operating voltage Frequency Rower consumption	24 Vac ±20%, 24 Vdc ±10% 50/60 Hz
	599-03609 assembly (with GCA161.1U actuator)	9 VA running, 5 VA holding
	599-03611 assembly (with GCA121.1U actuator)	8 VA running, 3 VA holding
	Equipment rating	Class 2, in accordance with UL/CSA
Control signal (599-03609 assembly with GCA161.1U actuator)	Input signal voltage input input resistance	0 to 10 Vdc (max. 35 Vdc) 100K ohms
	current input input resistance	4 to 20 mA 500 ohms
	Position output feedback signal	0 to 10 Vdc, ±1 mA maximum
Ambient conditions	Ambient temperature operation storage and transport	-25 to 130°F (-32 to 55°C) -25 to 158°F (-32 to 70°C)
	Ambient humidity (non-condensing)	95% rh
Mounting	Nominal angle of rotation	90°
	Maximum angular rotation	95°
	Noise level	<45 dBA (running)
	Enclosure	NEMA 2 in vertical to horizontal 90 degrees (see Figure 1)
Linkage	Frame	Aluminum alloy frame
	Construction	Steel rack, pinion and stem shaft pre- lubricated, bronze bushings
Physical characteristics	Pre-connected cable	18 AWG, 3 ft (0.9 m)
-	Dimensions	See Figures 2 and 3.
	Weight	8.35 lb (3.79 kg)

For Valve specifications, see the following documents:

- Flowrite[™] 599 Series Two-way 1/2 to 2-inch Bronze Valves Technical Instructions (155-184P25)
- Flowrite 599 Series Three-Way 1/2 to 2-inch Bronze Valves Technical Instructions (155-185P25)

For OpenAir™ Electronic Damper Actuator specifications, see the following document:

OpenAir GCA Series Spring Return 142 lb in Electronic Damper Actuators (155-173P25)
# Operation

599-03609 assembly with GCA161.1U actuator	A continuous 0 to 10 Vdc signal from a controller to Terminal Y (8, gray) of a normally-closed, direct-acting assembly operates the actuator and the valve opens respectively. The linkage proportionally translates the rotary actuator stroke into a linear valve stem motion.
	A 0 to 10 Vdc position output feedback signal at Terminal U (9, pink) is available to monitor the position of the actuator.
	In the event of a power failure or when the operating voltage is absent, the actuator returns to the fail-safe (90°) position and the valve closes.
	In the event of a stall, the actuator is overload protected over the full range to prevent damage.
599-03611 assembly with GCA121.1U actuator	When power is applied to a normally-closed, direct-acting assembly, the actuator moves to the full-open (-5°) position and the valve opens. The linkage translates the rotary actuator stroke into a linear valve stem motion.
	In the event of a power failure or when operating voltage is absent, the actuator returns to the fail-safe (90°) position and the valve closes.
	In the event of a stall, the actuator is overload protected over the full range to prevent damage.
Life expectancy	An improperly-tuned loop will cause excessive repositioning that will shorten the life of the actuator.
Installation and Mounting	Flowrite Rack & Pinion Valves are suitable for water applications where, the actuator mounts on the linkage vertically. Units are shipped from the factory in the vertical position.
	Flowrite Rack & Pinion Valves can be installed on normally-closed, normally-open, and three-way Flowrite valves for direct or reverse-acting control applications. The actuator orientation and the position of the actuator shaft adapter on the linkage determine whether the linkage shaft rotates clockwise or counterclockwise for the proper control action. <i>Flowrite 599 Series Rack &amp; Pinion Valves Installation Instructions</i> (129-292), shipped with the assembly, provides details to configure the assembly for the desired control application.
	For applications using an alternate OpenAir Electronic Actuator on the linkage, the actuator preload must be reset. <i>Flowrite 599 Series Rack &amp; Pinion Valves Installation Instructions</i> (129-292), shipped with the assembly, provides preload details.
	Install the Flowrite Rack & Pinion Valve so that the flow of the medium follows the direction of the arrow cast on the valve body. For best performance, install the valve with the actuator above the valve body. Figure 1 shows acceptable NEMA 2 mounting positions. Do not mount the assembly so that the actuator is below horizontal or upside-down.
	Allow sufficient space for servicing the assembly. See <i>Dimensions</i> and the recommended service envelope in Figure 2.



Figure 1. Acceptable NEMA 2 Mounting Positions.

Wiring

All wiring must conform to NEC, and to local codes and regulations.

Use earth ground isolating step-down Class 2 transformers. Do not use autotransformers.

Determine the supply transformer rating by summing the total VA of all actuators used. The maximum rating for a Class 2 step-down transformer is 100 VA.

Table 2 shows the recommended maximum actuators per Class 2 circuit and includes a safety factor of 80% of the transformer VA. Operating additional actuators requires additional transformers or separate 100 VA power trunks.

Table 2. Recommended Maximum Power Consumption(VA) for a Class 2 Step-Down Transformer.							
Actuator	Power Consumption	Actuator per Class 2 Supply Circuit					
GCA12x.	8 VA	10					
GCA16x	9 VA	9					

### Wiring Diagrams

599-03609 assembly with GCA161.1U actuator



# Table 3. 599-03609 Assembly (with GCA161.1U) for Modulating Control with 24 Vac or 24 VdcSupply Voltage.

Standard Symbol	Function	Terminal Connection	Standard Color
1	Supply (SP)	G	Red
2	Neutral (SN)	G0	Black
8	0 to 10 Vdc input signal	Y	Gray
9	Output for 0 to 10 Vdc position feedback indication	U	Pink

599-03611 assembly with GCA121.1U actuator



#### Table 4. 599-03611 Assembly (with GCA121.1U) for 24 Vac or 24 Vdc Two-Position Control.

Standard Symbol	Function	Terminal Connection	Standard Color		
1	Supply (SP)	G	Red		
2	Neutral (SN)	G0	Black		

### Start Up/ Commissioning

Check that the wires are connected correctly.

• For addit

 For additional actuator information, see OpenAir[™] GCA Series Spring Return 142 lb-in Electronic Damper Actuators Technical Instructions (155-173P25).

Service



### WARNING:

Do not open the actuator.

If the linkage or actuator is inoperative, replace the unit.

For valve service kits, see the following documents:

- Flowrite 599 Series Two-Way 1/2 to 2-Inch Bronze Valves Technical Instructions (155-184P25)
- Flowrite 599 Series Three-Way 1/2 to 2-inch Bronze Valves Technical Instructions (155-185P25)

# Dimensions



#### Figure 2. Dimensions of the Flowrite 599 Series Rack & Pinion Valve in Inches (Millimeters).

NOTES: For valve dimensions, see the following documents:

- Flowrite 599 Series Two-Way 1/2- to 2-inch Bronze Valves Technical Instructions (155-184P25)
- Flowrite 599 Series Three-Way 1/-2 to 2-inch Bronze Valves Technical Instructions (155-185P25)

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# SIEMENS

# OpenAir[™] GCA Series, Spring Return,160 lb-in, Electronic Damper Actuators

### Description

The OpenAir GCA Series spring return, 160 lb-in (18 Nm) electronic damper actuators provide modulating, two-position and floating control of building HVAC dampers.

	Operating Voltage			Control				Cak	oles	Built-in Control Options			
Product Number	24 Vac ± 20%	24 Vdc ±10%	120 Vac ± 10%	0 to 10 Vdc	2 to 10 Vdc or 0 to 10 Vdc	Floating	2-position	Standard	Plenum	Position Feedback	Dual Auxiliary Switches	Signal Inversion	Offset 0 to 5 Vdc Span 2 to 30 Vdc
GCA121.1U	٠	٠					٠	٠					
GCA121.1P	٠	٠					٠		٠				
GCA126.1U	٠	٠					٠	٠			٠		
GCA126.1P	٠	٠					٠		٠		•		
GCA221.1U			٠				٠	٠					
GCA226.1U			٠				٠	٠			•		
GCA131.1U	٠	•				٠		•					
GCA131.1P	٠	٠				•			•				
GCA132.1U	٠	•				٠		٠		٠			
GCA136.1U	٠	٠				•		٠			•		
GCA136.1P	٠	•				٠			•		•		
GCA151.1U	٠	•			•			•		•		٠	
GCA151.1P	٠	•			•				٠	٠		٠	
GCA156.1U	٠	•			•			٠		٠	•	•	
GCA156.1P	•	•			•				٠	•	•	•	
GCA161.1U	٠	•		٠				٠		٠			
GCA161.1P	•	•		٠					٠	•			
GCA163.1U	٠	•		٠				٠		٠			•
GCA163.1P	٠	•		•					•	•			•
GCA164.1U	٠	•		•				•		•	•		•
GCA164.1P	٠	•		•					•	٠	•		•
GCA166.1U	٠	•		•				•		٠	•		
GCA166.1P	٠	•		•					•	•	•		



### Features

- Brushless DC motor technology with stall protection
- Bi-directional fail-safe spring return
- · Patented self-centering shaft coupling
- Models available with dual independently adjustable auxiliary switches
- All modulating models offer built-in feedback
- Floating control models available with feedback potentiometer
- All metal housing
- Manual override
- 5° preload as shipped from factory
- Mechanical range adjustment capability by moving shaft coupling to desired position
- · Easily visible position indicator
- Precabled
- CE, UL60730, and cUL (C22.2 No. 24-93) listed

#### **Technical Data**

24 Vac, 120 Vac Torque:	160 lb-in (18 Nm) running and spring return <360 lb-in (40 Nm) maximum	2
NOTE: At -25°F, spring	ı return is 142 lb-in (16 Nm)	
Runtime for 90°:	90 sec. operating, 15 sec. typical (30 sec. max.) closing on power loss	
Frequency:	50/60 Hz	
Power consumption: Running:	7 VA/5W (24 Vac/dc; GCA12x, GCA13x) 7 VA/5W (24 Vac/dc, GCA15x) 7 VA/5W (24 Vac/dc GCA16x) 8 VA (120 Vac GCA22x)	
Power consumption:		
Holding	5 VA/3W (24 Vac/dc, GCA12x) 5 VA/3W (24 Vac/dc, GCA13x, GCA15x) 5 VA (24 Vac/dc, GCA16x) 6 VA (120 Vac, GCA22x)	
Equipment rating (24V):	Class 2 per UL/CSA	
Noise level:	<45 dBA (running)	
Angle of rotation:	90° nominal, 95° max.	
Shaft dimensions:	3/8-in to 1-in (8 to 25.6 mm) dia. 1/4-in to 3/4-in (6 to 18 mm) sq. 3/4-in (20 mm) min. length	
Operating temperature:	-25°F to 130°F (-32°C to 55°C)	
Storage temperature:	-40°F to 158°F (-40°C to 70°C)	2
Ambient humidity:	95% rh (non-condensing)	
Pre-cabled connection:	18 AWG, 3 ft (0.9 m) long	
Enclosure:	NEMA 2, IP54 per EN 60 529	
Material:	Die cast aluminum alloy	
Agency listings:	CE, UL60730, cUL C22.2 No. 24-93	
Gear Lubrication:	Silicone-free	
Weight:	4.85 lb (2.2 kg)	
Dimensions:	11-13/16 in (300 mm) H 4-3/4 in (120 mm) W 2-7/8 in (72 mm) D	

#### **Typical Specifications**

Spring return damper actuators shall be the type that requires no connecting linkages. The spring return actuators shall have a selfcentering damper shaft coupling that assures concentric alignment of the actuator's output coupling with the damper shaft and be capable of direct mounting to a shaft up to a 1-inch diameter. Actuators shall use a brushless DC motor and provide stall protection throughout the full range of rotation. All spring return actuators shall be capable of both clockwise and counterclockwise spring return fail-safe operation using a continuously engaged mechanical return spring that returns the actuator to a fail-safe position in <20 seconds in response to a loss of power. All actuators shall provide a means of manually positioning the output coupling in the absence of power. Dual independently adjustable auxiliary switches must be integral to the actuator. All actuators must be precabled and provide an easily readable high contrast yellow on black position indicator. All actuators shall be UL60730 and CSA22.2 listed and manufactured under ISO 9002 and ISO 14000 procedures. Actuators shall be designed for a minimum of 60,000 full stroke cycles at the actuators rated torque and temperatures. Actuators shall be as manufactured by Siemens Industry, Inc.

# Wiring Diagrams

#### 2-Position, 24 Vac/dc:



#### Floating, 24 Vac/dc:



#### 0 to 10 Vdc, GCA16x, 24 Vac/dc; 2 to 10 Vdc, GCA15x, 24 Vac/dc:



#### 2-Position, 120 Vac:



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# SIEMENS



Submittal Sheet Document No. 154-004P25 January 25, 2011

# OpenAir[™] GMA Series, Spring Return, 24 Vac/dc and 120 Vac, 62 Ib-in, Direct-Coupled Electronic Damper Actuators

Product Number	Operating Voltage		Control			Cat	oles		Built-In Control Options				
	24 Vac ±20% 24 Vdc ±15%	120 Vac ±10%	Modulating 0 to 10 Vdc	Modulating 2 to 10 Vdc	Floating	2-position	Standard	Plenum	Position Feedback	Dual Auxiliary Switches	Offset 0 to 5 Vdc Span 2 to 30 Vdc	Input Signal Inversion (Direct or Inverse Acting)	Feedback Signal Inversion
GMA121.1U	٠					٠	٠						
GMA121.1P/B	٠					•		•					
GMA121.1P	٠					•		•					
GMA126.1U	•					٠	•			•			
GMA126.1P	٠					•		•		•			
GMA221.1U		•				٠	•						
GMA226.1U		•				٠	٠			٠			
GMA131.1U	٠				٠		•						
GMA131.1P	٠				٠			٠					
GMA132.1U	٠				٠		•		•				
GMA136.1U	٠				•		•			٠			
GMA151.1U	٠			٠			٠		•			٠	•
GMA151.1P	•			•				•	٠			٠	•
GMA156.1U	•			•			•		٠	٠		٠	•
GMA156.1P	٠			•				•	٠	٠		•	•
GMA161.1U	•		•				•		•				
GMA161.1P	•		•					•	٠				
GMA163.1U	•		•				•		•		•		
GMA163.1P	•		•					•	٠		•		
GMA164.1U	•		•				•		•	•	•		
GMA166.1U	•		•				•		•	•			
GMA166.1P	•		•					•	•	•			

#### **Technical Data**

Runtime for 90°: 90 sec. operating 15 sec. typical (<60 seconds max. at -25°F (-32°C)) Spring Return: Frequency: 50/60 Hz Power consumption: 24 Vac/dc Running: 5 VA/3.5W Holding: 4 VA/3W Power Consumption: 120 Vac Running and holding: <7 VA/5W Equipment rating (24V): Class 2 per UL/CSA Angle of rotation: 90° nominal, 95° max. Shaft dimensions: 1/4 to 3/4-in. (6.4 to 20.5 mm) dia., 1/4 to 1/2-in. (6.4 to 13 mm) sq., 1-in. (25.4 mm) min. length Operating temperature: -25°F to 130°F (-32°C to 55°C) Storage temperature: -40°F to 158°F (-40°C to 70°C) Ambient humidity: 95% rh (non-condensing)

#### Description

The OpenAir direct-coupled, spring return electronic damper actuators provide modulating, two-position and three-position control of building HVAC dampers.



#### Features

- · Brushless motor technology
- Bi-directional fail-safe spring return
- Unique self-centering shaft coupling
- Models available with dual, independently adjustable auxiliary switches
- Floating control models available with feedback potentiometer
- All modulating control types include built-in feedback capability
- · All metal housing
- Manual override
- Mechanical range adjustment capability
- · Easily visible position indicator
- Precabled
- UL60730 (to replace UL873) and cUL (C22.2 No. 24-93) listed C € conformance
- Small actuator footprint with 62 lb-in of torque
- 24 Vac/dc compatible

#### **Technical Data, continued**

Enclosure:	NEMA 1
Precabled connection:	18 AWG, 3 ft (0.9 m) long
Agency listings:	UL60730 (to replace UL873)
	C-UL C22.2 No. 24-93
Material:	Die cast aluminum alloy
Gear lubrication:	Silicone free
Dimensions:	8-3/8" H × 3-1/4" W × 2-2/3" D
	(212 mm H x 83 mm W x 68 mm D)
Weight:	2.9 lb (1.3 kg)
Country of Origin	USA
Typical Specifications	

#### Typical Specifications

Spring-return damper actuators shall be the direct-coupled type that requires no connecting linkages. These spring return actuators shall have a self-centering damper shaft coupling that assures concentric alignment of the actuator's output coupling with the damper shaft for <60 lb-in torque and be capable of direct mounting to a shaft up to a 3/4-inch in diameter. Actuators shall provide stall protection throughout the full range of rotation. All spring return actuators shall be capable of both clockwise and counterclockwise spring return fail-safe operation using a continuously engaged mechanical return spring that returns the actuator to a fail-safe position in <15 seconds in response to a loss of power. All actuators shall provide a means of manually positioning the output coupling in the absence of power. Dual, independently adjustable auxiliary switches are available for these actuators. All actuators must be precabled and provide an easily readable high contrast yellow on black position indicator. All actuators shall be CE conforming; UL60730 (to replace UL873) and CSA22.2 listed and manufactured under ISO 9002 and ISO 14000 procedures. Actuators shall be as manufactured by Siemens Industry, Inc.

#### **Dimensions in Inches (Millimeters)**



### Wiring Diagrams

#### GMA12x, 2-Position, 24 Vac/dc:







#### GMA13x, Floating, 24 Vac/dc:



#### GMA16x, GMA15x; Modulating; 24 Vac/dc:



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GTx116E-P+



Airflow Measurement with Temperature and Alarm Capability

Advantage IV

# GTx116e-P+ OVERVIEW



The GTx116e-P+ is EBTRON's top-of-the-line solution for accurate and repeatable measurement in ducts and plenums. Ideal for outdoor air delivery monitoring and airflow tracking applications. Temperature and alarm capability plus unsurpassed product features and connectivity options make this the best choice for today's high performance buildings. Bluetooth[®] low energy technology interface.¹

¹ Order with the /NR option when RF devices are not permitted.

# **Typical Applications**

- Outdoor Air Delivery Monitoring
- Differential Airflow Tracking
- Hospital Pressurization
- Laboratory Pressurization
- Air Change Verification & Monitoring
- System Performance Monitoring

# Benefits

- Comply with ASHRAE Standards
- Demonstrate Code Compliance
- Satisfy LEED Prerequisites and Credits
- Provide Acceptable IAQ
- Save Energy
- Reduce Liability
- Improve Performance

# **Product Highlights**

- Best Installed Accuracy
- Low Airflow Capability
- Volumetric or Mass Airflow Measurement
- Long-term Stability
- "Plug and Play" Operation
- Intuitive User Interface
- Waterproof Sensor Assembly
- FEP Plenum Rated Cables



# SPECIFICATIONS: GTx116e-P+

#### General

Probe and Sensor Node Configurations (max.) 2 probes x 8 sensor nodes/probe 4 probes x 4 sensor nodes/probe Installed Airflow Accuracy¹ Ducts/Plenums: ±3% of reading Non-ducted OA Intakes: better than or equal to ±5% of reading P+ Sensor Density: Refer to the P+ sensor density table. Sensor Node Averaging Method Airflow: Independent, arithmetic average Temperature: Independent, velocity weighted average Listings & Compliance UL: UL-873 and CSA C22.2 No. 24 CE: Non-UK European shipments only UKCA: UK shipments only BACnet International: BTL Listed (GTC116e and GTM116e transmitters) FCC: This device complies with Part 15 of the FCC rules RoHS: This device is RoHS2 compliant **Environmental Limits** Temperature: Probes: -20 to 160 °F [-28.9 to 71.1 °C] Transmitter: -20 to 120 °F [-28.9 to 48.9 °C] Humidity: (non-condensing) Probes: 0 to 100% Transmitter: 5 to 95% Individual Sensing Nodes Sensing Node Sensors Self-heated sensor: Precision, hermetically sealed, bead-in-glass thermistor probe Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor probe Sensing Node Housing Material: Glass-filled Polypropylene (Kynar® with /SS option) Sensor Potting Materials: Waterproof marine epoxy Sensing Node Internal Wiring Type: Kynar® coated copper Airflow Measurement Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty) Calibrated Range: 0 to 5,000 fpm [25.4 m/s] Calibration Points: 16 **Temperature Measurement** Accuracy: ±0.15°F [0.08 °C] to NIST-traceable temperature standards (includes transmitter uncertainty) Calibrated Range: -20 to 160 °F [-28.9 to 71.1 °C] **Calibration Points: 3** Sensor Probe Assembly Tube Material: Gold anodized 6063 aluminum (316 stainless steel with

/SS option)

**Mounting Brackets** Material: 304 stainless steel Mounting Options & Size Limits¹ Insertion: 6 to 191in. [152.4 to 4851 mm] Stand-off: 6 to 190 in. [152.4 to 4826 mm] Internal: 8 to 194 in. [203.2 to 4928 mm] **Probe to Transmitter Cables** Type: FEP jacket, plenum rated CMP/CL2P, UL/cUL listed, -67 to 302 °F [-55 to 150 °C], UV tolerant Standard Lengths: 10, 15, 20, 25, 30, 40 and 50 ft. [3.1, 4.6, 6.1, 7.6, 9.1, 12.2, and 15.2 m] Connecting Plug: 13/16" [20.63 mm] nominal diameter with goldplated connector pins Transmitter Power Requirement: 24 VAC (22.8 to 26.4 under load) @20V-A max. Connector Receptacle Pins and PCB Connections: Gold-plated receptacle pins, PCB interconnects, PCB edge fingers, and test points User Interface: 2 line x16-character backlit LCD display and 4 button interface **B.A.S. Connectivity Options** All Transmitters: Three field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm, AO3=Not Used). GTA116e Transmitter: No additional connectivity to B.A.S. GTC116e Transmitter: One additional field selectable (BACnet MS/ TP or Modbus RTU) and isolated RS-485 network connection -Individual sensor node airflow rates and temperatures are available via the network GTM116e Transmitter: One additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network GTF116e Transmitter: One additional isolated Lonworks Free Topology network connection GTU116e Transmitter: One additional USB connection for thumb drive data-logging of sensor node airflow rates and temperatures **Airflow Alarm** Type: Low and/or high user defined setpoint alarm Tolerance: User defined % of setpoint Delay: User defined Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods) Reset Method: Manual or automatic Visual Indication: Yes, LCD display Analog Signal Indication: Yes, on AO2 assignment System Status Alarm Type: Sensor diagnostic system trouble indication Visual Indication: Yes, LCD display Analog Signal Indication: Yes, on AO2 assignment EB-Link Bluetooth® low energy Interface for Android® and

iPhone®: Display real-time airflow, velocity-weighted temperature, individual sensor node airflow/temperature data, settings and diagnostics.2

GTx116e-P+_Overview r@d

¹ Installed airflow accuracy allows for additional uncertainty that results from averaging a finite number of sensors in a contorted velocity profile created from up and downstream disturbances. The specified installed accuracy is based on the P+ sensor density rules for installations that meet or exceed EBTRON minimum placement requirements. P+ sensor density rules may not be available in certain duct sizes due to sensor placement limitations.

Order with the /NR option when RF devices are not permitted.

GTC108e



Fan Array Airflow Measurement with Temperature and Alarm Capability

Advantage IV

# Gold Series GTx108e-F/An OVERVIEW



The GTx108e-**F**/An is EBTRON's solution for accurate and repeatable airflow measurement in fan arrays. One to eight fans are supported. Airflow, temperature and/ or airflow alarming are available on all models. Individual fan airflow rates and fan alarming are available with combination analog output/network models. Does not affect fan performance. Bluetooth[®] low energy technology interface.¹

¹ Order with the /NR option when RF devices are not permitted.

# **Typical Applications**

- Fan Airflow Tracking
- Air Change Verification & Monitoring
- Individual Fan Performance Monitoring & Fault Detection

Benefits

- Monitor up to 8 Fans with a Single Transmitter
- Demonstrate Fan
   Performance and Operation
- Improve Fan Tracking of VAV Systems
- Comply with ASHRAE Standards
- Save Energy
- Reduce Fan Horsepower

# **Product Highlights**

- Accurate and Repeatable
- Long-term Stability
- Streamline Design
- Individual Fan Airflow Monitoring & Alarming
- Adjustable Mounting Brackets
- "Plug and Play" Operation
- FEP Plenum Rated Cables



# SPECIFICATIONS: GTx108e-F/An

#### General

#### **Probe and Sensor Node Configurations**

Fan Arrays (less than or equal to 4 fans): 2 probes x 1 sensor node per probe or 1 probe x 1 sensor node per probe in each fan Fan Arrays (greater than 4 fans): 1 probe x 1 sensor node per probe in each fan (8 probe maximum)

#### Installed Airflow Accuracy¹

 $\pm$ (3% to 10%) of reading, depending on fan type and installation. May be improved by field adjustment using the Field Adjust Wizard (FAW) to a reliable reference.

#### Sensor Node Averaging Method

Airflow: Independent, arithmetic average per fan Temperature: Independent, velocity weighted average

#### Listings and Compliance

UL: UL-873 and CSA C22.2 No. 24 CE: Non-UK European shipments only

UKCA: UK shipments only BACnet International: BTL Listed (GTC108e and GTM108e

transmitters) FCC: This device complies with Part 15 of the FCC rules

RoHS: This device is RoHS2 compliant

#### **Environmental Limits**

Temperature: Probes: -20 to 160 °F [-28.9 to 71.1 °C] Transmitter: -20 to 120 °F [-28.9 to 48.9 °C] Humidity: (non-condensing) **Probes:** 0 to 100% Transmitter: 5 to 95%

#### Individual Sensing Nodes

Sensing Node Sensors Self-heated sensor: Precision, hermetically sealed, bead-in-glass

thermistor Temperature sensor: Precision, hermetically sealed, bead-in-glass thermistor Sensing Node Housing Material: Glass-filled Polypropylene Sensor Potting Materials: Waterproof marine epoxy Airflow Measurement Accuracy: ±2% of reading to NIST-traceable airflow standards (includes transmitter uncertainty) Calibrated Range: 0 to 10,000 fpm [0. to 50.8 m/s] Calibration Points: 16 **Temperature Measurement** Accuracy: ±0.15°F [0.08 °C] to NIST-traceable temperature standards (includes transmitter uncertainty)

Calibrated Range: -20 to 160 °F [-28.9 to 71.1 °C] Calibration Points: 3

#### Sensor Probe Assembly

Mounting Rods Material: Zinc plated steel Mounting Brackets (Forward, Face, Flare) Material: 304 stainless steel Mounting Brackets (Cantilever) Material: Zinc plated steel Mounting Options & Size Limits

Forward: 6 to 64 inches [152.4 to 1625.6 mm] (diameter at inlet entrance)

Face: 11 to 77 inches [279.4 to 1955.8 mm] (diameter at inlet entrance) Flare: 6 to 57 inches [152.4 to 1447.8 mm] (opening size at backdraft damper inlet)

Cantilever: 11 to 82 inches [279.4 to 2082.8 mm] (diameter at inlet entrance)

#### **Probe to Transmitter Cables**

Type: FEP jacket, plenum rated CMP/CL2P, UL/cUL listed, -67 to 302 °F [-55 to 150 °C], UV tolerant Standard Lengths: 10, 25, and 50 ft. [3.1, 7.6 and 15.2 m]

Connecting Plug: 9/16" [14.29 mm] nominal diameter with gold-plated connector pins

#### Transmitter

Power Requirement: 24 VAC (22.8 to 26.4 under load) @16V-A Connector Receptacle Pins and PCB Connections: Gold-plated receptacle pins, PCB interconnects, PCB edge fingers, and test points User Interface: 2 line x16-character backlit LCD display and 4 button interface **B.A.S. Connectivity Options** All Transmitters: Three field selectable (0-5/0-10 VDC or 4-20mA), scalable and isolated analog output signals (AO1=airflow, AO2=temperature or alarm, AO3=Not Used). GTA108e Transmitter: No additional connectivity to B.A.S. GTC108e Transmitter: One additional field selectable (BACnet MS/TP or Modbus RTU) and isolated RS-485 network connection - Individual sensor node airflow rates and temperatures are available via the network GTM108e Transmitter: One additional isolated Ethernet (simultaneously supported BACnet Ethernet or BACnet IP, Modbus TCP and TCP/IP) network connection - Individual sensor node airflow rates and temperatures are available via the network GTF108e Transmitter: One additional isolated Lonworks Free Topology network connection GTU108e Transmitter: One additional USB connection for thumb drive data-logging of sensor node airflow rates and temperatures Airflow Alarm Type: Low and/or high user defined setpoint alarm Tolerance: User defined % of setpoint Delay: User defined Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods) Reset Method: Manual or automatic Visual Indication: Yes, LCD display Network Indication: Yes (GTM108e and GTC108e only) Analog Signal Indication: Yes, on AO2 assignment Fan Alarm Type: Minimum airflow, % deviation from median airflow, or % deviation from maximum airflow stored in memory Tolerance: User defined % of setpoint Delay: User defined Zero Disable: Alarm can be disabled when the airflow rate falls below the low limit cutoff value (unoccupied periods) Reset Method: Manual or automatic Visual Indication: Yes, LCD display Network Indication: Yes (GTM108e and GTC108e only) Analog Signal Indication: Yes, on AO2 assignment System Status Alarm Type: Sensor diagnostic system trouble indication Visual Indication: Yes, LCD display Network Indication: Yes Analog Signal Indication: Yes, on AO2 assignment EB-Link Bluetooth® low energy Interface for Android® and iPhone®: Download individual sensor node airflow/temperature data, settings and diagnostics.2

GTx108e-F_An_Overview Гœ

¹ Installed airflow accuracy is the actual system accuracy expected and includes sampling uncertainty of the sensor probes.

Order with the /NR option when RF devices are not permitted.

# 26410R5WD11A1C



# Model 264 Low Differential Pressure Transducer

# Features

- Industry standard for very low differential pressure
- ±0.25%, ±0.4%, ±1% FS accuracy
- 3 year unconditional warranty
- Up to 10 PSI overpressure (range dependent)
- Installation time minimized w/ mounting options
- Reverse wiring protection
- Internal regulation permits use with unregulated DC power supplies
- Fire retardant case (UL 94 V-0 approved)
- CE & RoHS compliant

# Applications

- HVAC/R systems
- Room pressurization for critical environments
- Energy management systems
- Variable air volume and fan control (VAV)
- Environmental pollution control
- Lab & fume hood control



With millions of sensors installed world wide, Setra's 264 is the "standard" for low differential pressure measurement in HVAC building automation. The 264 very low differential pressure transducer uses a dead-ended stainless steel welded capacitive sensing element that requires minimal amplification and delivers excellent accuracy and longterm stability in critical installations. The 264 has a 3 year, unconditional warranty, giving the end-user peace of mind well beyond the initial commissioning phase and guarantees performance well after the BAS warranty. The 264 utilizes a robust design that offers brass barbed fittings, and an optional conduit cover for easy and consistent installation.

# The industry standard

The 264 has been a consistent and trusted HVAC sensor for over two decades. The reputation of reliability and quality with exceptional delivery time has helped the 264 remain the trusted choice for any low differential pressure applications.

# Convenient installation

The 264 is available in both a wall and conduit versions providing the installer with flexible mounting options. The base mount allows the sensor to be installed anywhere, allowing for a simple installation.

# The Setra sensor

The core technology of the 264 is the all stainless steel capacitive sensing element. Setra designs and manufactures all of their sensing elements resulting in full control over the process and quality of every single sensor. The welded dead-ended capacitive sensors requires minimal amplification and delivers excellent accuracy and longterm stability. Setra's technology has been used in over 8 million installations and has the highest field acceptance rate in the industry.





# Specifications

Performance data	
Accuracy RSS ¹ (at constant temp)	±1.0% FS (standard); ±0.4% FS, ±0.25% FS (optional)
Non-linearity, BFSL	±0.96% FS (standard); ±0.38% FS, ±0.22% FS (optional)
Hysteresis	0.10% FS
Thermal effects ²	
Compensated range °F (°C)	0 to +150 (-18 to +65)
Zero shift %FS/100°F(50°C)	±0.033 (±0.06)
Span shift %FS/100°F(50°C)	±0.033 (±0.06)
Max. line pressure	10 PSI
Overpressure	Up to 10 PSI (range dependent)
Long term stability	0.5% FS/YR
Environmental data	
Operating temperature °F (°C) ³	0 to +175 (-18 to +79)
Storage temperature °F (°C)	-65 to +250 (-54 to +121)
Desition offect4	

#### Position effect

Range	Zero offset (%FS/G)
0 to 1" W.C.	2.3
0 to 0.25" W.C.	1
0 to 0.5" W.C.	0.5
0 to 1.0" W.C.	0.3
0 to 2.5" W.C.	0.2
0 to 10" W.C.	0.15

¹RSS of Non-Linearity, Hysteresis, and Non-Repeatability.
²Units calibrated at nominal 70°F. Maximum thermal error computed from this datum.

³ Operating temperature limits of the electronics only. Pressure media temperatures may be

considerably higher.
 ⁴ Unit is factory calibrated at 0g effect in the vertical position.

⁵ Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.

⁶ Zero output factory set to within ±50mV (±25 mV for optional accuracies).

#### **Physical description**

Case	Fire-retardant glass filled polyester (UL 94 V-O Approved)
Electrical Connection	Screw terminal strip
Mounting	screw holes on removable zinc plated steel base (designed for 2.75" snap track)
Pressure Fittings	3/16" O.D. barbed brass for 1/4" push on tubing
Zero and Span Adjustments	Accessible on top of case
Weight (approx.)	10 Ounces
Electrical data (voltage)	
Circuit	3-Wire (Com, Out, Exc)
Excitation/output⁵	9 to 30 VDC / 0 to 5 VDC ^{6,7}
Output impedance	100 ohms
Bidirectional output at zero press	ure 2.5 VDC ^{6,7}
Electrical data (current)	
Circuit	2-wire
Output [®]	4 to 20 mA ^{9,10}
External load	0 to 800 ohms
Min. loop supply voltage (VDC)	9 + 0.02 x (resistance of receiver plus line)

Max. loop supply voltage (VDC) 30 + 0.004 x (resistance of receiver plus line) Bidirectional output at zero pressure 12 mA^{9,10}

#### **Pressure media**

Clean air or similar non-conducting gases.

⁷ Span (Full Scale) output factory set to within ±50mV. (±25 mV for optional accuracies).
 ⁸ Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.
 ⁹ Zero output factory set to within ±0.16mA (±0.08 mA for optional accuracies).
 ¹⁰ Span (Full Scale) output factory set to within ±0.16mA (±0.08 mA for optional accuracies).

Specifications subject to change without notice.



# Ordering information

Example part number: 26412R5WD11T1C; Model 264, 0 to 2.5 in. W.C. Range, 4 to 20 mA Output, Terminal Strip Electrical Connection, and ±1% Accuracy:



¹ Optional accuracy codes E, F, G, include calibration certificate.

Contact Setra for versions not shown here.

# Dimensions



# 2301050PD3V11B



# Model 230 True Wet-to-Wet Differential Pressure Transducer

The Model 230 is Setra's highest accuracy solution for monitoring differential pressure in wet-to-wet applications. Its single diaphragm design enables a true wet-to-wet differential pressure measurement with superior  $\pm 0.25\%$  FS accuracy compared to competitive units which calculate differential pressure using two single point pressure sensors. The stainless steel capacitive sensor provides a highly accurate, linear analog output proportional to the pressure over a wide temperature range. The 230 is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance.

#### Avoid Line Pressure w/ Single Diaphragm Sensor

Unlike the competition, the 230 is a true wet-to-wet sensor with a single diaphragm construction. The differential pressure range of a single diaphragm is not impacted by line pressure whereas dual differential pressure sensors require the individual sensors to measure gauge pressure, comparing the outputs to determine the differential pressure.

#### Increase the Sensors Response Time

The 230 utilizes an all stainless steel capacitive sensor which responds 20x faster than oil filled sensors and provides conditioned electronic circuitry with a highly accurate, linear analog output proportional to the pressure over a wide temperature range.

#### Save Time on Money & Installation

When time and project costs are a priority, the 230 is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance. The brass body has no internal process connections, therefore eliminating the risk of internal leaks.



- Single Diaphragm Design
- All Stainless Steel Capacitive Sensor
- 3 or 5 Valve Manifold Assembly Options

#### Model 230 Features:

- Only true wet-to-wet differential pressure transducer on the market
- ±0.25% FS Accuracy
- Available to 1 PSID with 350 PSI Line Pressure
- No Liquid Fill Diaphragm
- NEMA 4 Rated Housing
- Low Line Pressure Effect
- Fast Response Time
- Gas & Liquid Compatible
- CE & RoHS Compliant

### **Applications:**

- Energy Management Systems
- Process Control Systems
- Flow Measurement of Various Gases or Liquids
- Liquid Level Measurement or Pressurized Vessels
- Pressure Drop Across Filters

# Model 230 True Wet-to-Wet Differential Pressure Transducer



# **PROOF PRESSURE**

#### Unidirectional Pressure Range Proof Pressure Proof Pressure PSID High Side PSI Low Side PSI 0 to 1.0 50 2.5 0 to 2.0 50 5 0 to 5.0 100 12.5 0 to 10.0 100 25 0 to 25.0 350 62.5 0 to 30.0 350 75 0 to 50.0 350 125 0 to 100.0 350 250

Bidirectional							
Pressure Range PSID	Proof Pressure High Side PSI	Proof Pressure Low Side PSI					
0 to ±0.5	50	1.25					
0 to ±1.0	50	2.5					
0 to ±2.5	100	6.35					
0 to ±5.0	100	12.5					
0 to ±10.0	200	25					
0 to ±25.0	350	62.5					
0 to ±50.0	350	125					

Performance Data		Physical Description (Model 230)					
Accuracy RSS ¹ (at constant temp)	±0.25% FS	Case	Stainless Steel/Aluminum				
Non-Linearity, BFSL	±0.20% FS	Electrical Connection	Barrier strip terminal block with conduit enclosure & 0.875 DIA conduit opening.				
Hysteresis	0.10% FS	Pressure Fittings	1/4"-18 NPT internal				
Non-Repeatability	0.05% FS	Weight (approx.)	14.4 oz				
Thermal Effects ²		Sensor Cavity Volume	0.27 in ³ Positive Port, 0.08 in ³ Negative Port				
Compensated Range °F(°C)	+30 to +150 (-1 to +65)	(With 1/4"NPT external fittings installed-does not include cavity volume of 1/4"NPT external fittings.)					
Zero Shift %FS/100°F(%FS/50°C)	2.0 (1.8)	<b>Physical Description</b>	(3-Valve Manifold Assembly) ⁴				
Span Shift %FS/100°F(%FS/50°C)	2.0 (1.8)	Manifold Block	Brass				
Line Pressure Effect	Zero shift ±0.004% FS/PSIG line pressure	Valves (3) ⁵	V1 for Connection to + port V2 for Connection to - port V3 for Equalizing Pressure				
Resolution	Infinite, limited only by output noise level (0.02%FS)	Valve Type	90° 0n/0ff				
Static Acceleration Effect	2%FS/g (most sensitive axis)	Process Connections	1/4"-18 NPT Internal Thread				
Natural Frequency	500 Hz (gaseous media)	Dimensions	7.05″W x 6.25″H x 2.16″D				
Warm-up Shift	rm-up Shift ±0.1% FS total		<2.5 lbs.				
Response Time	30 to 50 milliseconds	Physical Description	(5-Valve Manifold Assembly) ⁶				
Long Term Stability	0.5%FS/1 YR	Manifold Block	Brass				
Maximum Line Pressure	350 PSIG	Valve (5) ^s	V1 for Connection to ± Port V2 for Connection to – Port V3 for Equalizing Pressure V4 & V5 for Connection to External				
Environmental Data							
Operating ³ Temperature °F (°C)	0 to +175 (-18 to +80)		Gauge or Alternate Plumbing Configuration				
Storage Temperature °F (°C)	-65 to +250 (-54 to +121)	Process Connection	1/4"-18 NPT Internal Thread				
Vibration	5 g from 5 Hz to 500 Hz	Dimensions	7.05″W x 6.25″H x 2.16″D				
Acceleration	10g	Weight	<3.8 lbs.				
Shock	50g	Electrical Data (Volta	age)				
Pressure Media		Circuit	3-Wire (Exc, Out, Com)				
Model 230		Excitation	9 to 30 VDC for 0-5 VDC Output, 13 to 30 VDC for 0-10 VDC Output				
Gases or liquids compatible with 17	-4 PH Stainless Steel, 300 Series	Output ⁷	0 to 5 VDC ⁸ , 0 to 10 VDC ⁸				
Viton O-Rings. Note: Hydrogen not	recommended for use with 17-4	Output Impedance	100 ohms				
PH stainless steel. Optional Buna-N	O'rings are recommended for	Electrical Data (Curre	ent)				
hydrocarbon applications.		Circuit	2-Wire				
3 & 5 Valve Manifold		Output ⁹	4 to 20mA ¹⁰				
Gases or liquids compatible with 36	0 brass, Copper 122, Acetal plug	External Load	0 to 1000 ohms				
valves and Nitrile O-rings.		Minimum supply voltage (VDC)	9+ 0.02 x (Resistance of receiver plus line).				
¹ RSS of Non-Linearity, Hysteresis, and Non ² Units calibrated at nominal 70° F. Maximu	Repeatability. m thermal error computed from this datum.	Maximum supply voltage (VDC)	30+ 0.004 x (Resistance of receiver plus line).				

only. Pressure media temperatures may Specifications subject to change without notice.

be considerably higher. ⁴ Order assembled with the Model 230 (Code 3V) or separately as Option 891.

5 Refer to drawings

* Order assembled with the Model 230 (Code 5V)
 * Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.
 * Zero output factory set to within ±25mV (for 5 VDC output) or ±50mV (for 10 VDC

output) Span (Full Scale) output factory set to  $\pm 25$  mV (for 5 VDC output ) or  $\pm$  50 mV (for 10

VDC output

 9  Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.  10  Zero output factory set to within  $\pm 0.16$  mA. Span factory set to within  $\pm 0.16$  mA

# **GENERAL SPECIFICATIONS**



# MODEL 230 DIMENSIONS



# DIMENSIONS W/ 3-VALVE MANIFOLD ASSEMBLY



For differential pressure measurements at high line pressure (350 PSIG max), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports as shown.

# Model 230 True Wet-to-Wet Differential Pressure Transducer



# **ORDERING INFORMATION**



Ordering Example: 2301005PD2F11B = Model 230 0 to 5 PSID unidirectional, 1/4-18 NPT Ext. fitting, 4 to 20 mA Output, and Viton/Silicone Seals. 2301005PD3V11B = Model 230, 0 to 5 PSID unidirectional, 3-Valve Manifold, 4 to 20 mA, Output, and Viton/Silicone Seals (Assembled w/3- Valve Manifold).

# DIMENSIONS W/ 5-VALVE MANIFOLD ASSEMBLY





For differential pressure measurements at high line pressure (350 PSIG max), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports as shown.

Note: V6 and V7 bleed valves are not required when used with a Setra Model 230. Use the bleed screws on Model 230 to bleed the lines of air.

# RIBUIC Automation

Functional Devices, Inc.101 Commerce Drive, Sharpsville, IN 46068Email: sales@functionaldevices.comWebsite: www.functionaldevices.comToll Free:(800) 888-5538Office:(765) 883-7505Fax:

#### **10 AMP PILOT CONTROL RELAYS**

#### **RIBU1C**

Pilot Relay, 10 Amp SPDT, 10-30 Vac/dc/ 120 Vac Coil, NEMA 1 Housing



# RIBH1C

Pilot Relay, 10 Amp SPDT, 10-30 Vac/dc/ 208-277 Vac Coil, NEMA 1 Housing





#### SPECIFICATIONS

# Relays & Contact Type: One (1) SPDT Continuous Duty Coil Expected Relay Life: 10 million cycles minimum mechanical Operating Temperature: -30 to 140° F Humidity Range: 5 to 95% (noncondensing) Operate Time: 20ms Relay Status: LED On = Activated Dimensions: 1.70"H x 2.80"W x 1.50"D with 0.50" NPT nipple Housing Detail: See Housing A in housing guide for dimensions Origin: Made of US and non-US parts Wires: 16", 600V Rated Approvals: UL Listed, C-UL, CE, RoHS (All models) UL916 (RIBU1C, RIBH1C) UL864, California State Fire Marshal (RIBU1C-RD, RIBH1C-RD) UL508 (RIBU1C-N4, RIBH1C-N4) Housing Rating: UL Accepted for Use in Plenum, NEMA 1 Gold Flash: Yes Override Switch: No

#### **Contact Ratings:**

10 Amp Resistive @ 277 Vac 10 Amp Resistive @ 28 Vdc 480 VA Pilot Duty @ 240-277 Vac 480 VA Ballast @ 277 Vac Not rated for Electronic Ballast 600 Watt Tungsten @ 120 Vac (N/O) 240 Watt Tungsten @ 120 Vac (N/O) 1/3 HP @ 120-240 Vac (N/C) 1/6 HP @ 120-240 Vac (N/C) 1/4 HP @ 277 Vac (N/C) 1/8 HP @ 277 Vac (N/C)

#### Note:

Order packs by adding "-5PACK", "-10PACK", "-25PACK", or "-100PACK" to end of model number.

#### Coil Current:

33 mA @ 10 Vac 35 mA @ 12 Vac 46 mA @ 24 Vac 55 mA @ 30 Vac 28 mA @ 120 Vac (RIBU1C) 39 mA @ 208-277 Vac (RIBH1C) 13 mA @ 10 Vdc 15 mA @ 12 Vdc 18 mA @ 24 Vdc 20 mA @ 30 Vdc

#### Coil Voltage Input:

10-30 Vac/dc ; 120 Vac ; 50-60 Hz (RIBU1C) 10-30 Vac/dc ; 208-277 Vac ; 50-60 Hz (RIBH1C) Drop Out = 2.1 Vac / 2.8 Vdc Pull In = 9 Vac / 10 Vdc

# **RH Series Compact Power Relays**

# RH2B-UL-AC24VKIT RH3B-ULAC24V-KIT

#### **Key features**

- SPDT through 4PDT, 10A contacts
- Compact power type relays
- Miniature power relays with a large capacity
- 10A contact capacity
- Compact size saves space









# **Part Number Selection**

		Part N	Number	
Contact	Model	Blade Terminal	PCB Termi- nal	Coil Voltage Code (Standard Stock in bold)
	Standard	RH1B-U 🗆	RH1V2-U 🗌	
PDT	With Indicator	RH1B-UL	—	AC6V AC12V AC24V AC110V AC120V
C.C. Tax	With Check Button	RH1B-UC	—	AC220V, AC240V DC6V, DC12V, DC24V,
	With Indicator and Check Button	RH1B-ULC	—	DC48V, DC110V
	Top Bracket Mounting	RH1B-UT	—	
10-	With Diode (DC coil only)	RH1B-UD	RH1V2-UD	DC6V, <b>DC12V</b> , <b>DC24V</b> , DC48V, DC110V
	With Indicator and Diode (DC coil only)	RH1B-ULD	—	DC12V, DC24V, DC48V, DC110V
	Standard	RH2B-U 🗌	RH2V2-U 🗌	
PUT	With Indicator	RH2B-UL	RH2V2-UL	AC6V AC12V AC24V AC110-120V
VALA	With Check Button	RH2B-UC	—	AC220-240V
	With Indicator and Check Button	RH2B-ULC	—	DC6V, <b>DC12V</b> , <b>DC24V</b> , DC48V, DC100-110V
	Top Bracket Mounting	RH2B-UT	—	
	With Diode (DC coil only)	RH2B-UD	RH2V2-UD	
	With Indicator and Diode (DC coil only)	RH2B-ULD	RH2V2-ULD	DC8V, DC12V, DC24V, DC48V, DC100-110V
T	Standard	RH3B-U 🗆	RH3V2-U 🗌	
10	With Indicator	RH3B-UL	RH3V2-UL 🗌	AC6V AC12V AC24V AC110V AC120V
13 Para	With Check Button	RH3B-UC	—	AC220V, AC240V DC6V, DC12V, DC24V,
	With Indicator and Check Button	RH3B-ULC 🗆	—	DC48V, DC110V
Salar /	Top Bracket Mounting	RH3B-UT	—	
and the second s	With Diode (DC coil only)	RH3B-UD	—	
	With Indicator and Diode (DC coil only)	RH3B-ULD 🗆	—	DC0V, DC12V, DC24V, DC40V, DC110V
TOT	Standard	RH4B-U 🗆	RH4V2-U 🗌	
102	With Indicator	RH4B-UL	RH4V2-UL 🗌	AC6V AC12V AC24V AC110V AC120V
A COLORED	With Check Button	RH4B-UC	—	AC220V, AC240V DC6V, DC12V, DC24V, DC48V
	With Indicator and Check Button	RH4B-ULC	—	DC110V
and the second second	Top Bracket Mounting	RH4B-UT	—	
Contraction of the second s	With Diode (DC coil only)	RH4B-UD 🗌	RH4V2-UD	
	With Indicator and Diode (DC coil only)	RH4B-ULD	_	DGGV, DGTZV, DGZ4V, DG40V, DGTTUV





Signaling Lights

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IDEC

Switches & Pilot Lights

# Sockets (for Blade Terminal Models)

t Lig	Relays	Standard DIN Rail Mount ¹	Finger-safe DIN Rail Mount ¹	Through Panel Mount	PCB Mount	
Pilo	RH1B	SH1B-05	SH1B-05C	SH1B-51	SH1B-62	-
es &	RH2B	SH2B-05	SH2B-05C	SH2B-51	SH2B-62	1. DIN Rail mount socket
vitch	RH3B	SH3B-05	SH3B-05C	SH3B-51	SH3B-62	horseshoe clips. Do
Sw	RH4B	SH4B-05	SH4B-05C	SH4B-51	SH4B-62	not use unless you plan to insert pullover
aling Lights	Hold Dow	/n Springs & Clips	S. A.	Ly Juli		wire spring. Replace- ment horseshoe clip part number is Y778-011.
Sign	Annoaran	a Itam	Polov	For DIN	For Through Panel &	

# Hold Down Springs & Clips

Appearance	Item	Relay	For DIN Mount Socket	For Through Panel & PCB Mount Socket	
$\langle \rangle$		RH1B	SY2S-02F1 ²		<b>2</b>
	Dullouar Mire Coving	RH2B	SY4S-02F1 ²		
	Pullover wire Spring	RH3B	SH3B-05F1 ²	3143-31F1	3
$\sim$		RH4B	SH4B-02F1 ²		U
A.S.	Leaf Spring (side latch)	RH1B, RH2B, RH3B, RH4B	SFA-202 ³	SFA-302 ³	
1	Leaf Spring (top latch)	RH1B, RH2B, RH3B, RH4B	SFA-101 ³	SFA-301 ³	

2. Must use horseshoe clip when mounting in DIN mount socket. Replacement horseshoe clip part number is Y778-011. 3. Two required per relay.

# **AC Coil Ratings**

		Rated Current (mA) ±15% at 20°C							Coil Resistance (Ω)			)	Operation Characteristics		
Voltage		AC 50Hz				AC 60Hz			±10% at 20°C				(against rated values at 20°C)		
(V)	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage
6	170	240	330	387	150	200	280	330	330	9.4	6.4	5.4		80% maximum	
12	86	121	165	196	75	100	140	165	165	39.3	25.3	21.2			30% minimum
24	42	60.5	81	98	37	50	70	83	83	153	103	84.5			
110	9.6	—	18.1	21.6	8.4	—	15.5	18.2	18.2	—	2,200	1,800			
110-120	—	9.4- 10.8	—	—	—	8.0-9.2	—	—	—	—	—	—	110%		
120	8.6	—	16.4	19.5	7.5	—	14.2	16.5	16.5	—	10,800	7,360			
220	4.7	—	8.8	10.7	4.1	—	7.7	9.1	9.1	—	10,800	7,360			
220-240	—	4.7-5.4	_	_	—	4.0-4.6	_		—	18,820	—	_			
240	4.9	_	8.2	9.8	4.3	_	7.1	8.3	8.3	_	12,100	9,120			

### **DC Coil Ratings**

Voltage	Rated Current (mA) ±15% at 20°C				Coil Resistance (Ω) ±10% at 20°C			)	Operation Characteristics (against rated values at 20°C)				
(V)	SPDT	DPDT	3PDT	4PDT	SPDT	DPDT	3PDT	4PDT	Max. Continuous Applied Voltage	Pickup Voltage	Dropout Voltage		
6	128	150	240	250	47	40	25	24					
12	64	75	120	125	188	160	100	96					
24	32	36.9	60	62	750	650	400	388	1100/	80%	10%		Standard coil volt-
48	18	18.5	30	31	2,660	2,600	1,600	1,550	110%	maximum	minimum		ages are in <b>BULD</b> .
100-110	—	8.2-9.0	—	—	—	12,250	—	—					
110	8	_	12.8	15	13,800	_	8,600	7,340					



Relays & Sockets

Timers

Contactors

Terminal Blocks



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### **Contact Ratings**

	Maximum Contact Capacity											
	Continuous	Allowable Co	ontact Power	Rated Load								
Model	Current	Resistive Load	Inductive Load	Voltage (V)	Res. Load	Ind. Load						
				110 AC	10A	7A						
SPDT	10A	1540VA 300W/	990VA 210W	220 AC	7A	4.5A						
		00011	21011	30 DC	10A	7A						
DPDT				110 AC	10A	7.5A						
3PDT	10A	1650VA 300W/	1100VA 225W/	220 AC	7.5A	5A						
4PDT		000	22000	30 DC	10A	7.5A						
Note: Inductive load for the rated load — $\cos \varphi = 0.3$ , L/R = 7 ms												

# **TÜV Ratings**

Voltage	RH1	RH2	RH3	RH4
240V AC	10A	10A	7.5A	7.5A
30V DC	10A	10A	10A	10A

AC: cos ø = 1.0, DC: L/R = 0 ms

# **Socket Specifications**

	Sockets	Terminal	Electrical Rating	Wire Size	Torque
DIN Rail	SH1B-05	(Coil) M3 screws (contact) M3.5 screws with captive wire clamp	250V, 10A	Maximum up to 2—#12AWG	5.5 - 9 in●lbs 9 - 11.5 in●lbs
Mount Sockets	SH2B-05 SH3B-05 SH4B-05	M3.5 screws with captive wire clamp	300V, 10A	Maximum up to 2–#12AWG	9 - 11.5 in • lbs
Finger-safe	SH1B-05C	(coil) M3 screws (contact) M3.5 screws with captive wire clamp, fingersafe	250V, 10A	Maximum up to 2—#12AWG	5.5 - 9 in●lbs 9 - 11.5 in●lbs
DIN Rail Mount	SH2B-05C SH3B-05C SH4B-05C	M3.5 screws with captive wire clamp, fingersafe	300V, 10A	Maximum up to 2–#12AWG	9 - 11.5 in • lbs
Through Panel Mount Socket	SH1B-51 SH2B-51 SH3B-51 SH4B-51	Solder	300V, 10A	—	_
	SH1B-62	PCB mount	250V, 10A	—	
PCB Mount Socket	SH2B-62 SH3B-62 SH4B-62	PCB mount	300V, 10A	_	_

#### Accessories

ltem	Appearance	Use with	Part No.	Remarks
Aluminum DIN Rail (1 meter length)		All DIN rail sockets	BNDN1000	The BNDN1000 is designed to accommodate DIN mount sockets. Made of durable extruded aluminum, the BNDN1000 measures 0.413 (10.5mm) in height and 1.37 (35mm) in width (DIN standard). Standard length is 39" (1,000mm).
DIN Rail End Stop	A REAL PROPERTY.	DIN rail	BNL5	9.1 mm wide.
Replacement Hold-Down Spring Anchor	1	DIN mount sockets and hold down springs.	Y778-011	For use on DIN rail mount socket when using pullover wire hold down spring. 2 pieces included with each socket.

# **UL Ratings**

	I	Resistive	)	Ge	neral Us	se	Horsepower Rating		
Voltage	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4	RH1 RH2	RH3	RH4
240V AC	10A	7.5A	7.5A	7A	6.5A	5A	1/3 HP	1/3 HP	_
120V AC	—	10A	10A	—	7.5A	7.5A	1/6 HP	1/6 HP	—
30V DC	10A	10A	—	7A	—	—	—	—	—
28V DC	—	—	10A	_	_	_	—	—	—

# **CSA** Ratings

Voltage		Resi	stive		General Use				Horse- power Rating
	RH1	RH2	RH3	RH4	RH1	RH2	RH3	RH4	RH1, 2, 3
240V AC	10A	10A	—	7.5A	7A	7A	7A	5A	1/3 HP
120V AC	10A	10A	10A	10A	7.5A	7.5A	—	7.5A	1/6 HP
30V DC	10A	10A	10A	10A	7A	7.5A	—	—	—

Switches & Pilot Lights

**Terminal Blocks** 

# **Relays & Sockets**

#### **Specifications Contact Material**

Operating Time²

Release Time ²

**Power Consumption** 

Insulation Resistance

Dielectric Strength ³

**Operating Frequency** 

Vibration Resistance

Shock Resistance

Mechanical Life

**Electrical Life** 

Operating

Temperature ⁴

**Operating Humidity** 

Weight (approx.)

(approx.)

Contact Resistance 1

Minimum Applicable Load

Silver cadmium oxide

24V DC, 30 mA; 5V DC, 100 mA (reference value)

DC: 0.8W

DC: 0.9W

DC: 1.5W

DC: 1.5W

1,800 operations/hour maximum

18,000 operations/hour maximum

10 to 55Hz, amplitude 0.5 mm

10 to 55Hz, amplitude 0.5 mm

200m/s² (20G - SPDT, DPDT) 100m/s² (10G - 3PDT, 4PDT)

1,000m/s2 (100G)

2,000V AC, 1 minute

2,000V AC, 1 minute

2,000V AC, 1 minute

2,000V AC, 1 minute

50mΩ maximum

20ms maximum

25ms maximum

20ms maximum

25ms maximum

AC: 1.1VA (50Hz), 1VA (60Hz)

AC: 2VA (50Hz), 1.7VA (60Hz)

AC: 2.5VA (50Hz), 2VA (60Hz)

Between live and dead parts:

Between live and dead parts:

Between contact and coil:

Electrical:

Mechanical:

Damage limits:

Damage limits:

Operating extremes:

Operating extremes:

50,000,000 operations minimum

-25 to +70°C (no freezing)

45 to 85% RH (no condensation)

500,000 operations minimum (120V AC, 10A)

200,000 operations minimum (120V AC, 10A)

SPDT: 24g, DPDT: 37g, 3PDT: 50g, 4PDT: 74g

Between contact and coil:

100MΩ minimum (500V DC megger)

Between contacts of the same pole: 1,000V AC, 1 minute

Between contacts of different poles: 2,000V AC, 1 minute

Between contacts of the same pole: 1,000V AC, 1 minute

AC: 1.4VA (50Hz), 1.2VA (60Hz)

SPDT

DPDT

3PDT

4PDT SPDT

DPDT

3PDT

4PDT SPDT

DPDT

3PDT

4PDT

SPDT

DPDT

3PDT

4PDT

DPDT

SPDT

3PDT

4PDT

SPDT

DPDT

3PDT 4PDT

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Terminal Blocks

Note: Above values are initial values.

Measured using 5V DC, 1A voltage drop method

Measured at the rated voltage (at 20°C), excluding contact bouncing 2.

Release time of relays with diode: 40 ms maximum 3. Relays with indicator or diode: 1000V AC, 1 minute

4. For use under different temperature conditions, refer to Continuous Load Current vs. Operating Temperature Curve. The operating temperature range of relays with indicator or diode is -25 to +40°C.



### **Characteristics (Reference Data)**

DC Load

1000

500

(RH1)

#### **Electrical Life Curves**

Load Current (A)

1.0

0.5

0.1





DC resistive

200 300

DC inductive

Load Voltage (V)

Continuous Load Current vs. Operating Temperature Curve (Basic Type, With Check Button, and Top Bracket Mounting Type)



#### Internal Connection (View from Bottom) Basic Type



# With Indicator (-L type)



# With Diode (-D type)





DPDT



4P[	DT
	3 7 11 12 (+) 14

Contains a diode to absorb the back emf generated when the coil is de-energized. The release time is slightly longer. Available for DC coil only. • Diode Characteristics

Reverse withstand voltage: 1,000V Forward current: 1A



### With Indicator LED & Diode (-LD type)



### **Dimensions (mm)**

#### RH1B-U/RH1B-UL/RH1B-UD/RH1B-ULD



RH4B-U/RH4B-UL/RH4B-UD/RH4B-ULD

<del>\$</del>)

Ð 4.7

Ð

ø2.6 hole

0

35.6 max

0.5 Ð

6.4

Total length from panel surface including relay socket SH4B-05; 61.5 (63.5) max., SH4B-51; 39.6 (41.6) max.

Dimensions in the ( ) include a hold-down spring

2 3 4 8 12

41

27.5

14

5 9 13

#### RH2B-U/RH2B-UL/RH2B-UD/RH2B-ULD



### RH3B-U/RH3B-UL/RH3B-UD/RH3B-ULD







RH3B-UT

### RH4B-UT

**RH1B-UT** 

3.5 14.5





ø2.6 hole

35.6 1

ģ

6.4





# **Relays & Sockets**

# **Dimensions con't (mm)**

### RH1V2-U/RH1V2-UD





# RH3V2-U/RH3V2-UL/RH3V2-D





# **Standard DIN Rail Mount Sockets**

SH1B-05

SH3B-05







### RH4V2-U/RH4V2-UL/RH4V2-UD

RH2V2-U/RH2V2-UL/RH2V2-UD



SH2B-05



#### SH4B-05



Timers

Contactors

780

Terminal Blocks

# **Dimensions con't (mm)**

### **Finger-safe DIN Rail Mount Sockets** SH1B-05C



#### SH3B-05C





(Top View)

### **Through Panel Mount Socket**

#### SH1B-51 Panel Thickness: [18 (N-1) + 12.4] ^{+0.5} to 2 Terminal Arrangement 159 25.4 25.6+ 1314 (Bottom View 18 N: No. of sockets mounted min.* 5.4 18 3.5 * 10.4 min. when using hold-down springs 1 2.4 12.2 SH3B-51 [36 (N-1) + 30.4] ^{+0.6}



# 25.6 N: No. of sockets mounted min * 5.4 * 10.4 min. when using hold-down springs



SH4B-51



Switches & Pilot Lights

Signaling Lights

**Relays & Sockets** 

Timers

# **Relays & Sockets**

# **Dimensions con't (mm)**

ജ

# **PCB Mount Sockets**

SH2B-62







21.5 min.

8-ø2.4 holes

(Tolerance 0.1)

+ + + + +

\$ \$ \$

# SH3B-62





782



Switches & Pilot Lights

Signaling Lights

# **Operating Instructions**

### **Driving Circuit for Relays**

- 1. To ensure correct relay operation, apply rated voltage to the relay coil.
- 2. Input voltage for the DC coil:

A complete DC voltage is best for the coil power to make sure of stable relay operation. When using a power supply containing a ripple voltage, suppress the ripple factor within 5%. When power is supplied through a rectification circuit, the relay operating characteristics, such as pickup voltage and dropout voltage, depend on the ripple factor. Connect a smoothing capacitor for better operating characteristics as shown below.



#### 3. Leakage current while relay is off:

When driving an element at the same time as the relay operation, special consideration is needed for the circuit design. As shown in the incorrect circuit below, leakage current (lo) flows through the relay coil while the relay is off. Leakage current causes coil release failure or adversely affects the vibration resistance and shock resistance. Design a circuit as shown in the correct example.



4. Surge suppression for transistor driving circuits:

When the relay coil is turned off, a high-voltage pulse is generated, causing a transistor to deteriorate and sometimes to break. Be sure to connect a diode to suppress the back electromotive force. Then, the coil release time becomes slightly longer. To shorten the coil release time, connect a Zener diode between the collector and emitter of the transistor. Select a Zener diode with a Zener voltage slightly higher than the power voltage.



# **Protection for Relay Contacts**

1. The contact ratings show maximum values. Make sure that these values are not exceeded. When an inrush current flows through the load, the contact may become welded. If this is the case, connect a contact protection circuit, such as a current limiting resistor.

### 2. Contact protection circuit:

When switching an inductive load, arcing causes carbides to form on the contacts, resulting in increased contact resistance. In consideration of contact reliability, contact life, and noise suppression, use of a surge absorbing circuit is recommended. Note that the release time of the load becomes slightly longer. Check the operation using the actual load. Incorrect use of a contact protection circuit will adversely affect switching characteristics. Four typical examples of contact protection circuits are shown in the following table:



3. Do not use a contact protection circuit as shown below:

ower	This protection circuit is very effective in arc suppression when opening the contacts. But, the capacitor is charged while the contacts are opened. When the contacts are closed, the capacitor is discharged through the contacts, increasing the possibility of contact welding.
	This protection circuit is very effective in arc suppression when opening the contacts. But, when the contacts are closed, a curren

ppression when re closed, a current flows to charge the capacitor, causing contact welding.

Generally, switching a DC inductive load is more difficult than switching a DC resistive load. Using an appropriate arc suppressor, however, will improve the switching characteristics of a DC inductive load.

### Soldering

Тp

- 1. When soldering the relay terminals, use a soldering iron of 30 to 60W, and quickly complete soldering (within approximately 3 seconds).
- 2. Use a non-corrosive rosin flux.

817

IDEC

# **Relays & Sockets**

# **Operating Instructions con't**

# Switches & Pilot Lights

**Relays & Sockets** 

# Other Precautions 1. General notice:

To maintain the initial characteristics, do not drop or shock the relay.

The relay cover cannot be removed from the base during normal operation. To maintain the initial characteristics, do not remove the relay cover.

Use the relay in environments free from condensation, dust, sulfur dioxide (SO_2), and hydrogen sulfide (H_2S).

Make sure that the coil voltage does not exceed applicable coil voltage range.

- 2. UL and CSA ratings may differ from product rated values determined by IDEC.
- 3. Do not use relays in the vicinity of strong magnetic field, as this may affect relay operation.

# Safety Precautions

- Turn off the power to the relay before starting installation, removal, wiring, maintenance, and inspection of the relays. Failure to turn power off may cause electrical shock or fire hazard.
- Observe specifications and rated values, otherwise electrical shock or fire hazard may be caused.
- Use wires of the proper size to meet voltage and current requirements. Tighten the terminal screws on the relay socket to the proper tightening torque.
- Surge absorbing elements on AC relays with RC or DC relays with diode are
  provided to absorb the back electromotive force generated by the coil. When
  the relay is subject to an excessive external surge voltage, the surge absorbing element may be damaged. Add another surge absorbing provision to the
  relay to prevent damage.

### Precautions for the RU Relays

- Before operating the latching lever of the RU relay, turn off the power to the RU relay. After checking the circuit, return the latching lever to the original position.
- Do not use the latching lever as a switch. The durability of the latching lever is a minimum of 100 operations.
- When using DC loads on 4PDT relays, apply a positive voltage to terminals of neighboring poles and a negative voltage to the other terminals of neighboring poles to prevent the possibility of short circuits.
- DC relays with a diode have a polarity in the coil terminals. Apply the DC voltage to the correct terminals.







TR100VA002

# TRANSFORMER

#### TR100VA002

Transformer 96 VA, 120 to 24 Vac, Circuit Breaker, Foot and Dual Threaded Hub Mount





#### **SPECIFICATIONS**

VA Rating:	96
Frequency:	50/60 Hz
Mounting:	Foot & Dual Threaded Hubs
<b>Over Current Protection:</b>	Circuit Breaker
Dimensions:	4.077" x 2.504" x 3.023" (w/ .500" NPT Hubs)
Wire Length:	8" Typical w/ .5" Strip
<b>Operating Temperature:</b>	-30 to 140° F
MTBF:	100,000 Hours @ 77° F
Construction:	Split-Bobbin
Approvals:	Class 2 UL5085-3 Listed, C-UL, CE, RoHS

- 3.095" ----

-

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PSH500A

**PSMN500A** 

500 VA Power Supply, Five 100 VA Class 2 Outputs,



Functional Devices, Inc. 101 Commerce Drive, Sharpsville, IN 46068 Email: sales@functionaldevices.com | Website: www.functionaldevices.com Toll Free: (800) 888-5538 Office: (765) 883-5538 | Fax: (765) 883-7505 

#### **AC POWER SUPPLIES**

#### **PSH500A**

500 VA Power Supply, Five 100 VA Class 2 Outputs, 480/277/240/120 Vac to 24 Vac, Metal Enclosure



#### **SPECIFICATIONS**

0

Transformer:	One (1) 500 VA
ver Current Protection:	Circuit Breaker
Primary:	480/277/240/120 Vac
Frequency:	50/60 Hz
Dimensions:	12.125″ H x 12.125″ W x 6.000″ D (PSH500A)
	11.330″ H x 11.400″ W x 5.000″ D (PSMN500A)
Origin:	Made of US and non-US parts
Approvals:	Class 2 (UL Approved UL5085-3),
	UL916, C-UL, CE, RoHS, Special
	A Seismic Certification of Equipment and Compo-
	nents: OSP-0201-10
Housing:	NEMA1 Metal Enclosure (PSH500A)
Sub-Panel:	Plenum Rated Polymetal (PSMN500A)
Notes:	• To order UL508, add "-IC" to end of model number.
	<ul> <li>Primary voltage terminal cover available.</li> </ul>
	• Design is in accordance with ASCE 7-05 Chapter 13: ^
	https://hcai.ca.gov/wp-content/uploads/2020/10/OSP-0201.pdf

Consult factory for OSP labeling

PSMN500A

24 Vac, with LED Indicators

On / Off Switch & Breaker

4 Amp breaker for each output

5 Secondaries:

24 Vac ON/OFF:

Input:

Output:

٨



PSH500A Shown Without Cover

#### Standby Wattage:

48.515 W @ 120 Vac 48.699 W @ 240 Vac 49.564 W @ 277 Vac 48.255 W @ 480 Vac

#### Full Load Primary Current:

4.66 A @ 120 Vac 2.41 A @ 240 Vac 2.06 A @ 277 Vac 1.17 A @ 480 Vac

#### Secondary Output Voltage vs. Load:

24.0 V @ 1 Amp 23.0 V @ 2 Amp 21.8 V @ 3 Amp 21.1 V @ 4 Amp

With 240 Vac primary input voltage

Ambient Temperature Derating:

• When all 5 outputs operated simultaneously, at room temperature

5 Ungrounded, Isolated, 100 VA, Class 2, 24 Vac Outputs. Terminals accept 12-26 AWG wire.

4A up to 40° C ; 3A up to 50° C ; 2A up to 55° C

(When All 5 Outputs Operated Simultaneously)

480/277/240/120 Vac Finger-Safe Terminals, 8-18 AWG



**ECMset** 

# C-2320-L ECM

# ECM (Brushless motor) Current Switch

Adjustable minimum turn-on Prevents false trip due to ECM stand-by current Split-core operation to 200A N.O. 30VAC/DC output





#### DESCRIPTION

ECMSet[™] is designed for no/go run detection on electronically commutated motors (ECMs) . ECMs draw a small amount of AC standby current to power their inverter, up to 1A, even when the motor isn't running. The ECMSet features a high resolution adjustable turn-on setpoint to ignore standby current, preventing false ON status indications.

#### APPLICATIONS

- No/go run detection for EC motors
- On set-point prevents false trips due to EC inverter stand-by current
- Great for data center current switch sensing



Turn-on setpoint minimizes false trips due to standby ECM inverter draw.







FEATURES

- Reliable operation on ECM motors
- Set trip point with easily scaled dial to that sensor only turns on when motor is actually running
- Super low turn-on adjustment scale Maintenance-free—no call backs
- No hazardous guesswork. Multi-turn adjustments are a thing of the past
- Reduce the risk of arc flash; sensor can be set without calibration in live enclosure
- Industry leading 7 year warranty



ORDERING					
SPLIT CORE	Min (on)	Max Amps	N.O. Output*	Trip LED	Power LED
C-2320-L-ECM	0.25A	200A	1.0A@30VAC/DC		

COMMAND RELAY - DIRECT MOUNT (MOUNTS ON ALL 2300 SERIES CURRENT DEVICES)	Contact rating	Coil
CR3-24	N.O. 10A @ 125VAC	24VAC/DC 15mA nominal
CR4-24	N.C. 10A @ 125VAC	24VAC/DC 15mA nominal
CR3-12	N.O. 10A @ 125VAC	9-12VDC 30mA nominal
CR4-12	N.C. 10A @ 125VAC	9-12VDC 30mA nominal

Other coil voltages available—consult factory






L: 2.5" H: 0.57" W: 2.23" A: 0.75"x0.75"

**Warning:** The datasheet is designed for reference only. Refer to installation instructions that accompany the product and heed all safety instructions. Product improvement is a continuing process at Senva. Changes may occur to products without prior notice.



SPECIFICATIONS	
Standard Output Rating	1.0A@30VAC/DC
Output Type	NO, solid-state FET
Environmental Rating	5-140 °F (-15-60 °C)
	10-90% RH Non-condensing
Insulation Class	600V RMS. For use on insulated conductors only! Use minimum 75 ° C insulated conductor
Sensor Power	Induced
Frequency Range	50/60Hz
Compliance	cUL, UL, CE, RoHS

* Product improvement is a continual process at Senva and product features and specification may change without prior notice. Refer to instructions that accompany the product for installation and wiring.

## H614

Automatically Learns At Initial Power-Up



The Hawkeye H614 is a microprocessor based, self-learning, selfcalibrating current-sensitive switching device designed for use with VFD systems. At initial power-up, the H614 automatically learns the average current on the line with no action required by the installer. Once a current is learned, the switch monitors for changes in current greater than  $\pm 20\%$  of the learned load. When calibrated for a given VFD system, the H614 is tolerant of gradual drifts in frequency due to expected conditions, such as an accumulation of debris in a filter, while still detecting a sudden drop due to a potential abnormal system condition (e.g., belt loss or other mechanical failure).

#### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Response Time	1 sec.
Learn Time	15 sec. learn period after frequency stabilizes
Frequency Range in Conductor	12 to 115 Hz ¹
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Alarm Limits	$\pm 20\%$ of learned current in every 5 Hz freq. band ²
Normal-to-Alarm Status Output Delay	Approx. 7 sec.
Alarm-to-Normal Status Output Delay	1 sec. nominal ³
Off Delay	<30 sec. nominal
Contact Ratings	30 Vac/dc, 1 A
Insulation Class	600 Vac (UL); 300 Vac RMS (CE)
Terminal Block Wire Size	24 to 14 AWG (0.2 to 2.1 mm ² )
Terminal Block Torque	3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)

## Microcontroller based learning technology

Automatically learns load upon initial power-up...minimizes calibration labor

# Automatic trip point

Automatic trip point (1.5 to 150 Amps, 12 to 115 Hz)...detect abnormal events

Under- and over-load

Microcontroller based learning technology...automatically learns load

#### APPLICATIONS

- Monitoring fans, pumps, motors, and other electrical loads for proper operation
- Detecting belt loss and motor failure...ideal for fan and pump status

## Saves space

Small size fits easily inside small starter enclosures

## 100% solid state

100% solid state...no moving parts to fail

## Flexibility

Removable mounting bracket for installation flexibility

- Verifying lighting circuit loads
- Monitoring critical motors (compressor, fuel, etc.)
- Monitoring industrial process equipment status (OEM)

#### WARRANTY

L

imited Warranty	5 years
GENCY APPROVALS	
gency Approvals	UL508 open device, CE: EN61010-1, CAT III, Pollution Degree 2



- 1. VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.
- 2. The H614 is not intended for use in applications where the current is expected to

fluctuate by more than 20% due to acceptable causes other than VFD driven changes.
If the H614 experiences a momentary loss of power, the Alarm-to-Normal output delay may exceed 1 sec.

Specification Note: For CE compliance, conductor shall be insulated according to IEC 61010-1

The product design provides for basic insulation only. Use wire with minimum 75°C rated insulation. Do not use the LED status indicators as evidence of applied voltage. This sensor detects abnormal operation by looking for sudden changes in current across the entire frequency range. In Learn mode, the sensor calculates a margin 20% above and 20% below the learned frequency curve. An abnormal condition in the circuit is one that falls outside this margin.



#### **DIMENSIONAL DRAWING**



* Terminal block may extend up to 1/8" over the height dimensions shown.

**PRODUCT FUNCTIONS** +20% (upper trip limit) Normal **Constant Torque Constant Power** Operation Learned Current -20% (lower trip limit) Elbow Current Elbow Frequency

#### **HOW IT WORKS**

During setup, the H614 automatically determines the normal amperage and frequency profile and stores it in memory. Then the microprocessor monitors for amperage changes greater than ±20% of this learned curve, indicating a potential system failure.

Band

#### WIRING DIAGRAM



NOTE: The H614 is not intended for use in staged pump, variable inlet vane, and other applications in which the amperage changes under normal operation, independent of frequency. NOTE: (Optional) For added sensitivity in detecting amperage changes, use H614 devices on all three phases of the VFD

	SENSOR MODE	STATUS LED BLINK PATTERN	CONTACTS
Learning Mode (first 15 sec of operation after frequency stabilizes)		Alternating Red/Green (1 per sec.)	Closed
On/ Off Status	Learn mode incomplete. VFD system does not meet abnormal condition detection criteria	Green blink (5 times per sec. after 15 sec of stable frequency)	Closed
only	Current is not adequate for the device to detect abnormal conditions	No LED	Closed
Status OK		Green blink (1 per sec.)	Closed
Alarm		Red blink (1 per sec.)	Open

#### **USAGE EXAMPLE**

The H614 is designed for HVAC fan and blower systems, as well as some single stage pumping systems involving consistent viscosity liquids. If an H614 is installed on one phase of the VFD, it detects changes in that phase that result from the VFD compensating for changes elsewhere in the system. Alternatively, for increased sensitivity, H614s can be used on all three phases for immediate detection of phase balance changes anywhere in the system.

#### **ORDERING INFORMATION**

MODEL	AMPERAGE RANGE	FREQUENCY RANGE	STATUS OUTPUT	NOMINAL TRIP POINT TARGET RANGE	HOUSING	STATUS LED	UL	CE
H614	1.5 to 150 A ¹	12 to 115 Hz	N.O. 1.0 A @ 30 Vac/dc	±20% in each of 20 bands	Split-core	٠	• 2	•

1. If the current is above 1.5 A, but neither LED is illuminated, the H614 is considered to be in on/off status mode.

2. Listed for use on 75°C insulated conductors.



## **HX08 SERIES & H701**

Detect Belt Loss, Coupling Shear, and Mechanical Failure



Hx08 Series and H701 adjustable current switches offer high performance, with a wide array of amperage range options. These products can accurately detect belt loss, coupling shear, or other mechanical failure on unit vents, exhaust fans, recirculation pumps, and other fixed loads down to as little as 1/5 HP.

#### SPECIFICATIONS

Sensor Power	Induced from monitored conductor
Insulation Class	600 Vac RMS (UL), 300VAC RMS (CE)
Frequency Range ²	50/60 Hz, On/Off status for Variable Frequency Drive (VFD) outputs at 12 to 115 Hz
Temperature Range	-15 to 60 °C (5 to 140 °F)
Humidity Range	10 to 90% RH non-condensing
Hysteresis	10% (typical)
Terminal Block Wire Size	H308: 22-16 AWG (0.3 to 1.3 mm ² ) Others: 24-14 AWG (0.2 to 2.1 mm ² )
Terminal Block Torque	H308: 3.5 to 7 in-lbs (0.8 N-m) Others: 3.5 to 4.4 in-lbs (0.4 to 0.5 N-m)
WARRANTY	
Limited Warranty	5 years
AGENCY APPROVALS	
Agency Approvals	UL 508 open device listing; CE: EN61010-1, CAT III, Pollution Degree 2, basic insulation

# Retrofit or new construction

High performance devices in splitand solid-core housings

# Adjustable trip point

Precise current trip point setting

## Low setpoint

Minimum trip point as low as 0.5 A (H608)...no need for multiple wraps of the conductor through the sensor, even on loads as small as 1/5 HP

#### APPLICATIONS

- Detecting belt loss, coupling shear, and mechanical failure
- Verifying lighting circuit and other electrical service run times

## Small size

Fits easily inside small enclosures

## Self-gripping iris

Self-gripping iris on split-core housings for easy installation

## Status LEDs

Status LEDs available for easy setup and local indication

- Monitoring status of industrial process equipment
- Monitoring status of critical motors (compressor, fuel, etc.)
- VFD output on/off status



Notes: Do not use the LED status indicators as evidence of applied voltage.

If using this switch in an application that includes an electronically commutated motor (ECM), see Veris Application Note VN61, at www.veris.com.

VFD systems generate fields that can disrupt electrical devices. Ensure that these fields are minimized and are not affecting the sensor.



#### H308 Dimensional Drawing



#### H608



#### H708/701

**Dimensional Drawing** 



* Terminal block may extend up to 1/8" over the height dimensions shown.

** Slide switch may extend up to 1/4" over the height dimensions shown.

#### H908 Dimensional Drawing



#### MONITORING FAN /PUMP MOTORS FOR POSITIVE PROOF OF FLOW

Wiring Diagram



#### H808 Dimensional Drawing



#### **ORDERING INFORMATION**

MODEL	AMPERAGE RANGE @ 50/60 HZ ONLY	STATUS OUTPUT (MAX.)	MIN. TRIP POINT	HOUSING	STATUS LED	UL	CE
H308	0.75 to 50 A		0.75 A or less	Split-Core	٠	• 2	٠
H608	0.5 to 175 A		0.5 A or less	Split-Core	•	•1	٠
H701	1 to 135 A	N.O. 1.0 A @ 30 Vac/dc	1.0 A or less	Solid-Core		•	
H708	1 to 135 A		1.0 A or less	Solid-Core	٠	•	
H808	0.75 to 50 A		0.75 A or less	Solid-Core	•	٠	٠
H908	2.5 to 135 A	]	2.5 A or less	Split-Core	٠	٠	٠

1. Listed for use on 75 °C insulated conductors.

2. Product provides functional insulation only.





## **LEVEL & LEAK DETECTION**

#### CONDENSATE OVERFLOW SWITCHES SS/SP SERIES

SS1



SS2AP

SAFE-T-GARD

SG1

#### DESCRIPTION

The **Rectorseal SS/SP Series** condensate overflow switches detect rising water in A/C condensate drain pans and shut off the system to prevent overflow and water damage. Designed for installation on auxiliary drain pan outlets or inline on primary drains, models are available with a solid state electronic probe or magnetic reed switch. Switches include mounting adapters and hardware.

**Model SG1** condensate overflow alarm is wired across the normally closed contacts of the condensate switch. As the water level rises, the switch opens allowing current to flow through the alarm which sounds a buzzer and flashes an LED indicating a possible overflow condition. The SG1 works with most 24-volt overflow switches and pumps and comes prewired with 4-foot 18 AWG lead wires and 2-sided tape.

#### FEATURES

- Waterproof
- Primary or auxiliary installation
- · Easy to install and service
- Low voltage
- UL 508 listed
- Plenum rated models
- One year warranty

#### SPECIFICATIONS

Supply Voltage	24 VAC
Relay Type	Magnetic, Solid state
Switching Capability	1.25A, 2.3A
Plenum Rating	No, Yes
Mounting	3/4" adapter, NA
Mounting Orientation	Primary (inline) or auxillary, Auxillary,
	Drain Pan
Wire Length	6 ft (1.8m), 18 AWG, 4 ft (1.2m),
Let	18 AWG
Weight	0.2 lb (0.09 kg), 0.09 lb (0.04 kg)
Warranty	1 year



SS3

#### SPECIFICATIONS

Model	Switch Type	Supply Voltage	Switching Capability	Installation	Plenum Rated	Mounting Adapter	Lead Length	Weight
SS1	Magnetic	24 VAC	1.25A	Primary (inline) or auxillary	No	3/4" adapter	6 ft (1.8m), 18 AWG	0.2 lb (0.09 kg)
SS2AP	Magnetic	24 VAC	1.25A	Auxillary	Yes	3/4" adapter	4 ft (1.2m), 18 AWG	0.2 lb (0.09 kg)
SS3	Magnetic	24 VAC	1.25A	Drain Pan	No	NA	6 ft (1.8m), 18 AWG	0.09 lb (0.04 kg)

	ORDERING INFORMATION
MODEL SS1 SS2AP SS3 SP1P	<b>DESCRIPTION</b> Inline magnetic reed condensate overflow switch Auxiliary condensate overflow switch Auxiliary condensate pan overflow switch Inline solid state condensate overflow switch
SG1	RELATED PRODUCTS Condensate overflow alarm



# **SIEMENS**

## **PX Series Enclosures and Accessories**



Figure 1. New PX Series Enclosures.

## Enclosures

## Description

PX series enclosures house both electronic and pneumatic components. The enclosures include a perforated backplane for mounting of the PXC series controllers, Power Modular Equipment Controllers, Point Expansion Modules or other electronic or pneumatic components.

### Features

- Three sizes available to match installation needs.
- Sturdy construction accommodates secure conduit fittings and protects components against incidental contact and falling dirt.
- Multiple knockouts along top, sides and bottom.
- Perforated backplane extends wall-to-wall for mounting of additional equipment.
- DIN rail(s) for mounting of components.
- Spacious interior for easy routing and termination of wiring.
- Hinged door, key lock, wire tie bars, PXA series service boxes
- UL Smoke Control Listing is available on the 19" and 34" models.
- UL 916 rating is available on the 18' enclosure
- 18" enclosure pull-box type, utility cabinet for low cost installations (see Figure 2).



Figure 2. Complete 18" Enclosure Assembly.

## Accessories

### **Service Boxes**

## Description

PXA series service boxes include all of the parts necessary for installation inside a 19 inch or 34 inch PX Series Enclosure Assemblies. The 192VA service box can also be used within existing MEC enclosures. The 384VA service box may only be installed in the 34 inch PX Series Enclosure.



Figure 3. SB115V384VA service box .

### **Features**

- Four service boxes are available to step-down line voltage to 24Vac for use by electronic components.
- Service boxes are sized for:
  - 115V to 24V at 192VA
  - 115V to 24V at 384VA
  - 230V to 24V at 192VA
  - 230V to 24V at 384VA
- 384VA models mount inside the 34" enclosures.
- 192VA models mount inside the 19" and 34" enclosures.
- Two sidewall kits cover exposed circuits for use in other NEMA Type 1 enclosures such as motor control cabinets.
- Each service box includes an on/off circuit breaker for the transformer, transient protection on both primary and secondary sides, two NEC Class 1 power limited terminations for components inside the enclosure and one NEC Class 2 termination for external components such as TX-I/O Bus expansion or actuators.

- The 115V models provide an un-switched duplex outlet to power peripheral devices such as modems, trunk interfaces and Portable Operator's Terminals.
- UL864 Smoke Control rated when used in PXA Series Enclosure 19" or 34" or within existing MEC enclosures.

#### DIN Replacement Kit (PXA-DIN16KIT)

The DIN Replacement Kit can be used when additional 16" DIN rail is required.

This kit contains:

- Four 16" (406 mm) DIN rails for use when extra rails are needed
- Twelve Screws

#### Wire Tie Bar Kit (PXA-TIEBARKIT)

The Wire Tie Bar kit can be used when addition tie bars are needed to secure wiring within the enclosure.

This kit contains:

- Four 4.5" (114 mm) tie bars
- Four 9.5" (241 mm) tie bars
- Screws and cable ties

#### USB Modem Kit (PXA-USBMODEMKIT)

USB Modem kit contains everything needed for dial up modem connection using the USB Host port of the PXC Modular controller.

This kit contains:

- Sportsters Modem 56k BPS Dialup
- USB to RS232 Adapter
- Surge Suppressor Analog Telephone Line
- DB25M/F Right-Angle Adapter
- IBM 6' PC Cable DB9F to DB25M

#### USB to RS232 Adapter (PXA-USBADAPTER)

USB to RS232 Adapter converts USB Host signals (Type A male connector) to RS232 signals (DB9 male connector).

This adapter may be used for connection to a RS232 printer. It is part of the PXA-USBMODEMKIT.

## Specifications

Specifications	PXA-ENC18	PXA-ENC19	PXA-ENC34
UL Listed NEMA Type 1 Enclosure	Х	Х	Х
Pull-box style	Х		
Hinged Door with lock		X	Х
Ambient Operating Environment			
+32°F to +120°F (0°C to +49°C) 93% RH (Non-condensing)	X	X	Х
Agency Listing			
UL864 UUKL		Х	Х
ULC-C100 UUKL7		Х	Х
UL 916 PAZX		Х	Х
UL 508A	Х		
Agency Compliance			
FCC Compliance	X	X	Х
Australian EMC Framework	Х	Х	Х
European EMC Directive (CE)	Х	X	Х
European Low Voltage Directive (LVD)	Х	Х	Х
Dimensions	18"H × 14"W × 6"D	19"H × 22"W × 5.75"D	34"H × 22"W × 5.75"D
	(457.2 mm × 355.6 mm × 152.4 mm)	(482.6 mm × 558.8 mm × 146.05 mm)	(863.6 mm ×558.8 mm × 146.05 mm)
Mounting Surface			

Mounting Surface			
Building Wall	Х	Х	Х
Structural Member	Х	Х	Х

Input Power Requirement	115V Service Boxes	230V Service Boxes
Voltage	115Vac +/- 15% @ 60 Hz +/- 5%, from 15 or 20A circuit breaker	230Vac +/- 15% @ 50/60 Hz +/- 5%, from 10A circuit breaker
Current	2A for 192VA, 4A for 384VA, 2A for 115Vac Service Outlets	1A for 192VA, 2A for 384VA

## **Ordering Information**

#### **Enclosure Range**

Description	Product Number
18" PX Series Enclosure	PXA-ENC18
19" PX Series Enclosure	PXA-ENC19
34" PX Series Enclosure	PXA-ENC34
Accessories	
Service Box 115V, 24 Vac, 192 VA	PXA-SB115V192VA
Service Box 230V, 24 Vac, 192 VA	PXA-SB230V192VA
Service Box 115V, 24 Vac, 384 VA	PXA-SB115V384VA
Service Box 230V, 24 Vac, 384 VA	PXA-SB230V384VA
Service Box Sidewall Kit, 192 VA	PXA-SW192VA
Service Box Sidewall Kit, 384 VA	PXA-SW384VA
Replacement door for 19" PX series enclosure	PXA-ENC19.REPL.DR
Replacement door for 34" PX series enclosure	PXA-ENC34.REPL.DR

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# SIEMENS



## **Terminal Equipment Controller Enclosure**

## **Product Description**

A Terminal Equipment Controller enclosure is a general-purpose metal cabinet with a removable cover that houses an electronic output Terminal Equipment Controller (TEC). It is available in two versions: one to enclose a short platform TEC, and a larger multi-purpose model designed to enclose any of the following:

- Short platform TEC with or without actuator
- Long platform TEC
- TEC Actuator Package
- TEC Plug-in Relay Module (either direct or remote mounted)

### **Product Number**

- 540-155 Enclosure for short platform TEC
- 550-002 Multi-purpose enclosure for short or long platform TEC and/or other components listed above

## Agency Approvals

- UL listed as an industrial control panel enclosure per UL 508
- cUL certified as an industrial control panel enclosure per Canadian standard C22.2 No.14–95

## **Required Tools**

- 1/4-inch hex nut driver
- If supplied screws are not used: electric drill and appropriate size bit
- Medium flat-blade screwdriver

## Prerequisites

The mounting screws provided are designed for common sheet-metal duct surfaces. Have appropriate mounting hardware on hand if another surface is used.

### Instructions

- 1. Remove enclosure cover.
  - **NOTE:** Enclosure 540-155 has cover screws that should be loosened but not removed. Enclosure 550-002 has no cover screws; see Figure 5 for tip on removing cover.
- 2. Remove appropriate knockouts.
- 3. Align the enclosure on the mounting surface and mark the position of the mounting holes (Figure 1 or Figure 2).
- 4. Mount the enclosure with the self-tapping screws provided or drill pilot holes and mount with other screws.
- 5. Do one of the following:
  - If the controller will not be installed at this time, replace the cover.
  - If the controller will be installed now, then snap it into the mounting rail and replace enclosure cover. (For enclosure 550-002, see Figure 4 for how to secure the mounting rail, and Figure 6 for how to replace the cover.)

The enclosure is installed.

### **Expected Installation Time**

20 minutes



Figure 2. Enclosure 550-002.

Document No. 550-196 Installation Instructions December 15, 2004



Enclosure 540-155 with Short Platform Controller



Enclosure 550-002 with Short Platform Controller and optional TEC Plug-in Relay Module (remotely mounted)







**Note:** TEC Plug-in Relay Module (optional) is not shown but is available with this configuration.

Enclosure 550-002 with TEC Actuator Package (shown with optional Autozero Module)

Figure 3. Enclosures with Controllers and Optional Components Installed.



With enclosure 550-002, the mounting rail does not mount with screws. Instead, it slides under and is secured by mounting flanges. **Exception:** TEC Actuator Package (P/N comes pre-assembled on a common base-plate that must be screwed in place. Short platform mounting rail mounts in same manner as long platform mounting rail, but at right angle.

#### Figure 4. Enclosure 550-002, Method of Securing Mounting Rails.

Long platform mounting rail shown above. Short platform mounting rail mounts in same NOTE: manner but at right angle.



Figure 5. Enclosure 550-002 — First Step of Removing Cover (do both sides).



Figure 6. Enclosure 550-002 — Replacing Cover.

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