City of Wichita Ks

Re-Use Water Pump Station (Plant 2)

Project No. 468-85112

Date: 07/14/16

Re-submitted by: Mark Allen / R.E. Pedrotti

913.677.3366 (email) marka@repedrotti.com

R.E. Pedrotti Company Re-Submittal Response to MKEC Submittal Comments

Item #1

The float switch (Anchor Sci.) will need to have an external weight added to the part number. The part number will be GSE not the GSI prefix.

REP Comments: Item #1
The float switch configuration has been changed as requested. Originally submitted GSI-50-NONC has been changed to GSE-50 NONC. Mounting style was originally submitted as internally weighted, has been changed to externally weighted. The part number and float switch configuration has been updated to reflect the requested change.

Item #2

The Level transmitter is 2.75" dia. The stilling well is 3.068" id… This will be a tight fit if the stilling well is used.

REP Comments: Item #2
The Level Transmitter model KPSI 750-S14D-015.00-000.000-B1-0050-B originally submitted has been changed to model KPSI 710-S14D-015.00-000.000-B1-0050-B to meet the spacing requirements. The part number and Level Transmitter Configuration has been changed to reflect the requested change.

Item #3

The flow meter substitution will be fine the 9500A/IMT31A is a fine replacement for the 9300A/IMT25 transmitter. The mounting location of the transmitter (IMT31A) will need to be discussed with the customer…
I am ok with the balance of the submittal…

REP Comments: Item #3
We acknowledge the 9500A/IMT31A Flow tube and Transmitter replacement. We will move forward as directed.

MKEC ENGINEERING, INC.
411 North Webb Road – Wichita, KS 67206

☑ Reviewed ☐ Reviewed As Noted
☐ Revise and Resubmit ☐ Rejected
☐ Not Required by the Contract Documents

Reviewed for conformance with the design concept of the project and compliance with the information given in the contract documents. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication process or to techniques of construction; and coordination of work of all other trades. If "Resubmit" or "Rejected" are not checked resubmission is neither desired or required.

By: Dave Strickland Date: 08/02/2016

RE-SUBMITTALS FOR APPROVAL:

CITY OF WICHITA KANSAS
RE-USE WATER PUMP STATION (PLANT 2)
TO SERVE SPIRIT AEROSYSTEMS
PROJECT NO. 468-85112

CONTRACTED BY:

WILDCAT CONSTRUCTION CO., INC.
3219 W. MAY
WICHITA, KS 67213
(316) 945-9408

SUBMITTED BY:

R.E. PEDROTTI COMPANY, INC.
5855 BEVERLY AVE.
MISSION, KS 66202
(913) 677-3366

INSTRUMENTATION AND CONTROLS PACKAGE

JULY 2016

R.E. PEDROTTI CO. REP 40 YEARS SINCE 1976

MKEC ENGINEERING, INC.
411 North Webb Road – Wichita, KS 67206

☑ Reviewed ☐ Reviewed As Noted
☐ Revise and Resubmit ☐ Rejected
☐ Not Required by the Contract Documents

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By: Dave Strickland Date: 08/02/2016

CITY OF WICHITA
RE-USE WATER PUMP STATION

INSTRUMENTATION & CONTROLS

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2.0	**LEVEL TRANSMITTER**	
	Submersible Level Transducer	KPSI
3.0	**PRESSURE TRANSMITTER**	
	Gauge Pressure Transmitter	Foxboro
4.0	**LEVEL SWITCHES**	
	Float Level Switch	Anchor Scientific
5.0	**RE-USE WATER PLC CONTROL PANEL**	
	Control Panel Wiring Diagrams	REP/KASA
	PLC Equipment	GE
	Network Switch	Moxa
	Industrial Touch Panel PC	Phoenix Contact
	HMI Software Licensing	Wonderware
	Misc. Panel Mounted Components	Various
6.0	**UV BUILDING CONTROL PANEL MODIFICATIONS**	
	Network Switch	Moxa
	Misc. Panel Mounted Components	Various

Item	Qty	FLOW TRANSMITTER	
1.01	**1**	**Foxboro 9508A-A0540B1300107000**	**Magnetic Flowtube Sensor**
	9508A	**NOMINAL DIAMETER and LINER**	
		DN200,8" Hard rubber	
	A	**NOMINAL PRESSURE**	
		150 lbs RF ASME B 16.5 (1" ...24")	
	0	**APPROVAL**	
		Non Ex	
	5	**SYSTEM DESIGN**	
		Separate with Aluminum Connection Box / PF 1/2	
	4	**CONVERTER MODEL**	
		IMT31 (Wall Mount Version)	
	0	**LINING**	
		Standard	
	B	**ELECTRODES (Fixed)**	
		Hastelloy C22	
	1	**CONSTRUCTION OF ELECTRODES**	
		Fixed	
	3	**HOUSING - FLANGE MATERIAL**	
		Steel / St. Steel DIN 1.4404 | 316 L	
	0	**PROTECTION CLASS - DIMENSION (FACE TO FACE)**	
		IP 66 / 67 - Standard	
	0	**CABLE**	
		Compact - Without - Separate DS	
	1	**CABLE LENGTH**	
		10 m | 30 ft.	
	0	**CALIBRATION**	
		Standard	
	7	**RING - MATERIAL**	
		Ring 7 1 - Hastelloy C22	
	0	**CONSTRUCTION REQUIREMENTS**	
		Standard	
	0	**QA - QC REQUIREMENTS**	
		Standard	
	0	**RATIO OF CT-CALIBRATION**	
		Standard, R=80	

FIELD DEVICES - FLOW
Product Specifications

Foxboro®
by Schneider Electric

PSS 1-6H4 A en

Foxboro® Model 9500A Magnetic Flow Sensor

The 9500A magnetic flow sensor can be used with IMT30A, IMT31A and IMT33A magnetic flow converter.

- For all water and wastewater applications
- Wide range of approvals for potable water
- Robust, fully welded construction

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1.1 Reliable solution for the water and wastewater industry

The **9500A** is designed to meet the demands for all water and waste water applications including groundwater, potable water, waste water, sludge and sewage, industry water and salt water.

The 9500A has a field proven and unsurpassed lifetime. This is assured by the fully welded construction, full bore pipe, absence of moving parts and wear resistant liner materials.
The sensor has the widest diameter range available in the market: from DN25 up to DN2000 (DN3000 available on request).

① Robust fully welded construction
② Diameter range: DN25...DN3000
③ PP, PO and hard rubber liners

Highlights

- Rugged liners suitable for any water and wastewater application
- Proven and unsurpassed lifetime, huge installed base
- Tamper proof, fully welded construction, also available in customer specific constructions
- Drinking water approvals including KTW, KIWA, ACS, DVGW, NSF, WRAS
- Suitable for subsoil installation and constant flooding (IP68)
- Bi-directional flow metering
- Standard in house wet calibration of sensors up to diameter DN3000
- Easy installation and commissioning
- No grounding rings with virtual reference option on IMT33A
- Extensive diagnostic capabilities
- Maintenance-free

Industries

- Water
- Wastewater
- Pulp & Paper
- Minerals & Mining
- Iron, Steel & Metals
- Power

Applications

- Water abstraction
- Water purification and desalination
- Drinking water distribution networks
- Leakage detection
- Irrigation
- Industry water
- Cooling water
- Wastewater
- Sewage and sludge
- Sea water

1.2 Options

The reliable solution for the water and wastewater industry

From standard to customized
For easy ordering the standard range of the 9500A covers all popular sizes, flange materials and connections (ASME, EN, JIS, AWWA).

The 9500A is designed to meet the demands for all water and waste water applications including groundwater, potable water, waste water, sludge and sewage, industry water and salt water.

The 9500A has a field proven and unsurpassed lifetime assured by the fully welded housing, full bore pipe construction, absence of moving parts and wear resistant liner materials.

Easy installation
Fitting the 9500A is easy with the flanged design and standard ISO insertion lengths. To further ease the operation, the 9500A can be installed without filters and straighteners. Even grounding rings are not required with the patented **"Virtual Reference"** option on the IMT33A converter.

IP68
Installation in measurement chambers subject to (constant) flooding is possible with the IP68 rated version. The chambers can even be completely surpassed if the IP68 version is combined with our special subsoil coating, allowing the 9500A to be installed directly in the ground.

1.3 Measuring principle

An electrically conductive fluid flows inside an electrically insulated pipe through a magnetic field. This magnetic field is generated by a current, flowing through a pair of field coils. Inside of the fluid, a voltage U is generated:

U = v * k * B * D

in which:
v = mean flow velocity
k = factor correcting for geometry
B = magnetic field strength
D = inner diameter of flowmeter

The signal voltage U is picked off by electrodes and is proportional to the mean flow velocity v and thus the flow rate q. A signal converter is used to amplify the signal voltage, filter it and convert it into signals for totalizing, recording and output processing.

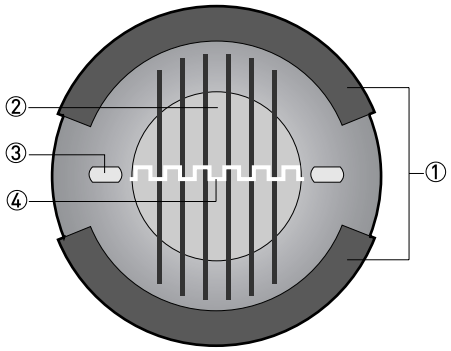


Figure 1-1: Measuring principle

① Field coils
② Magnetic field
③ Electrodes
④ Induced voltage (proportional to flow velocity)

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website.*

Measuring system

Measuring principle	Faraday's law of induction
Application range	Electrically conductive fluids
Measured value	
Primary measured value	Flow velocity
Secondary measured value	Volume flow

Design

Features	Fully welded maintenance-free sensor.
	Large diameter range DN25...2000
	Rugged liners approved for drinking water.
	Large standard range but also available in customer specific diameter, length and pressure rating.
Modular construction	The measurement system consists of a flow sensor and a signal converter. It is available as compact and as separate version. Additional information can be found in the documentation of the signal converter.
Compact version	With signal converter IMT30A
	With signal converter IMT31A
	With signal converter IMT33A
Remote version	In wall (W) mount version with signal converter IMT30A
	In wall (W) mount version with signal converter IMT31A
	In field (F), wall (W) or rack (R) mount version with signal converter IMT33A F, W or R
Nominal diameter	With signal converter IMT30A: DN25...1200 / 1...48"
	With signal converter IMT31A: DN25...1200 / 1...48"
	With signal converter IMT33A: DN25...2000 / 1...80"

Measuring accuracy

Reference conditions	Medium: water
	Temperature: +10...+30°C / +50...+86°F
	Operating pressure: 1 bar / 14.5 psi
	Inlet section ≥ 5 DN
	Electrical conductivity: ≥ 300 µS/cm
Maximum measuring error	IMT30A: 0.5% of the measured value above 0.5 m/s; below 0.5 m/s, deviation ± 2.5 mm/s
	IMT31A: down to 0.3% of the measured value ±1 mm/s
	IMT33A: down to 0.2% of the measured value ±1 mm/s
	The maximum measuring error depends on the installation conditions.
	For detailed information refer to *Measuring accuracy* on page 14.
Repeatability	±0.1% of the measured value, minimum 1 mm/s
Calibration / Verification	**Standard:**
	2 point calibration by a direct volume comparison.
	Only in combination with the signal converter IMT33A.

Operating conditions

Temperature	
For detailed information in pressure / temperature refer to *Pressure derating* on page 15.	
	For Ex versions different temperatures are valid. Please refer to the relevant Ex documentation for details.
Process temperature	Hard rubber liner: -5...+80°C / +23...+176°F
	Polypropylene liner: -5...+90°C / +23...+194°F
	Polyolefin liner: -5...+80°C / +23...+176°F
Ambient temperature	**Standard** (with aluminum signal converter housing): standard flanges
	-20…+65°C / -4…+149°F
	Option (with aluminum signal converter housing): low temperature carbon steel flanges or stainless steel flanges
	-40…+65°C / -40…+149°F
	Option (with stainless steel signal converter housing): low temperature carbon steel flanges or stainless steel flanges
	-40...+55°C / -40…+130°F
Protect electronics against self-heating at ambient temperatures above +55°C / +131°F.	
Storage temperature	-50...+70°C / -58...+158°F
Measuring range	-12...+12 m/s / -40...+40 ft/s
Pressure	
For detailed information in pressure / temperature refer to *Pressure derating* on page 15.	

EN 1092-1	DN1200...2000: PN6
	DN200...1000: PN10
	DN65 and DN100...150: PN16
	DN25...50 and DN80: PN40
ASME B16.5	1...24": 150 & 300 lb RF
JIS	DN50...1000 / 2...40": 10 K
	DN25...40 / 1...1½": 20 K
AWWA (class B or D FF)	**Option:**
	DN700...1000 / 28...40": ≤ 10 bar / 145 psi
	DN1200...2000 / 48...80": ≤ 6 bar / 87 psi
DIN	PN16 - 6 bar rated; DN700...2000
	PN10 - 6 bar rated; DN700...2000
	PN6 - 2 bar rated; DN700...2000
Vacuum load	For detailed information refer to *Vacuum load* on page 17.
Pressure loss	Negligible
Chemical properties	
Physical condition	Electrically conductive liquids
Electrical conductivity	Standard: ≥ 5 µS/cm
	Demineralised water: ≥ 20 µS/cm
Permissible gas content (volume)	IMT30A: ≤ 3%
	IMT31A: ≤ 3%
	IMT33A: ≤ 5%
Permissible solid content (volume)	IMT30A: ≤ 10%
	IMT31A: ≤ 10%
	IMT33A: ≤ 70%

Installation conditions

Installation	Assure that the flow sensor is always fully filled.
	For detailed information refer to *Installation* on page 22.
Flow direction	Forward and reverse
	Arrow on flow sensor indicates flow direction.
Inlet run	≥ 5 DN
Outlet run	≥ 2 DN
Dimensions and weights	For detailed information refer to *Dimensions and weights* on page 18.

Materials

Flow sensor housing	Sheet steel
Measuring tube	Austenitic stainless steel
Flanges	Carbon steel
Liner	**Standard:**
	DN25...150 / 1...6": polypropylene
	DN200...2000 / 8...80": hard rubber
	Option:
	DN25...150 / 1...6": hard rubber
	DN200...1000 / 8...40": polyolefin
Protective coating	On exterior of the meter: flanges, housing, signal converter (compact version) and / or connection box (field version)
	Standard: polyurethane coating
	Option: subsoil coating, offshore coating
Connection box	Only for remote versions
	Standard: die-cast aluminum
	Option: stainless steel
Measuring electrodes	Standard: Hastelloy® C
	Option: stainless steel, titanium
Grounding rings	Standard: stainless steel
	Option: Hastelloy® C, titanium, tantalum
	Grounding rings can be omitted with virtual reference option for the signal converter IMT33A.
Reference electrode (optional)	Standard: Hastelloy® C
	Option: stainless steel, titanium

Process connections

Flange	
EN 1092-1	DN25...3000 in PN2.5...40
ASME	1…24" in 150 & 300 lb RF
JIS	DN25…1000 in 10...20 K
AWWA	DN700...2000 in 6...10 bar
Design of gasket surface	RF

Electrical connections

	For full detail refer to the relevant documentation of the signal converter.
Signal cable (remote versions only)	
Type A (DS)	**In combination with the signal converter IMT30A, IMT31A and IMT33A**
	Standard cable, double shielded. Max. length: 600 m / 1968 ft (depends on electrical conductivity and flow sensor)
Type B (BTS)	**Only in combination with the signal converter IMT33A**
	Optional cable, triple shielded. Max. length: 600 m / 1968 ft (depends on electrical conductivity and flow sensor)
I/O	For full details of I/O options, including data streams and protocols, see technical datasheet of the relevant signal converter.

Approvals and certificates

CE	
This device fulfils the statutory requirements of the EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.	
	For full information of the EU directive & standards and the approved certifications; see the CE declaration or the manufacturer website.
Hazardous area	
ATEX	Please check the relevant Ex documentation for details.
	Compact version with signal converter IMT31A
	II 2 GD
	Compact version with signal converter IMT33A
	II 2 GD or II 2(1) GD
	Remote version
	II 2 GD
FM	**In combination with signal converter IMT33A**
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
	Class III, Div. 2, Groups F and G
CSA	**In combination with signal converter IMT33A**
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
Other approvals and standards	
Drinking water approvals	Hard rubber liner: NSF / ANSI standard 61 / ACS, KTW(<60°C), DVGW-W270, KIWA on request.
	Polypropylene liner: ACS, KIWA/ATA, KTW, NSF / ANSI standard 61, DVGW-W270, WRAS
	Polyolefin liner: ACS, KIWA/ATA, KTW, DVGW-W270, WRAS
Protection category acc. to IEC 529 / EN 60529	**Standard:**
	IP66 / 67 (NEMA 4/4X/6)
	Option:
	IP68 (NEMA 6P)
	IP68 is only available for separate design and with a stainless steel connection box.
Shock test	IEC 68-2-27
	30 g for 18 ms
Vibration test	IEC 68-2-64
	f = 20-2000 Hz, rms = 4.5 g, t = 30 min

2.2 Measuring accuracy

Each flowmeter is standard wet calibrated under reference conditions by direct volume comparison. The performance of the flowmeter is defined and documented in an individual calibration certificate.

Reference conditions

- Medium: water
- Temperature: +10...+30°C / +50...+86°F
- Operating pressure: 1 bar / 14.5 psi
- Inlet section: ≥ 5 DN
- Electrical conductivity: ≥ 300 µS/cm

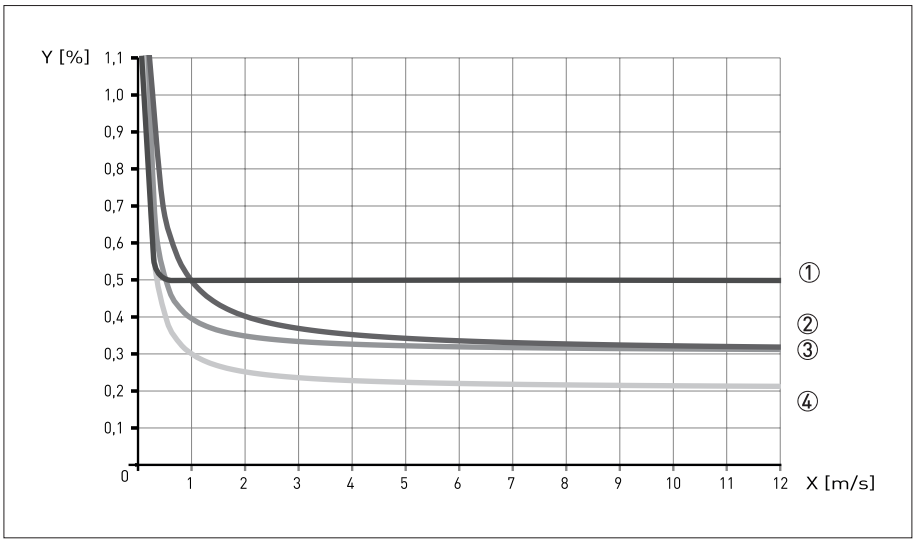


Figure 2-1: Flow velocity vs. accuracy
X [m/s] : flow velocity
Y [%]: deviation from the actual measured value (mv)

Accuracy

Flow sensor diameter	Signal converter type	Accuracy	Curve
DN25...1200 / 1...48"	IMT30A	0.5% of mv above 0,5 m/s, below 0,5 m/s, deviation ± 2.5 mm/s	①
DN25...1200 / 1...48"	IMT31A	0.3% of mv + 1 mm/s	③
DN25...1600 / 1...64"	IMT33A	0.2% of mv + 1 mm/s	④
DN1800...2000 / > 64"	IMT33A	0.3% of mv + 2 mm/s	②

2.3 Pressure derating

The graphs below refer to the maximum pressure as a function of the temperature for the flanges of the flowmeter (per specified flange material).

Please note that the specified values only refer to the flanges. The maximum value for the flowmeter can further be limited by the maximum value for other materials (o.a. the liner)

For A = Carbon steel A 105 & B = Stainless steel 316L
X/Y axes in all graphs; X = Temperature in [°C] / Y = Pressure in [bar]
x/y axes in all graphs; x = Temperature in [°F] / y = Pressure in [psi]

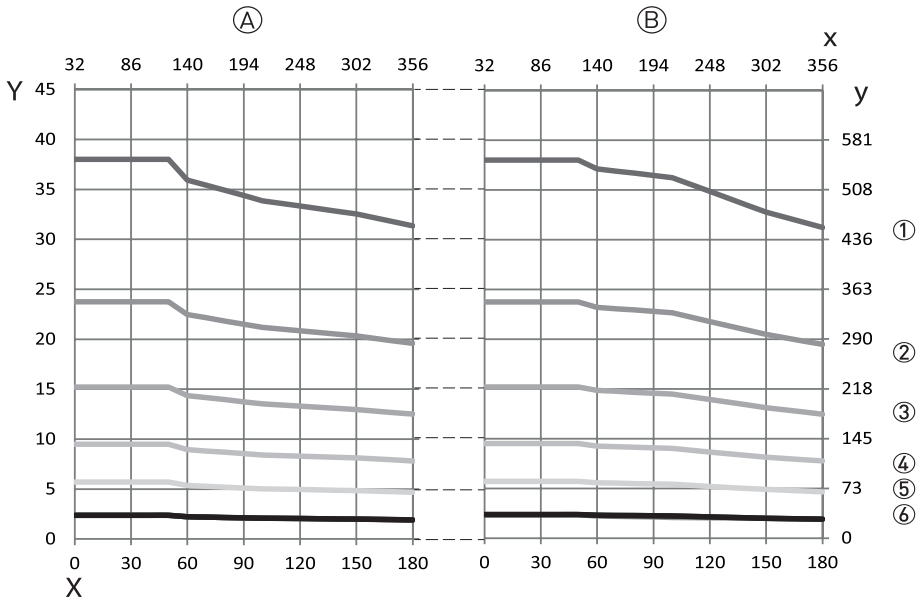


Figure 2-2: Pressure derating; EN 1092-1

① PN 40
② PN 25
③ PN 16
④ PN 10
⑤ PN 6
⑥ PN 2.5

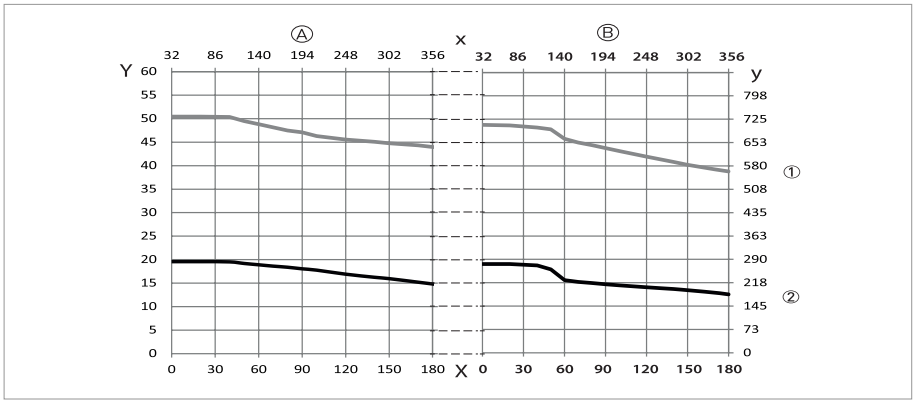


Figure 2-3: Pressure derating; ANSI B16.5

① 300 lbs
② 150 lbs

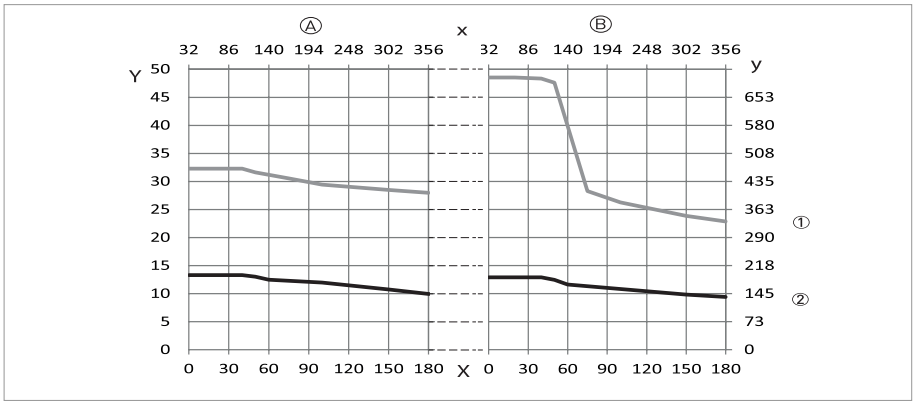


Figure 2-4: Pressure derating; JIS B2220

① 20K
② 10K

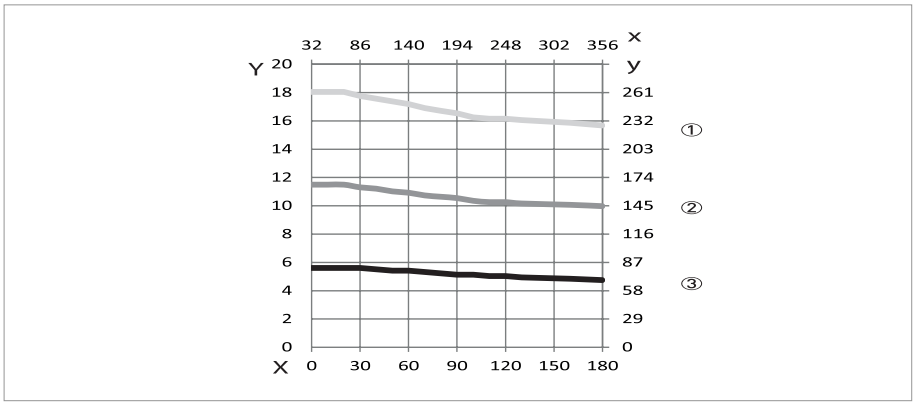


Figure 2-5: Pressure derating; AWWA C207

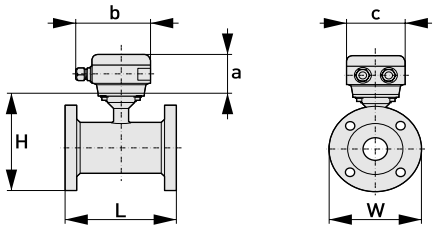
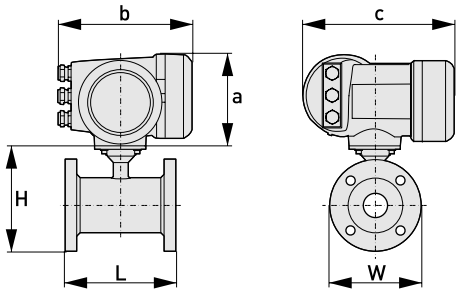
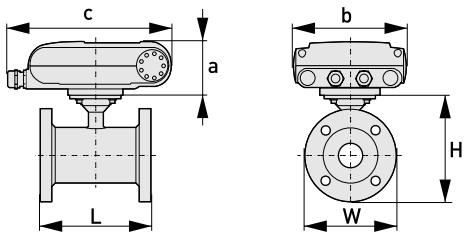
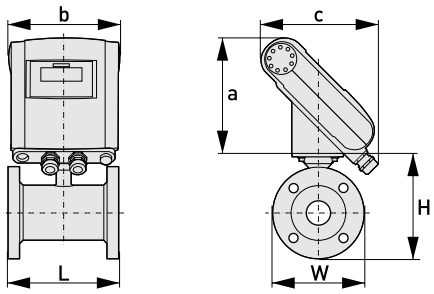
① Class D2 [>12"]
② Class D1 [4...12"]
③ Class B

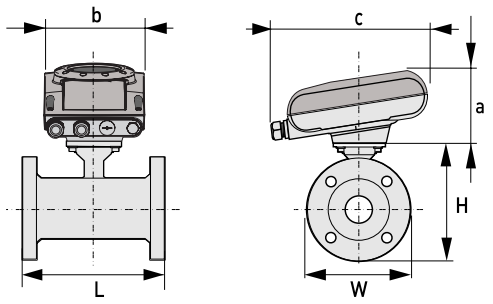
2.4 Vacuum load

Diameter	Vacuum load in mbar abs. at a process temperature of			
[mm]	20°C	40°C	60°C	80°C
Hard rubber				
DN200...300	250	250	400	400
DN350...1000	500	500	600	600
DN1200...2000	600	600	750	750
Polypropylene				
DN25...150	250	250	400	400
Polyolefin				
DN200...1000	0	0	0	0

Diameter	Vacuum load in psia at process temperature of			
[inch]	68°F	104°F	140°F	176°F
Hard rubber				
8...12	3.6	3.6	5.8	5.8
14...40	7.3	7.3	8.7	8.7
48...80	8.7	8.7	10.9	10.9
Polypropylene				
1...6	3.6	3.6	5.8	5.8
Polyolefin				
8...40	0	0	0	0

2.5 Dimensions and weights

Remote version		a = 88 mm / 3.5" b = 139 mm / 5.5" ① c = 106 mm / 4.2" Total height = H + a
Compact version with : **IMT33A**		a = 155 mm / 6,1" b = 230 mm / 9.1" ① c = 260 mm / 10.2" Total height = H + a
Compact version with: **IMT31A (0°)**		a = 82 mm / 3.2" b = 161 mm / 6.3" c = 257 mm / 10.1" ① Total height = H + a
Compact version with: **IMT31A (45°)**		a = 186 mm / 7.3" b = 161 mm / 6.3" c = 184 mm / 2.7" ① Total height = H + a

Compact version with: IMT30A (10°)		a = 101 mm / 3.98" b = 157 mm / 6.18" c = 260 mm / 10.24" ① Total height = H + a

① The value may vary depending on the used cable glands.

- *All data given in the following tables are based on standard versions of the flow sensor only.*
- *Especially for smaller nominal sizes of the flow sensor, the signal converter can be bigger than the flow sensor.*
- *Note that for other pressure ratings than mentioned, the dimensions may be different.*
- *For full information on signal converter dimensions see relevant documentation.*

EN 1092-1

Nominal size DN [mm]	Dimensions [mm]				Approx. weight [kg]
	Standard length	ISO Insertion length	H	W	
25	150	200	140	115	5
32	150	200	157	140	6
40	150	200	166	150	7
50	200	200	186	165	11
65	200	200	200	185	9
80	200	200	209	200	14
100	250	250	237	220	15
125	250	250	266	250	19
150	300	300	300	285	27
200	350	350	361	340	34
250	400	450	408	395	48
300	500	500	458	445	58
350	500	550	510	505	78
400	600	600	568	565	101
450	600	-	618	615	111
500	600	-	671	670	130
600	600	-	781	780	165
700	700	-	898	895	248
800	800	-	1012	1015	331
900	900	-	1114	1115	430
1000	1000	-	1225	1230	507
1200	1200	-	1417	1405	555
1400	1400	-	1619	1630	765
1600	1600	-	1819	1830	1035
1800	1800	-	2027	2045	1470
2000	2000	-	2259	2265	1860

ASME B16.5 / 150 lb flanges

Nominal size [inch]	Dimensions [inch]			Approx. weight [lb]
	L	H	W	
1"	5.91	5.39	4.25	7
1½"	5.91	6.10	5.00	11
2"	7.87	7.05	5.98	18
3"	7.87	8.03	7.50	26
4"	9.84	9.49	9.00	44
5"	9.84	10.55	10.00	49
6"	11.81	11.69	11.00	64
8"	13.78	14.25	13.50	95
10"	15.75	16.30	16.00	143
12"	19.69	18.78	19.00	207
14"	27.56	20.67	21.00	284
16"	31.50	22.95	23.50	364
18"	31.50	24.72	25.00	410
20"	31.50	26.97	27.50	492
24"	31.50	31.38	32.00	675

ASME B16.5 / 300 lb flanges

Nominal size [inch]	Dimensions [inch]			Approx. weight [lb]
	L	H	W	
1"	5.91	5.71	4.87	11
1½"	7.87	6.65	6.13	13
2"	9.84	7.32	6.50	22
3"	9.84	8.43	8.25	31
4"	11.81	10.00	10.00	44
6"	12.60	12.44	12.50	73
8"	15.75	15.04	15.00	157
10"	19.69	17.05	17.50	247
12"	23.62	20.00	20.50	375
14"	27.56	21.65	23.00	474
16"	31.50	23.98	25.50	639
20"	31.50	28.46	30.50	937
24"	31.50	33.39	36.00	1345

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The 9500Aelectromagnetic flowmeter is designed exclusively to measure the flow of electrically conductive, liquid media.

3.1 General notes on installation

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

Do a check of the packing list to make sure that you have all the elements given in the order.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.1.1 Vibration

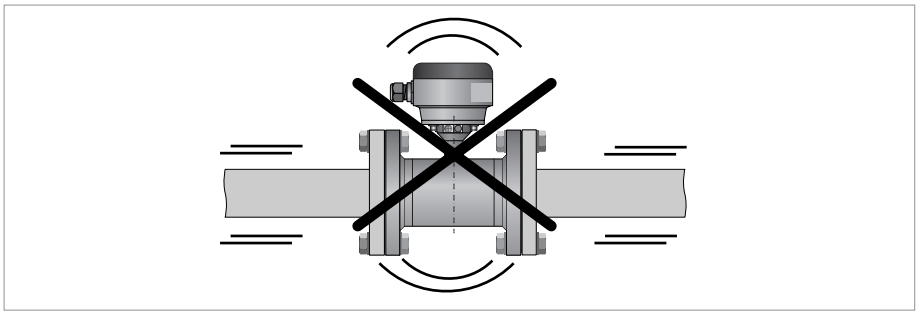


Figure 3-1: Avoid vibrations

3.1.2 Magnetic field

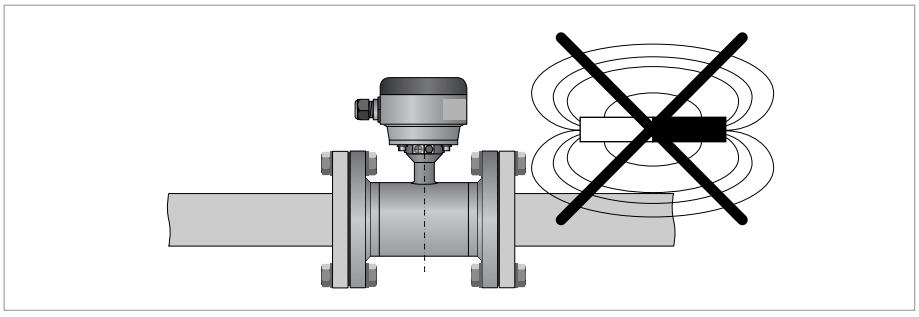


Figure 3-2: Avoid magnetic fields

3.2 Installation conditions

3.2.1 Inlet and outlet

Use straight inlet and outlet pipe sections to prevent flow distortion or swirl, caused by bends and T- sections.

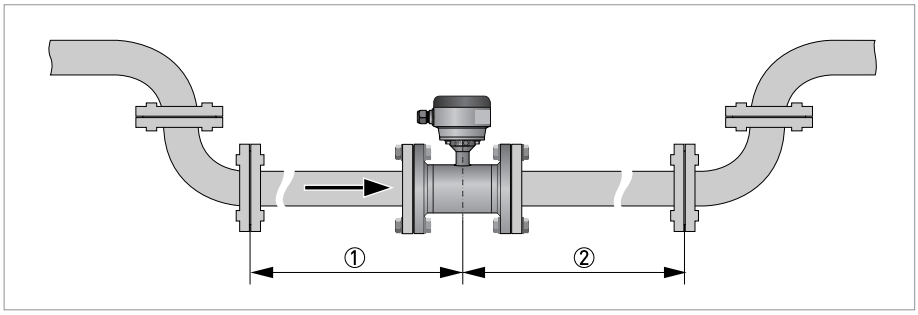


Figure 3-3: Recommended inlet and outlet section

① Refer to chapter "Bends in 2 or 3 dimensions"
② ≥ 2 DN

3.2.2 Bends in 2 or 3 dimensions

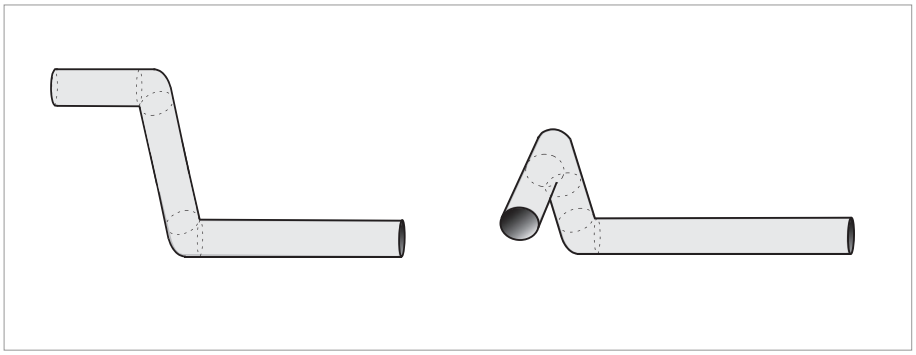


Figure 3-4: Inlet when using 2 and/or 3 dimensional bends in front of the flowmeter

Inlet length: using bends in 2 dimensions: ≥ 5 DN; when having bends in 3 dimensions: ≥ 10 DN

3.2.3 T-section

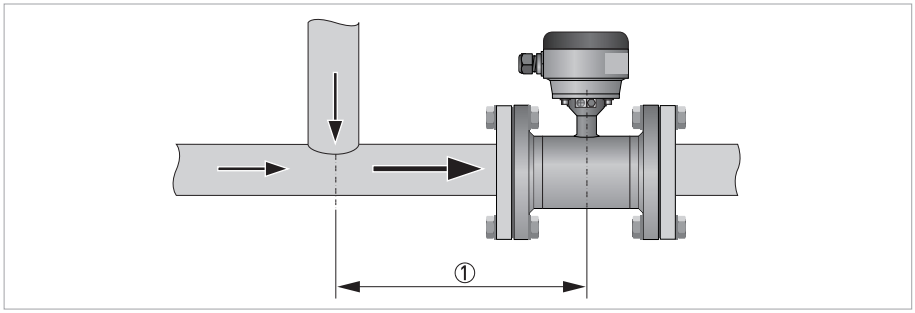


Figure 3-5: Distance behind a T-section

① ≥ 10 DN

3.2.4 Bends

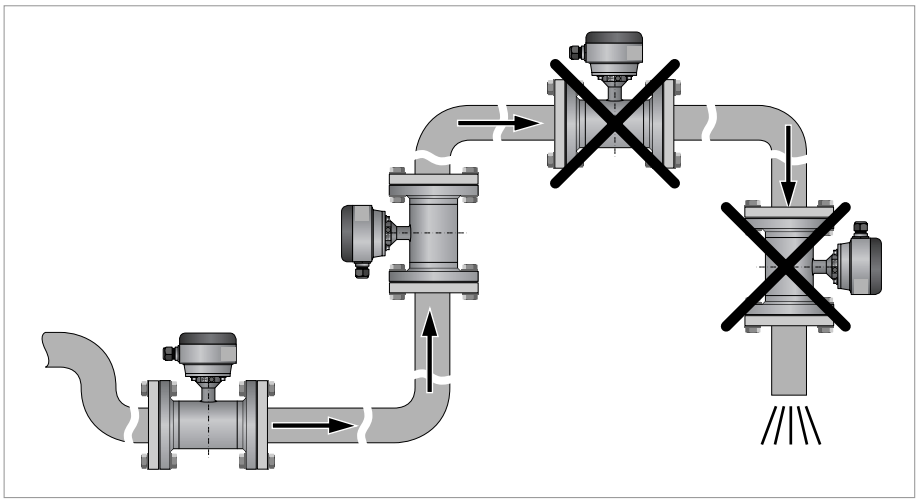


Figure 3-6: Installation in bending pipes

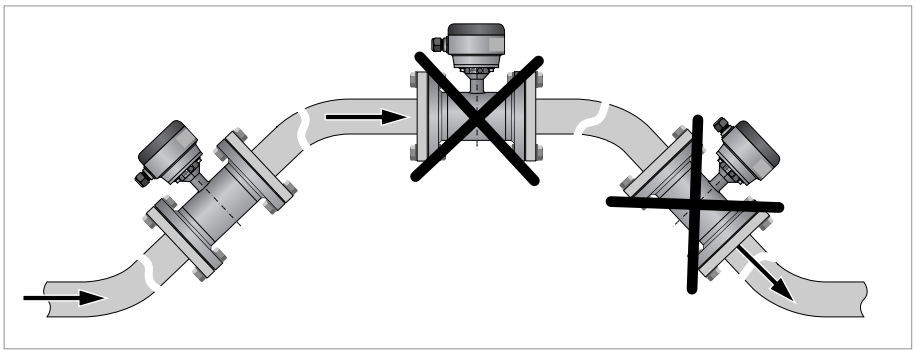


Figure 3-7: Installation in bending pipes

Avoid draining or partial filling of the flow sensor

3.2.5 Open feed or discharge

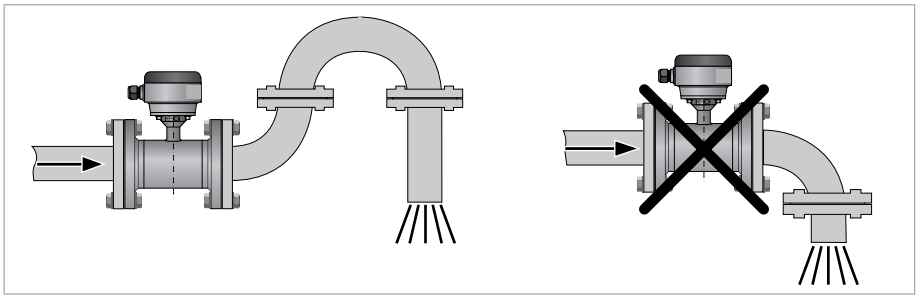


Figure 3-8: Installation in front of an open discharge

3.2.6 Flange deviation

Max. permissible deviation of pipe flange faces:
$L_{max} - L_{min} \leq 0.5$ *mm / 0.02"*

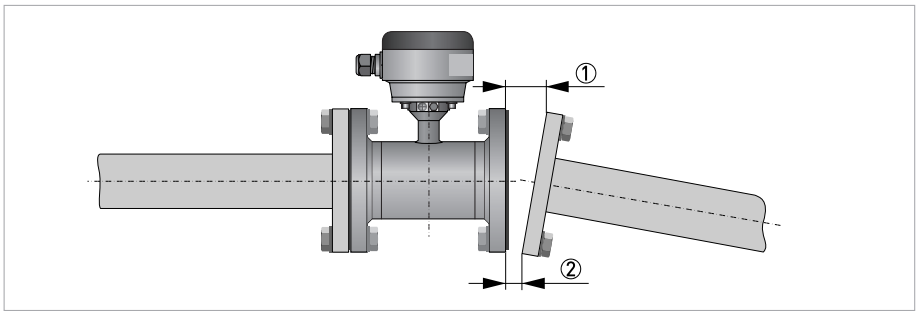


Figure 3-9: Flange deviation

① L_{max}
② L_{min}

3.2.7 Pump

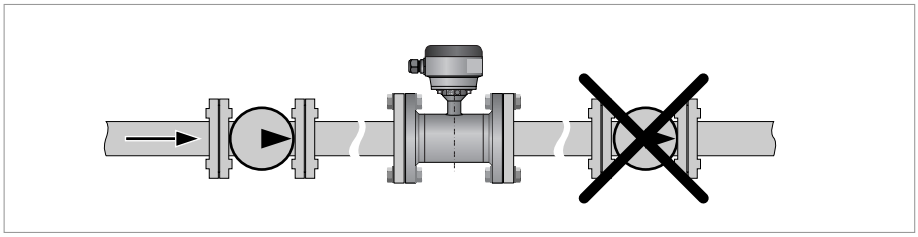


Figure 3-10: Installation behind a pump

3.2.8 Control valve

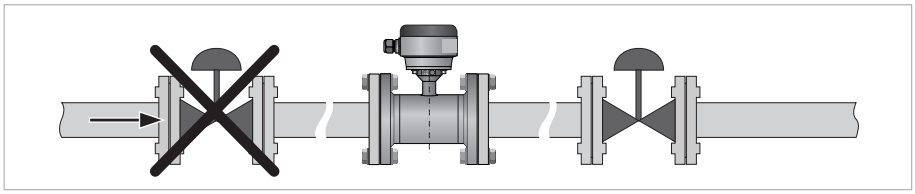


Figure 3-11: Installation in front of a control valve

3.2.9 Air venting and vacuum forces

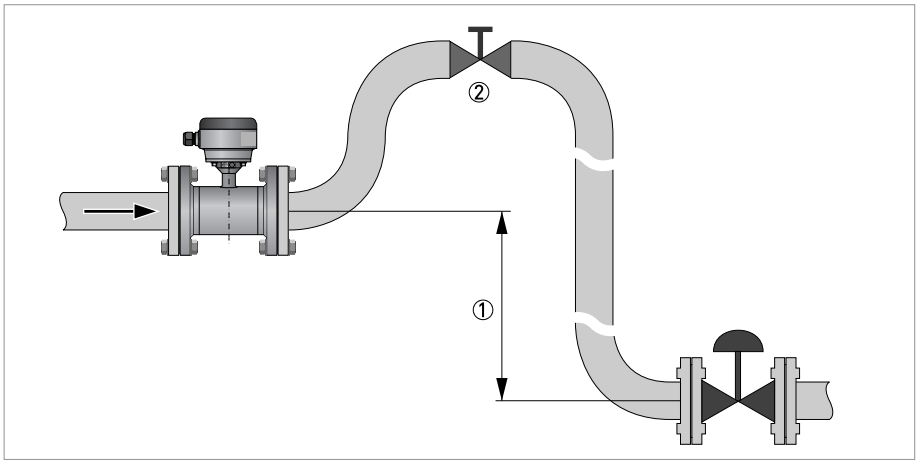


Figure 3-12: Air venting

① ≥ 5 m
② Air ventilation point

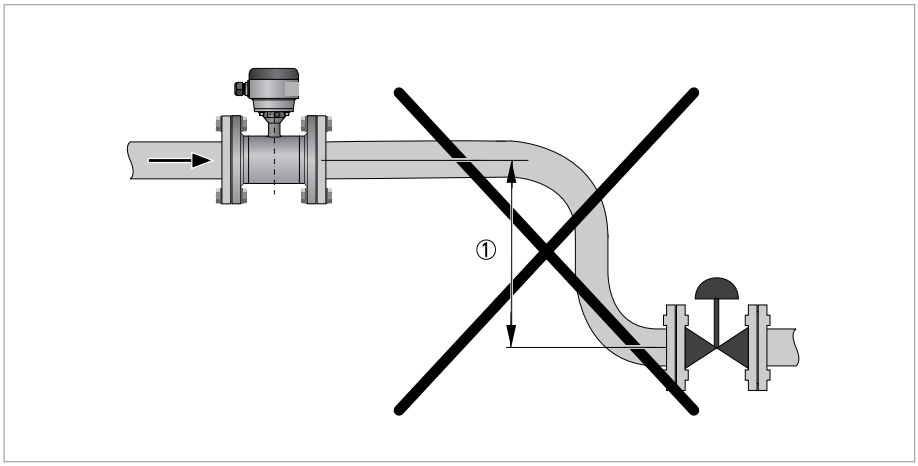


Figure 3-13: Vacuum

① ≥ 5 m

3.2.10 Mounting position

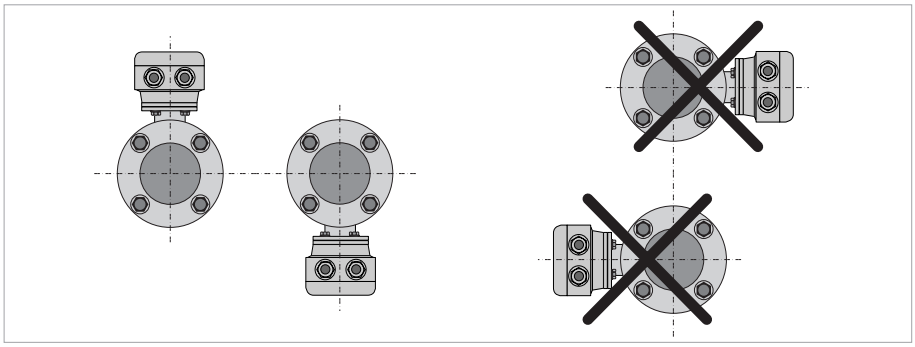


Figure 3-14: Mounting position

- Mount flow sensor either with signal converter aligned upwards or downwards.
- Install flow sensor in line with the pipe axis.
- Pipe flange faces must be parallel to each other.

3.3 Mounting

3.3.1 Torques and pressures

The maximum pressure and torques values for the flowmeter are theoretical and calculated for optimum conditions and use with carbon steel flanges.

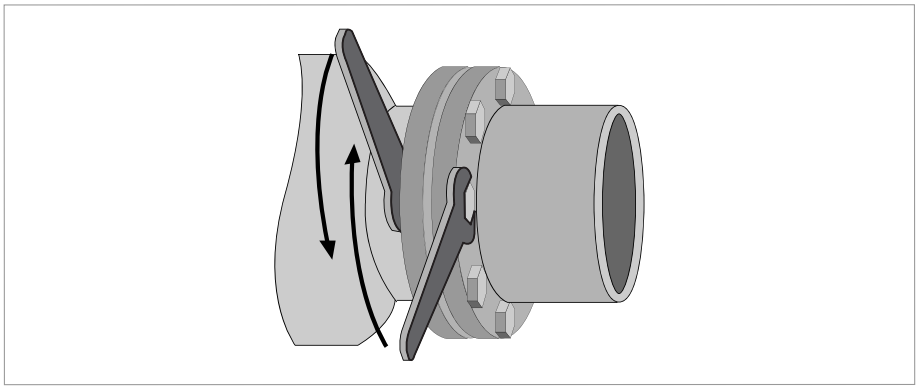


Figure 3-15: Tightening of bolts

- Always tighten the bolts uniformly and in diagonally opposite sequence.
- Do not exceed the maximum torque value.
- Step 1: Apply approx. 50% of max. torque given in table.
- Step 2: Apply approx. 80% of max. torque given in table.
- Step 3: Apply 100% of max. torque given in table.

Nominal size DN [mm]	Pressure rating	Bolts	Max. torque [Nm] ①		
			Polyolefin	Polypropylene	Hard rubber
25	PN 40	4 x M 12	-	22	11
32	PN 40	4 x M 16	-	37	19
40	PN 40	4 x M 16	-	43	25
50	PN 40	4 x M 16	-	55	31
65	PN 16	② x M 16	-	51	42
65	PN 40	8 x M 16	-	38	21
80	PN 40	8 x M 16	-	47	25
100	PN 16	8 x M 16	-	39	30
125	PN 16	8 x M 16	-	53	40
150	PN 16	8 x M 20	-	68	47
200	PN 10	8 x M 20	68	-	68
200	PN 16	12 x M 20	45	-	45
250	PN 10	12 x M 20	65	-	65
250	PN 16	12 x M 24	78	-	78
300	PN 10	12 x M 20	76	-	76
300	PN 16	12 x M 24	105	-	105
350	PN 10	16 x M 20	75	-	75
400	PN 10	16 x M 24	104	-	104
450	PN 10	20 x M 24	93	-	93
500	PN 10	20 x M 24	107	-	107
600	PN 10	20 x M 27	138	-	138
700	PN 10	24 x M 27	163	-	163
800	PN 10	24 x M 30	219	-	219
900	PN 10	28 x M 30	205	-	205
1000	PN 10	28 x M 33	261	-	261

① The specified torque values are dependent on variables (temperature, bolt material, gasket material, lubricants, etc.) which are not within the control of the manufacturer. Therefore the values should be regarded as indicative only.

② DN65 / PN16 is available with standard 8 bolt holes.

Nominal size [inch]	Flange class [lb]	Bolts	Max. torque [lbf.ft] ①		
			Polyolefin	Polypropylene	Hard rubber
1	150	4 x 1/2"	-	6.7	3.2
1 1/2	150	4 x 1/2"	-	13	9
2	150	4 x 5/8"	-	24	17
3	150	4 x 5/8"	-	43	29
4	150	8 x 5/8"	-	34	23
6	150	8 x 3/4"	-	61	38
8	150	8 x 3/4"	51	-	51
10	150	12 x 7/8"	58	-	58
12	150	12 x 7/8"	77	-	77
14	150	12 x 1"	69	-	69
16	150	16 x 1"	67	-	67
18	150	16 x 1 1/8"	105	-	105
20	150	20 x 1 1/8"	94	-	94
24	150	20 x 1 1/4"	133	-	133
28	150	28 x 1 1/4"	119	-	119
32	150	28 x 1 1/2"	191	-	191
36	150	32 x 1 1/2"	198	-	198
40	150	36 x 1 1/2"	198	-	198

① The specified torque values are dependent on variables (temperature, bolt material, gasket material, lubricants, etc.) which are not within the control of the manufacturer. Therefore the values should be regarded as indicative only.

- *Pressures are applicable at 20° C / 68° F.*
- *For higher temperatures, the pressure ratings are as per ASME B16.5.*

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Grounding

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

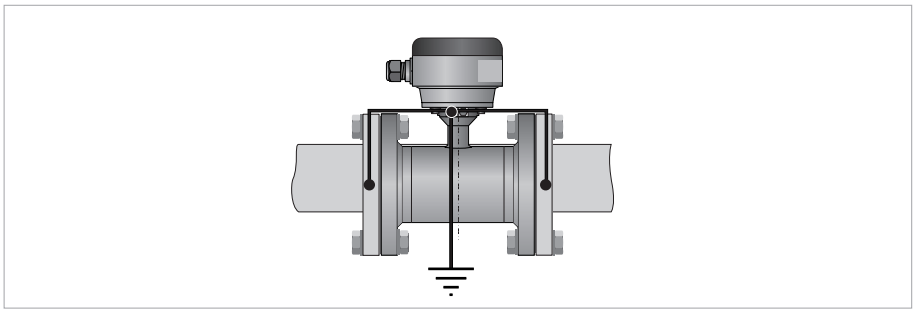


Figure 4-1: Grounding

① Metal pipelines, not internally coated. Grounding without grounding rings.

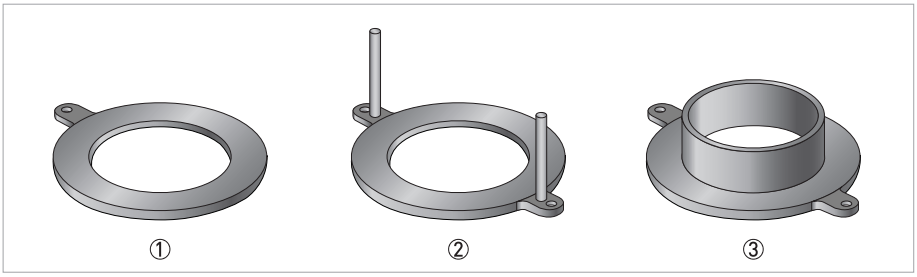


Figure 4-2: Different types of grounding rings

① Grounding ring number 1
② Grounding ring number 2
③ Grounding ring number 3

Grounding ring number 1:

- 3 mm / 0.1" thick (tantalum: 0.5 mm / 0.02")

Grounding ring number 2:

- 3 mm / 0.1" thick
- Prevents damage to the flanges during transport and installation
- Especially for flow sensors with PTFE liner

Grounding ring number 3:

- 3 mm / 0.1" thick
- With cylindrical neck (length 30 mm / 1.25" for DN10...150 / 3/8...6")
- Prevents damage to the liner when abrasive liquids are used

4.3 Virtual reference for IMT33A (C, W and F version)

The virtual reference option on the flow converter provides complete isolation of the measurement circuit.

Benefits of virtual reference:

- Grounding rings or grounding electrodes can be omitted.
- Safety increases by reducing the number of potential leakage points.
- The installation of the flowmeters is much easier.

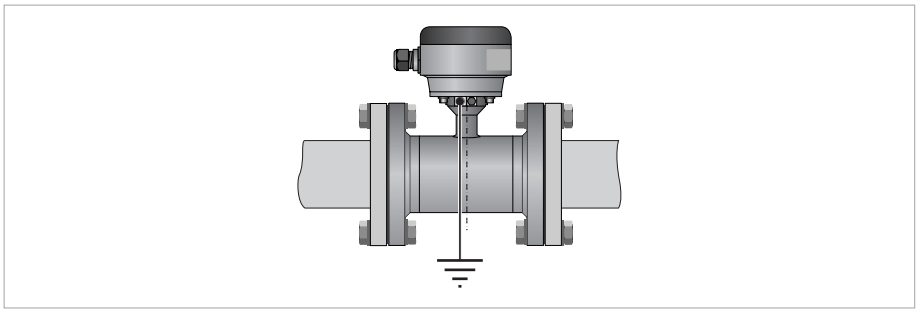


Figure 4-3: Virtual reference

Minimum requirements:

- Size: ≥ DN10
- Electrical conductivity: ≥ 200 µS/cm
- Signal cable: max. 50 m / 164 ft, type DS

4.4 Connection diagrams

For the connection diagrams please refer to the documentation of the applicable signal converter.

Model	Description
	Foxboro® Model 9500A Magnetic Flow Sensor
	Nominal diameter and liner
9501A	DN25,1" PP
951QA	DN32,1¼" PP
951HA	DN40,1½" PP
9502A	DN50,2" PP
952HA	DN65,2½" PP
9503A	DN80,3" PP
9504A	DN100,4" PP
9505A	DN125,5" PP
9506A	DN150,6" PP
9508A	DN200,8" Hardrubber
9510A	DN250,10" Hardrubber
9512A	DN300,12" Hardrubber
9514A	DN350,14" Hardrubber
9516A	DN400,16" Hardrubber
9518A	DN450,18" Hardrubber
9520A	DN500,20" Hardrubber
9524A	DN600,24" Hardrubber
9528A	DN700,28" Hardrubber
9532A	DN800,32" Hardrubber
9536A	DN900,36" Hardrubber
9540A	DN1000,40" Hardrubber
9548A	DN1200,48" Hardrubber
9556A	DN1400,56" Hardrubber
9564A	DN1600,64" Hardrubber
9572A	DN1800,72" Hardrubber
9580A	DN2000,80" Hardrubber
	Nominal pressure
-1	PN 6 EN 1092-1 (DN 1200-2000)
-2	PN 10 EN 1092-1 (DN 200-2000)
-3	PN 16 EN 1092-1 (DN 25... 1000)
-5	PN 40 EN 1092-1 (DN25...600)
-A	150 lbs RF ASME B 16.5 (1" ... 24")
-B	300 lbs RF ASME B 16.5 (1" ... 24")
-M	JIS 20 K (DN 25 ... 40 | 1" ... 1 1/2") & (DN200 ... 600 |8" ... 24")
-N	JIS 10 K (DN 50 ... 1400 | 2" ... 56")
-4	PN 25 EN 1092-1 (DN 200 ... 600)
-W	Class D AWWA (DN 700 ... 2000 | 28" ... 80")
	Ex version ①
0	non Ex
1	EEx zone 1 (for IMT33A compact and field, IMT31A compact and wall only)
3	Ex zone 2 (for IMT33A compact and field only)
5	FM Class I DIV 2 (for IMT33A compact and field, IMT31A compact and wall only)
A	cCSAus OL (for IMT33A compact and field, IMT31A compact and wall only)
C	CSA Class I DIV 2 (for IMT33A compact and field, IMT31A compact and wall only)
D	NEPSI zone 1 (for IMT33A compact and field only)
F	IECEx zone 1 (for IMT33A compact and field, IMT31A compact and wall only)
T	BE-Ex EAC (Belarus IMT33A compact and field, IMT31A compact and wall only)
U	RU-Ex EAC (Russia IMT33A compact and field, IMT31A compact and wall only) KA-
V	Ex EAC (Kazakhstan IMT33A compact and field, IMT31A compact and wall only)
W	RU-EAC (Russia)
X	KA-EAC (Kazakhstan)
Y	BE-EAC (Belarus)

Model	Description
	System design
1	Compact with aluminum converter housing / at converter
2	Compact with stainless steel converter housing / at converter
3	Modular / without
4	Separate with aluminum connection box / ½" NPT
5	Separate with aluminum connection box / PF ½
6	Separate with aluminum connection box / M20 x 1.5 A
A	Separate with stainless steel connection box / ½" NPT
B	Separate with stainless steel connection box / PF ½
C	Separate with stainless steel connection box / M20 x 1.5
	Converter model
0	without / modular
3	IMT31A (compact design)
4	IMT31A (wall mount version)
C	IMT33A (compact design)
D	IMT33A (field mount version)
E	IMT33A (wall mount version)
F	IMT33A (rack mount version)
K	IMT30A (compact design)
L	IMT30A (wall mount version)
	LiningLiningLiningLining
0	Standard (PFA for EEx Zone 1) (Hardrubber DN 200 ... 2000)
5	Hardrubber (4...6" / DN100...DN150)
8	Hardrubber (1...3" / DN25...80)
T	PP - provided for protection rings (Only up to 6" / DN150)
F	PO (PolyOlefin) (non Ex only)
	Electrodes (fixed)
1	Stainless steel DIN 1.4571|316 Ti
3	Hastelloy C4
6	Titanium
B	Hastelloy C22
	Construction of electrodes
1	fixed
	Housing- / flange material
1	Steel /steel St 37-c22/A105
3	Steel / st. steel DIN 1.4404|316 L
4	Steel st.steel dIN 1.4571/316Ti
A	1.4301|304 / steel St 37-C22 / A 105 (with st.st. conn. box.)
C	1.4301|304 / st. steel DIN 1.4404/316L (with st.st. conn. box.)
D	1.4301|304 / st. steel DIN 1.4571|316 Ti (with st.st. conn. box.)
	Protection class / dimension (face-to-face)
0	IP 66 / 67 / standard
1	IP 68 Field / standard (with stainless steel connection box)
2	IP 68 Factory / standard (with stainless steel connection box)
3	IP 66 / 67 / ISO 13359
4	IP 68 Field / ISO 13359 (with stainless steel connection box)
5	IP 68 Factory / ISO 13359 (with stainless steel connection box)
	Cable
0	Compact - without / separate DS
1	Separate BTS
2	Separate LIYCY (only for FM / CSA Class 1 DIV 2)
Y	Without

Model	Description
	Cable length
0	Compact - none / separate - 5 m | 15 ft
1	10 m | 30 ft
2	15 m | 45 ft
3	20 m | 60 ft
4	25 m | 75 ft
5	30 m | 90 ft
6	40 m | 120 ft
7	50 m | 150 ft
8	100 m | 300 ft
Y	Without
	Calibration
0	Standard
2	316/1.4401 tag plate (120 x 46 mm)
3	316/1.4401 tag plate (67 x 25 mm)
	Ring / Materials
0	Without
5	Ring #1 / Titanium
6	Ring #1 / 1.4404|316 L
7	Ring #1 / Hastelloy C22
E	Ring #3 / 1.4404|316 L
N	Protection ring #2 / Titanium
P	Protection ring #2 / 1.4404|316 L
R	Protection ring #2 / Hastelloy C22
	Construction requirements
0	Standard
	QA / QC requirements
0	Standard
	Ratio of CT-calibration
0	Standard, R = 80

① Note: to maintain certification, make sure the transmitter being used is listed in the description

ORDERING INSTRUCTIONS

1. Model Number.
2. Flow Data:
   a. Maximum, minimum, and normal flow rate.
   b. Fluid composition and viscosity at operating temperatures.
   c. Fluid density or relative density (specific gravity).
   d. Maximum, minimum and normal operating temperatures.
   e. Maximum, minimum and normal operating pressures.
   f. Mating pipe schedule.
   g. Type and location (distance) of upstream disturbance.
3. Calibration Information (analog output only); maximum flow rate 20 mA output.
4. Electric Classification.
5. Operational Selection and Accessories (see "Optional Selections and Accessories" section).
6. Customer Tag Data.

FLOWEXPERTPRO SIZING APPLICATION

Mobile application FlowExpertPro.com

OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling and recording. For a list of these offerings, visit our website at:

www.fielddevices.foxboro.com

Invensys Systems, Inc.
38 Neponset Avenue
Foxboro, MA 02035
United States of America
http://www.fielddevices.foxboro.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: http://support.ips.invensys.com

Invensys is now part of Schneider Electric.

APRIL 2016

Item	Qty	FLOW TRANSMITTER
1.02	**1**	**Foxboro IMT31A-N40460D1100003 Magnetic Flow Converter**
	IMT31A	**Function**
		Magnetic Flow Converter for simple applications used with 9500A and 9600A Magnetic Flow Sensors.
	N	**TYPE**
		IMT31 Wall
	4	**POWER SUPPLY**
		24 VDC (19-29V)
	0	**EX-VERSION**
		Without - non Ex
	4	**CABLE CONNECTION**
		½" NPT
	6	**OPERATING MANUAL - OPERATING LANGUAGE**
		Without / English
	0	**CUSTODY TRANSFER**
		Without
	D	**PROCESS DIAGNOSTICS**
		Empty Pipe Detection
	1	**CONVERTER HOUSING**
		Standard (Not for Field)
	1	**COMMUNICATIONS**
		Basic IO (4-20 mA / HART + pulse / frequency + status)
	0	**1-st IO Module**
		Without , No Module Possible
	0	**2-nd IO Module**
		Without , No Module Possible
	0	**REFERENCE METHOD**
		Standard
	0	**TAGPLATE**
		Standard
	3	**MANUALS**
		English

Tag Set		
Set 1	Customer Tag	FIT-100
	Customer Item	Station Flow
	Configured Range	0-_____ GPM = 4-20 mA

*******ENGINEER – PLEASE SPECIFIY CONFIGURED FLOW RANGE*******

FIELD DEVICES - FLOW
Product Specifications

Foxboro®
by Schneider Electric

PSS 1-6H2 A en

Foxboro® Model IMT31A Magnetic Flow Signal Converter

The IMT31A magnetic flow signal converter can be used with 9500A and 9600A magnetic flow sensors.

- Simple and easy to install and start-up
- Diagnostics of device and application
- Extremely fast signal conversion

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1.1 The more than economical solution

The **IMT31A** electromagnetic signal converter is designed to measure the flow velocity, conductivity, volume and mass flow of electrically conductive, liquid media.

The signal converter can be combined with any measuring sensor, making it very widely used. In terms of available housing versions, there is a compact variant, in which the signal converter is connected to the measuring sensor, as well as a 0° and 45° version. If the measuring point is difficult to access or the ambient conditions prevent the use of the compact variant, the signal converter is available in a wall-mounted housing.

The **IMT31A** was designed for applications requiring an economical measuring solution with a high level of technology.

(signal converter in wall-mounted housing)

① Large backlit graphic display with 4 push buttons to operate the signal converter without having to open the housing
② Supply voltage: 100...230 VAC (standard) and 24 VDC or 24 VAC/DC (optional)
③ Communication with any third party system possible via Foundation Fieldbus or Modbus

Highlights

- Simple installation and start-up
- Available inputs and outputs: Current output (incl. HART®), pulse/frequency output, status output and control input
- Large backlit graphic display with intuitive operation
- A variety of operating languages integrated as standard
- Maintenance free
- Excellent price/performance ratio
- Extremely quick signal conversion
- Higher accuracy by extended calibration

Industries

- Water & Wastewater
- Agriculture
- Heating, Ventilation & Air Conditioning (HVAC)
- Machinery
- Power plants

Applications

- Measuring homogeneous media
- Water distribution networks and spray-irrigation systems
- Water treatment
- Environmental technology

1.2 Options and variants

Modular converter concept

(Compact version as 45° version)

Despite its somewhat different appearance, the IMT31A has many of the same functions as its "big brother" IMT33A. Diagnostic function, conductivity measurement and simple navigation to name but a few.

This latest member of the converter family also has a large number of fully-developed functions:

- various power supply versions (AC, DC, AC/DC)
- HART® as standard
- Foundation Fieldbus or Modbus
- optional Ex version available

Compact design in various versions

(Compact version as 0° version)

The IMT31A C in the 0° version is ideal for installation in vertical pipelines.

On the other hand, the 45° version improves the readability of the display in specific applications.

The backlit display provides excellent readability from long distances. The 4 push buttons make operation, start-up and configuration simple.

In the 0° version, the signal converter can be rotated in 90° increments allowing for customer-specific installation position. The 45° version can only be rotated in 180° increments.

Remote version in wall-mounted housing

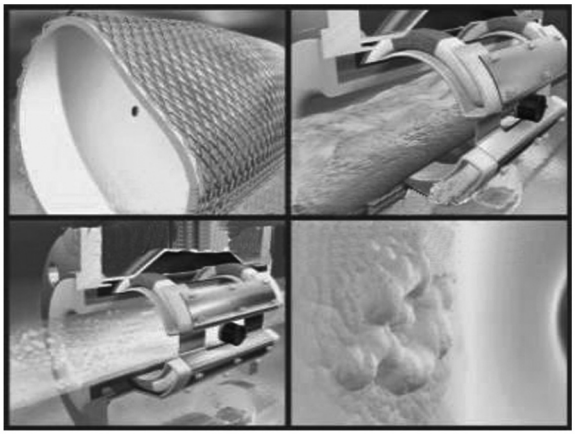
(signal converter in wall-mounted housing)

For temperature effects, vibration or in places that are difficult to access, remote installation is possible with the IMT31A W.

A signal cable is used to connect the measuring sensor and the converter for the purposes of power supply and signal processing.

The electronics can be used in all housing versions without having to be reconfigured.

Diagnostics



The IMT31 has been equipped with a wide variety of diagnostic tools for device function and application check.

- Conductivity measurement
- Electrode error
- Process or ambient temperature too high

1.3 Measuring principle

An electrically conductive fluid flows inside an electrically insulated pipe through a magnetic field. This magnetic field is generated by a current, flowing through a pair of field coils. Inside of the fluid, a voltage U is generated:

U = v * k * B * D

in which:
v = mean flow velocity
k = factor correcting for geometry
B = magnetic field strength
D = inner diameter of flowmeter

The signal voltage U is picked off by electrodes and is proportional to the mean flow velocity v and thus the flow rate q. A signal converter is used to amplify the signal voltage, filter it and convert it into signals for totalizing, recording and output processing.

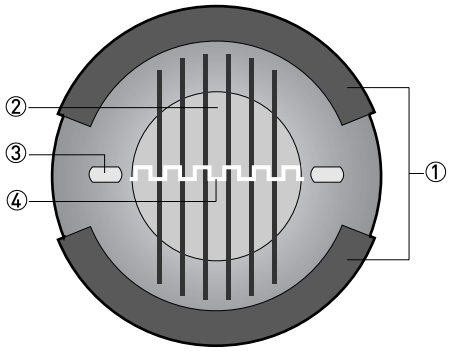


Figure 1-1: Measuring principle

① Field coils
② Magnetic field
③ Electrodes
④ Induced voltage (proportional to flow velocity)

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website.*

Measuring system

Measuring principle	Faraday's law of induction
Application range	Continuous measurement of current volume flow, flow velocity, conductivity, mass flow (at constant density), coil temperature of the flow sensor

Design

Modular construction	The measuring system consists of a flow sensor and a signal converter.
Flow sensor	
9500A	DN25...1200 / 1...48"
9600A	DN2.5...150 / 1/10...6"
	All flow sensors are also available in an Ex version.
Signal converter	
Compact version (C)	9500A & 9600A with IMT31A **C** (0° & 45° version)
Wall-mounted remote version (W)	IMT31A **W**
	All signal converters are also available in an Ex version.
Options	
Outputs	Current output (incl. HART®), pulse output, frequency output, status output and/or limit switch
Counter	2 internal counters with a max. of 10 counter places (e.g. for counting volume and/or mass units)
Verification	Integrated verification, diagnostic functions: measuring device, empty pipe detection, stabilisation
Communication interfaces	HART® as standard
	Foundation Fieldbus, Profibus PA/DP or Modbus

Display and user interface	
Graphic display	LC display, backlit white.
	Size: 128 x 64 pixels, corresponds to 59 x 31 mm = 2.32" x 1.22"
	Ambient temperatures below -25°C / -13°F may affect the readability of the display.
Operating elements	4 push buttons for operator control of the signal converter without opening the housing.
Remote control	PACTware™ (including Device Type Manager (DTM))
	HART® Communicator
	AMS®
	All DTMs and drivers are available free of charge from the manufacturer's website.
Display functions	
Operating menu	Setting the parameters using 2 measuring pages, 1 status page, 1 graphic page (measured values and graphics are freely adjustable)
Language display texts (as language package)	Standard: English, French, German, Dutch, Portuguese, Swedish, Spanish, Italian
	Eastern Europe: English, Slovenian, Czech, Hungarian
	Northern Europe: English, Danish, Polish, Finnish, Norwegian
	Southern Europe: English, Turkish
	China: English, German, Chinese
	Russia: English, German, Russian
Units	Metric, British and US units selectable as required from lists for volume / mass flow and counting, flow velocity, electrical conductivity, temperature

Measuring accuracy

Reference conditions	Medium: water
	Temperature: +20°C / +68°F
	Pressure: 1 bar / 14.5 psi
	Inlet section: ≥ 5 DN
Maximum measuring error	Standard calibration: +0.3% of the measured value +1 mm/s, depending on the flow sensor
	Extended calibration is selectable and special calibrations are available on request.
	For detailed information and accuracy curves, refer to chapter "Accuracy".
	Current output electronics: ±10 µA; ±100 ppm/°C (typically: ±30 ppm/°C)
Repeatability	±0.1%

Operating conditions

Temperature	
Process temperature	Refer to technical data for the flow sensor.
Ambient temperature	Depending on the version and combination of outputs.
	It is a good idea to protect the signal converter from external heat sources such as direct sunlight as higher temperatures reduce the life cycle of all electronic components.
	Ambient temperatures below -25°C / -13°F may affect the readability of the display.
Storage temperature	-40…+70°C / -40…+158°F
Pressure	
Medium	Refer to technical data for the flow sensor.
Ambient pressure	Atmospheric
Chemical properties	
Electrical conductivity	All media except for water: ≥ 5 µS/cm (also refer to the technical data for the flow sensor)
	Water: ≥ 20 µS/cm
State of aggregation	Conductive, liquid media
Solid content (volume)	≤ 10%
Gas content (volume)	≤ 3%
Flow rate	For detailed information, refer to chapter "Flow tables".
Other conditions	
Protection category acc. to IEC 529 / EN 60529	IP66/67 (acc. to NEMA 4/4X)

Installation conditions

Installation	For detailed information, refer to chapter "Installation conditions".
Inlet / outlet sections	Refer to technical data for the flow sensor.
Dimensions and weight	For detailed information refer to chapter "Dimensions and weight".

Materials

Signal converter housing	Aluminum with a polyester topcoat
Flow sensor	For housing materials, process connections, liners, grounding electrodes and gaskets, refer to technical data for the flow sensor.

Electrical connection

General	Electrical connection is carried out in conformity with the VDE 0100 directive "Regulations for electrical power installations with line voltages up to 1000 V" or equivalent national specifications.
Power supply	100…230 VAC (-15% / +10%), 50/60 Hz; non-Ex: standard; Ex: optional 240 VAC + 5% is included in the tolerance range.
	24 VDC (-55% / +30%); only available as non Ex version 12 VDC - 10% is included in the tolerance range.
	24 VAC/DC (AC: -15% / +10%; DC: -25% / +30%); non-Ex: standard; Ex: optional 12 V is **not** included in the tolerance range.
Power consumption	AC: 7 VA
	DC: 4 W
Signal cable	Only necessary for remote versions.
	DS 300 (type A) Max. length: 600 m / 1968 ft (dep. on electrical conductivity and flow sensor)
Cable entries	Standard: M20 x 1.5 (8...12 mm)
	Option: ½ NPT, PF ½

Outputs

General	All outputs are electrically isolated from each other and from all other circuits.
	All operating data and output values can be adjusted.
Description of abbreviations	U_{ext} = external voltage; R_L = load + resistance; U_0 = terminal voltage; I_{nom} = nominal current

Current output		
Output data	Volume flow, mass flow, diagnostic value, flow velocity, coil temperature, conductivity	
Settings	**Without HART®**	
	Q = 0%: 0…20 mA; Q = 100%: 10…21.5 mA	
	Error identification: 20…22 mA	
	With HART®	
	Q = 0%: 4…20 mA; Q = 100%: 10…21.5 mA	
	Error identification: 3…22 mA	
Operating data	**Basic I/Os**	**Ex i I/Os**
Active	$U_{int, nom}$ = 20 VDC I ≤ 22 mA R_L ≤ 750 Ω	-
	HART® at terminals A	
Passive	U_{ext} ≤ 32 VDC I ≤ 22 mA U_0 ≥ 2 V at I = 22 mA $R_L \leq (U_{ext} - U_0) / I_{max}$	U_{ext} ≤ 32 VDC I ≤ 22 mA U_0 ≥ 4 V $R_L \leq (U_{ext} - U_0) / I_{max}$
		U_i = 30 V I_i = 130 mA P_i = 1 W C_i = 10 nF L_i ~ 0 mH
	HART® at terminals A	HART® at terminals C
HART®		
Description	HART® protocol via active and passive current output	
	HART® version: V5	
	Universal Common Practice HART® parameter: completely supported	
Load	≥ 250 Ω at HART® test point; Note maximum load for current output!	
Multi-drop mode	Yes, current output = 4 mA	
	Multi-drop address adjustable in operation menu 1…15	
Device drivers	Available for HART® Communicator, AMS®, FDT/DTM	
Registration (HART Communication Foundation)	Yes	

Pulse output / frequency output		
Output data	Pulse output: volume flow, mass flow	
	Frequency output: volume flow, mass flow, diagnostic value, flow velocity, coil temperature, conductivity	
Function	Can be set as a pulse output or frequency output	
Pulse rate/frequency	0.25...10000 Hz	
	For Modbus I/O: 0.25...1000 Hz	
Settings	Pulses per volume or mass unit or max. frequency for 100% flow	
	Pulse width: adjustable as automatic, symmetric or fixed (0.05...2000 ms)	
Operating data	**Basic I/Os**	**Ex i I/Os**
Passive	$U_{ext} \leq 32$ VDC	-
	f_{max} in operating menu set to $f_{max} \leq 100$ Hz: $I \leq 100$ mA open: $I \leq 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 0.2$ V at $I \leq 10$ mA $U_{0, max} = 2$ V at $I \leq 100$ mA	
	f_{max} in operating menu set to $100 \text{ Hz} < f_{max} \leq 10$ kHz: $I \leq 20$ mA open: $I \leq 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 1.5$ V at $I \leq 1$ mA $U_{0, max} = 2.5$ V at $I \leq 10$ mA $U_{0, max} = 5.0$ V at $I \leq 20$ mA	-
NAMUR	-	Passive to EN 60947-5-6 open: $I_{nom} = 0.77$ mA closed: $I_{nom} = 4.7$ mA
		$U_i = 30$ V $I_i = 130$ mA $P_i = 1$ W $C_i = 10$ nF $L_i = 0$ mH

Operating data	**Modbus**
Passive	$U_{ext} \leq 32$ VDC
	f_{max} in the operating menu set to $f_{max} \leq 1$ kHz: $I \leq 100$ mA open: $I \leq 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 0.2$ V at $I \leq 10$ mA $U_{0, max} = 2$ V at $I \leq 100$ mA
Low flow cut off	
Function	Switching point and hysteresis separately adjustable for each output, counter and the display
Switching point	Set in increments of 0.1%.
	0…20% (current output, frequency output) or 0...±9.999 m/s (pulse output)
Hysteresis	Set in increments of 0.1%.
	0…5% (current output, frequency output) or 0…5 m/s (pulse output)
Time constant	
Function	The time constant corresponds to the elapsed time until 67% of the end value has been reached according to a step function.
Settings	Set in increments of 0.1 seconds.
	0…100 seconds

Status output / limit switch		
Function and settings	Adjustable as automatic measuring range conversion, display of flow direction, counter overflow, error, switching point or empty pipe detection	
	Valve control with activated dosing function	
	Status and/or control: ON or OFF	
Operating data	**Basic I/Os + Modbus**	**Ex i I/Os**
Passive	$U_{ext} \leq 32$ VDC $I \leq 100$ mA open: $I \leq 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 0.2$ V at $I \leq 10$ mA $U_{0, max} = 2$ V at $I \leq 100$ mA	-
NAMUR	-	Passive to EN 60947-5-6 open: $I_{nom} = 0.77$ mA closed: $I_{nom} = 4.7$ mA
		$U_i = 30$ V $I_i = 130$ mA $P_i = 1$ W $C_i = 10$ nF $L_i = 0$ mH
Control input		
Function	Hold value of the outputs (e.g. for cleaning work), set value of the outputs to "zero", counter and error reset, range change.	
	Start of dosing when dosing function is activated.	
Operating data	**Basic I/Os**	**Ex i I/Os + Modbus**
Passive	$U_{ext} \leq 32$ VDC $I_{nom} = 6.5$ mA at $U_{ext} = 24$ VDC $I_{nom} = 8.2$ mA at $U_{ext} = 32$ VDC Contact closed (on): $U_0 \geq 8$ V with $I_{nom} = 2.8$ mA Contact open (off): $U_0 \leq 2.5$ V with $I_{nom} = 0.4$ mA	-
FOUNDATION Fieldbus		

Description	Galvanically isolated acc. to IEC 61158-2
	Current consumption: 10.5 mA
	Permissible bus voltage: 9…32 VDC; in Ex application: 9...24 VDC
	Bus interface with integrated reverse polarity protection
	Link Master function (LM) supported
	Tested with Interoperable Test Kit (ITK) version 5.2
Function blocks	3 x analogue input, 2 x integrator, 1 x PID
Output data	Volume flow, mass flow, velocity, coil temperature, conductivity, electronics temperature
Modbus	
Description	Modbus RTU, Master / Slave, RS485
Address range	1…247
Broadcast	Supported with function code 16
Supported Baud rate	1200, 2400, 3600, 4800, 9600, 19200, 38400, 57600, 115200 Baud

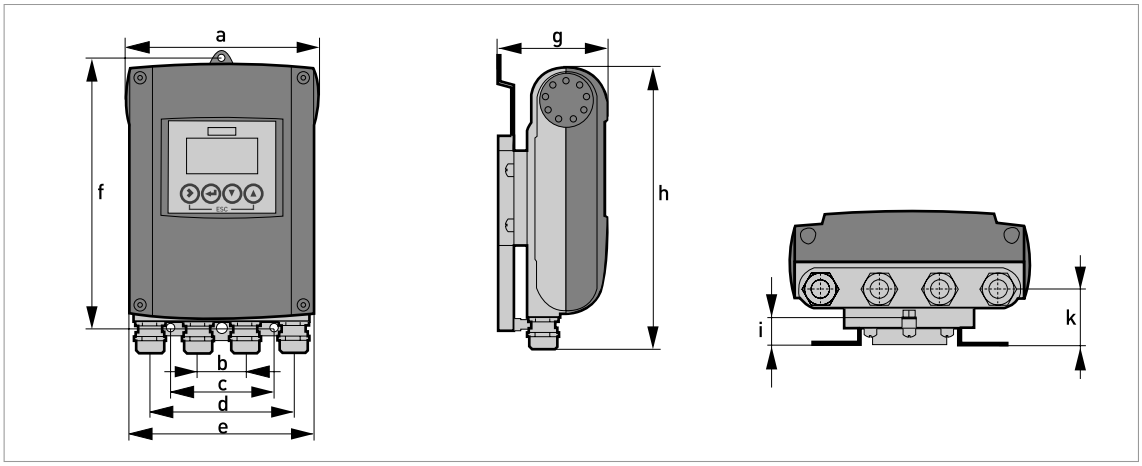
Approvals and certificates

CE	The device fulfils the statutory requirements of the EC directives. The manufacturer certifies that these requirements have been met by applying the CE marking.
Non-Ex	Standard
Hazardous areas	
ATEX	**Optional (only 9500A)**
	II 2 G Ex e [ia] mb IIC T4 (DN10...20; DN200...300; DN350...3000)
	II 2 G Ex d e [ia] mb IIC T4 (DN25...150)
	II 2 G Ex e [ia] mb q T4/T3 (DN25...150; DN200...300)
	II 2 D Ex tD A21 IP64 T120 (all nominal sizes)
	Option (Wall-mounted version only)
	II 2 G Ex e [ia] mb IIC T4
	II 2 D Ex tD A21 IP64 T135
IECEx	**Optional (only 9500A)**
	Ex e [ia] mb IIC T4 (DN10...20; DN200...300; DN350...3000)
	Ex d e [ia] mb IIC T4 (DN25...150)
	Ex tD A21 IP64 T120°C (all nominal sizes)
	Option (Wall-mounted version only)
	Ex e [ia] mb IIC T4
	Ex tD A21 IP64 T135°C
FM/CSA	**Optional (only 9500A)**
	Class I, Div 2, Group A, B, C and D
	Option (Wall-mounted version only)
	Class I, Div 2, Group A, B, C and D
Other standards and approvals	
FM/CSA	Ordinary location
Shock and vibration resistance	IEC 68-2-27, IEC 68-2-64
Electromagnetic compatibility (EMC)	2004/108/EC in conjunction with EN 61326-1 (A1, A2)
European pressure equipment directive	PED 97/23 (only for compact versions)
NAMUR	NE 21, NE 43, NE 53

2.2 Dimensions and weights

2.2.1 Housing

Wall-mounted version



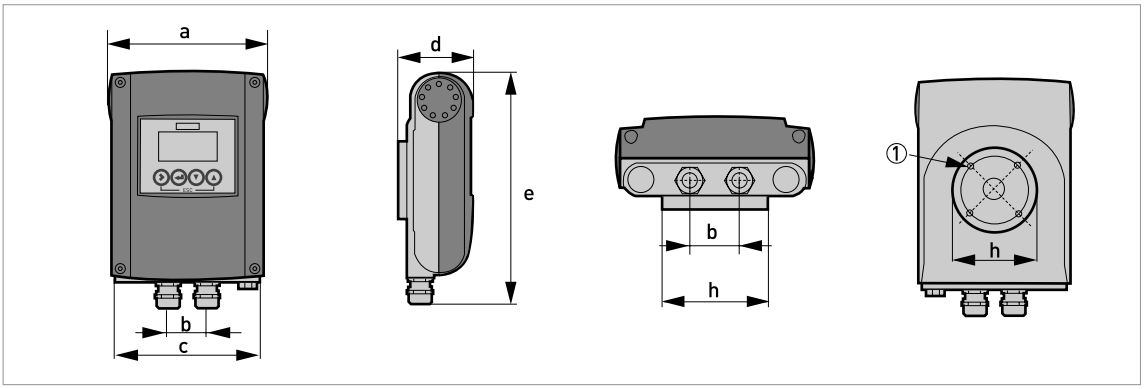
Dimensions and weights in mm and kg

	Dimensions [mm]										Weight [kg]
	a	b	c	d	e	f	g	h	i	k	
Wall-mounted version	161	40	87.2	120	155	241	95.2	257	19.3	39.7	Std: 1.9 Ex: 2.4

Dimensions and weights in inch and lb

	Dimensions [inch]										Weight [lb]
	a	b	c	d	e	f	g	h	i	k	
Wall-mounted version	6.34	1.57	3.43	4.72	6.10	9.50	3.75	10.12	0.76	1.56	Std: 4.2 Ex: 5.3

Compact 0° version



① 4 x M 6

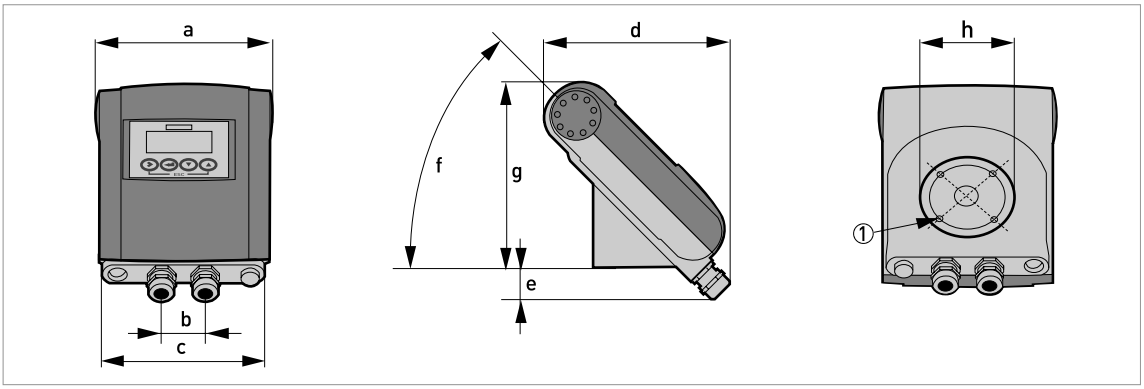
Dimensions and weights in mm and kg

	Dimensions [mm]								Weight [kg]
	a	b	c	d	e	f	g	h	
0° version	161	40	155	81.5	257	-	-	Ø72	Std: 1.9 Ex: 2.4

Dimensions and weights in inch and lb

	Dimensions [inch]								Weight [lb]
	a	b	c	d	e	f	g	h	
0° version	6.34	1.57	6.1	3.21	10.12	-	-	Ø2.83	Std: 4.2 Ex: 5.3

Compact 45° version



① 4 x M 6

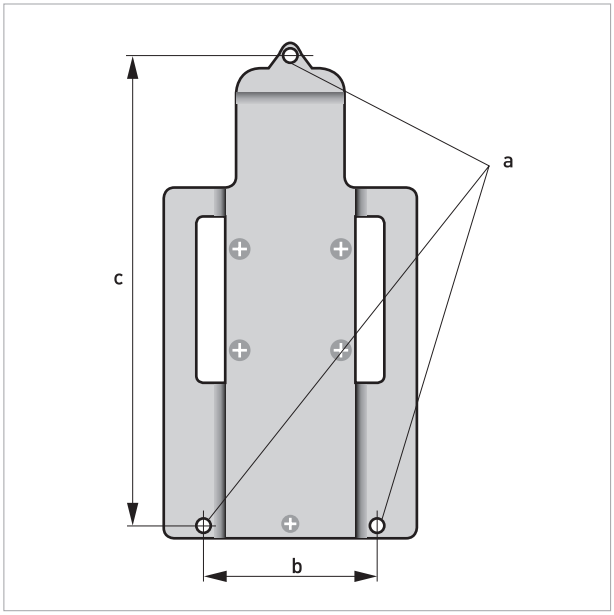
Dimensions and weights in mm and kg

	Dimensions [mm]								Weight [kg]
	a	b	c	d	e	f	g	h	
45° version	161	40	155	184	27.4	45°	186	Ø72	Std: 2.1 Ex: 2.6

Dimensions and weights in inch and lb

	Dimensions [inch]								Weight [lb]
	a	b	c	d	e	f	g	h	
45° version	6.34	1.57	6.10	7.24	1.08	45°	7.32	Ø2.83	Std: 4.6 Ex: 5.7

2.2.2 Mounting plate, wall-mounted version



Dimensions in mm and inch

	[mm]	[inch]
a	Ø6.5	Ø0.26
b	87.2	3.4
c	241	9.5

2.3 Flow tables

Flow rate in m/s and m^3/h

	$Q_{100\ \%}$ in m^3/h			
v [m/s]	0.3	1	3	12
DN [mm]	Min. flow	Nominal flow		Max. flow
2.5	0.005	0.02	0.05	0.21
4	0.01	0.05	0.14	0.54
6	0.03	0.10	0.31	1.22
10	0.08	0.28	0.85	3.39
15	0.19	0.64	1.91	7.63
20	0.34	1.13	3.39	13.57
25	0.53	1.77	5.30	21.21
32	0.87	2.90	8.69	34.74
40	1.36	4.52	13.57	54.29
50	2.12	7.07	21.21	84.82
65	3.58	11.95	35.84	143.35
80	5.43	18.10	54.29	217.15
100	8.48	28.27	84.82	339.29
125	13.25	44.18	132.54	530.15
150	19.09	63.62	190.85	763.40
200	33.93	113.10	339.30	1357.20
250	53.01	176.71	530.13	2120.52
300	76.34	254.47	763.41	3053.64
350	103.91	346.36	1039.08	4156.32
400	135.72	452.39	1357.17	5428.68
450	171.77	572.51	1717.65	6870.60
500	212.06	706.86	2120.58	8482.32
600	305.37	1017.90	3053.70	12214.80
700	415.62	1385.40	4156.20	16624.80
800	542.88	1809.60	5428.80	21715.20
900	687.06	2290.20	6870.60	27482.40
1000	848.22	2827.40	8482.20	33928.80
1200	1221.45	3421.20	12214.50	48858.00

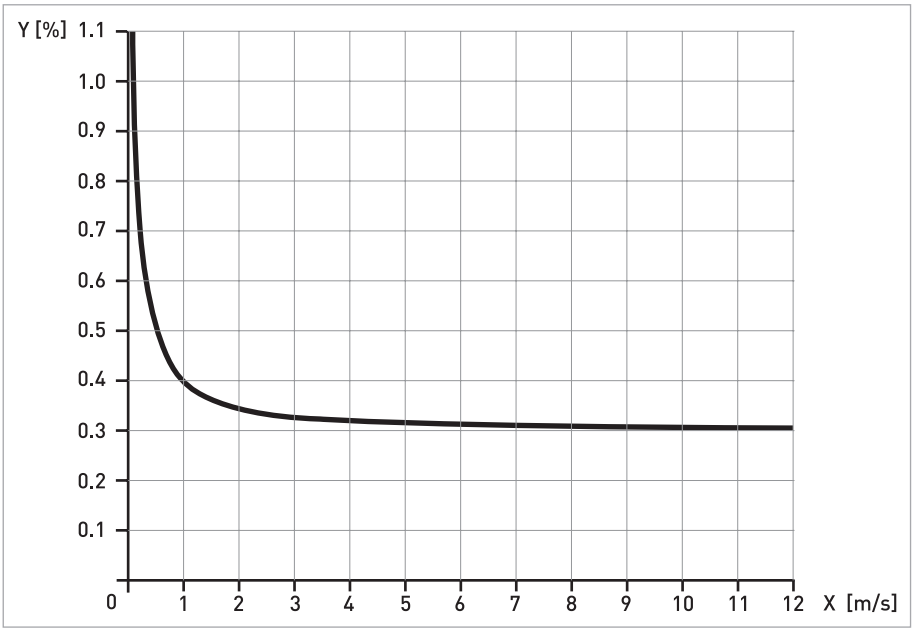
Flow rate in ft/s and US gallons/min

	$Q_{100\ \%}$ in US gallons/min			
v [ft/s]	1	3.3	10	40
DN [inch]	Min. flow	Nominal flow		Max. flow
1/10	0.02	0.09	0.23	0.93
1/8	0.06	0.22	0.60	2.39
1/4	0.13	0.44	1.34	5.38
3/8	0.37	1.23	3.73	14.94
1/2	0.84	2.82	8.40	33.61
3/4	1.49	4.98	14.94	59.76
1	2.33	7.79	23.34	93.36
1.25	3.82	12.77	38.24	152.97
1.5	5.98	19.90	59.75	239.02
2	9.34	31.13	93.37	373.47
2.5	15.78	52.61	159.79	631.16
3	23.90	79.69	239.02	956.09
4	37.35	124.47	373.46	1493.84
5	58.35	194.48	583.24	2334.17
6	84.03	279.97	840.29	3361.17
8	149.39	497.92	1493.29	5975.57
10	233.41	777.96	2334.09	9336.37
12	336.12	1120.29	3361.19	13444.77
14	457.59	1525.15	4574.93	18299.73
16	597.54	1991.60	5975.44	23901.76
18	756.26	2520.61	7562.58	30250.34
20	933.86	3112.56	9336.63	37346.53
24	1344.50	4481.22	13445.04	53780.15
28	1829.92	6099.12	18299.20	73196.79
32	2390.23	7966.64	23902.29	95609.15
36	3025.03	10082.42	30250.34	121001.37
40	3734.50	12447.09	37346.00	149384.01
48	5377.88	17924.47	53778.83	215115.30

2.4 Measuring accuracy

Reference conditions

- Medium: water
- Temperature: +20°C / +68°F
- Pressure: 1 bar / 14.5 psi
- Inlet section: ≥ 5 DN



X [m/s]: flow velocity
Y [%]: deviation from the actual measured value (mv)

Standard calibration	DN [mm]	DN [inch]	Accuracy	Curve
9500A / 9600A	10…1200	3/8…48	0.3% of mv + 1 mm/s	①
9600A	2.5…6	1/10…1/4	0.4% of mv + 1 mm/s	as ① + 0.1%

3.1 Intended use

The electromagnetic flowmeters are designed exclusively to measure the flow and conductivity of electrically conductive, liquid media.

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

If the device is not used according to the operating conditions (refer to chapter "Technical data"), the intended protection could be affected.

This device is a Group 1, Class A device as specified within CISPR11:2009. It is intended for use in industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

3.2 Installation specifications

The following precautions must be taken to ensure reliable installation.

- *Make sure that there is adequate space to the sides.*
- *Protect the signal converter from direct sunlight and install a sun shade if necessary.*
- *Signal converters installed in control cabinets require adequate cooling, e.g. by fan or heat exchanger.*
- *Do not expose the signal converter to intense vibrations. The measuring devices are tested for a vibration level in accordance with IEC 68-2-64.*

3.3 Mounting of the compact version

The signal converter is mounted directly on the flow sensor. For installation of the flowmeter, please observe the instructions in the supplied product documentation for the flow sensor.

3.4 Mounting the wall-mounted housing, remote version

Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

3.4.1 Wall mounting

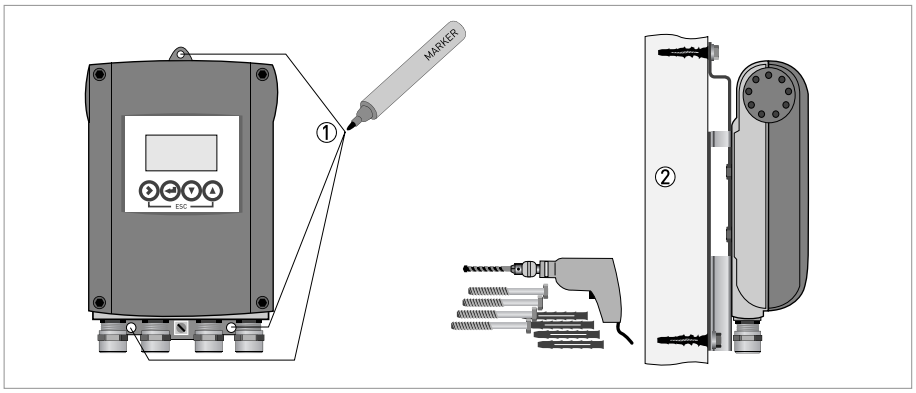
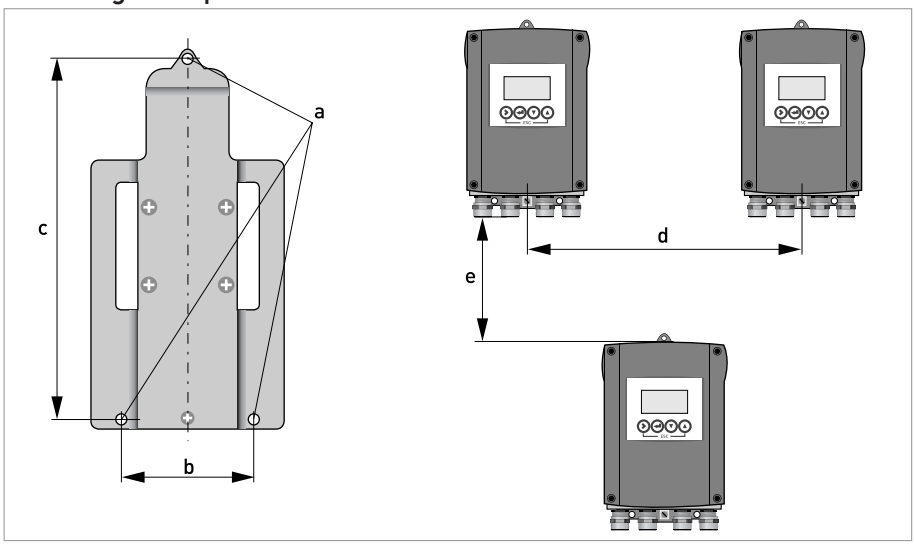


Figure 3-1: Mounting the wall-mounted housing

① Prepare the holes with the aid of the mounting plate. For further information refer to *Mounting plate, wall-mounted version* on page 21.
② Fasten the device securely to the wall with the mounting plate.

Mounting multiple devices next to each other



	[mm]	[inch]
a	Ø6.5	Ø0.26
b	87.2	3.4
c	241	9.5
d	310	12.2
e	257	10.1

4.1 Important notes on electrical connection

Electrical connection is carried out in conformity with the VDE 0100 directive "Regulations for electrical power installations with line voltages up to 1000 V" or equivalent national regulations.

- *Use suitable cable entries for the various electrical cables.*
- *The flow sensor and signal converter have been configured together at the factory. For this reason, please connect the devices in pairs.*
- *If delivered separately or when installing devices that were not configured together, set the signal converter to the DN size and GK/GKL of the flow sensor.*

4.2 Preparing the signal and field current cables

Assembly materials and tools are not part of the delivery. Use the assembly materials and tools in compliance with the applicable occupational health and safety directives.

4.2.1 Signal cable A (type DS 300), construction

- Signal cable A is a double-shielded cable for signal transmission between the flow sensor and signal converter.
- Bending radius: ≥ 50 mm / 2"

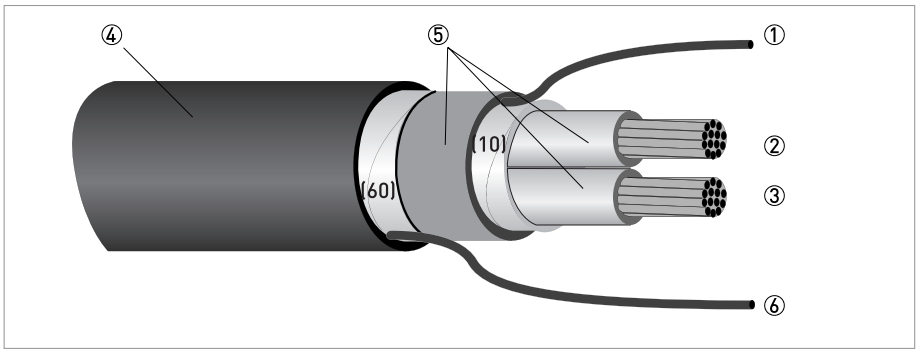


Figure 4-1: Construction of signal cable A

① Stranded drain wire (1) for the inner shield (10), 1.0 mm^2 Cu / AWG 17 (not insulated, bare)
② Insulated wire (2), 0.5 mm^2 Cu / AWG 20
③ Insulated wire (3), 0.5 mm^2 Cu / AWG 20
④ Outer sheath
⑤ Insulation layers
⑥ Stranded drain wire (6) for the outer shield (60)

4.2.2 Length of signal cable A

For temperatures of the medium above 150° C / 300° F, a special signal cable and a ZD intermediate socket are necessary. These are available including the changed electrical connection diagrams.

Flow sensor	Nominal diameter		Min. electrical conductivity [µS/cm]	Curve for signal cable A
	DN [mm]	[inch]		
9500A	25...150	1...6	20	A1
	200...1200	8...48	20	A2
9600A	2.5...150	1/10...6	5	A1

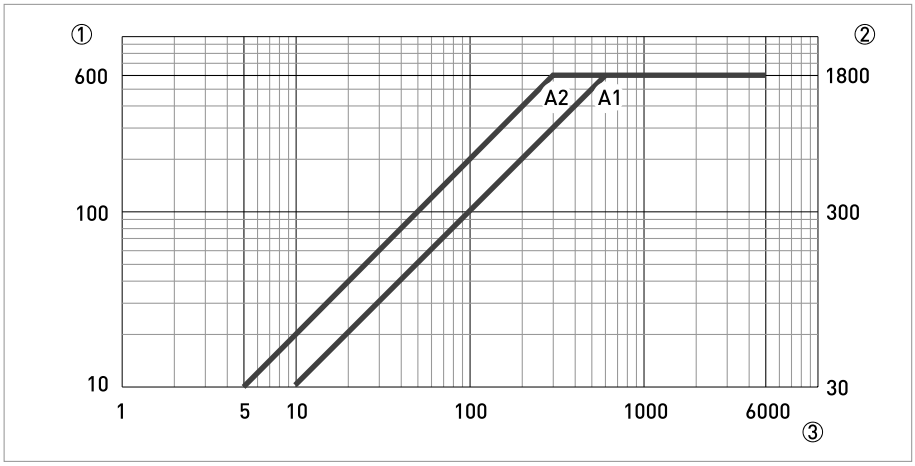


Figure 4-2: Maximum length of signal cable A

① Maximum length of signal cable A between the flow sensor and signal converter [m]
② Maximum length of signal cable A between the flow sensor and signal converter [ft]
③ Electrical conductivity of the medium being measured [µS/cm]

4.2.3 Connection diagram for signal and field current cable

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

- A shielded 2-wire copper cable is used as the field current cable. The shielding **MUST** be connected in the housing of the flow sensor and signal converter.
- The outer shield (60) is connected in the terminal compartment of the flow sensor directly via the shield and a clip.
- Bending radius of signal and field current cable: ≥ 50 mm / 2"
- The following illustration is schematic. The positions of the electrical connection terminals may vary depending on the housing version.

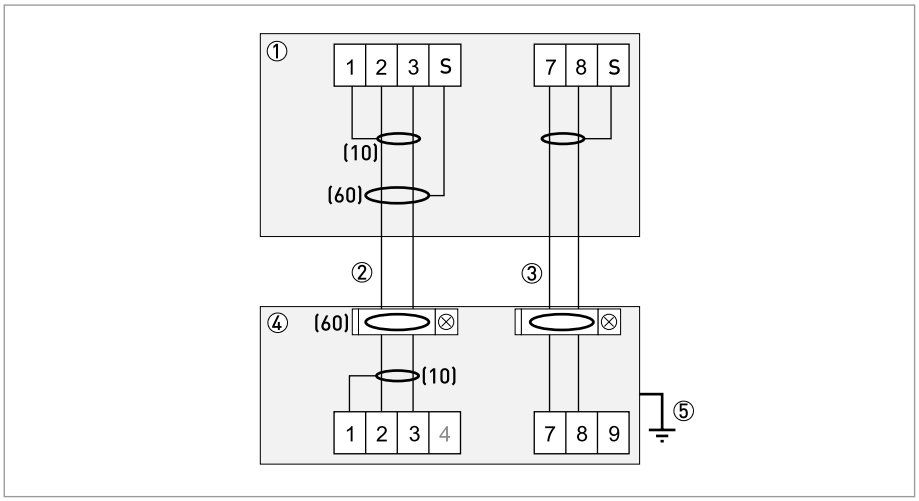


Figure 4-3: Connection diagram for signal and field current cable

① Electrical terminal compartment in the signal converter
② Signal cable A
③ Field current cable C
④ Electrical terminal compartment in the flow sensor
⑤ Functional ground FE

4.3 Connecting the power supply

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

- The housings of the devices, which are designed to protect the electronic equipment from dust and moisture, should be kept well closed at all times. Creepage distances and clearances are dimensioned to VDE 0110 and IEC 664 for pollution severity 2. Supply circuits are designed for overvoltage category III and the output circuits for overvoltage category II.
- Fuse protection ($I_N \leq 16$ A) for the infeed power circuit, and also a separator (switch, circuit breaker) to isolate the signal converter must be provided.

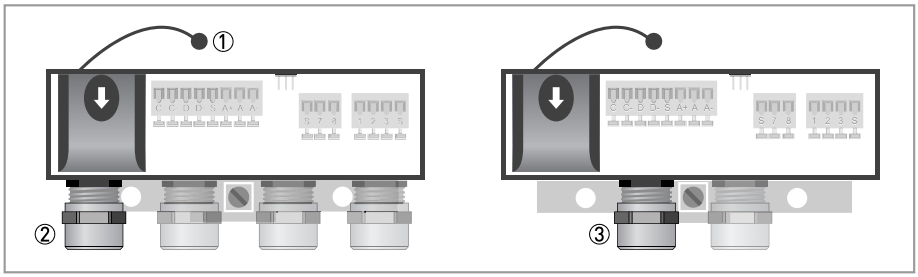


Figure 4-4: Terminal compartment for power supply

① Retaining band of the cover
② Cable entry for power supply, remote version
③ Cable entry for power supply, compact version

Version overview

Version	Non-Ex	Ex
100...230 VAC	Standard	Optional
24 VDC	Standard	-
24 VAC/DC	Standard	Optional

- Open the cover of the electrical terminal compartment by pressing down and pulling forwards at the same time.

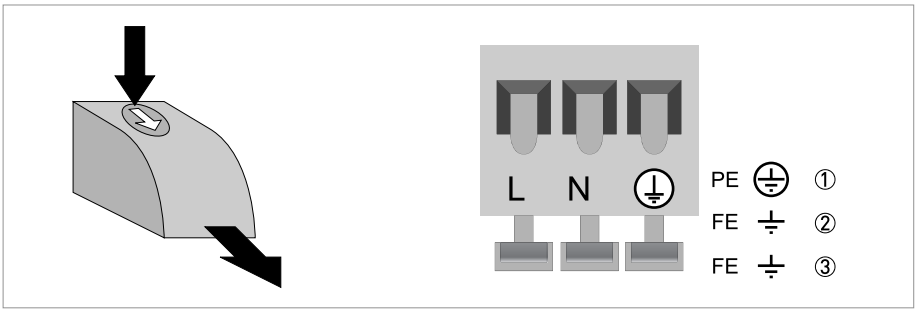


Figure 4-5: Power supply connection

① 100...230 VAC (-15% / +10%), 8 VA
② 24 VDC (-55% / +30%), 4 W
③ 24 VAC/DC (AC: -15% / +10%; DC: -25% / +30%), 7 VA or 4 W

- Close the cover after the power has been connected.

100...230 VAC (tolerance range: -15% / +10%)

- Note the power supply voltage and frequency (50...60 Hz) on the nameplate.

240 VAC + 5% is included in the tolerance range.

24 VDC (tolerance range: -55% / +30%)

- Note the data on the nameplate!
- When connecting to functional extra-low voltages, provide a facility for protective separation (PELV) (acc. to VDE 0100 / VDE 0106 and/or IEC 364 / IEC 536 or relevant national regulations).

12 VDC - 10% is included in the tolerance range.

24 VAC/DC (tolerance range: AC: -15% / +10%; DC: -25% / +30%)

- AC: Note the power supply voltage and frequency (50...60 Hz) on the nameplate.
- AC/DC: When connecting to functional extra-low voltages, provide a facility for protective separation (PELV) (acc. to VDE 0100 / VDE 0106 and/or IEC 364 / IEC 536 or relevant national regulations).

*12 V is **not** included in the tolerance range.*

4.4 Inputs and outputs, overview

4.4.1 Description of the CG number

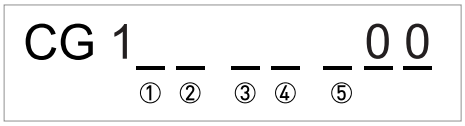


Figure 4-6: Marking (CG number) of the electronics module and output variants

① ID number: 0
② ID number: 0 = standard; 9 = special
③ Power supply
④ Display (language versions)
⑤ Output version

4.4.2 Fixed, non-alterable output versions

This signal converter is available with various output combinations.

- The grey boxes in the tables denote unassigned or unused connection terminals.
- In the table, only the final digits of the CG no. are depicted.
- Connection terminal A+ is only operable in the basic output version.

Basic outputs (I/O) (Standard)

CG no.	Connection terminals							
	C	C-	D	D-	S	A+	A	A-
1 0 0	S_p / C_p passive ①		P_p / S_p passive ①		②		I_p + HART® passive ③	
						I_a + HART® active ③		

① Function change by software
② Shielding
③ Function changed by reconnecting

Description of the used abbreviations

I_a	I_p	Current output active or passive
P_p		Pulse/frequency output passive
S_p		Status output / limit switch passive
C_p		Control input passive

Ex i, Foundation Fieldbus and Modbus (I/O) (Option)

CG no.	Connection terminals						
	D	D-	S	C	C-	B	B-

Ex i (Option)

3 0 0	P_p / S_p passive ①	②	I_p + HART® passive		

FOUNDATION Fieldbus (Option)

E 0 0	V/D+ (1)	V/D+ (2)	②	V/D- (1)	V/D- (2)	

Modbus (Option)

G 0 0	P_p / S_p passive	②	+3.3 V; 560 Ω	Common	Sign. A (D0-)	Sign. B (D1+)

① Function change by software
② Shielding

Supplementary instructions related to the communication busses Foundation Fieldbus and Modbus are available on the website.

4.5 Laying electrical cables correctly

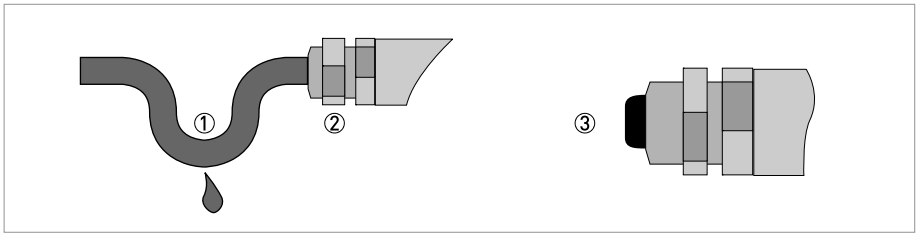


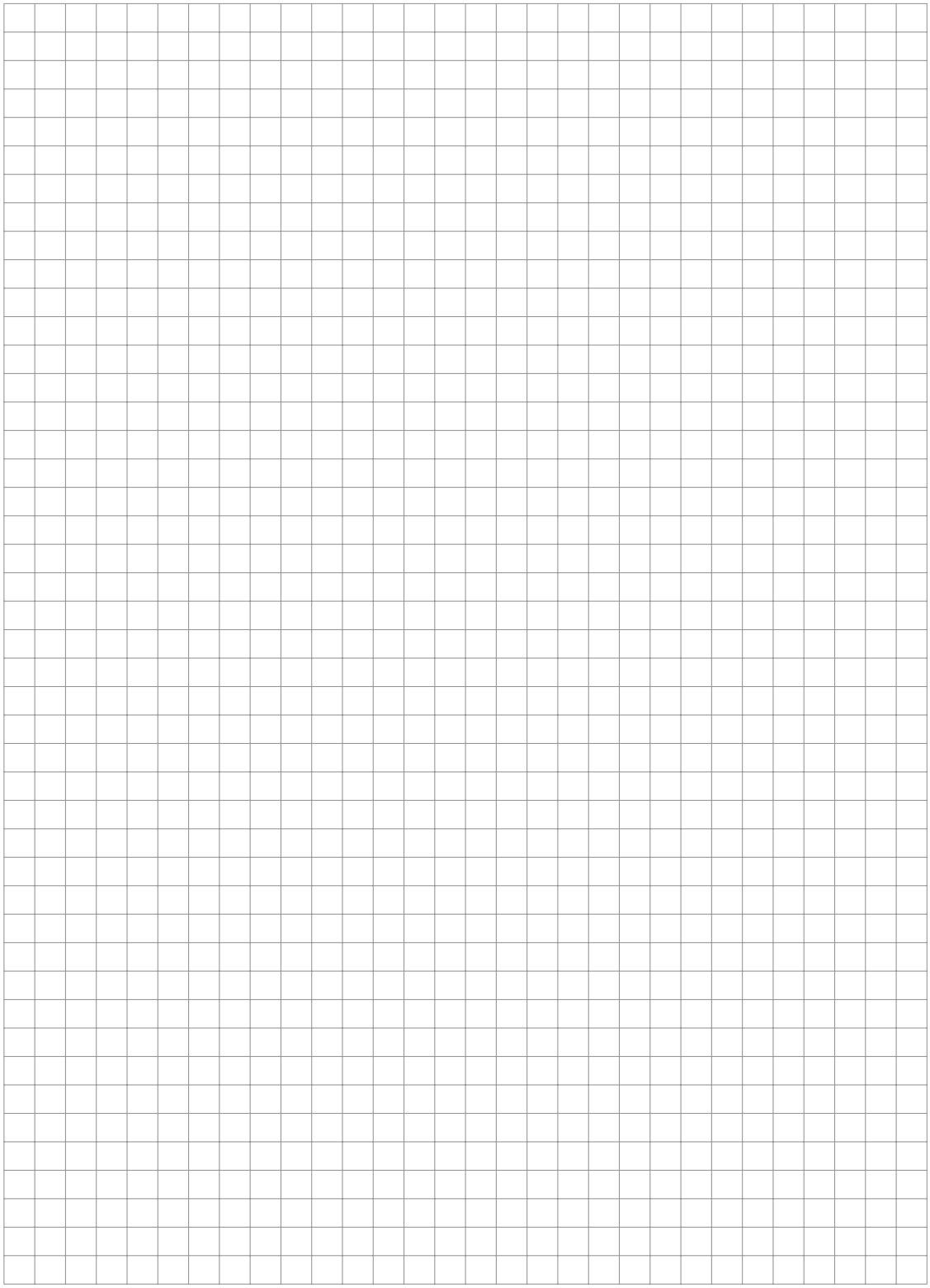
Figure 4-7: Protect housing from dust and water

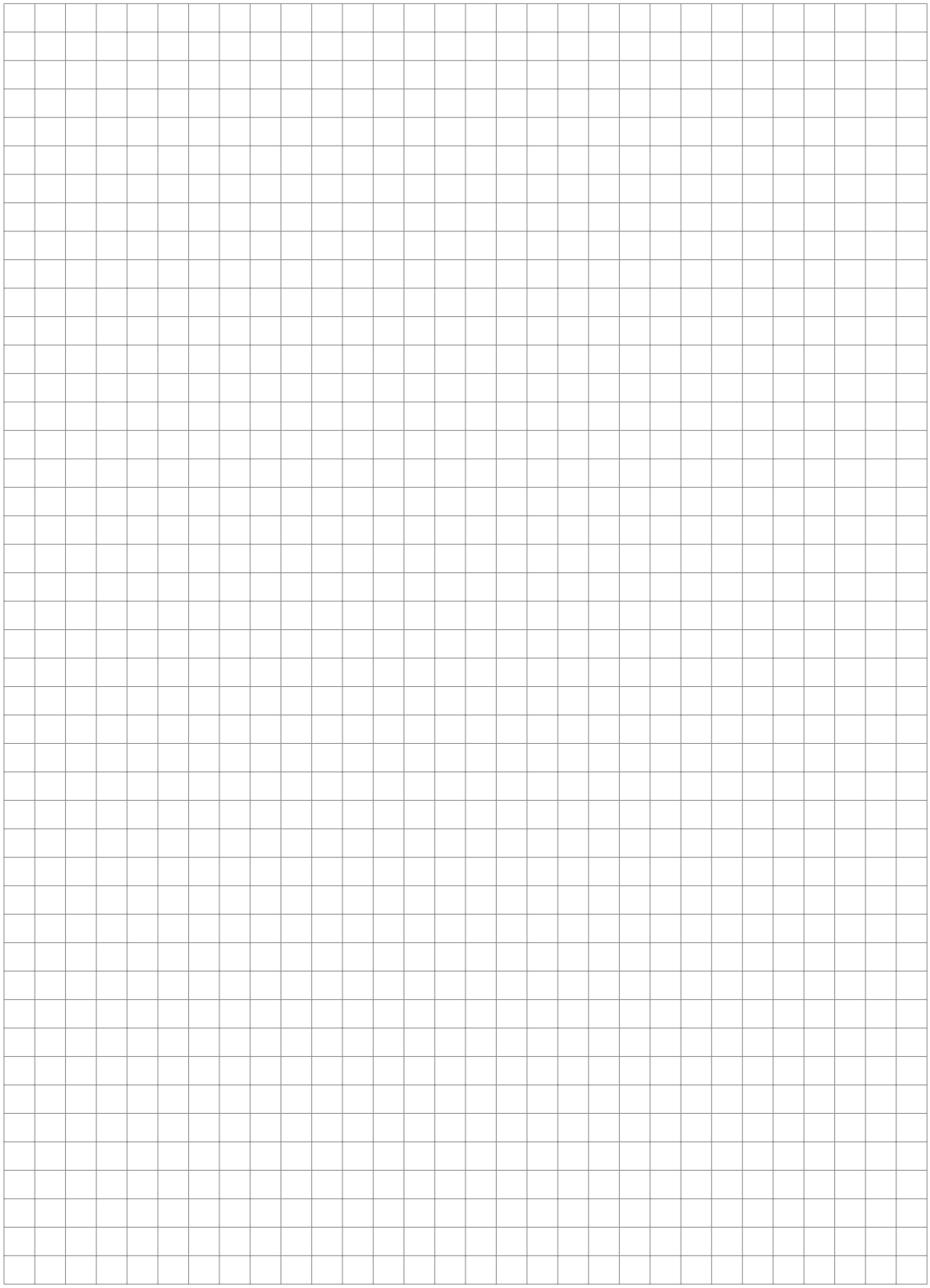
① For compact versions with nearly horizontally-oriented cable entries, lay the necessary electric cables with a drip loop as shown in the illustration.
② Tighten the screw connection of the cable entry securely.
③ Seal cable entries that are not needed with a plug.

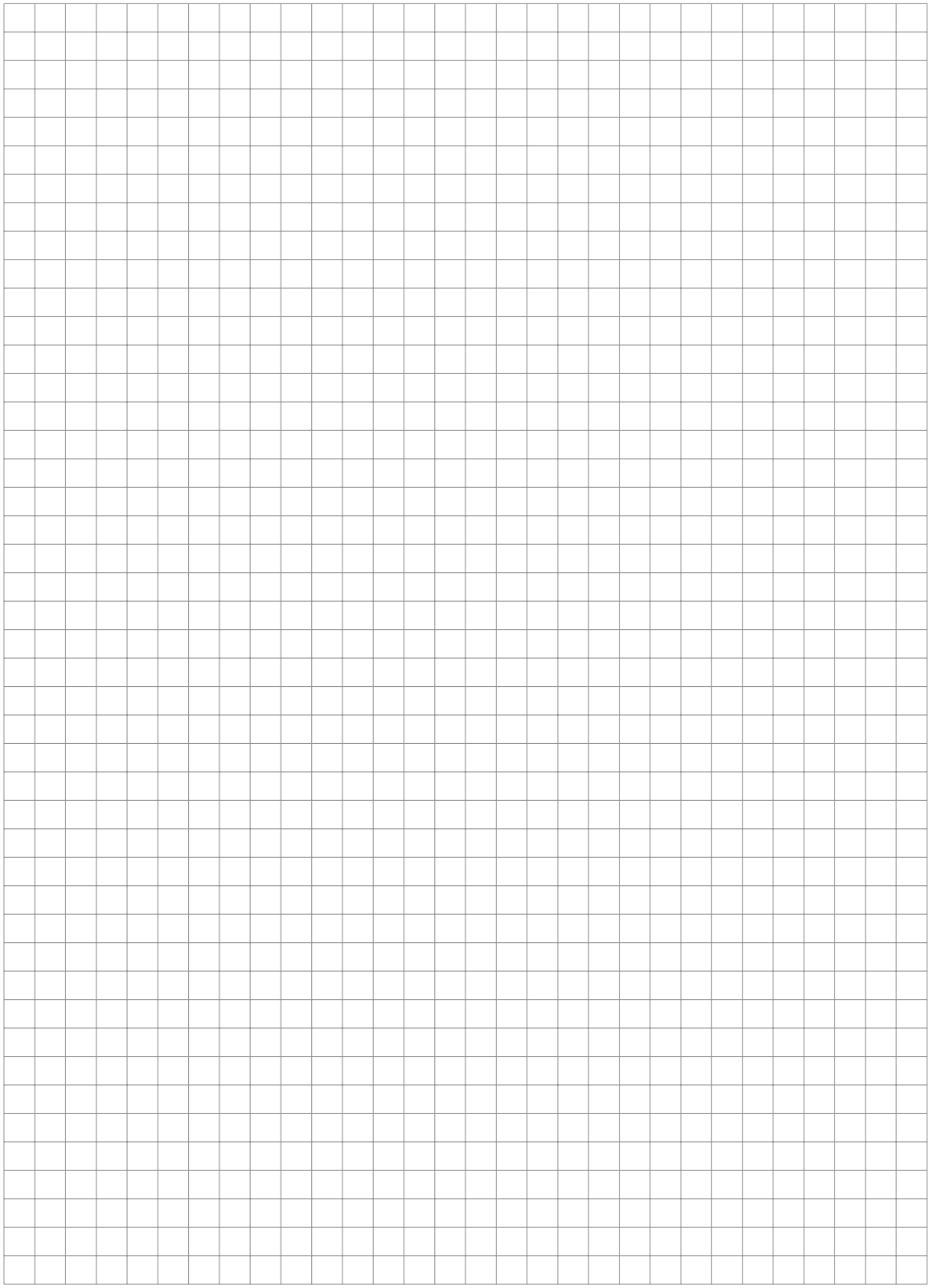
Model	Description
IMT31A	Foxboro® Model IMT31A Magnetic Flow Signal Converter
	Type
-4	IMT31A compact (0°)
-6	IMT31A compact (45°)
-B	IMT31A modular (0°, non Ex)
-C	IMT31A modular (45°, non Ex)
-N	IMT31A wall-mounted
	Power supply
1	12-24 VDC (12-24 VDC)
4	24 VDC/AC (19-29 V)
A	100-230 VAC (85-250 VAC, 50/60 Hz)
	Ex version
0	without - non Ex
2	Ex zone 1 (terminal compartment "e" - compact & wall) (9500A tubes only)
5	cFMus Class 1 DIV 2 (US)
A	cCSAus OL
C	cFMus Class 1 DIV 2 (Canada)
G	IECEx zone 1 (terminal compartment "e" - compact & wall) (9500A tubes only)
T	BE-Ex EAC (Belarus "e" - compact & wall) (9500A tubes only)
U	RU-Ex EAC (Russia "e" - compact & wall) (9500A tubes only)
V	KA-Ex EAC (Kazakhstan "e" - compact & wall) (9500A tubes only)
W	RU EAC (Russia)
X	KA EAC (Kazakhstan)
Y	BE EAC (Belarus)
	Cable connection
4	½" NPT
5	PF ½
6	M20 x 1.5
	Operating manual / operating language
5	without / German
6	without / English GB
7	without / French
8	without / Spanish
A	without / eastern Europe groupe (GB, CZ, HU, SI, SL, AL, BG & RO)
B	without / northern Europe groupe (GB, DK, FI, LT, NO, PL, EE & LV)
H	without / Italian
K	without / Portuguese
L	without / Dutch
M	without / Swedish
X	without / Russian
	Custody transfer
0	without
	Process diagnostics
0	Standard
C	Tropicalized electronics for non Ex (not for 12-24 VDC)
	Signal converter housing
1	Standard
	Communication
1	Basic IO (4-20 mA / HART + pulse / frequency + status output)
E	Fieldbus IO: Foundation Fieldbus
G	IO RS485 Modbus
	1st IO module
0	without, no module possible
	2nd IO module
0	without, no module possible

Model	Description
0	**Reference method** Standard
0 2 3	**Tag plate (field & wall only)** Standard 316/1.4401 tag plate (120 x 46 mm) 316/1.4401 tag plate (67 x 25 mm)
1 3* 4	**Manuals** German English French

*: Standard







ORDERING INSTRUCTIONS

1. Model Number.
2. Flow Data:
   a. Maximum, minimum, and normal flow rate.
   b. Fluid composition and viscosity at operating temperatures.
   c. Fluid density or relative density (specific gravity).
   d. Maximum, minimum and normal operating temperatures.
   e. Maximum, minimum and normal operating pressures.
   f. Mating pipe schedule.
   g. Type and location (distance) of upstream disturbance.
3. Calibration Information (analog output only); maximum flow rate 20 mA output.
4. Electric Classification.
5. Operational Selection and Accessories (see "Optional Selections and Accessories" section).
6. Customer Tag Data.

FLOWEXPERTPRO SIZING APPLICATION

Mobile application FlowExpertPro.com

OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a board of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling and recording. For a list of these offerings, visit our website at:

www.fielddevices.foxboro.com

Invensys Systems, Inc.
38 Neponset Avenue
Foxboro, MA 02035
United States of America
http://www.fielddevices.foxboro.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: http://support.ips.invensys.com

Invensys is now part of Schneider Electric.

FEB 2016

Item	Qty	LEVEL TRANSMITTER
2.00	**1**	**KPSI 710-S1474A-015.000-000.000-B1-0050-B Submersible Pressure Transducer**
	750	**SYSTEM DESIGN**
		Non-Clogging 1.0” PTFE Coated Elastomeric Diaphragm
	S	**MATERIAL**
		Stainless Steel
	1	**REFERENCE FORMAT**
		Vented Gage
	4	**OUPTUT**
		4-20 ma
	7	**PRESSURE CONNECTION**
		1/2"14 NPT male fitting
	4	**ELECTRICAL CONNECTION**
		1/2“ - 14 NPT male conduit fitting with molded cable seal
	A	**LIGHTNING PROTECTION**
		None
	015.000	**LEVEL RANGE (AT MAX OUTPUT)**
		15
	000.000	**LEVEL RANGE (AT MIN OUTPUT)**
		0
	B	**MOISTURE PROTECTION**
		Vent Filter
	1	**CABLE TYPE**
		Polyurethane
	0050	**CABLE LENGTH**
		50 feet
	B	**ENGINEERING UNITS/LABEL**
		ft. H_2O

Tag Set		
Set 1	Customer Tag	LT-101
	Customer Item	Re-Use Water Basin Level
	Configured Range	0 – 15 Feet = 4-20 mA

MEAS KPSI 710

- **Submersible Level Transducer**
- **±0.50% FSO Static Accuracy**
- **Custom Built in Two Days**
- **Two Year Warranty**

DESCRIPTION

The MEAS KPSI 710 is a submersible hydrostatic level transducer specifically designed to meet the rigorous environments encountered in liquid level measurement and control. It can be configured to perform to specifications under most adverse, reactive conditions.

All MEAS KPSI Transducers utilize a highly accurate pressure sensor assembly specifically designed for hostile fluids and gases. The assembly is integrated with supporting electronics in a durable waterproof housing constructed of 316 stainless steel or titanium. The attached electrical cable is custom manufactured and includes Kevlar® members to prevent errors due to cable elongation, and a unique water block feature that self-seals in the event of accidental cuts to the cable. Each transducer is shipped with a SuperDry™ Vent Filter that prevents moisture from entering the vent tube for at least one year without maintenance, even in the most humid environments.

FEATURES

- Custom Polyurethane or ETFE Cable Lengths
- Welded 316SS or Titanium
- Custom Level Ranges up to 700 ft (210m) H2O
- Multiple Analog Outputs
- Multiple Nose Piece Styles
- Optional Lifetime Lightning Protection
- Shipped with Long Life Vent Filter

APPLICATIONS

- Lift Stations
- Pump Control
- Level Control
- Surface Water Monitoring
- Landfill Leachate
- Well Monitoring
- Groundwater Monitoring

SPECIFICATIONS

Parameter		Comment
LEVEL RANGES		
Full Scale Level Ranges (intermediate level ranges are available)	2.3 thru 700 ft H2O (0.70 thru 210 m H2O)	Vented Gage Reference
	10 thru 700 ft H2O (3 thru 210 m H2O)	Sealed Gage Reference
	35 thru 700 ft H2O (10 thru 210 m H2O)	Absolute Gage Reference
Proof Pressure	1.5 x FS	
Burst Pressure	2.0 x FS	

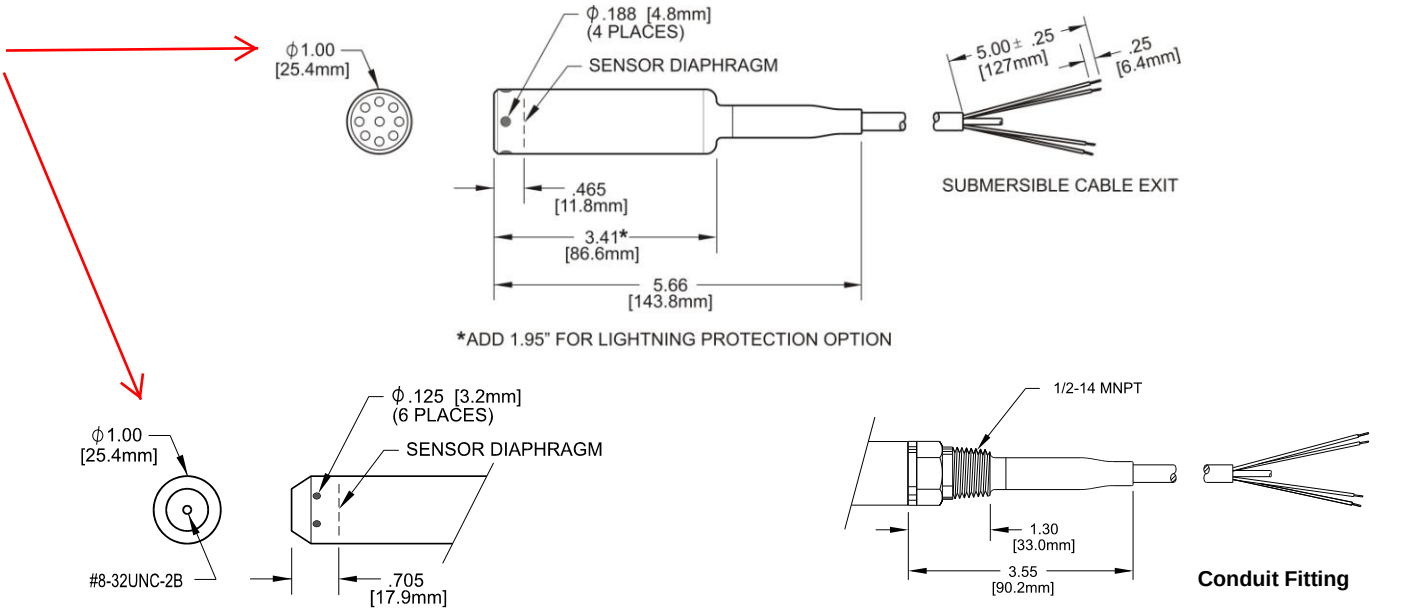
MEAS KPSI 710

SPECIFICATIONS

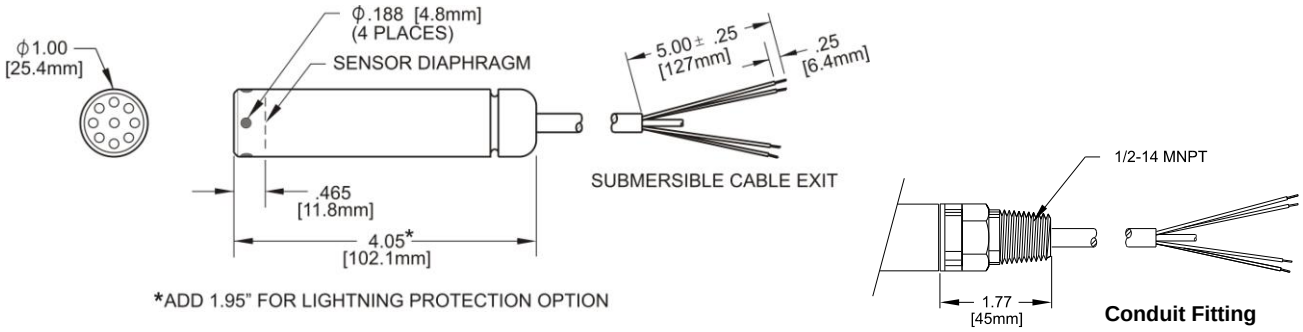
STATIC PERFORMANCE		
Static Accuracy (combined effects of non-linearity, hysteresis and repeatability, best fit straight line method)	±0.50% FSO	BFSL method
Resolution	+0.0001% FS	
ENVIRONMENTAL		
Wetted Materials	316 SS or Titanium; Delrin®; polyurethane or Viton®	Delrin® and Viton® are registered trademarks of DuPont.
Compensated Temp Range	0 to 50ºC	
Thermal Error (maximum allowable deviation from the Best Fit Straight Line due to a change in temperature)	±0.05% FSO/ºC ±0.1% FSO/ºC	worst case over compensated temperature range for ranges < 12 ft (4 m) H_2O
Operating Temp Range	-20 to 60 ºC	when attached to polyurethane cable
Protection Rating	IP 68, NEMA 6P	
ELECTRICAL		
Excitation	9-28V – VDC output 9-28V – mA output 15-28V – VDC output 10-28V – VDC output	0-5V, 0-2.5V, 0-4V 4-20 0-10V 1.5-7.5V
Input Current	20 mA max 3.5 mA max	for mA output for VDC output
Output	4-20mA, 0-5 VDC, 0-2.5VDC, 0-4VDC, 0-10VDC, 1.5-7.5VDC	for ranges < 5 ft (1.5m) H2O, only 4-20mA output is available
Zero Offset	±0.25 mA for mA output < 0.25 VDC for VDC output	
Output Impedance	See loop diagram for mA output 20 ohm for VDC output	
Insulation Resistance	100 mega ohm at 50 VDC	
Circuit Protection	Polarity, surge/shorted output	
CERTIFICATIONS		
	CE compliant	EN 61326-1:2001 and 61326-2-3:2006
	UL, CUL and FM	Class I, II, III, Div 1, Groups A,B,C,D,E,F&G
	WEEE/RoHS	Waste from Electrical and Electronic Equipment (WEEE) and Restrictions on the use of Hazardous Substances (RoHS)
PHYSICAL		
Approximate Weight	0.44 lbs (198 g) transducer 0.05 lbs/ft (79 g/m) cable	
Cable Jacket Material	Polyurethane (standard) ETFE (optional)	ETFE is a fluoropolymer material, Tefzel® or equivalent. Tefzel® and Kevlar® are registered trademarks of DuPont.
Cable Pull Strength	200 lbs (90 kg)	
Cable Number of Conductors	4	
Cable Conductor Size	22 AWG	
Cable Seal	Molded Polyurethane Viton® Gland	for polyurethane cable for ETFE cable
TEMPERATURE OUTPUT OPTION (not intrinsically safety approved)		
Temperature Range	-20 to 60ºC	available for 4-20mA output versions only
Output Signal	4-20mA	
Temperature Measurement Accuracy	±4ºC	
LIGHTNING PROTECTION (power supply needs to be limited to 150mA to avoid lock up of the gas tube after a suppression event)		
Life Expectancy	>1,000 Operations	
Peak Clamping Voltage	36 Volts	
Response Time	<10 nsecs	
Shunts	20,000 Amperes	

MEAS KPSI 710

DIMENSIONS



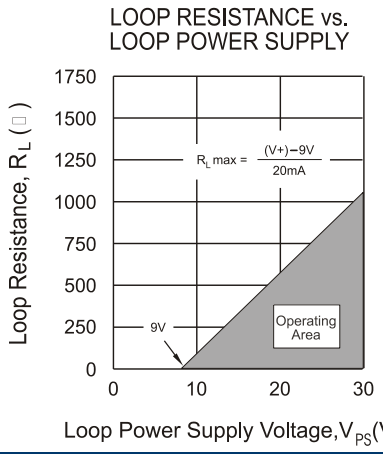
Molded Cable Seal Configuration for Polyurethane Cable



Gland Cable Seal Configuration for ETFE cable

ELECTRICAL TERMINATION / LOOP RESISTANCE / CERTIFICATIONS

ELECTRICAL TERMINATION		
22AWG CONDUCTORS IN A SHIELDED CABLE WITH VENT TUBE		
4-20 mA	RED	+ EXCITATION
	BLACK	- EXCITATION
0-5 VDC	RED	+ EXCITATION
	BLACK	- EXCITATION
	WHITE	+ SIGNAL
ALL	DRAIN WIRE	SHIELD



MEAS KPSI 710

ORDERING INFORMATION

MODEL	SUBMERSIBLE LEVEL TRANSDUCER
7 1 0	±0.50% FSO Static Accuracy
↓	**MATERIAL**
S	Stainless Steel
T	Titanium
↓	**REFERENCE FORMAT**
1	Vented gage
3	Sealed gage
4	Absolute
↓	**OUTPUT**
3	0-5 VDC
F	0-2.5 V
G	0-4 V
H	0-10 V
J	1.5-7.5V
4	4-20mA
6	4-20mA temperature measurement option
↓	**PRESSURE CONNECTION**
A	Open-face nosecap
B	Ported nose cap
E	Piezometer nosecap
2	1/4" - 18 NPT male fitting
7	1/2" - 14 NPT male fitting
↓	**ELECTRICAL CONNECTION**
0	Molded cable seal
4	1/2" - 14 NPT male conduit fitting with molded cable seal
A	Gland cable seal
B	1/2" - 14 NPT male conduit fitting with gland cable seal
↓	**LIGHTNING PROTECTION**
A	None
B	Full Lightning Protection
↓	**LEVEL RANGE (at MAX output)**[1]
# # # . # # #	15.0 ft h20
↓	**LEVEL RANGE (at MIN output)**[1]
# # # . # # #	0 ft H20
↓	**MOISTURE PROTECTION**
A	None (sealed/absolute only)
B	Vent Filter
C	Aneroid Bellows
↓	**CABLE TYPE**
1	Polyurethane
2	ETFE
↓	**CABLE LENGTH**
# # # #	(in feet)
↓	**LABEL**[2]
A	psi
B	ft H_2O
C	m H_2O
↓	

7	1	0	S	1	4	7	4	A	0	1	5	.	0	0	0	0	0	0	.	0	0	0	B	1	0	0	5	0	B

Notes:

1 The part number requires two level range limits, corresponding to the maximum and minimum analog outputs of the transducer, to be specified in **pounds per square inch (psi)** to three decimal places. The lower level range is typically 000.000 unless otherwise required. For reverse output requirements, enter the lower level range for the maximum output signal and the upper range for the minimum output. Use the following conversion factors:

ft H_2O / 2.3073 = psi — Examples: 10 ft H_2O / 2.3073 = 4.334 psi (enter 004.334 in the part number)
m H_2O / 0.703265 = psi — 10m H_2O / 0.703265 = 14.219 psi (enter 014.219 in the part number)

For sealed gage reference add local atmosphere when converting to psi. Contact PSI for assistance.
Example: 10 ft H_2O / 2.3073 +14.7 = 19.034 psi (enter 019.034 in the part number)

2 Units of measure on standard PSI label. Contact PSI if private labeling is required.

NORTH AMERICA

Measurement Specialties, Inc.
1000 Lucas Way
Hampton, VA 23666
USA
Tel: 1-757-766-1500
Fax: 1-800-745-8008
Sales: WL.sales@meas-spec.com

EUROPE

Measurement Specialties (Europe), Ltd.
26 Rue des Dames
78340 Les Clayes-sous-Bois
France
Tel: +33 (0) 130 79 33 00
Fax: +33 (0) 134 81 03 59
Sales: pfg.cs.emea@meas-spec.com

ASIA

Measurement Specialties (China), Ltd.
No. 26 Langshan Road
Shenzhen High-Tech Park (North)
Nanshan District, Shenzhen 518057
China
Tel: +86 755 3330 5088
Fax: +86 755 3330 5099
Sales: pfg.cs.asia@meas-spec.com

Item	Qty	PRESSURE TRANSMITTER
3.00	**1**	**Foxboro IGP10-T22D1F-L1V3** **Gauge Pressure Transmitter**
		Aux Specs: D0197MJ
	IGP10	**FUNCTION:**
		Measures Pressure And Transmits A Proportional Electrical Signal.
	T	**ELECTRONIC VERSION AND OUTPUT SIGNAL:**
		Intelligent; Digital HART & 4 To 20 mA
	22	**STRUCTURE CODE MATERIALS AND TYPE:**
		316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, 1/2 NPT External & 1/4 NPT Internal Thread Connection Type
	D	**SPAN LIMITS:**
		0.07 & 2.1 MPa, 10 & 300 psi, 0.70 & 21 bar or kg/cm²
	1	**CONDUIT CONNECTION & HOUSING MATERIAL:**
		1/2 NPT Conduit Connection, Both Sides, Aluminum Housing
	F	**ELECTRICAL SAFETY:**
		FM Intrinsically Safe For Class I, Division 1, Groups A, B, C, & D; Class II, Division 1, Groups E,F, & G; And Class III, Division 1. Also Class I, Division 2, Groups A,B,C, & D; Class II, Groups F & G; And Class III, Division 2. Explosionproof For Class I, Division 1, Groups B,C, & D; Dust-Ignitionproof For Class II, Division 1, Groups E,F,G; And Class III, Div 1. Zone Certified Intrinsically Safe AEx ia IIC And AEx n IIC.
	L1	**OPTIONAL MODEL SUFFIX(ES) INCLUDED:**
		Digital Indicator, Internal Pushbuttons, And Window Cover
	D0197MJ	**Accessories for IAP10, IGP10, IGP25, IGP10S, IAP10**
		Anderson Greenwood M25 2-Valve Manifold ½" FNPT x ½" MNPT SS Teflon packing with Body Material SS

Tag Set

Set 1	Customer Tag	PT-102
	Customer Item	Station Discharge Pressure
	Configured Range	0 To 150 psi = 4-20 mA

Foxboro®
by Schneider Electric

PSS 2A-1C13 B

Models IAP10, IGP10, IAP20, and IGP20 I/A Series® Absolute and Gauge Pressure Transmitters with HART® Communication Protocol

IAP20/IGP20
TRANSMITTER

IAP10/IGP10 TRANSMITTER
STRUCTURE CODES
52, 53, 60-63, D5, D6,
S5, S6, SH, AND SJ

IAP10/IGP10
TRANSMITTER
STRUCTURE CODES
20-23, 30, 31,
D1, D2, S3, S4,
SC, AND SD

The Foxboro® brand I/A Series® Models IAP10, IGP10, IAP20, and IGP20 are Intelligent, two-wire transmitters that provide precise, reliable, measurement of absolute or gauge pressure, and transmit a 4 to 20 mA output signal with a superimposed HART® digital signal for remote configuration and monitoring.

FEATURES

- Silicon strain gauge sensors successfully field-proven in many thousands of installations.
- Simple, elegant sensor packaging with very few parts; achieves exceptionally high reliability.
- Aluminum housing has durable, corrosion-resistant epoxy finish; 316 ss housing also available; both meet the ratings of NEMA 4X and IEC IP66.
- Remote configuration or locally via the optional LCD Indicator.
- Can be provided with numerous configurations of direct connect or remote mount seals.
- HART protocol allows multidrop topology.
- SIL2-Certified transmitter offered as an option.
- CE marked; complies with applicable EMC, ATEX, and PED European Union Directives.
- The IAP10 and IGP10 are offered with integral process connections for sanitary, and pulp and paper installations. Also, the IGP10 is offered for high gauge pressure applications to 52, 105, or 210 MPa (7500, 15,000, or 30,000 psi).
- Sensor wetted parts materials include Co-Ni-Cr, 316L ss, and nickel alloy(1); additionally, Monel, tantalum, and gold-plated 316L ss sensors are offered for the IAP20/IGP20.
- Multi-marking available for ATEX, CSA, and FM intrinsically safe applications. User determines and permanently marks the certification to be applied.
- Complies with NAMUR NE 21 interference immunity requirement, and NAMUR NE 43 analog output overrange and underrange annunciations.

1. Equivalent to Hastelloy®. Hastelloy® is a registered trademark of Haynes International, Inc.

- Complies with electromagnetic compatibility requirements of European EMC Directive 2004/108/EC by conforming to following EN and IEC Standards: EN 61326-1, and IEC 61000-4-2 through 61000-4-6.
- Meets numerous requirements for hazardous locations. Versions available to meet Agency flameproof and zone requirements.
- Dual Seal certified by CSA to meet ANSI/ ISA 12.27.01-2003 requirements.
- Numerous mounting bracket set options. Many other options and accessories offered.
- Standard 5-year warranty.

I/A Series® PRESSURE TRANSMITTER FAMILY

The I/A Series Electronic Pressure Transmitters are a complete family of d/p Cell®, gauge, absolute, multirange, multivariable, and premium performance transmitters, as well as transmitters with remote or direct connect pressure seals, all using field-proven silicon strain gauge sensors and common topworks.

OPTIONAL LCD DIGITAL INDICATOR

This is a two-line digital indicator with on-board pushbuttons that displays the measurement with a choice of units. The pushbuttons allow zero and span adjustments, as well as local configuration without the need for a Communicator or PC-based Configurator. See Figure 10.

MODULAR ELECTRONICS

A common HART electronics module is used for all I/A Series HART Pressure Transmitters. Also, because all configuration and calibration data is stored in the sensor, you can replace a HART module with another HART module without transmitter reconfiguration or recalibration.

Furthermore, if your needs change, the transmitter modular design allows easy migration to other standards, including FoxCom™, FOUNDATION™ fieldbus, and Analog 4 to 20 mA or 1 to 5 V dc.

HART Communication Protocol Version (-T Electronics)

4 to 20 mA with HART communications. Allows direct analog connection to common receivers while still providing full digital communications using a Communicator, PC-based Configurator, or optional LCD Indicator.

In addition to HART, Foxboro pressure transmitters are also available with other protocols as described below.

FoxCom Version, Software Configurable for Digital or 4 to 20 mA Output (-D Electronics)

Provides measurement integration with an I/A Series system, or allows direct analog connection to common receivers while still providing full intelligent digital communication with a PC-based configurator. Refer to PSS 2A-1C13 A.

FOUNDATION Fieldbus Version (-F Electronics)

This is a FISCO/FNICO compliant all digital, serial, two-way communication system which interconnects field devices such as transmitters, actuators, and controllers. It is a local area network (LAN) with built-in capability to distribute control across the network. Refer to PSS 2A-1C13 E.

Analog Output Version (-A Electronics)

Provides a 4 to 20 mA analog output and includes a standard LCD Indicator to provide transmitter configuration directly from on-board pushbuttons. Refer to PSS 2A-1C13 C.

Analog Output Version (-V Electronics)

A low power, low voltage transmitter that draws no more than 3 mA, and transmits a 1 to 5 V dc output signal. As with the -A version, it includes a standard LCD Indicator. Refer to PSS 2A-1C13 D.

HART Intelligent Module Configured for 4 to 20 mA Output

Measurements and diagnostics are available from the HART Communicator connected to the two-wire loop carrying the 4 to 20 mA measurement signal by using a bidirectional digital signal superimposed on the 4 to 20 mA current signal.

Multiple measurements are transmitted digitally, including not only the primary measurement in pressure units, but also the electronics temperature and sensor temperature which can be used to monitor external heat tracing equipment. Complete transmitter diagnostics are also communicated.

Configuration and reranging can be accomplished with the Communicator, PC-based Configurator, or the optional LCD Indicator with pushbuttons.

HIGH PERFORMANCE

Both direct-connected and bracket-mounted transmitters utilize microprocessor-based correction to achieve both excellent accuracy and ambient temperature compensation.

OPTIONAL SIL2 TRANSMITTERS

Modern industrial processes tend to be technically complex and have the potential to inflict serious harm to persons or property during a mishap. The IEC 61508 standard defines safety as “freedom from unacceptable risk.” SIL2 pressure transmitters with HART communication protocol, in conjunction with Triconex Safety Systems, provide integrated solutions for safety and critical control applications. The integrated solution is certified as interference-free from the 4 to 20 mA loop; this guarantees the integrity of the safety system and the safety of the controlled process. The integrated design allows uninterrupted operation of the safety function, while allowing access to device level information via HART commands. The solution permits interface of device diagnostics with asset management systems without compromising functional safety. Select Option -S2 for a SIL2-certified HART Transmitter. A copy of the certification is available via Auxiliary Specification (AS) Code CERT-S.

2. Equivalent to Hastelloy®.

MULTIDROP COMMUNICATIONS

Point-to-point or multidrop topologies are permitted. Multidropping is the connection of several transmitters to a single communications line. Communications between the host computer and transmitters takes place digitally with the analog output of the transmitter fixed. Up to fifteen transmitters can be connected on a single twisted pair of wires or over leased telephone lines. See Figure 8 and Figure 9.

CHOOSE MOUNTING CONFIGURATION NEEDED

Direct Connected Transmitters (Models IAP10 and IGP10)

These transmitters are light weight and easy-to-install. They use 316L ss or nickel alloy(2) process connections, and a choice of either 316L ss, Cobalt-Nickel-Chrome, or nickel alloy for the sensing diaphragm. See Direct-Connected Transmitters section.

Bracket-Mounted Transmitters (Models IAP20 and IGP20)

These transmitters offer a large selection of corrosion resistant process covers and sensing diaphragm materials. They are suitable for applications requiring low spans, vacuum service, and high overrange pressure.

EASE OF INSTALLATION

Rotatable Topworks allows transmitter installation in tight places, allows indicator to be positioned in preferred direction, and eases field retrofit.

Two Conduit Entrances offer a choice of entry positions for ease of installation and self-draining of condensation regardless of mounting position and topworks rotation.

Wiring Guides and Terminations provide ease of wire entry and support, plenty of space to work and store excess wire, and large, rugged screw terminals for easy wire termination.

DIRECT-CONNECTED TRANSMITTERS – IAP10 AND IGP10

EXCEPTIONAL VALUE

The combination of small size, light weight, direct mounting, standard materials, and wide measurement capability with high performance make this an exceptionally cost effective solution for process pressure measurement.

DIRECT PROCESS MOUNTING

Because of their light weight and external threaded connection, these transmitters can be installed directly on process piping without mounting brackets. However, for unique requirements, an optional bracket is offered and connection can be made to the standard 1/4 NPT internal thread.

WIDE RANGEABILITY

Three absolute pressure versions are offered to allow spans from 7 to 21,000 kPa (1 to 3,000 psi), and four gauge pressure versions are offered to allow spans from 7 to 42,000 kPa (1 to 6,000 psi). Refer to IGP20 Transmitter for gauge pressure vacuum service.

316L ss, NICKEL ALLOY, AND Co-Ni-Cr PROCESS WETTED PARTS

With process connection of 316L ss or nickel alloy[3], and sensor diaphragm available in either 316L ss, nickel alloy, or highly corrosion resistant Co-Ni-Cr, this transmitter is an excellent choice for the vast majority of process pressure measurements.

FLAMEPROOF DESIGN

The IAP10 and IGP10 flameproof versions are designed to meet Agency flameproof and zone requirements.

Figure 1. Direct Connected Transmitter (Flameproof Version Shown on Left)

HIGH GAUGE PRESSURE VERSIONS

Three high gauge pressure versions with URLs of 52, 105, and 210 MPa (7,500, 15,000, and 30,000 psi) are available in the IGP10 line. See PSS 2A-1C13 F.

SANITARY AND PULP AND PAPER VERSIONS

These transmitters are also available with integral process connections for use in sanitary, and pulp and paper installations. See PSS 2A-1C13 K and PSS 2A-1C13 L, respectively.

3. Equivalent to Hastelloy®.

BRACKET-MOUNTED TRANSMITTERS – IAP20 AND IGP20

SENSOR CORROSION PROTECTION

Choice of 316L ss, Co-Ni-Cr, nickel alloy[4], Monel, Gold-Plated 316L ss, and Tantalum materials. High corrosion resistance of Co-Ni-Cr (TI 037-078) means long service life in many difficult applications without the extra cost for exotic materials. Also see TI 37-75b for process applicability with Co-Ni-Cr and other process wetted parts materials.

WIDE RANGEABILITY

Gauge pressure measurement spans may be as low as 0.12 kPa (0.5 inH_2O) to as high as 35 MPa (5000 psi) by choosing one of only six sensors, and absolute pressure measurement spans may be as low as 0.87 kPa (3.5 inH_2O) to as high as 21 MPa (3000 psi) by choosing one of only four sensors. This provides exceptional measurement range capability with a minimum of versions.

VACUUM SERVICE

A lower range limit of -100 kPa (-14.7 psi, -1 bar) means that vacuum measurements are easily handled with the versatile IGP20 Gauge Pressure transmitter.

PROCESS CONNECTOR

Removable, gasketed process connector (Figure 2) allows a wide range of selections, including 1/4 NPT, 1/2 NPT, Rc 1/4, Rc 1/2, and weld neck connections.

For highly corrosive chemical processes, a 1/2 NPT PVDF (Kynar) insert, as shown in Figure 3, is installed in the HI-side 316 ss cover and is used as the process connector. In these applications, tantalum is used as the sensor diaphragm material.

Figure 2. Bracket-Mounted Transmitter Shown with Conventional Process Connector

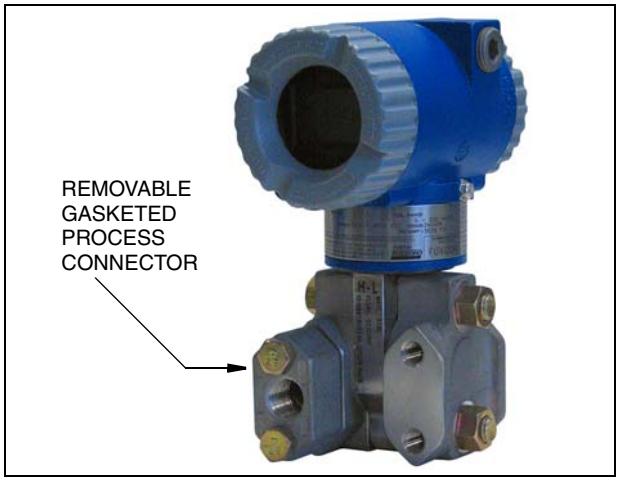
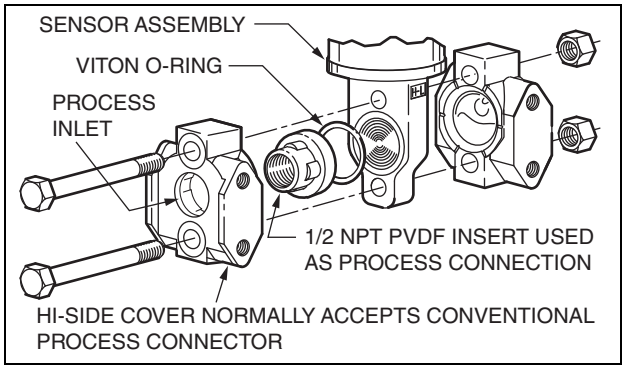


Figure 3. Bracket-Mounted Transmitter Shown with 1/2 NPT PVDF Insert Installed in HI-Side Cover



EASE OF MOUNTING TWO-VALVE MANIFOLD

Optional two-valve manifold to isolate transmitter, and vent pressure, is easily mounted directly to transmitter.

FLAMEPROOF DESIGN

The transmitters are designed to meet Agency flameproof and zone requirements.

4. Equivalent to Hastelloy®.

PRESSURE SEALS

Pressure seals are used with the IAP10, IGP10, IAP20, and IGP20 Series Transmitters when it is necessary to keep the transmitter isolated from the process. A sealed system is used for a process fluid that may be corrosive, viscous, subject to temperature extremes, toxic, sanitary, or tend to collect and solidify.

Table 1 and Table 2 list the various seals that can be used with these transmitters. To order a transmitter with seals, both a Transmitter Model Number and Seal Model Number are required. See PSS 2A-1Z11 A for a complete listing of pressure seal models and specifications. Also see Figure 4 for typical pressure seal configurations.

Table 1. Pressure Seals Used with IAP10, IGP10, IAP20, and IGP20 Transmitters

Direct Connect Pressure Seal Assemblies		
Seal Model	**Seal Description**	**Process Connections**
PSFLT	Flanged, Direct Connect (Flanged Level), Flush or Extended Diaphragm (IAP10 only)	ANSI Class 150, 300, 600 flanges and BS/DIN PN 10/40, 10/16, 25/40 flanges
PSFAD	Flanged, Direct Connect, Recessed Diaphragm (IAP10 and IGP10 only)	ANSI Class 150, 300, 600, 1500 flanges
PSFFD	Flanged, Direct Connect, Flush Diaphragm (IAP10 and IGP10 only)	ANSI Class 150, 300, 600 and PN 10/40
PSTAD	Threaded, Direct Connect, Recessed Diaphragm (IAP10 and IGP10 only)	1/4, 1/2, 3/4, 1, or 1 1/2 NPT internal thread
PSISD	In-Line Saddle Weld, Direct Connect, Recessed Diaphragm (IAP10 and IGP10 only)	Lower housing of seal is in-line saddle welded to nominal 3- or 4-inch (and larger) Pipe
PSSCT	Sanitary, Direct Connect (Level Seal), Flush Diaphragm (IGP20 only)	Process Connection to Sanitary Piping with 2- or 3-inch Tri-Clamp
PSSST	Sanitary, Direct Connect (Level Seal), Extended Diaphragm (IGP20 only)	Process Connection to 2-in Mini Spud or 4-in Standard Spud; Tri-Clamp
Remote Mount, Capillary-Connected Pressure Seal Assemblies		
Seal Model	**Seal Description**	**Process Connections**
PSFPS	Flanged, Remote Mount, Flush Diaphragm	ANSI Class 150, 300, 600 flanges and BS/DIN PN 10/40 flanges
PSFES	Flanged, Remote Mount, Extended Diaphragm	ANSI Class 150, 300, 600 flanges and BS/DIN PN 10/40, 10/16, 25/40 flanges
PSFFR	Flanged, Remote Mount, Flush Diaphragm	ANSI Class 150, 300, 600 flanges and DIN/BS PN 10/40
PSFAR	Flanged, Remote Mount, Recessed Diaphragm	ANSI Class 150, 300, 600, 1500 flanges
PSTAR	Threaded, Remote Mount, Recessed Diaphragm	1/4, 1/2, 3/4, 1, or 1 1/2 NPT internal thread
PSISR	In-Line Saddle Weld, Remote Mount, Recessed Diaphragm	Lower housing of seal is in-line saddle welded to nominal 3- or 4-inch (and larger) Pipe
PSSCR	Sanitary, Remote Mount, Flush Diaphragm	Process Connection secured with a Tri-Clamp to a 2- or 3-inch pipe
PSSSR	Sanitary, Remote Mount, Extended Diaphragm	Process Connection to 2-in Mini Spud or 4-in Standard Spud; Tri-Clamp

Table 2. I/A Series Pressure Transmitters and Applicable Pressure Seals

Transmitter Model	Used with Pressure Seal Model: (a)														
	FLT	FAD	FFD	TAD	ISD	SCT	SST	FPS	FES	FAR	FFR	TAR	ISR	SCR	SSR
IAP10	–	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
IGP10	–	✓	✓	✓	✓	–	–	✓	✓	✓	✓	✓	✓	✓	✓
IAP20	–	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓
IGP20	✓	–	–	–	–	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

a. Pressure Seal models are shown with an abbreviated code; all seal codes have a PS prefix; for example, FLT is Model PSFLT.

Figure 4. Typical Pressure Seals used with IAP10, IGP10, IAP20, and IGP20 Transmitters

FUNCTIONAL SPECIFICATIONS

Table 3. Span and Range Limits for IAP10 and IGP10 Transmitters

Span Code	Span Limits			Range Limits (Absolute or Gauge Units)		
	MPa	psi	bar	MPa	psi	bar
C	0.007 and 0.21	1 and 30	0.07 and 2.1	0 and 0.21	0 and 30	0 and 2.1
D	0.07 and 2.1	10 and 300	0.7 and 21	0 and 2.1	0 and 300	0 and 21
E	0.7 and 21	100 and 3000	7 and 210	0 and 21	0 and 3000	0 and 210
F (a)	14 and 42	2000 and 6000	140 and 420	0 and 42	0 and 6000	0 and 420

a. Span Limit Code F is applicable to IGP10 Transmitter only.

Table 4. Maximum Overrange and Proof Pressure Ratings for IAP10 and IGP10 Transmitters

Span Code	Maximum Overrange Pressure Rating (a)			Proof Pressure Rating (a) (b)		
	MPa	psi	bar	MPa	psi	bar
C	0.31	45	3.15	0.827	120	8.27
D	3.1	450	31.5	8.27	1200	82.7
E	31	4500	315	79.3	11500	793
F (c)	59	8400	588	152	22000	1517

a. Values listed are in absolute or gauge pressure units, as applicable. Maximum overrange pressure is the maximum pressure that may be applied without causing damage to the transmitter.

b. Proof pressure ratings meet ANSI/ISA Standard S82.03-1988. Unit may become nonfunctional after application of proof pressure.

c. Span Limit Code F is applicable to IGP10 Transmitter only.

Table 5. Span and Range Limits for IAP20 and IGP20 Transmitters

Span Code	Span Limits			Range Limits (Absolute or Gauge Units) (a)		
	kPa	inH_2O	mbar	kPa	inH_2O	mbar
A (b)	0.12 and 7.5	0.5 and 30	1.2 and 75	-7.5 and +7.5	-30 and +30	-75 and +75
B	0.87 (c) and 50	3.5 (c) and 200	8.7 (c) and 500	-50 (a) and +50	-200 (a) and +200	-500 (a) and +500
Span Code	**MPa**	**psi**	**bar**	**MPa**	**psi**	**bar**
C	0.007 and 0.21	1 and 30	0.07 and 2.1	-0.1 (a) and 0.21	-14.7 (a) and +30	-1 (a) and +2.1
D (d)	0.07 and 2.1	10 and 300	0.7 and 21	-0.1 (a) and 2.1	-14.7 (a) and +300	-1 (a) and +21
E (e)	0.7 and 21	100 and 3000	7 and 210	-0.1 (a) and 21	-14.7 (a) and +3000	-1 (a) and +210
F (b)	1.38 and 35	200 and 5000	13.8 and 350	-0.1 and +35	-14.7 and +5000	-1 and +350

a. For absolute pressure transmitters (IAP20), the lower range limit is 0.

b. Span Codes A and F applicable to IGP20 Transmitter only. Also, Span Code A is not available when pressure seals are specified.

c. For the IAP20, the minimum span for factory calibration is 1.2 kPa (5 inH_2O, 12.4 mbar). This span can be field reranged within the limits shown in Table .

d. Minimum span limit is 30 psi (0.21 MPa, 2.1 bar) for Analog protocol (-A).

e. When certain options are specified, the upper span and range limit values are reduced as shown in Table 7.

Table 6. Maximum Overrange and Proof Pressure Ratings for IAP20 and IGP20 Transmitters (a)

Transmitter Configuration (See Model Code for Description of Options)	Overrange Pressure Rating			Proof Pressure Rating (b)		
	MPa	psi	bar	MPa	psi	bar
Standard with IGP20 Span Code F only	51.8	7500	518	100	14500	1000
Standard (c) or with Option -B2, -D3, or -D7	25	3626	250	100	14500	1000
With Option -B3	20	2900	200	70	11150	700
With Option -D1	16	2320	160	64	9280	640
With Option -B1 or -D5	15	2175	150	60	8700	600
With Option -D2, -D4, -D6, or -D8	10	1500	100	40	6000	400
With Structure Codes 78 and 79 (PVDF insert)	2.1	300	21	8.4	1200	84

a. Refer to Model Code section for application and restrictions related to the items listed in the table.

b. Proof pressure ratings meet ANSI/ISA Standard S82.03-1988. Unit may become nonfunctional after application of proof pressure.

c. Standard with IAP20/IGP20 Span Codes A to E.

Table 7. Impact of Certain Options on IAP20/IGP20 Span and Range Limits (a)

Option	Description (Also see Model Code)	Span and Range Limits Derated to:
-B3	B7M Bolts and Nuts (NACE)	20 MPa (2900 psi, 200 bar
-D1	DIN Construction	16 MPa (2320 psi, 160 bar)
-D5 or -B1	DIN Construction or 316 ss Bolting	15 MPa (2175 psi, 150 bar)
-D2, -D4, -D6, or -D8 ((a)	DIN Construction (a)	10 MPa (1500 psi, 100 bar) (a)

a. Refer to Model Code section for application and restrictions related to the items listed in the table.

Output Signal and Configuration

Output is 4 to 20 mA with digital HART communications. For multidrop applications, the mA signal is fixed at 4 mA to provide power to the device. Configurable using the HART Communicator, PC-based Configurator, or optional LCD Indicator with on-board pushbuttons.

Electronics and Sensor Temperatures

Readable from the Communicator or PC-based Configurator. Measurement is transmitter temperature, at the sensor and the electronic module, not necessarily process temperature.

Field Wiring Reversal

No transmitter damage.

Suppressed Zero and Elevated Zero

Suppressed or elevated zero ranges are acceptable as long as the Span and Range Limits are not exceeded (elevated zero applicable to IGP20 only).

Zero and Span Adjustments

Zero and span adjustments can be initiated using the Communicator, a PC-based Configurator, or the optional LCD with on-board pushbuttons.

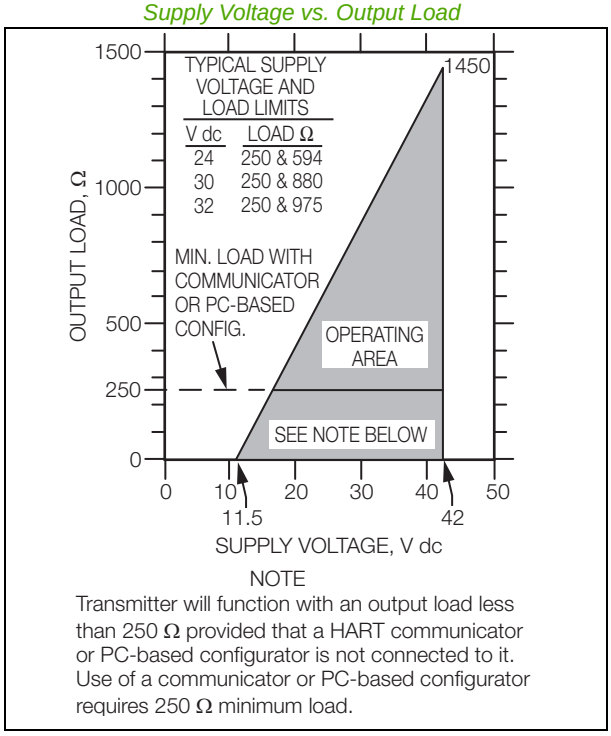
Write Protect Jumper

Can be positioned to lock out all configurators from making transmitter database changes. This makes transmitter suitable for Safety Shutdown System Applications that require this feature.

Supply Voltage Requirements and External Loop Load Limitations

Nominal minimum supply voltage is 11.5 V dc. This value can be reduced to 11 V dc by using a plug-in jumper across the test receptacles in the field wiring compartment terminal block as shown in the Physical Specifications section.

Figure 5. 4 to 20 mA Output, Supply Voltage vs. Output Load



NOTE

Transmitter will function with an output load less than 250 Ω provided that a HART communicator or PC-based configurator is not connected to it. Use of a communicator or PC-based configurator requires 250 Ω minimum load.

Zeroing for Nonzero-Based Ranges

Dual Function Zeroing allows zeroing with the transmitter open to atmosphere, even when there is a nonzero-based range. This greatly simplifies position effect zeroing on many pressure and level applications. It applies to the LCD Indicator pushbuttons and optional External Zero Adjustment.

Adjustable Damping

The transmitter response time is normally 0.75 s, or the electronically adjustable setting of 0.00 (none), 0.25, 0.50, 1, 2, 4, 8, 16, or 32 seconds, whichever is greater, for a 90% recovery from an 80% input step as defined in ANSI/ISA S51.1. (For 63.2% recovery, 0.50 s with sensors B to F, and 0.60 s with sensor A.)

Minimum Allowable Absolute Pressure vs. Transmitter Temperature

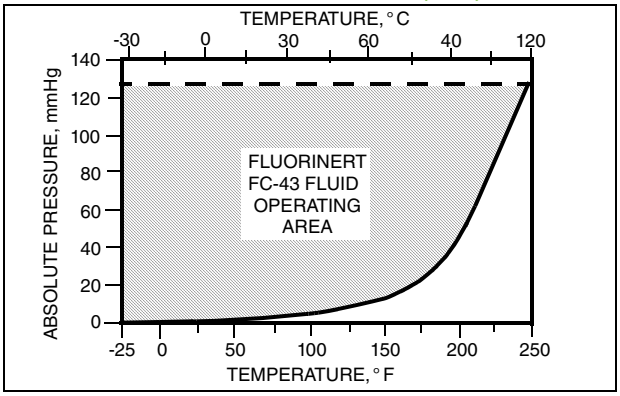
With Silicone Fill Fluid

Full Vacuum: up to 121°C (250°F)

With Inert Fill Fluid

Refer to Figure 6.

Figure 6. Minimum Allowable Absolute Pressure vs. Transmitter Temperature, Inert FC-43, 2.6 cSt at 25°C (77°F)



Current Outputs for Overrange, Fail, and Offline Conditions

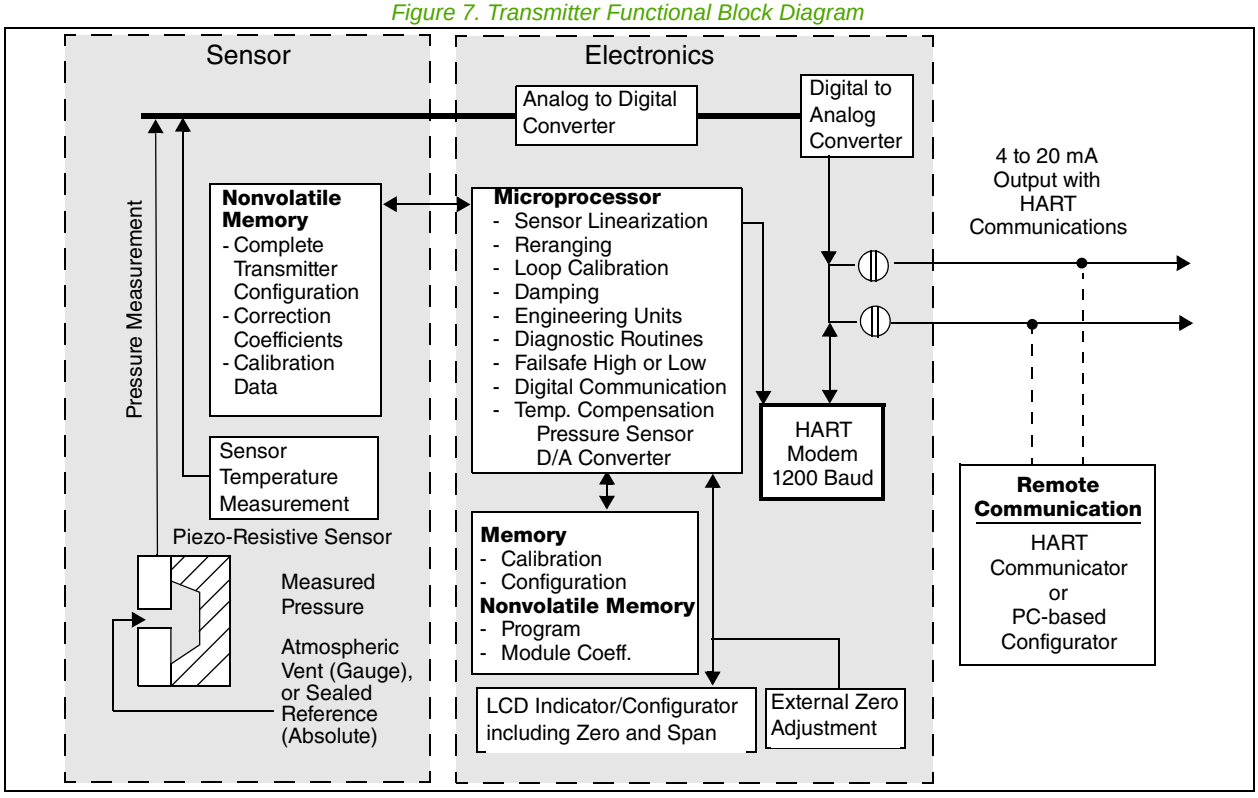
Parameter	Current Outputs
Offline	Configurable between 4 and 20 mA
Sensor Failure	Configurable to Fail LO or Fail HI
Fail LO	3.60 mA
Underrange	3.80 mA
Overrange	20.50 mA
Fail HI	21.00 mA

Configuration and Calibration Data and Electronics Upgradeability

All factory characterization data and user configuration and calibration data are stored in the sensor (refer to Figure 7). This means that the electronics module may be replaced, with one of like type, without the need for reconfiguration or recalibration.

Although module replacement can affect accuracy by a maximum of 0.20% of span, this error can be removed by a mA trim without application of pressure. Changing module types (e.g., from one to another communication protocol) may require reconfiguration and recalibration, as well as a different terminal block, but all factory characterization data is retained.

Figure 7. Transmitter Functional Block Diagram



Configuration Capability

Calibrated Range

- Input range within Range Limits
- See Table 8 for pressure units

Output Measurement #1 – Digital Primary Variable and 4 to 20 mA

- Mode: Linear
- Units: See Table 8 for pressure units

Output Measurement #2 – Digital Secondary Variable

- Mode: Linear
- Units: See Table 8 for pressure units

Communications

Configurable for either Analog or Multidrop (fixed current) Modes. Digital communications is provided in both modes based upon the FSK (Frequency Shift Keying) technique which alternately superimposes one of two different frequencies on the uninterrupted current carried by the two signal/power wires. See Figure 8 and Figure 9.

Analog Mode (4 to 20 mA)

The 4 to 20 mA output signal is updated 30 times per second. Digital communications between the transmitter and HART Communicator is rated for distances up to 3050 m (10,000 ft). The communications rate is 1200 baud and requires a minimum loop load of 250 ohms.

Multidrop Mode (Fixed Current)

This Mode supports communications with up to 15 transmitters on a single pair of signal/power wires. The output signal is updated 4 times per second and carries not only the pressure measurement, but also the sensor and electronics temperatures (internal recalculation rate for temperature is once per second). Communication between transmitter and system, or between transmitter and Communicator or Configurator, is rated for distances up to 1525 m (5000 ft). The communications rate is 1200 baud and requires a minimum loop load of 250 ohms.

Table 8. Allowable Pressure Units for Calibrated Range (a)

inH_2O ftH_2O mmH_2O mH_2O	psi inHg mmHg –	Pa kPa MPa –	atm bar mbar –	g/cm^2 torr –

a. For absolute pressure, change psi to psia and MPa to MPaa, etc.

Figure 8. 4 to 20 mA Output Functional Block Diagram Point-to-Point Communications

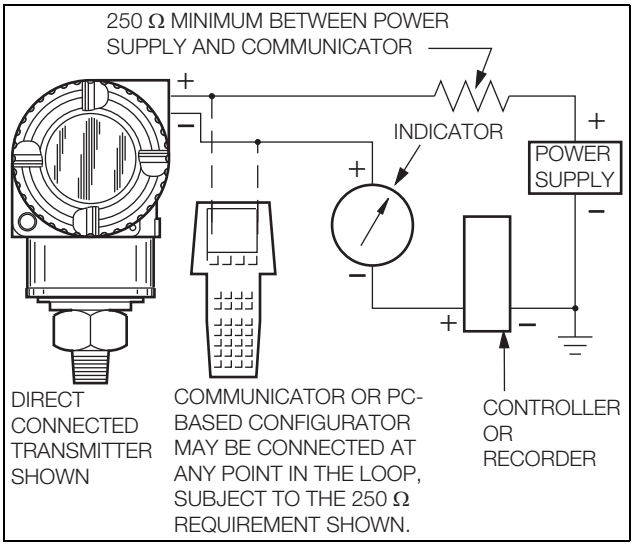
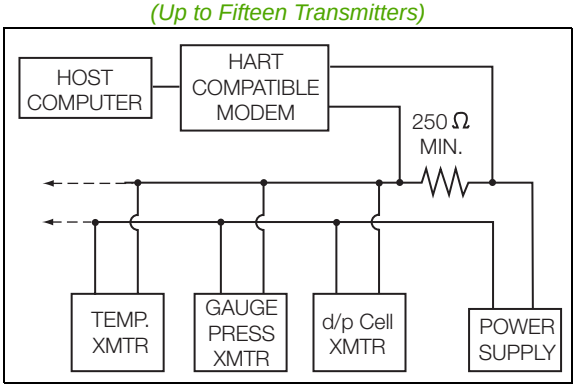


Figure 9. Typical Multidrop Functional Block Diagram (Up to Fifteen Transmitters)



Remote Communications

The HART Communicator or PC-based Configurator has full access to all of the “Display” and “Display and Reconfigure” items listed below. It may be connected to the communications wiring loop, and does not disturb the mA current signal. Plug-in connection points for the communicator are also provided on the transmitter terminal block.

“Display” Items

- Process Measurement in two formats
- Electronics and Sensor Temperatures
- mA Output

“Display and Reconfigure” Items

- Two Digital Outputs for Pressure
- Choice of Pressure Engineering Units
- Reranging without Pressure
- Zero and Span Calibration
- Electronic Damping
- Temperature Sensor Failure Strategy
- Failsafe Direction
- Tag, Descriptor, and Message
- Date of Last Calibration

Optional Custom Configuration (Option -C2)

For the transmitter to be custom configured by the factory, the user must fill out a data form. If this option is not selected, a standard (default) configuration will be provided. Refer to Table 9.

Table 9. Example of Custom Configuration Option -C2

Parameter	Standard (Default) Configuration	Example of Custom Configuration Option -C2
Tagging Info. Tag (8 char. max.) Descriptor (16 char. max.) Message (32 char. max.) HART Poll Address (0 to 15)	 TAG TAG NAME LOCATION 0	 PT101 WATER PRESS. BUILDING 2 0 (a)
Calibrated Range Pressure EGU LRV URV	 per S.O. (b) per S.O. (c) per S.O. (c)	 inH_2O 0 100
Measurement #1 Pressure EGU Output	 per S.O. (d) 4 to 20 mA	 inH_2O 4 to 20 mA (e)
Measurement #2 Pressure EGU	 per S.O. (d)	 inH_2O
Other Electronic Damping Failsafe Direction Failure Strategy Ext. Zero Option	 None Upscale Continue Enabled	 0.5 s Downscale Failsafe Disabled

a. Address is 1 to 15 for multidrop applications.

b. Units from Table 8. If not specified, factory default calibration is zero to maximum span; default units vary by sensor code.

c. Within Span and Range Limits for selected sensor code.

d. Same as Calibrated Range.

e. Fixed current is used for multidrop applications.

NOTE

Any of the configurable parameters in Table 9 can easily be changed using the HART communicator or PC-based configurator.

Optional LCD Indicator with Pushbuttons

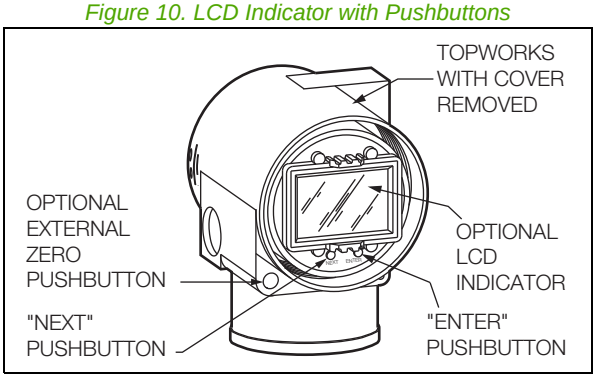
The LCD indicator provides:

- Two Lines: Five numeric characters on top line (four when a minus sign is needed); and seven alphanumeric characters on bottom line.
- Measurement readout: Value displayed on top line, and units label displayed on bottom line.
- Configuration and calibration prompts.

Two pushbuttons provide the following configuration and calibration prompts:

- Zero and Span settings, noninteractive to automatically set output to either 4 mA or 20 mA using the “NEXT” and “ENTER” pushbuttons.
- 4 and 20 mA Jog Settings, allowing the user to easily increment the mA output signal up or down in fine steps to match a value shown on an external calibrator.
- Forward or Reverse Output
- Damping Adjustment
- Enable/Disable Optional External Zero
- Temperature Sensor Failure Strategy
- Failsafe Action (High or Low)
- Units Label (Bottom Line of Display)
- Settable Lower and Upper Range Values for Transmission and Display (Top Line)
- Reranging without Pressure
- Percent (%) Output

Figure 10. LCD Indicator with Pushbuttons



Optional External Zero Adjustment

An external pushbutton mechanism (Figure 10) is isolated from the electronics compartment and magnetically activates an internal reed switch through the housing. This eliminates a potential leak path for moisture or contaminants to get into the electronics compartment. This zero adjustment can be disabled by a configuration adjustment.

OPERATING, STORAGE, AND TRANSPORTATION CONDITIONS

Influence	Reference Operating Conditions	Normal Operating Conditions (a) (b)	Operative Limits (a) (b)	Storage and Transportation Limits
Process Connection Temp. ▸ with Silicone Fill Fluid ▸ with Inert Fill Fluid	 ▸ 24 ± 2°C (75 ± 3°F) ▸ 24 ± 2°C (75 ± 3°F)	 ▸ -29 to + 82°C (-20 to +180°F) ▸ -29 to + 82°C (-20 to +180°F)	 ▸ -46 and +121°C (c) (-50 and +250°F) ▸ -29 and +121°C (-20 and +250°F)	 ▸ Not Applicable ▸ Not Applicable
Electronics Temperature ▸ with LCD Indicator (d)	▸ 24 ± 2°C (75 ± 3°F) ▸ 24 ± 2°C (75 ± 3°F)	▸ -29 to + 82°C (e) (-20 to +180°F) ▸ -20 to + 82°C (e) (-4 to +180°F)	▸ -40 and +85°C (e) (-40 and +185°F) ▸ -29 and +85°C (e) (-20 and +185°F)	▸ -54 and +85°C (-65 and +185°F) ▸ -54 and +85°C (-65 and +185°F)
Relative Humidity (f)	50 ± 10%	0 to 100%	0 and 100%	0 and 100% Noncondensing
Supply Voltage - mA Output	30 ± 0.5 V dc	11.5 to 42 V dc (g)	11.5 and 42 V dc (g)	Not Applicable
Output Load - mA Output	650 Ω	0 to 1450 Ω	0 and 1450 Ω	Not Applicable
Vibration	1 m/s^2 (0.1 “g”)	6.3 mm (0.25 in) Double Amplitude: from 5 to 15 Hz with Aluminum Housing and from 5 to 9 Hz with 316 ss Housing - 0 to 30 m/s^2 (0 to 3 “g”) from 15 to 500 Hz with Aluminum Housing; and 0 to 10 m/s^2 (0 to 1 “g”) from 9 to 500 Hz with 316 ss Housing		11 m/s^2 (1.1 “g”) from 2.5 to 5 Hz (in Shipping Package)
Mounting Position	Upright (h)	Upright (h)	No Limit	Not Applicable

a. Temperature limits are derated as follows for IAP20 and IGP20 Transmitters:
to -7 and +82°C (20 and 180°F) when Structure Codes 78/79 (PVDF inserts) are used, and
to 0 and 60°C (32 and 140°F) when DIN Construction Options D2/D4/D6/D8 are used.

b. Normal Operating Conditions and Operative Limits are defined per ANSI/ISA 51.1-1979 (R1993).

c. Selection of Option -J extends the low temperature operative limit of transmitters with silicone filled sensors down to -50°C (-58°F). Performance is not assured below -29°C. Sensor damage may occur if process is frozen.

d. Although the LCD will not be damaged at any temperature within the “Storage and Transportation Limits”, updates will be slowed and readability decreased at temperatures outside the “Normal Operating Conditions”.

e. Refer to the Electrical Safety Specifications section for a restriction in ambient temperature limits with certain electrical approvals/certifications.

f. With topworks covers on and conduit entrances sealed.

g. 11.5 V dc can be reduced to 11 V dc by using a plug-in shorting bar; see “Physical Specifications” sections.

h. Sensor process wetted diaphragms in a vertical plane for IAP20 and IGP20 Transmitter.

PERFORMACE SPECIFICATIONS

Zero-Based Calibrations; 316L ss or Co-Ni-Cr Diaphragms with Silicone Fluid for IGP10 and IAP10; Cobalt-Nickel-Chromium or 316L Stainless Steel Sensor with Silicone Fluid for IGP20; Under Reference Operating Conditions unless otherwise Specified; URL = Upper Range Limit, and Span = Calibrated Span.

Accuracy (Includes Linearity, Hysteresis, and Repeatability)

Accuracy, % of Span (a) (b)	
Spans ≥10% URL	Spans <10% URL
±0.060%	±[0.025 + 0.0035 (URL/Span)]%

a. Add ±0.04% for Span Code A; ±0.02% for Codes E and F.
b. Subtract ±0.01% for digital output accuracy.

Stability

Long term drift is less than ±0.05% of URL per year over a 5-year period.

Calibration Frequency

The calibration frequency is five years. This frequency is derived using the values of allowable error (% span), TPE (% span), performance margin (% span), and stability (% span/month), where:

$$\text{Calibration Frequency} = \frac{\text{Performance Margin}}{\text{Stability}} = \text{Months}$$

Power-Up Time

Less than 5 seconds for output to reach first valid measurement.

Supply Voltage Effect

The output changes less than 0.005% of span for each 1 V change within the specified supply voltage requirements. See Figure 5.

Position Effect

The transmitter may be mounted in any position. Any zero effect caused by the mounting position can be eliminated by rezeroing. There is no span effect.

RFI Effect

The output error is less than 0.1% of span for radio frequencies in the range of 27 to 1000 MHz and field intensity of 30 V/m when the transmitter is properly installed with shielded conduit and grounding, and housing covers are in place. (Per IEC Std. 61000-4-3.)

Ambient Temperature Effect

Total effect for a 28°C (50°F) change within Normal Operating Condition limits is:

For the IAP10 and IGP10 Transmitters

Span Code (a)	Ambient Temperature Effect
C, D, E, and F	± (0.03% URL + 0.060% Span)

a. Span Code F applicable to IGP10 Transmitter only.

For the IAP20 and IGP20 Transmitters

Span Code	Ambient Temperature Effect
A (a)	± (0.18% URL + 0.025% Span)
B and C	± (0.03% URL + 0.060% Span)
D	± (0.05% URL + 0.045% Span)
E and F (a)	± (0.08% URL + 0.025% Span)

a. Span Codes A and F applicable to IGP20 Transmitter only.

NOTE

For additional ambient temperature effect when pressure seals are used, see PSS 2A-1Z11 A.

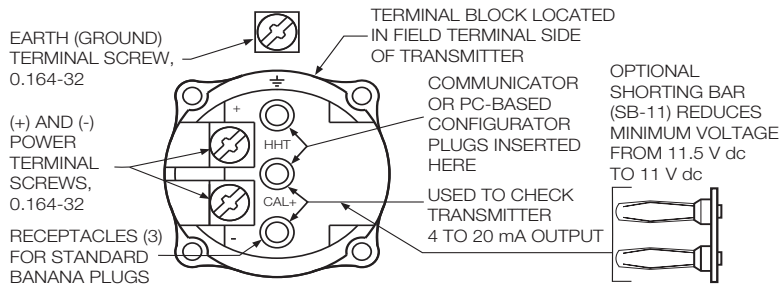
Vibration Effect

Total effect is ±0.2% of URL per “g” for vibrations in the frequency range of 5 to 500 Hz; with double amplitudes of 6.3 mm (0.25 in) in the range of 5 to 15 Hz, or accelerations of 3 “g” in the range of 15 to 500 Hz, whichever is smaller, for transmitters with aluminum housings; and with double amplitudes of 6.3 mm (0.25 in) in the range of 5 to 9 Hz, or accelerations of 1 “g” in the range of 9 to 500 Hz, whichever is smaller, for transmitters with 316 ss housings.

Switching and Indirect Lightning Transients

The transmitter can withstand a transient surge up to 2000 V common mode or 1000 V normal mode without permanent damage. The output shift is less than 1.0%. (Per ANSI/IEEE C62.41-1980 and IEC Std. 61000-4-5.)

PHYSICAL SPECIFICATIONS

Description	Direct Connected Absolute and Gauge Pressure Transmitters IAP10 and IGP10	Bracket Mounted Absolute and Gauge Pressure Transmitters IAP20 and IGP20
Process Wetted Parts Materials (High Pressure Side)		
▸ Process Connection	316L ss or nickel alloy (a)	Carbon Steel, 316 ss, nickel alloy (a), Monel, or PVDF (Kynar)
▸ Gaskets	Not applicable	Glass Filled ptfe (Chemloy), Viton
▸ Sensor Diaphragm	316L ss, Co-Ni-Cr, or nickel alloy (a)	Co-Ni-Cr, 316L ss, Gold-Plated 316L ss, nickel alloy (a), Monel, or Tantalum
Reference Side Materials. (Atmospheric Pressure Side)	IGP10 Transmitter: Silicon, Pyrex, RTV, and 316 ss IAP10 Transmitter: N/A	Sensor Diaphragm: Same as specified for High Pressure side process wetted material. Cover: 316 ss
Sensor Fill Fluid	Silicone or Fluorinert	Silicone or Fluorinert
Bolts and Nuts for Process Cover and Connector	Not applicable	Standard Bolting: ASTM A193, Grade B7 Bolts ASTM A194, Grade 2H Nuts Optional Bolting: 316 ss, Type 17-4 ss, or B7M (NACE)
Electrical Housing and Housing Covers	Two compartments to separate electronics from field connections. Material is low copper (0.6% maximum) die-cast aluminum alloy with epoxy finish, or 316 ss.	
Environmental Protection	The enclosure has the dusttight and weatherproof rating of IP66 as defined by IEC 60529, and provides the environmental and corrosion resistant protection rating of NEMA 4X.	
Electronics Module	Printed wiring assemblies are conformally coated for moisture and dust protection.	
Electrical Connections	1/2 NPT (Code 1) or PG 13.5 (Code 2) entrances on both sides of electronics housing, as specified. Unused entrance must be plugged to ensure moisture and RFI protection (Aluminum or 316 ss plug that is supplied).	
Mounting Position	The transmitter may be mounted in any orientation.	
Approximate Mass (Does not include seals. Refer to PSS 2A-1Z11 A for integral transmitter and seal systems)	Standard Transmitter: 1.5 kg (3.3 lb) With 316 ss Housing: Add 1.1 kg (2.4 lb) With LCD Indicator Option: Add 0.2 kg (0.4 lb)	With Process Connectors: 4.2 kg (9.2 lb) Without Process Connectors: 3.5 kg (7.8 lb) With 316 ss Housing: Add 1.1 kg (2.4 lb) With LCD Indicator Option: Add 0.2 kg (0.4 lb)
Field Terminal Connections		

a. Equivalent to Hastelloy®.

ELECTRICAL SAFETY SPECIFICATIONS

The transmitter has been designed to meet the electrical safety descriptions listed in the tables that follow. Contact Global Customer Support for information or status of testing laboratory approvals or certifications.

NOTES

- See Model Code for availability of Electrical Safety Design Codes with particular Transmitter structures.
- Refer to applicable Instruction Manual for application conditions and connectivity requirements.
- When selecting ATEX Safety Design Code M or P, the user must permanently mark (check off in rectangle block on data plate) one type of protection only (ia and ib, d, or n). Do not change this mark once it has been applied.
- When selecting Safety Design Code W, the user must permanently mark (check off in rectangular block on data plate) intrinsically safe certifications for ATEX, CSA, or FM, as applicable. Do not change this mark once it has been applied.

Electrical Safety Specifications – IAP10 and IGP10 Transmitters

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
ATEX flameproof; II 2 GD EEx d IIC, Zone 1.	Temperature Class T6, T85°C, Ta = -40°C to +80°C.	D
ATEX intrinsically safe; II 1 GD EEx ia IIC, Zone 0.	Temperature Class T4, Ta = -40°C to +80°C.	E
ATEX protection n; II 3 GD, EEx nL IIC, Zone 2.	Temperature Class T4, Ta = -40°C to +80°C.	N
ATEX multiple certifications, ia and ib, and n. Refer to ATEX Codes E and N for details.	Applies to Codes E and N but not to Code D.	M
ATEX multiple certifications, ia and ib, d, and n. Refer to ATEX Codes D, E, and N for details.	Applies to Codes D, E, and N.	P
CSA intrinsically safe for Class I, Division 1, Groups A, B, C, and D, Class II, Division 1, Groups E, F, and G; Class III, Division 1.	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient.	C
CSA explosionproof for Class I, Division 1, Groups B, C, and D, and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Maximum Ambient Temperature 85°C.	C
CSA Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient.	C
CSA field device zone certified flameproof Ex d IIC. Also, all certifications of Code C above.	Maximum Ambient Temperature 85°C.	B
CSA zone certified intrinsically safe Ex ia IIC, and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	B
FM intrinsically safe for Class I, Division 1, Groups A, B, C, and D, Class II, Division 1, Groups E, F, and G; Class III, Division 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F

Electrical Safety Specifications – IAP10 and IGP10 Transmitters (Continued)

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
FM explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F
FM nonincendive Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G, and Class III, Division 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F
FM field device zone certified flameproof AEx d IIC. Also, all certifications of Code F above.	Temperature Class T6 at 75°C maximum ambient.	G
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	G
IECEx intrinsically safe, Ex ia IIC.	Temperature Class T4, Ta = -40°C to +80°C.	T
IECEx protection n, Ex nL IIC.	Temperature Class T4, Ta = -40°C to +80°C.	U
IECEx flameproof, Ex d IIC.	Temperature Class T6, Ta = -40°C to +75°C.	V
Multi-marked for HART as follows: **ATEX** intrinsically safe, II 1 GD, EEx ia IIC, Zone 0. **CSA** intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1; also CSA zone certified intrinsically safe Ex ia IIC. **FM** intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1. Also FM zone certified intrinsically safe AEx ia IIC.	 See application conditions for Code E intrinsically safe applications. See application conditions for Code C intrinsically safe applications. See application conditions for Code F intrinsically safe applications.	W

Electrical Safety Specifications – IAP20 and IGP20 Transmitters

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
ATEX flameproof; II 2 GD EEx d IIC, Zone 1.	Temperature Class T6, T85°C, Ta = -40°C to +80°C.	D
ATEX intrinsically safe; II 1 GD EEx ia IIC, Zone 0.	Temperature Class T4, Ta = -40°C to +80°C.	E
ATEX protection n; II 3 GD, EEx nL IIC, Zone 2.	Temperature Class T4, Ta = -40°C to +80°C.	N
ATEX multiple certifications, ia and ib, and n. Refer to ATEX Codes E and N for details.	Applies to Codes D, E, and N.	M
CSA intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1.	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient.	C

Electrical Safety Specifications – IAP20 and IGP20 Transmitters (Continued)

Testing Laboratory, Types of Protection, and Area Classification	Application Conditions	Electrical Safety Design Code
CSA explosionproof for Class I, Division 1, Groups B, C, and D, and dust-ignitionproof for Class II, Division 1, Groups E, F, and G; and Class III, Division 1.	Maximum Ambient Temperature 85°C.	C
CSA Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T4A at 40°C and T3C at 85°C maximum ambient.	C
CSA field device zone certified flameproof Ex d IIC. Also, all certifications of Code C above.	Maximum Ambient Temperature 85°C.	B
CSA zone certified intrinsically safe Ex ia IIC, and energy limited Ex nA II.	Temperature Class T4 at 40°C and T3 at 85°C maximum ambient.	B
FM intrinsically safe for Class I, Division 1, Groups A, B, C, and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F
FM explosionproof for Class I, Division 1, Groups B, C, and D; and dust-ignitionproof for Class II, Division 1, Groups E, F, and G, and Class III, Division 1.	Temperature Class T6 at 80°C and T5 at 85°C maximum ambient.	F
FM nonincendive Class I, Division 2, Groups A, B, C, and D; Class II, Division 2, Groups F and G; and Class III, Division 2.	Temperature Class T4A at 40°C and T4 at 85°C maximum ambient.	F
FM field device zone certified flameproof AEx d IIC. Also, all certifications of Code F above.	Temperature Class T6 at 75°C maximum ambient.	G
FM zone certified intrinsically safe AEx ia IIC.	Temperature Class T4 at 85°C maximum ambient.	G
IECEx intrinsically safe, Ex ia IIC.	Temperature Class T4, Ta = -40°C to +80°C.	T
IECEx protection n, Ex nL IIC.	Temperature Class T4, Ta = -40°C to +80°C.	U
IECEx flameproof, Ex d IIC.	Applies to Version 5 electronic module. T6, Ta = 80°C; T5, Ta = 85°C Ambient Temperature -20°C to +85°C.	V
Multi-marked for HART as follows: **ATEX** intrinsically safe, II 1 GD, EEx ia IIC, Zone 0. **CSA** intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1; also CSA zone certified intrinsically safe Ex ia IIC. **FM** intrinsically safe, Cl. I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1. Also FM zone certified intrinsically safe AEx ia IIC.	 See application conditions for Code E intrinsically safe applications. See application conditions for Code C intrinsically safe applications. See application conditions for Code F intrinsically safe applications.	W

MODEL CODE – IAP10 AND IGP10 TRANSMITTERS

Description				Model
I/A Series, Electronic, Direct Connected Absolute Pressure Transmitter				IAP10 (a)
I/A Series, Electronic, Direct Connected Gauge Pressure Transmitter				IGP10 (a)
Electronics Versions and Output Signal				
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)				-T
Structure Code - Select from one of the following six groups:				
1. Transmitter Only (no seals)				
Process Connection	**Sensor**	**Sensor Fill Fluid**	**Connection Type**	
316L ss	Co-Ni-Cr	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	20
316L ss	Co-Ni-Cr	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	21
316L ss	316L ss	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	22
316L ss	316L ss	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	23
316L ss	Nickel alloy (b)	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	30
316L ss	Nickel alloy (b)	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	31
2. Transmitter Prepared for Foxboro Model Coded Seals (c)				
Transmitter Prepared for Foxboro Direct Connect Seal; Silicone Fill in Sensor (d)				D1
Transmitter Prepared for Foxboro Direct Connect Seal; Inert Fill in Sensor (IGP10 only) (d)				D2
Transmitter Prepared for Foxboro Remote Mount Seal; Silicone Fill in Sensor (e)				S3
Transmitter Prepared for Foxboro Remote Mount Seal; Inert Fill in Sensor (IGP10 only) (e)				S4
3. Transmitters Prepared for non-Foxboro Seals				
Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (f)				SC
Transmitter Prepared for Remote Seal; Inert Fill in Sensor (g)				SD
4. Flameproof Transmitter Only (no seals)				
Process Connection	**Sensor**	**Sensor Fill Fluid**	**Connection Type**	
316L ss	316L ss	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	52
316L ss	316L ss	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	53
316L ss	Nickel alloy (b)	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	60
316L ss	Nickel alloy (b)	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	61
Nickel alloy (b)	Nickel alloy (b)	Silicone	1/2 NPT External Thread, 1/4 NPT Internal Thread	62
Nickel alloy (b)	Nickel alloy (b)	Inert	1/2 NPT External Thread, 1/4 NPT Internal Thread	63
5. Flameproof Transmitter Prepared for Foxboro Model Coded Seals (c)				
Flameproof Transmitter Prepared for Direct Connect Seal; Silicone Fill in Sensor (d)				D5
Flameproof Transmitter Prepared for Direct Connect Seal; Inert Fill in Sensor (IGP10 only) (d)				D6
Flameproof Transmitter Prepared for Remote Mount Seal; Silicone Fill in Sensor (e)				S5
Flameproof Transmitter Prepared for Remote Mount Seal; Inert Fill in Sensor (IGP10 only) (e)				S6
6. Flameproof Transmitter Prepared for non-Foxboro Seals				
Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (f)				SH
Flameproof Transmitter Prepared for Remote Seal; Inert Fill in Sensor (g)				SJ
Span Limits - Absolute or Gauge Pressure Units, as Applicable				
MPa	**psi**	**bar**		
0.007 and 0.21	1 and 30	0.07 and 2.1		C
0.07 and 2.1	10 and 300	0.7 and 21		D
0.7 and 21	100 and 3000	7 and 210		E
14 and 42	2000 and 6000	140 and 420 (IGP10 only)		F

MODEL CODE – IAP10 AND IGP10 TRANSMITTERS (CONTINUED)

Description	Model
Conduit Connection and Housing Material	
1/2 NPT Conduit Connection, Aluminum Housing	1
PG 13.5 Conduit Connection, Aluminum Housing (With Electrical Safety Codes E, D, M, N, and P only)	2
1/2 NPT Conduit Connection, 316 ss Housing	3
PG 13.5 Conduit Connection, 316 ss Housing (With Electrical Safety Codes E, D, M, N, and P only)	4
M20 Conduit Connection, Both Sides, Aluminum Housing (Electrical Safety Codes E, D, M, N, and P only)	5
M20 Conduit Connection, Both Sides, 316 ss Housing (Electrical Safety Codes E, D, M, N, and P only)	6
Electrical Safety (Also See Electrical Safety Specifications Section)	
ATEX II 1 GD, EEx ia IIC, Zone 0	E
ATEX II 2 GD, EEx d IIC, Zone 1 (h) (i)	D
ATEX II 3 GD, EEx nL IIC, Zone 2	N
ATEX Multiple Certifications (includes ATEX Codes E and N) (See Electrical Safety Specifications section for user marking)	M
ATEX Multiple Certifications (includes ATEX Codes E, D, and N) (h) (i) (See Electrical Safety Specifications section for user marking)	P
CSA Certifications: (j) Division 1 intrinsically safe, explosionproof, dust-ignitionproof Zone certified Ex ia IIC and energy limited Ex nA II Division 2, Classes I, II, and III	C
CSA zone certified flameproof Ex d IIC; also all certifications of Code C above (h) (i)	B
FM Approvals: (j) Division 1 intrinsically safe, explosionproof, dust-ignitionproof Zone approved AEx ia IIC Division 2 nonincendive, Classes I, II, and III	F
FM approved flameproof AEx d IIC; also all approvals of Code F above (h) (i)	G
IECEx intrinsically safe, Ex ia IIC	T
IECEx protection n, Ex nL IIC	U
IECEx flameproof, Ex d IIC (h) (i)	V
Multi-marked for ATEX, CSA, and FM Intrinsically Safe Applications only (k)	W
Optional Selections	
Mounting Bracket Set (l)	
Painted Steel Bracket with Plated Steel Bolts, 1/2 NPT (with Conduit Connection Codes 1 and 3 only)	-M1
Stainless Steel Bracket with Stainless Steel Bolts, 1/2 NPT (with Conduit Connection Codes 1 and 3 only)	-M2
Painted Steel Bracket with Plated Steel Bolts, PG 13.5 (with Conduit Connection Codes 2 and 4 only)	-M3
Stainless Steel Bracket with Stainless Steel Bolts, PG 13.5 (with Conduit Connection Codes 2 and 4 only)	-M4
Painted Steel Bracket with Plated Steel Bolts, M20 (with Conduit Connection Codes 5 and 6 only)	-M5
Stainless Steel Bracket with Stainless Steel Bolts, M20 (with Conduit Connection Codes 5 and 6 only)	-M6
Digital Indicator with Pushbuttons	
Digital Indicator, Pushbuttons, and Window Cover	-L1
Vent Screw and Block & Bleed Valve	
316 ss Vent Screw in Process Connection (Not with Structure Codes 32 or 33, or Pressure Seals)	-V1
Block and Bleed Valve, Carbon Steel (Not with Pressure Seals)	-V2
Block and Bleed Valve, 316 ss (Not with Pressure Seals)	-V3
Block and Bleed Valve, 316 ss w/Monel Trim (Not with Pressure Seals)	-V4
Conduit Thread Adapters	
Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3 only (m)	-A1
Plastic PG 13.5 Cable Gland for use with Conduit Connection Codes 2 and 4 only (n)	-A2
M20 Connector for use with Conduit Connection Codes 1 and 3 only (m)	-A3
Brass PG 13.5 Cable Gland (Trumpet-Shaped) for use with Conduit Connection Codes 2 and 4 only (n)	-A4

MODEL CODE – IAP10 AND IGP10 TRANSMITTERS (CONTINUED)

Description	Model
Electronics Housing Features	
External Zero Adjustment	-Z1
Custody Transfer Lock and Seal	-Z2
External Zero Adjustment and Custody Transfer Lock and Seal	-Z3
Custom Factory Configuration	
Full Factory Configuration (Requires Configuration Form to be filled out)	-C2
Cleaning and Preparation	
Unit Degreased - for Silicone Filled Sensors Only (Not for Oxygen/Chlorine Service, Option -V1, or Pressure Seals)	-X1
Cleaned and Prepared for Oxygen Service - for Inert Filled Sensors Only (Not with Option -V1 or Pressure Seals)	-X2
Cleaned and Prepared for Chlorine Service - with Structure Code 33 Only (Not with Option -V1 or Pressure Seals)	-X3
SIL2 Transmitters	
SIL2-Certified HART Transmitter	-S2
Instruction Books (Common MI, Brochure, and Full Documentation Set on DVD is Standard)	
Without Instruction Book and DVD - Only “Getting Started” Brochure is supplied	-K1
Miscellaneous Optional Selections	
G 1/2 B Manometer Process Connection (Not Available with Option -V1 or Pressure Seals)	-G
Low Temperature Operative Limit of Electronics Housing Extended Down to -50°C (-58°F) (o) Not available with sensors and seals with Inert fill; Structure Codes 78 and 79; or DIN Options -D2, -D4, -D6, and -D8 (p)	-J
R 1/2 Process Connection (1/2 NPT to R 1/2 Adapter) (q)	-R
Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)	-T

a. Refer to PSS 2A-1C13 F for very high GP versions with upper range limits of 52, 105, and 210 MPa (7500, 15000, and 30000 psi). Refer to PSS 2A-1C13 K and PSS 2A-1C13 L for AP and GP versions for sanitary and pulp/paper industries, respectively.

b. Equivalent to Hastelloy®.

c. Both transmitter and pressure seal Model Numbers are required. Refer to PSS 2A-1Z11 A for pressure seal Model Codes.

d. Direct Connect Seal Models that may be specified are PSTAD, PSFAD, and PSISD.

e. Remote Mount Seal Models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.

f. For transmitters with Silicone fill prepared for remote seal by others, specify Structure Code 22 or 52.

g. For transmitters with Inert fill prepared for remote seal by others, specify Structure Code 23 or 53.

h. Electrical Safety Codes B, D, G, V, and P are only available with flameproof transmitter Structure Codes 52, 53, 60, 61, 62, 63, D5, D6, S5, S6, SH, and SJ.

i. A cover lock is provided as standard with Electrical Safety Codes B, D, G, V, and P.

j. Electrical Safety Codes C and F are not available with flameproof transmitter Structure Codes 52, 53, 60, 61, 62, 63, D5, D6, S5, S6, SH, and SJ.

k. For multi-marking details, see Electrical Safety Specifications section.

l. Mounting sets not offered with direct mounted seals, except if a direct mounted PSTAD threaded seal with a 1/4 NPT process connection is used, then a mounting set is recommended.

m. Available with Electrical Safety Codes E, D, M, N, and P only.

n. Available with Electrical Safety Codes E only.

o. -50°C indicates sensor and electronics ambient temperature capabilities. Performance is not assured below -29°C. Sensor damage may occur if process is frozen.

p. Not available with Inert fill in sensor or seal.

q. Not available with pressure seals, or nickel alloy sensors.

MODEL CODE – IAP20 AND IGP20 TRANSMITTERS

Description			Model
I/A Series, Electronic, Bracket-Mounted Absolute Pressure Transmitter			IAP20
I/A Series, Electronic, Bracket-Mounted Gauge Pressure Transmitter			IGP20
Electronics Versions and Output Signal			
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)			-T
Structure Code - Select from one of the following three groups:			
1. Transmitter			
Hi-Side Cover	**Sensor**	**Fill Fluid**	
Steel	Co-Ni-Cr	Silicone	10
Steel	Co-Ni-Cr	Inert	11
Steel	316L ss	Silicone	12
Steel	316L ss	Inert	13
Steel	Nickel alloy (a)	Silicone	16
Steel	Nickel alloy (a)	Inert	17
316 ss	Co-Ni-Cr	Silicone	20
316 ss	Co-Ni-Cr	Inert	21
316 ss	316L ss	Silicone	22
316 ss	316L ss	Inert	23
316 ss	316L ss, Gold Plated	Silicone	2G
316 ss	Monel	Silicone	24
316 ss	Monel	Inert	25
316 ss	Nickel alloy (a)	Silicone	26
316 ss	Nickel alloy (a)	Inert	27
Monel	Monel	Silicone	34
Monel	Monel	Inert	35
Nickel alloy (a)	Nickel alloy (a)	Silicone	46
Nickel alloy (a)	Nickel alloy (a)	Inert	47
Nickel alloy (a)	Tantalum	Silicone	48
Nickel alloy (a)	Tantalum	Inert	49
2. Transmitter Prepared for Foxboro Model Coded Seals (b)			
Transmitter Prepared for Remote Seal on HI Side; Silicone fill in sensor			S3 (c)
Transmitter Prepared for Remote Seal on HI Side; Inert fill in sensor (IGP20 only)			S4 (c)
Transmitter Prepared for PSFLT, PSSCT, or PSSST Seal, HI Side; Silicone fill in sensor (IGP20 only)			F1
Transmitter Prepared for PSFLT, PSSCT, or PSSST Seal, HI Side; Inert fill in sensor (IGP20 only)			F2
3. Transmitter Prepared for non-Foxboro Seals			
Transmitter Prepared for Remote Seal; Silicone Fill in Sensor			SC
Transmitter Prepared for Remote Seal; Inert Fill in Sensor			SD
Span Limits (Absolute or Gauge Pressure Units)			
kPa	**inH_2O**	**mbar**	
0.12 and 7.5	0.5 and 30	1.2 and 75 (IGP20 only)	A (d)
0.87 and 50	3.5 and 200	8.7 and 500	B
MPa	**psi**	**bar**	
0.007 and 0.21	1 and 30	0.07 and 2.1	C
0.07 and 2.1	10 and 300	0.7 and 21	D
0.7 and 21	100 and 3000	7 and 210	E (e)
1.38 and 35	200 and 5000	13.8 and 350 (IGP20 only)	F (e)

MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)

Description	Model
Process Connector Type (Material Same as Process Cover Material)	
None; connect directly to process cover (not available with Structure Codes 78 and 79)	0
1/4 NPT (not available with Structure Codes 46, 47, 48, 49, 78, 79)	1
1/2 NPT (not available with Structure Codes 78, 79)	2
Rc 1/4 (not available with Structure Codes 46, 47, 48, 49, 78, 79)	3
Rc 1/2 (not available with Structure Codes 78, 79)	4
1/2 Schedule 80 Welding Neck (not available with Structure Codes 46, 47, 48, 49, 78, 79)	6
None; PVDF (Kynar) insert tapped for 1/2 NPT on side of 316 ss Process Cover (only with Codes 78/79)	7
Conduit Connection and Housing Material	
1/2 NPT Conduit Connection, Aluminum Housing	1
PG 13.5 Conduit Connection, Aluminum Housing (With Electrical Safety Codes E, D, M, and N only)	2
1/2 NPT Conduit Connection, 316 ss Housing	3
PG 13.5 Conduit Connection, 316 ss Housing (With Electrical Safety Codes E, D, M, and N only)	4
M20 Conduit Connection, Both Sides, Aluminum Housing	5
M20 Conduit Connection, Both Sides, 316 ss Housing	6
Electrical Safety (Also see Electrical Safety Specifications section)	
ATEX II 1 GD, EEx ia IIC, Zone 0	E
ATEX II 2 GD, EEx d IIC, Zone 1 (f)	D
ATEX II 3 GD, EEx nL IIC, Zone 2	N
ATEX Multiple Certifications (includes ATEX Codes E, D, and N) (f) (See Electrical Safety Specifications section for user marking)	M
CSA Certifications: Division 1 intrinsically safe, explosionproof, dust-ignitionproof Zone certified Ex ia IIC and energy limited Ex nA II Division 2, Classes I, II, and III	C
CSA zone certified flameproof Ex d IIC; also all certifications of Code C above (g)	B
FM Approvals: Division 1 intrinsically safe, explosionproof, dust-ignitionproof Zone approved AEx ia IIC Division 2 nonincendive, Classes I, II, and III	F
FM approved flameproof AEx d IIC; also all approvals of Code F above (g)	G
IECEx intrinsically safe, Ex ia IIC	T
IECEx protection n, Ex nL IIC	U
IECEx flameproof, Ex d IIC	V
Multi-marked for ATEX, CSA, and FM Intrinsically Safe Applications only (h)	W
Optional Selections	
Mounting Bracket Set - Not available with Direct Connect Seals, Structure Codes F1 and F2	
Standard Style Painted Steel Bracket with Plated Steel Bolts	-M1
Standard Style Stainless Steel Bracket with Stainless Steel Bolts	-M2
Universal Style Stainless Steel Bracket with Stainless Steel Bolts	-M3
Digital Indicator with Pushbuttons	
Digital Indicator, Pushbuttons, and Window Cover	-L1

MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)

Description				Model
Process Cover Type	**Cover Screw Material**	**Cover Screw Size**	**Connector Screw Material**	
Single Ended (i)	Steel	M10 (by User)	N/A	-D1
Double Ended (i) (j) (Blind Kidney Flange on back)	Steel	M10	Steel	-D2
Single Ended	Steel	7/16 (by User)	N/A	-D3
Double Ended (i) (j) (Blind Kidney Flange on back)	Steel	7/16	Steel	-D4
Single Ended (i)	316 ss	7/16 (by User)	N/A	-D5
Double Ended (i) (j) (Blind Kidney Flange on back)	316 ss	7/16	316 ss	-D6
Single Ended	17-4 ss	7/16 (by User)	N/A	-D7
Double Ended (i) (j) (Blind Kidney Flange on back)	17-4 ss	7/16	17-4 ss	-D8
Cleaning and Preparation - Not Available with Gold-Plated Sensor, Structure 2G (g)				
Unit Degreased - for Silicone Filled Sensors Only (Not for Oxygen/Chlorine/Other Fluids that may react with Silicone)				-X1
Cleaned and Prepared for Oxygen Service - for Inert Filled Sensors Only (Not available with Carbon Steel Covers or with Silicone Filled Sensors)				-X2
Cleaned and Prepared for Chlorine Service - for Inert Filled Sensors Only (k) (Not available with Carbon Steel Covers or with Silicone Filled Sensors)				-X3
Bolting for Process Covers/Connectors (l)				
316 ss Bolts and Nuts (Pressure Derated) (i)				-B1
17-4 ss Bolts and Nuts (k)				-B2
B7M Bolts and Nuts (NACE)(Pressure Derated) (i)				-B3
Conduit Thread Adapters				
Hawke-Type 1/2 NPT Cable Gland for use with Conduit Connection Codes 1 and 3 (m)				-A1
Plastic PG 13.5 Cable Gland for use with Conduit Connection Codes 2 and 4 (n)				-A2
M20 Connector for use with Conduit Connection Codes 1 and 3 (m)				-A3
Brass PG 13.5 Cable Gland (Trumpet-Shaped) for use with Conduit Connection Codes 2 and 4 (m)				-A4
Electronics Housing Features				
External Zero Adjustment				-Z1
Custody Transfer Lock and Seal				-Z2
External Zero Adjustment and Custody Transfer Lock and Seal				-Z3
Custom Factory Configuration				
Full Factory Configuration (Requires Configuration Form to be filled out)				-C2
Tubing Connectors - Specify Only One (Only 316 ss process covers; no side vents on cover) (g)				
Steel, Connecting 6 mm Tubing to 1/4 NPT Process Connector				-E1
Steel, Connecting 12 mm Tubing to 1/2 NPT Process Connector				-E2
316 ss, Connecting 6 mm Tubing to 1/4 NPT Process Connector				-E3
316 ss, Connecting 12 mm Tubing to 1/2 NPT Process Connector				-E4
Gaskets				
Gasket for Vacuum Service with Pressure Seals (o)				-G1
SIL2 Transmitters				
SIL2-Certified Transmitter				-S2

MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)

Description	Model
Instruction Books (Common MI, Brochure, and Full Documentation Set on DVD is Standard)	
Without Instruction Book and DVD - Only "Getting Started" Brochure is supplied	-K1
Miscellaneous Optional Selections	
Low Temperature Operative Limit of Electronics Housing Extended Down to -50°C (-58°F) (p) Not available with sensors and seals with Inert fill, Structure Codes 78 and 79, or DIN Options -D2, -D4, -D6, and -D8	-J
Vent Screw in side of Process Cover (with 316 ss process covers only) Not available with seals, DIN construction options, or Structure Codes 78 and 79	-V (g)
Supplemental Customer Tag (Stainless Steel Tag wired onto Transmitter)	-T
Examples: IGP20-T20B21F-M1Z2; IAP20-TS3C11F-T	

a. Equivalent to Hastelloy®.
b. Transmitter and Pressure Seal Model Codes are both required. See PSS 2A-1Z11 A for the various pressure seal model codes.
c. Remote Seal Models that may be specified are PSFPS, PSFES, PSFAR, PSTAR, PSISR, PSSCR, and PSSSR.
d. Span Limit Code A is not available with pressure seals (Structure Codes F1, F2, S3, S4, SC, SD).
e. Span Limit Codes E and F not available with Structure Codes 78 and 79 (PVDF insert in HI Side Cover).
f. A cover lock is provided as standard with Electrical Safety Codes D, B, G, and M.
g. Not available when Remote Mount or Direct Connect Pressure Seals are specified.
h. For multi-marking details, see Electrical Safety Specifications section.
i. Pressure derated. See derating table in specifications section.
j. Temperature limits derated to 0 and 60°C (32 and 140°F). Also Mounting Sets -M1 and -M2 not available.
k. When -X3 is specified, the standard bolting is replaced with 17-4 ss bolts and nuts. Therefore, there is no need to specify Option -B2 when selecting the Chlorine Service Option -X3.
l. Not available with DIN construction options. For stainless steel bolts with DIN construction, specify -D5 to -D8, as required.
m. Available with Electrical Safety Codes E, D, M, and N only.
n. Available with Electrical Safety Code E only.
o. Standard offering with IAP20 Transmitters with pressure seals. However, -G1 is a required option with IGP20 Transmitters when pressure seal (Structure Codes S3, S4, F1, F2, SC, and SD) will be used in vacuum applications. This option substitutes vacuum service metal gasket for standard ptfe process cover gasket.
p. -50°C indicates sensor and electronics ambient temperature capabilities. Performance is not assured below -29°C. Sensor damage may occur if process is frozen.

SUGGESTED RFQ SPECIFICATIONS

The manufacturer shall provide direct connected or bracket mounted pressure transmitters featuring remote digital communications capability for measuring absolute or gauge pressure and transmitting a 4 to 20 mA output with a superimposed HART digital signal for use in a standard two-wire dc supply voltage system. These transmitters shall also be provided (as required) with direct connect pressure seals, or remote mount capillary connected pressure seals. The specifications for these transmitters are as follows:

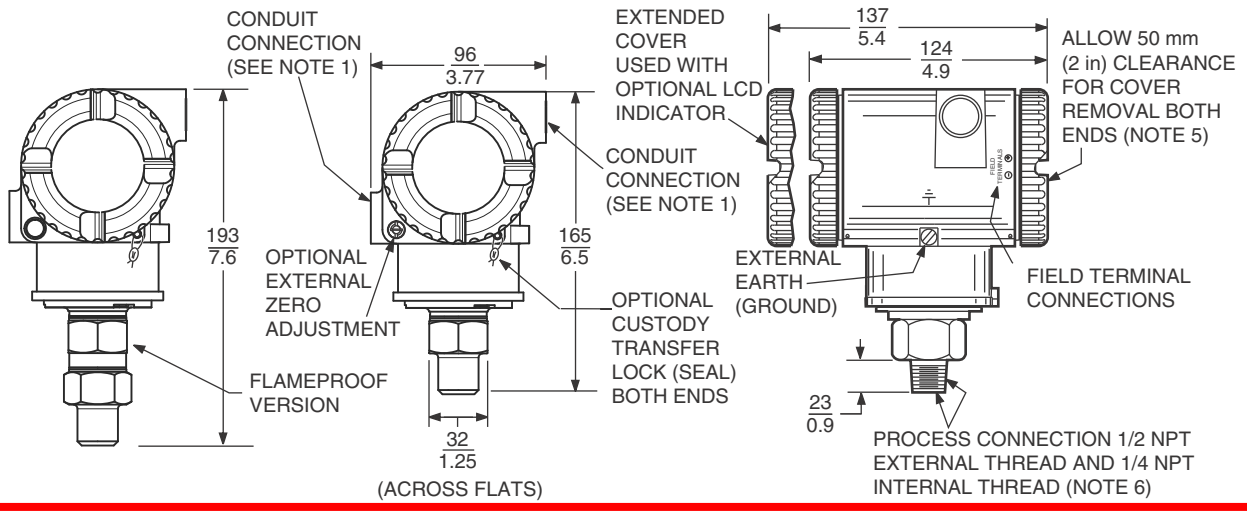
Communication Protocol:	HART, 4 to 20 mA dc, and digital output signal.
Remote Communications:	Must not interfere with output.
Accuracy:	Digital Output: ±0.050% of calibrated span. 4 to 20 mA Output: ±0.060% of calibrated span.
RFI Protection:	0.1% error between 27 and 1000 MHz at 30 V/m field intensity
Proof Pressure:	120, 1200, 11 500, or 22 000 psi for direct connected transmitters; 27 250 psi for bracket mounted transmitters, as specified.
Span Limits:	From 1 to 6000 psi for standard direct connected transmitters; and from 0.5 inH_2O to 5000 psi for standard bracket mounted transmitters, as specified; or SI and Metric equivalents.
Electronics Housing:	IEC IP66 (NEMA 4X); 316 ss or aluminum housing with Epoxy finish; two compartments (field wiring and electronics); housing sealed with O-rings for double protection against moisture or other contaminants.
Modular Electronics:	Easily replaceable modular electronics; optional integral LCD Digital Indicator with on-board configuration pushbuttons.
Mounting:	Direct to process or bracket mounted to pipe or surface.
Process Connection:	**IAP10/IGP10 Transmitters:** Direct to process piping or pressure seal with 1/2 NPT; optional Rc 1/2 or G 1/2 B external threads to process piping. Internal 1/4 NPT thread also provided as plumbing connection to process, or prepared for a direct connect seal or capillary connected seal. **IAP20/IGP20 Transmitters:** Used with process connectors to accept 1/4 NPT, 1/2 NPT, Rc 1/4, Rc 1/2, Schedule 80 welding neck; or a PVDF insert (tapped for 1/2 NPT) in HI side process cover is used as process connection. Process connection can also be prepared to accept a direct connect seal, or prepared for a remote capillary connected seal.
Process Cover Materials Available:	Applicable to IAP20/IGP20 transmitters only. Industry Standard 316 ss, Carbon Steel, Monel, and nickel alloy (a).
Sensor Materials:	Co-Ni-Cr, 316L ss, and nickel alloy (a) for IAP10/IGP10 transmitters; and Co-Ni-Cr, 316L ss, nickel alloy (a), Monel, Tantalum, and Gold-Plated 316L ss for IAP20/IGP20 transmitters.
Electrical Classification:	Nonincendive for Class I and Class II, Division 2 locations; intrinsically safe or explosionproof for Class I and Class II, Division 1 locations. Versions available to meet Agency flameproof and zone requirements; comply with applicable European Union Directives.
Approximate Mass:	Direct Connected Transmitter: 1.5 kg (3.3 lb) Bracket-Mounted Transmitter: 3.5 kg (7.8 lb) without process connector 4.2 kg (9.2 lb) with process connector With 316 ss Electronics Housing: Add 1.1 kg (2.4 lb) With Optional LCD Indicator: Add 0.2 kg (0.4 lb) With Pressure Seals: See PSS 2A-1Z11 A
Model Code:	I/A Series IGP10 or IAP10 Direct Connected Gauge or Absolute Pressure Transmitters; or IGP20 or IAP20 Bracket Mounted Gauge or Absolute Pressure Transmitters; all with HART Communication Protocol; with or without pressure seals; or equivalent.

a. Equivalent to Hastelloy®.

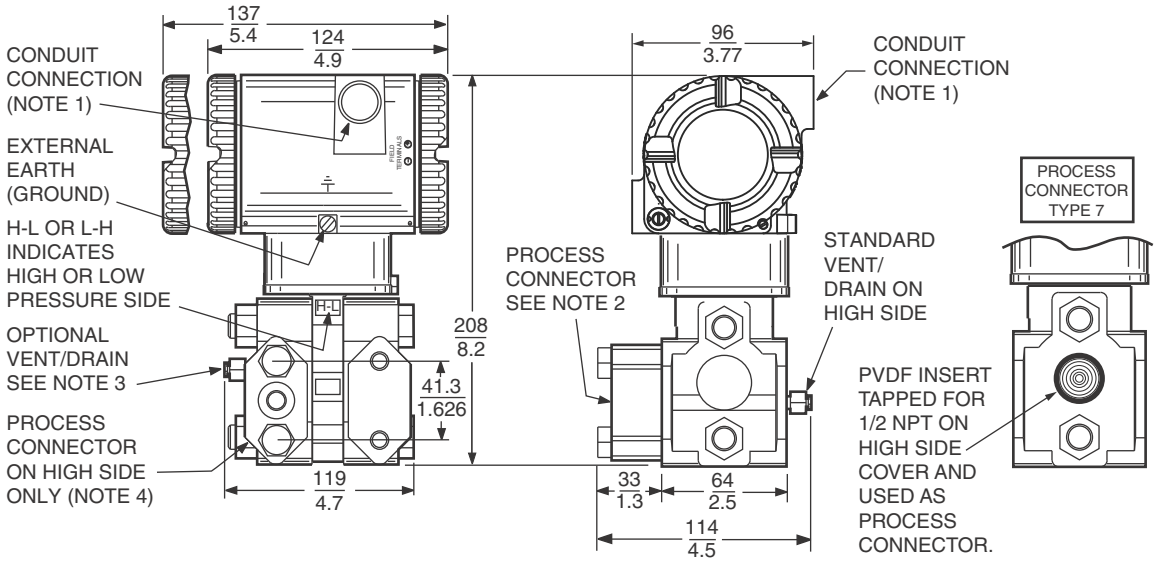
DIMENSIONS – NOMINAL

IAP10 AND IGP10 DIRECT CONNECTED TRANSMITTERS

mm / in



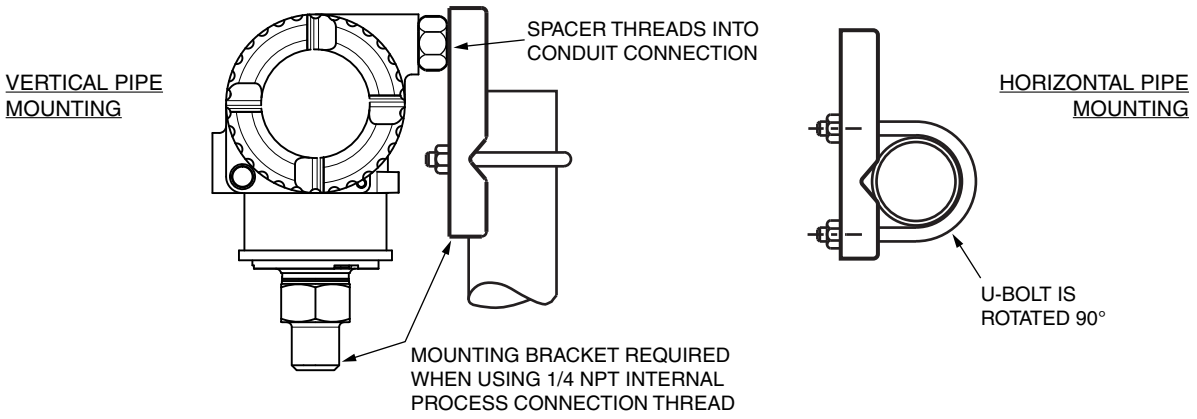
IAP20 AND IGP20 BRACKET MOUNTED TRANSMITTERS



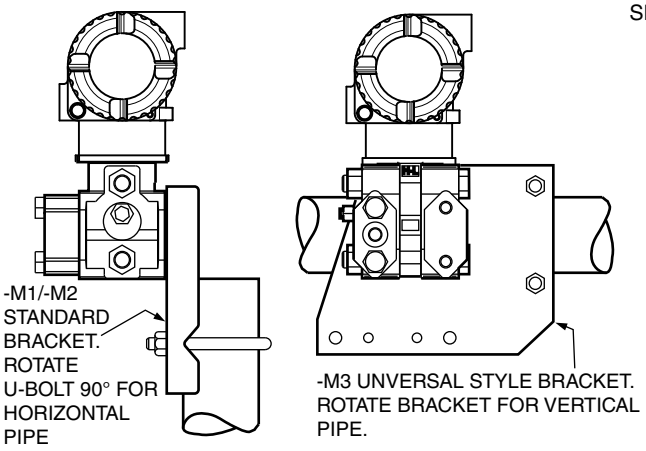
NOTES

1. CONDUIT CONNECTION 1/2 NPT, PG 13.5, OR M20, BOTH SIDES : PLUG UNUSED CONNECTION WITH METAL PLUG (SUPPLIED).
2. PROCESS CONNECTOR CAN BE REMOVED AND CONNECTION MADE DIRECTLY TO PROCESS COVER USING 1/4 NPT INTERNAL THREAD IN PROCESS COVER. NOTE THAT WITH PROCESS CONNECTION CODE "0", THERE IS NO CONNECTOR.
3. PROCESS COVER CAN BE INVERTED MAKING OPTIONAL SIDE VENT A SIDE DRAIN.
4. FOR USERS WHO DESIRE THE PROCESS CONNECTOR ON THE RIGHT SIDE, MERELY ROTATE TRANSMITTER 180° AND RELOCATE PROCESS CONNECTOR SHOWN TO THE RIGHT SIDE.
5. TOPWORKS ROTATABLE TO ANY POSITION WITHIN ONE TURN COUNTERCLOCKWISE OF FULLY TIGHTENED POSITION.
6. DO NOT USE THE 1/4 NPT INTERNAL THREAD TO DIRECT-CONNECT THE TRANSMITTER.

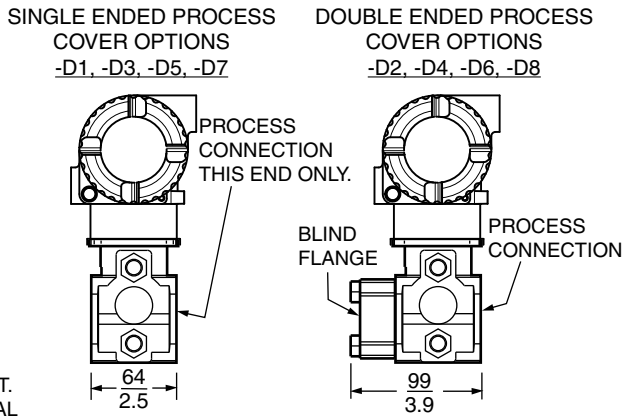
IAP10/IGP10 WITH OPTIONS -M1 TO -M6



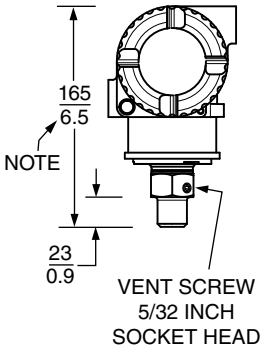
IAP20/IGP20 WITH OPTIONS -M1, -M2, AND -M3



IAP20/IGP20 WITH DIN CONSTRUCTION OPTIONS



IAP10/IGP10 OPTION -V1



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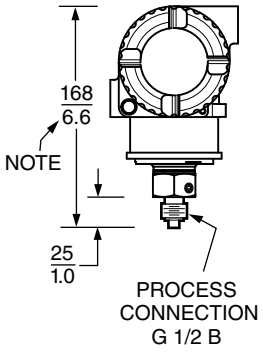
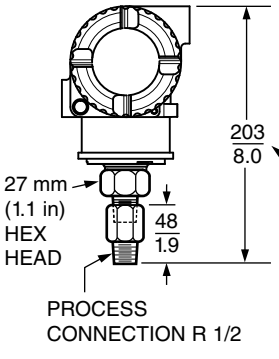
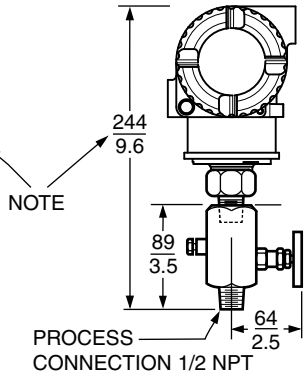


IAP10/IGP10 OPTION -R



IAP10/IGP10 -V2, -V3, -V4



NOTES

1. FOR FLAMEPROOF TRANSMITTERS, ADD 28 mm (1.1in) TO OVERALL HEIGHT DIMENSION.
2. REFER TO DIMENSIONAL PRINT DP 020-447 FOR FURTHER INFORMATION.

NOTES

ORDERING INSTRUCTIONS

1. Model Number(s) as follows:
   - Transmitter only if pressure seals are not selected
   - Both transmitter and pressure seal if pressure seal is selected. See PSS 2A-1Z11 A.
2. Calibrated Pressure Range (using allowable pressure units from the table below).

inH_2O	inHg	kPa	mbar	psi
ftH_2O	mmHg	MPa	bar	atm
mmH_2O	Pa	torr	g/cm^2	kg/cm^2
mH_2O	–	–	–	

   (a) Absolute or gauge pressure units, as applicable. The suffix (a) is added to the unit to indicate absolute pressure; e.g., psia, MPaa.

3. Configuration Data Form when Factory Calibration Option -C2 is specified.
4. If Option -S2 (SIL-Certified HART Transmitter) is selected, a copy of the certification can be provided by specifying AS Code CERT-L.
5. Options and Accessories not in Model Code (see PSS 2A-1Z9 E).
6. User Tag Data – Data Plate; 32 characters maximum. For additional tag data, specify Optional Supplemental Tag -T.
7. User Tag Data – Software (Database); 8 characters maximum (user configured).

OTHER FOXBORO PRODUCTS

The Foxboro product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording. For a list of these offerings, visit our web site at:

www.fielddevices.foxboro.com

Foxboro®
by Schneider Electric

Invensys Systems, Inc.
38 Neponset Avenue
Foxboro, MA 02035
United States of America
http://www.invensys.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: http://support.ips.invensys.com

Block and Bleed Gauge Valves – M25 and M251

Product Overview

The M25 and M251 are two-valve single outlet gauge valves that combine isolating, calibrating, and venting facilities in a single compact unit. These valves enable gauges, pressure transmitters, or switches to be reliably installed and serviced, by reducing potential leak points.

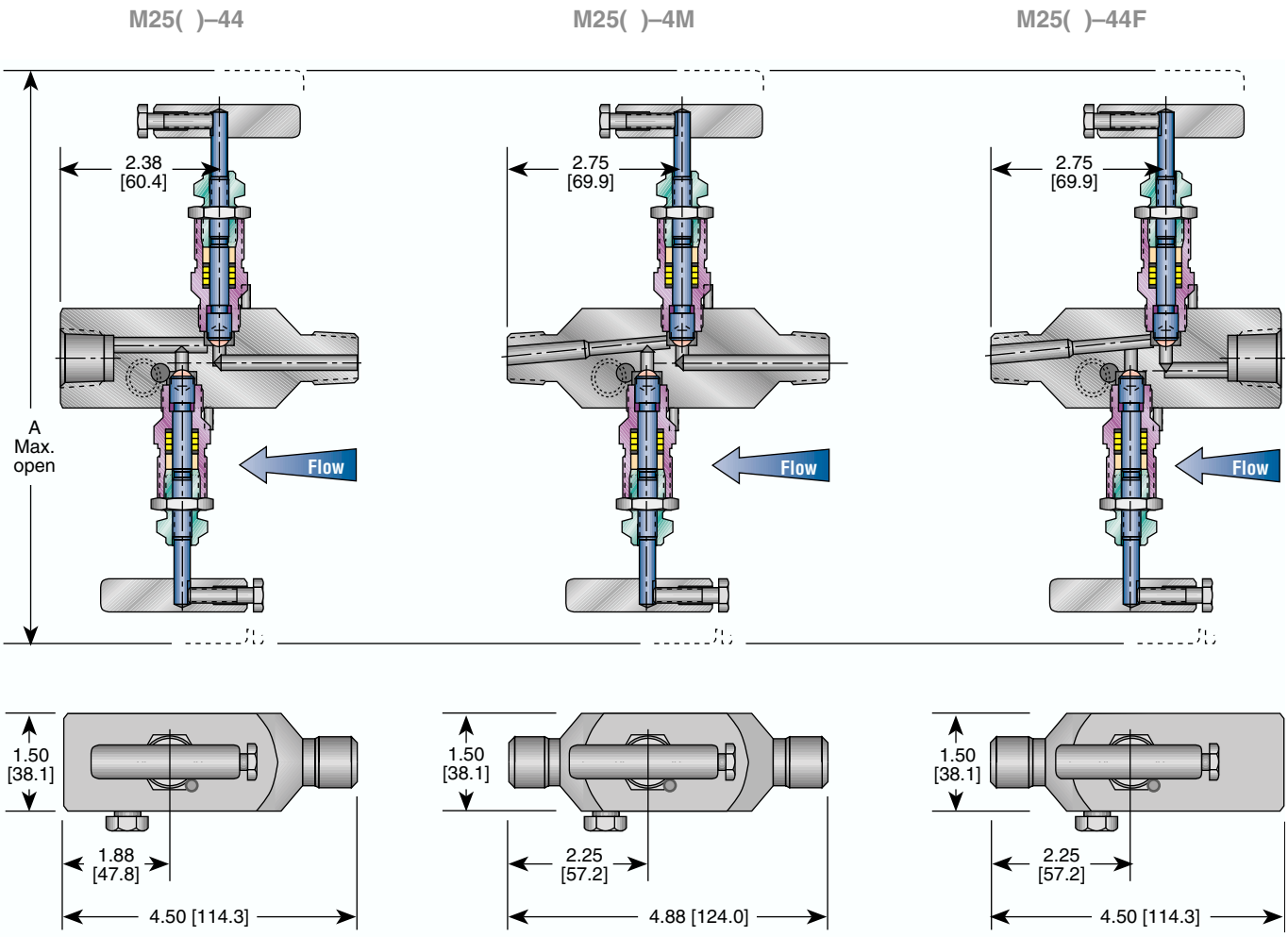
The vent port is threaded 1/4-inch NPT on all valves and is fitted with a plug. This facilitates installation of exhaust piping/tubing on hazardous services, which in turn contributes to operator safety.

Features and Benefits

- **Compact design** requires minimum space for operation and installation. Lower valve weight increases strength at the process connection and reduces gauge whip.
- **Cost savings** from reduced number of components required for instrument installation, also decreases possible leak points.
- **Easy instrument check calibration** using 1/4-inch FNPT vent/test port.
- **Ball end stem** eliminates seat galling, provides bubble-tight shutoff and long life. The hardened, non-rotating ball ensures perfect alignment closure.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering the thread area, which can cause galling. It also prevents process contamination.
- **Adjustable packing** adjusts easily – loosen jam nut, tighten bushing slightly, then retighten jam nut. Decreases packing replacement downtime and increases valve life.
- **Safety back seating** prevents stem blowout or accidental removal while in operation and provides a metal-to-metal secondary stem seal while in the full open position.
- **Dust cover** prevents lubricant washout and keeps contaminants (dirt, rain, etc.) out of bonnet assembly.
- **Panel mount** (optional) affords opportunity to use high quality products in racks or panels.
- **Chrome plating of 316 SS** prevents galling or freezing of stem threads when similar metals mate. CS valves use a 303 SS stem.
- **Rolled threads** provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area enables smooth stem operation and extends packing life.
- **Body-to-bonnet seal** is metal-to-metal in constant compression, isolating the bonnet threads from process fluid corrosion. Eliminates possible tensile breakage of bonnet, and gives a reliable seal point.
- **Bonnet lock pin** is another safety feature which prevents the accidental separation of the bonnet from the body. However, normal valve maintenance and repair are still easily accomplished.

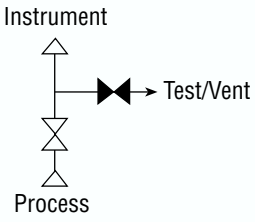
Block and Bleed Gauge Valves – M25 Specifications

Dimensions, inches [mm]



Dimensions, inches [mm]

Packing	A
Low Emissions (E) GRAFOIL® (H)	8.14 [206.8]
Teflon® (V)	6.84 [173.7]



Note

1. Approximate valve weight M25( )–44 and M25( )–44F 3.6 lb [1.63 kg].
   M25( )–4M 3.8 lb [1.72 kg].
   Valve C_v 0.52 maximum.

Block and Bleed Gauge Valves – M25 and M251 Specifications

Pressure and Temperature Ratings

Teflon® Packing

CS, SS, SG	6000 psig @ 200°F [414 barg @ 93°C]	4000 psig @ 500°F [276 barg @ 260°C]

GRAFOIL® and Low Emissions Graphite Packing

CS, SS, SG	6000 psig @ 200°F [414 barg @ 93°C]	1500 psig @ 850°F [103 barg @ 454°C]
SS, SG	6000 psig @ 200°F [414 barg @ 93°C]	1500 psig @ 1000°F [103 barg @ 538°C]

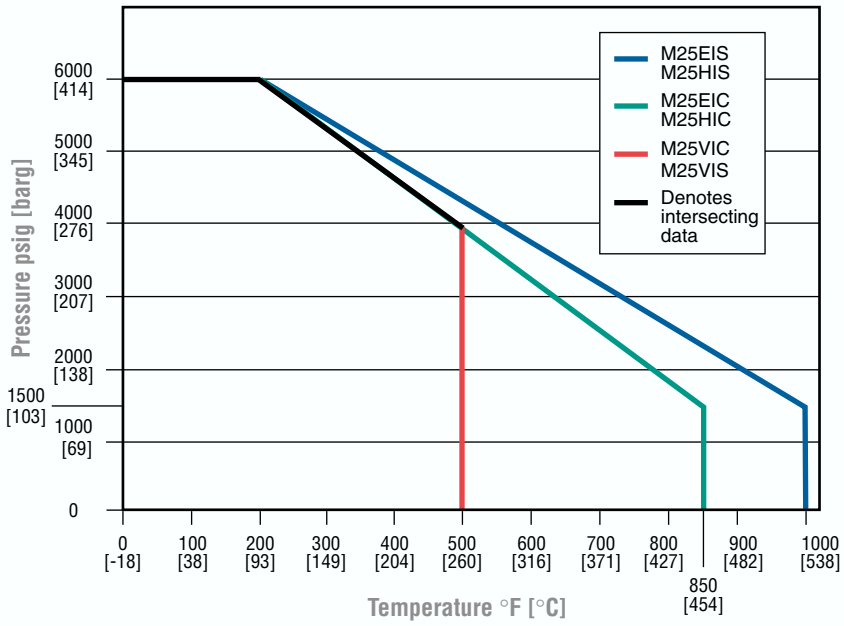
Standard Materials

Valve	Body	Bonnet	Stem	Ball	Packing
CS[1]	A105 CS	A108 CS	A581-303 SS	17-4 PH	Teflon®
CS[1]	A105 CS	A105 CS	A581-303 SS	17-4 PH	GRAFOIL® Low Emissions Graphite
SS	A479-316 SS	A479-316 SS	A276-316 SS	316 SS	Teflon®
SS	A479-316 SS	A479-316 SS	A276-316 SS	316 SS	GRAFOIL® Low Emissions Graphite
SG[2]	A479-316 SS	A479-316 SS	Monel® 400	Monel® K500	Teflon®
SG[2]	A479-316 SS	A479-316 SS	Monel® 400	Monel® K500	GRAFOIL® Low Emissions Graphite

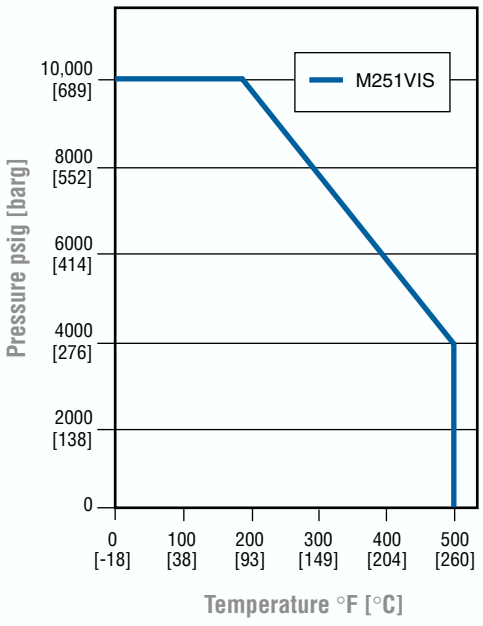
Notes

1. CS is zinc-cobalt plated to prevent corrosion.
2. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.

Pressure vs. Temperature – M25



Pressure vs. Temperature – M251



Block and Bleed Gauge Valves – M25 and M251 Specifications

Ordering Information

M25 V I S – 44C – SG

Model Number

M25, M251

Packing

V – Teflon® (patent protected)
H – GRAFOIL®
E – Low Emissions Graphite

Seat Material

I – Integral

Body Material[1]

C – CS
S – 316 SS
M – Monel®

Connections (Inlet/Outlet)[2]

4M – 1/2-inch MNPT x 1/2-inch MNPT
44 – 1/2-inch MNPT x 1/2-inch FNPT
44F – 1/2-inch FNPT x 1/2-inch MNPT
46 – 3/4-inch MNPT x 1/2-inch FNPT

C – Male plain end (CS is black oxide coated)

Options

BL – Bonnet Lock Device (patent protected)
CLC – Chlorine Cleaning
HD – Hydrostatic Testing (100%)(MSS-SP-61)
OC – Oxygen Cleaning
SG – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)
SP – Special Requirements - please specify

Notes

1. For other body materials, consult factory.
2. Consult factory for other optional connections.

Item	Qty	LEVEL SWITCH		
4.00	**2**	**Anchor Scientific**	**GSE-50-NONC**	**Float Level Switch**

G	**SYSTEM DESIGN**
	Mercury-free Eco-Float for controlling liquid levels
SI	**MOUNTING STYLE**
	Externally weighted
50	**CABLE LENGTH**
	50 feet
NONC	**CIRCUIT CONFIGURATION**
	Normally open/ normally closed contacts (7 A @ 115 VAC)
WRW-20	**ACCESSORIES**
	Cable suspension mounting kit - 15# anchor, stainless steel cable assembly and cable suspension bracket (1 kit supplied for up to 5 float switches)

Tag Set		
Set 1	Customer Tag	LS-103A
	Customer Item	Re-Use Water Basin High Level Switch
Set 2	Customer Tag	LS-103B
	Customer Item	Re-Use Water Basin Low Level Switch

anchor scientific inc.
Box 378, Long Lake, MN 55356
952-473-7115 • FAX 952-473-6002 • www.anchorscientific.com

eco·float

Eco-Float Model G

Description

The Eco-float is a mercury-free float switch for controlling liquid levels in a variety of applications. A snap-action switch is activated by a steel ball rolling back and forth within a switching tube in a plastic float housing. There is a minimum differential between "on" and "off" of approximately 3.5 inches. Greater differentials can be achieved when the pipe mounted or externally weighted mounting styles are used. Various lengths of cable and circuit configurations are available and in stock.

Features

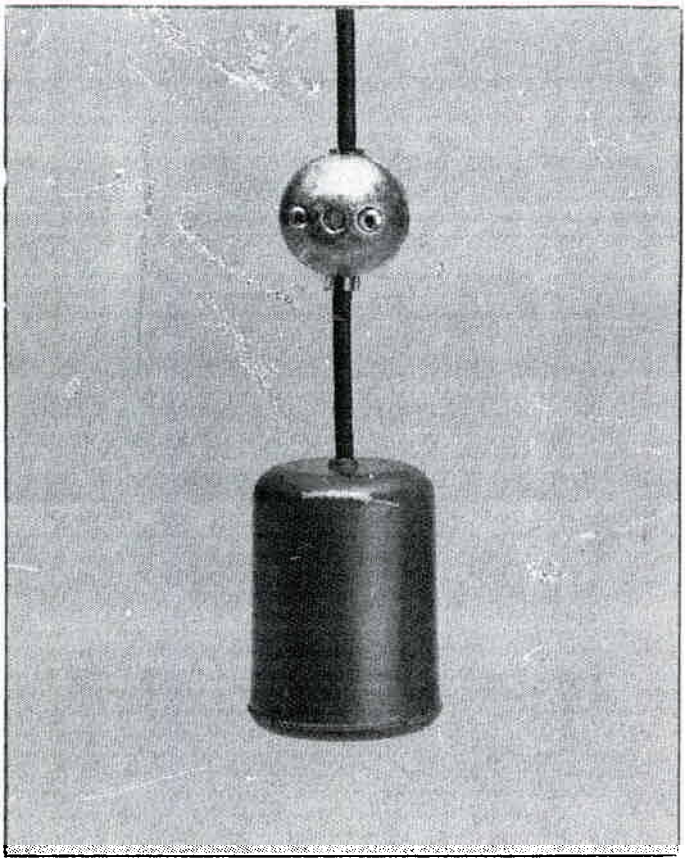
- Mercury Free
- Variety of Mounting Styles
- Variety of Circuit Configurations
- Installation Easy
- Differential In One Float
- Replaces Diaphragm and Mercury Switches

Applications

The Eco-Float can be used in a variety of liquid level monitoring applications including sumps, sewage ejectors, septic tanks, vaults, lift stations, and tanks. Eco-Floats are ruggedly constructed of corrosion resistant materials, enabling them to be used in a variety of different liquids. Some applications are subject to additional requirements described in the National Electric Code.

Specifications

Cable	18-2 or 18-3 SJO W/A, 60 C., 41 x 34 stranding dia. - .29(18-2); .31(18-3)
Float Housing	Polypropylene Dim: 3.0D x 4.25
Electrical Ratings	7A. @ 115 VAC; 3.5A @ 230VAC
Clamp	Polypropylene, (Model GP)
External Weight	Lead, 300 series stainless steel (Model GSE)
Temp. Limit	140° F



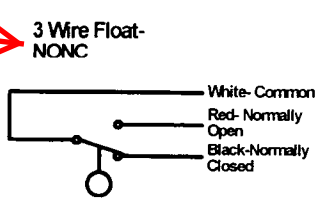
Model GSE

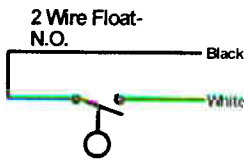
Ordering Information

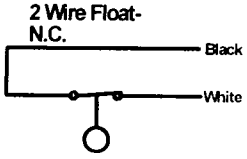
Specify:

Model	G
Mounting Style	SE (external weight) ~~SI (internal weight)~~ ~~P (pipe mounted)~~
Cable Length	10, 15, 20, 30, 40, 50 Custom lengths available
Circuit Configuration	NO (normally open) NC (normally closed) NONC (normally open/ normally closed)

Example
GSI 20NO - Eco-Float, suspended internal wt. 20', normally open contacts.







Item	Qty	RE-USE WATER PLC CONTROL PANEL
5.00	**1**	**R.E. Pedrotti Co./Kasa Controls** **Primary Control Panel Components**

PLC EQUIPMENT

Rack: (1) GE IC695CHS016, 16-slot
Processor: (1) GE IC695CPE30, 1 GHz / 5 MB Memory
Power Supply: (1) GE IC695PSA040, 120 VAC
Digital Input Module: (2) GE IC694MDL645, 16-pt., 24 VDC
Digital Output Module: (1) GE IC694MDL740, 16-pt. 24 VDC
Analog Input Module: (1) GE IC694ALG223, 16-ch., 0-20 mA
Analog Output Module: (1) GE IC694ALG392, 8-ch., 0-20 mA
Communications Module: (2) GE IC695ETM001, Ethernet
Battery Pack: GE (1) IC693ACC302, High Capacity Battery

NETWORK SWITCH

(1) Moxa EDS-508A-MM-SC, 8-port Ethernet Switch, 6-port Copper/2-port Fiber, Multi-mode Type SC (24 VDC)

INDUSTRIAL COMPUTER

(1) Phoenix Contact ValueLine 21.5" Industrial Touch Panel PC with Windows 7 Pro SP1, 24 VDC, 8 GB, 80 GB SSHD

HMI SOFTWARE LICENSING

(1) Wonderware System Platform 2014 License

POWER SUPPLY

(2) Phoenix Contact 2938581 120 VAC In/24 VDC Out, 5A

ENCLOSURE

(1) Saginaw SCE-42EL3612LP, Wall Mount Painted Steel (gray)
42" H x 36" W x 12" D, NEMA 12 with SCE-42P36 Sub-panel

PATCH PANEL

(1) Panduit CBXF12IW-AY 12-port Fiber Optic Patch Panel with (12) CMDEISCEI Type SC multi-mode connectors

UNINTERRUPTIBLE POWER SUPPLY (UPS)

(1) APC BR1500G 1500 VA UPS System, 120 VAC

R.E. PEDROTTI CO., INC.

WICHITA WWTP PLANT 2
RE–USE WATER PUMP STATION CONTROL PANEL
WICHITA, KANSAS
KASA INDUSTRIAL CONTROLS INC., JOB #8076

SHEET #	DRAWING #	DESCRIPTION
ID	8076–ID	DRAWING INDEX
1	8076–E01	120VAC POWER DISTRIBUTION
2	8076–E02	120VAC/24VDC POWER DISTRIBUTION
3	8076–E03	24VDC POWER DISTRIBUTION
4	8076–E04	RACK POWER SUPPLY, SLOT 0 AND 1
5	8076–E05	CPU MODULE – MAIN RACK, SLOT 2 PROCESSOR
6	8076–E06	COMMUNICATION – MAIN RACK, SLOT 3 & 4
7	8076–E07	DISCRETE INPUTS – MAIN RACK, SLOT 5
8	8076–E08	DISCRETE INPUTS – MAIN RACK, SLOT 6
9	8076–E09	SPARE SLOT – MAIN RACK, SLOT 7
10	8076–E10	DISCRETE OUTPUTS – MAIN RACK, SLOT 8
11	8076–E11	SPARE SLOT – MAIN RACK, SLOT 9
12	8076–E12	ANALOG INPUTS – MAIN RACK, SLOT 10
13	8076–E13	SPARE SLOT – MAIN RACK, SLOT 11
14	8076–E14	ANALOG OUTPUTS – MAIN RACK, SLOT 12
15	8076–E15	SPARE SLOT – MAIN RACK, SLOT 13
16	8076–E16	SPARE SLOT – MAIN RACK, SLOT 14
17	8076–E17	SPARE SLOT – MAIN RACK, SLOT 15
18	8076–E18	INTERPOSING RELAY SCHEMATICS
19	8076–L01	EXTERIOR LAYOUT
20	8076–L02	INTERIOR LAYOUT
21	8076–L03	PLC RACK LAYOUT
22	8076–BOM	BILL OF MATERIALS

Jul, 05 2016

DRAWING INDEX

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677–3366 FAX (913) 677–3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484–WIKSP2GW

kasa
INDUSTRIAL CONTROLS, INC.
PHONE 785–825–7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE–USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	OF	ID	JOB NO.	DWG. NO.
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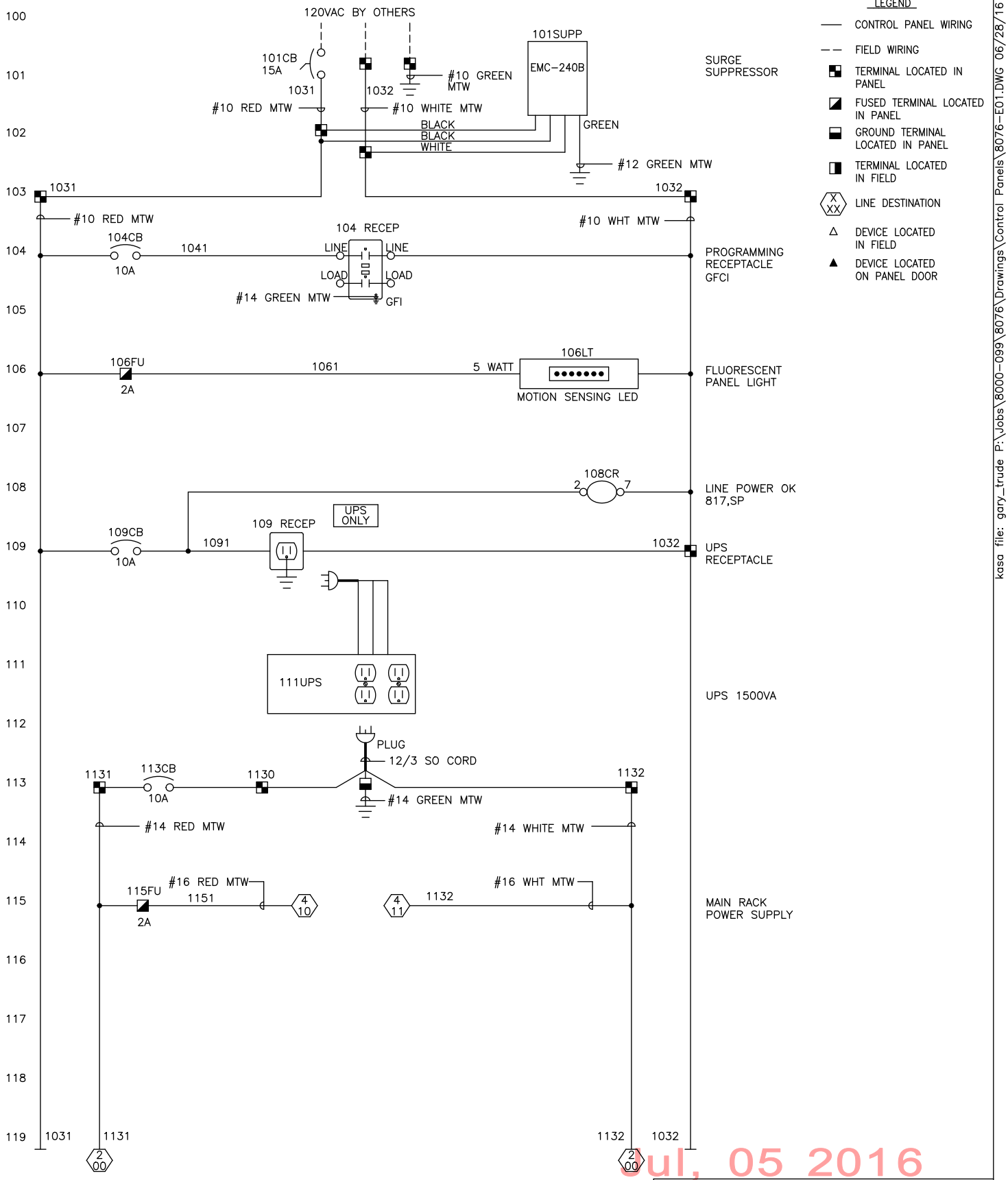

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120VAC POWER DISTRIBUTION

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R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

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R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
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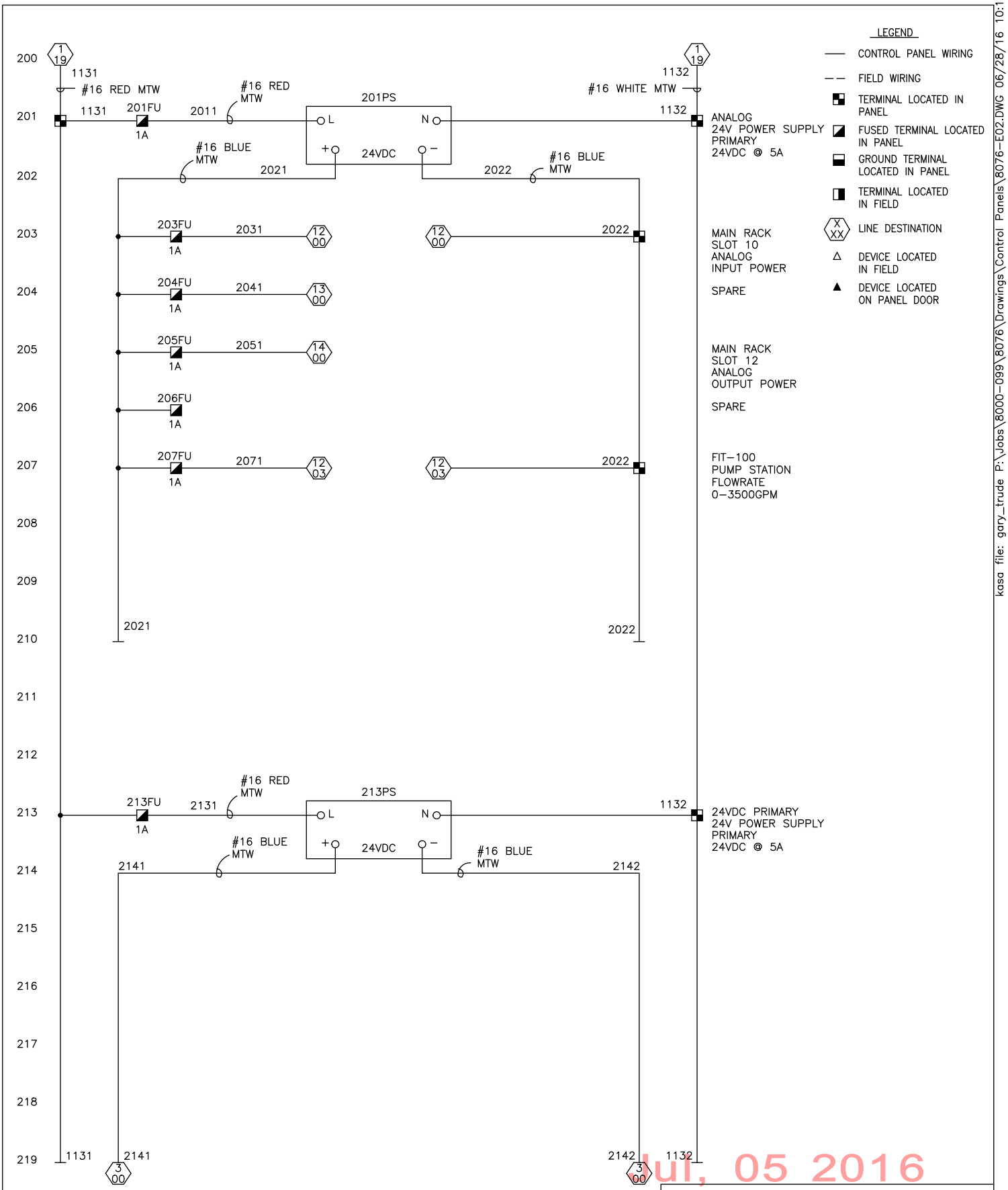

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120VAC/24VDC POWER DISTRIBUTION

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5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

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1	SUBMITTAL	–	BF
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APPROVED	–
P.O. NO.	49484-WIKSP2GW

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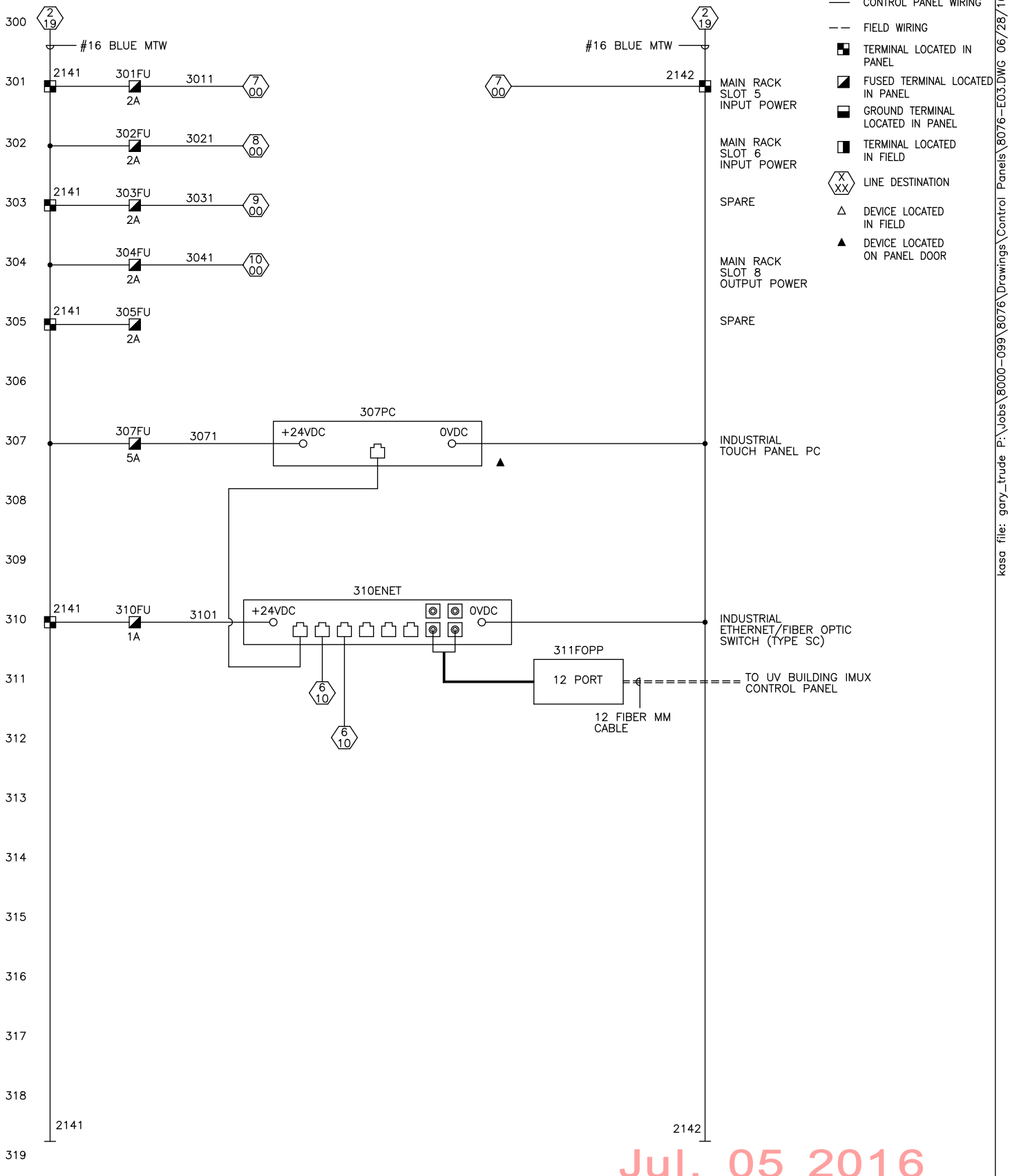
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
2 OF 22	8076	8076-E02



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Jul, 05 2016

24VDC POWER DISTRIBUTION

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MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

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1	SUBMITTAL	–	BF
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APPROVED	–
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Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

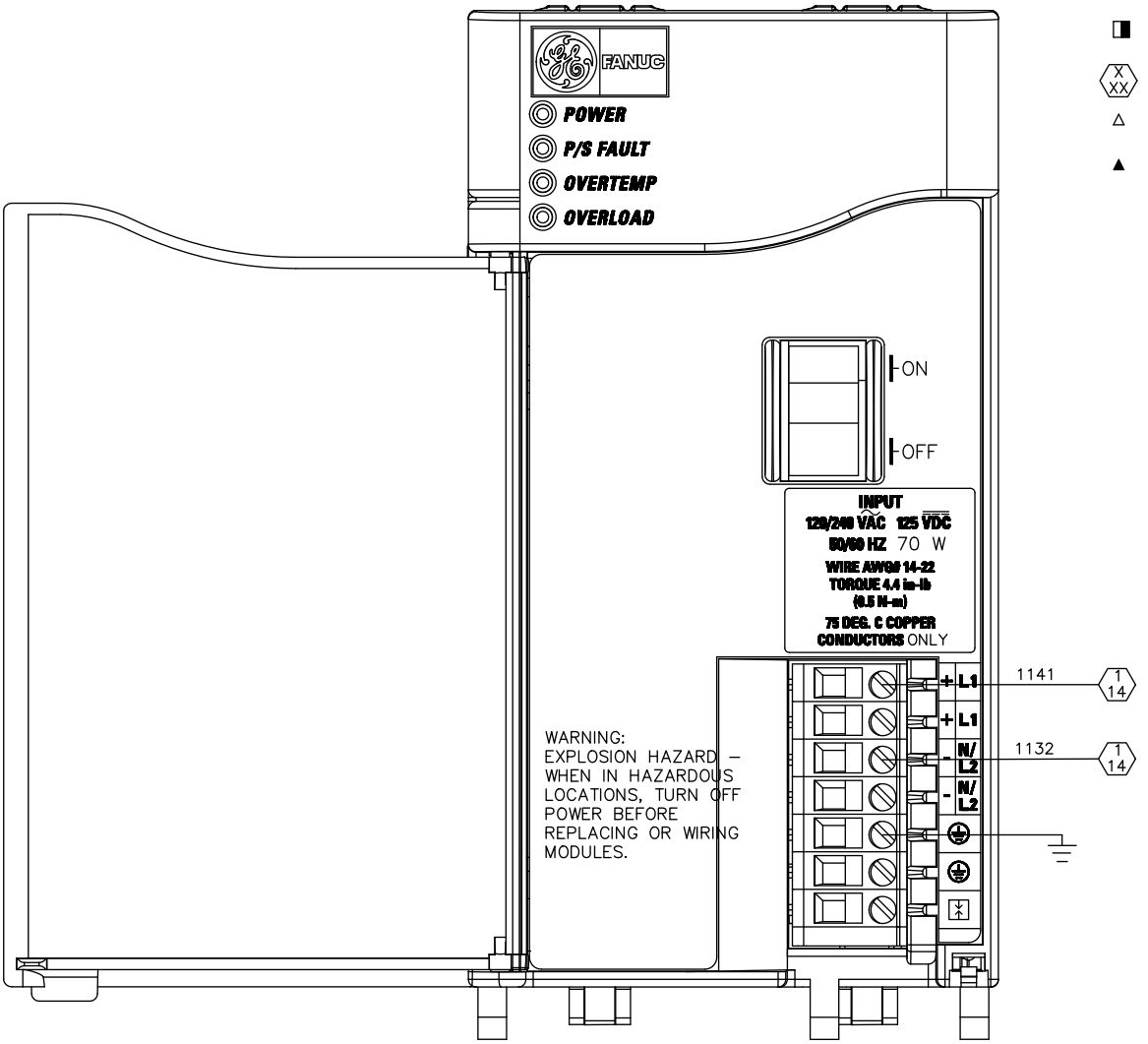
SHEET	JOB NO.	DWG. NO.
3 OF 22	8076	8076-E03

LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- LINE DESTINATION
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

MAIN RACK
SLOT 0 AND 1

IC695PSA040



Jul, 05 2016

RACK POWER SUPPLY, SLOT 0 AND 1

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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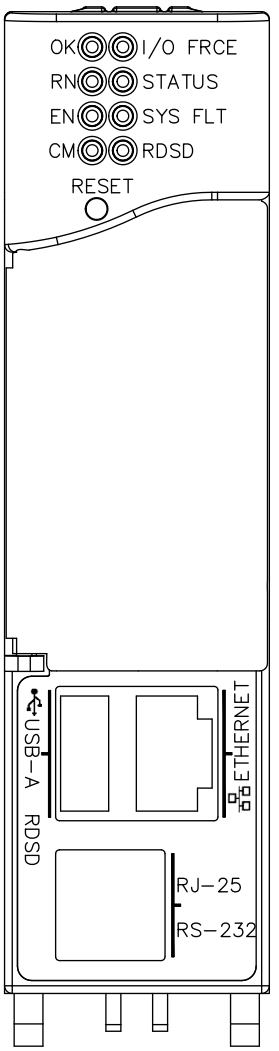
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
4 OF 22	8076	8076-E04

MAIN RACK
SLOT 2

IC695CPE305



LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX — LINE DESTINATION
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E05.DWG 06/27/16 14:36

Jul, 05 2016

CPU MODULE – MAIN RACK, SLOT 2, PROCESSOR

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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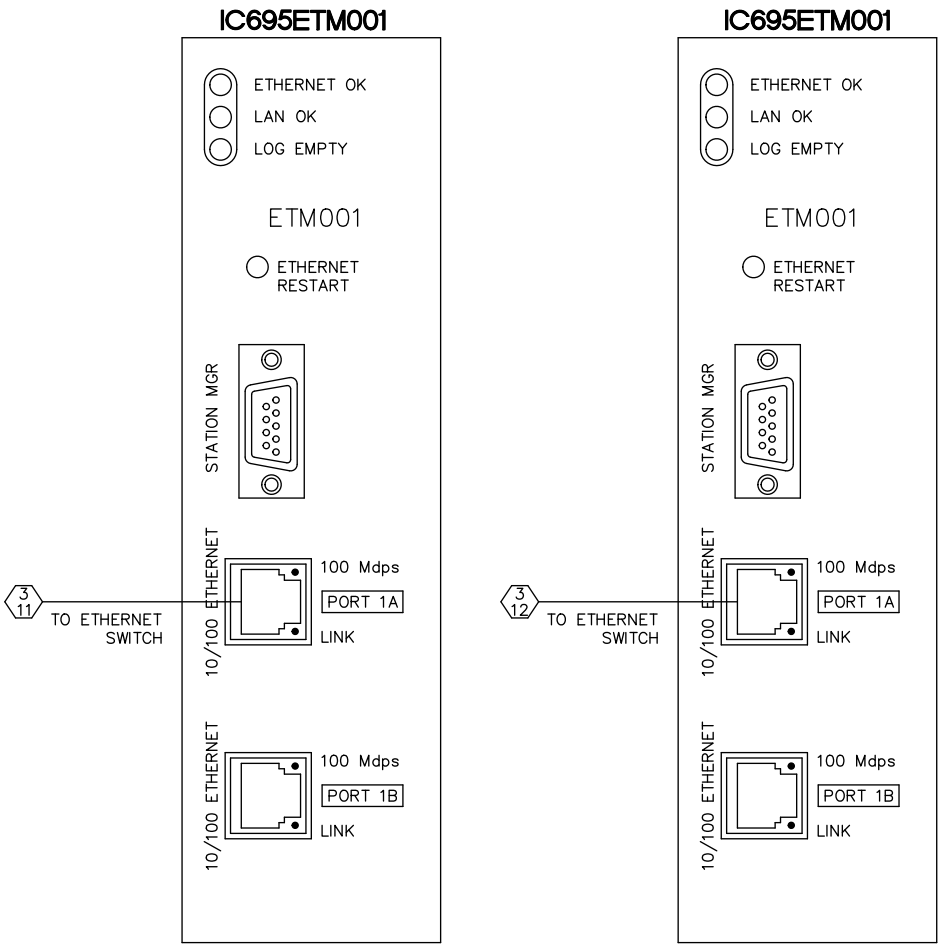
MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

kasa
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
5 OF 22	8076	8076-E05



LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX — LINE DESTINATION
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E06.DWG 06/28/16 16:00

Jul, 05 2016

COMMUNICATION – MAIN RACK, SLOT 3 & SLOT 4

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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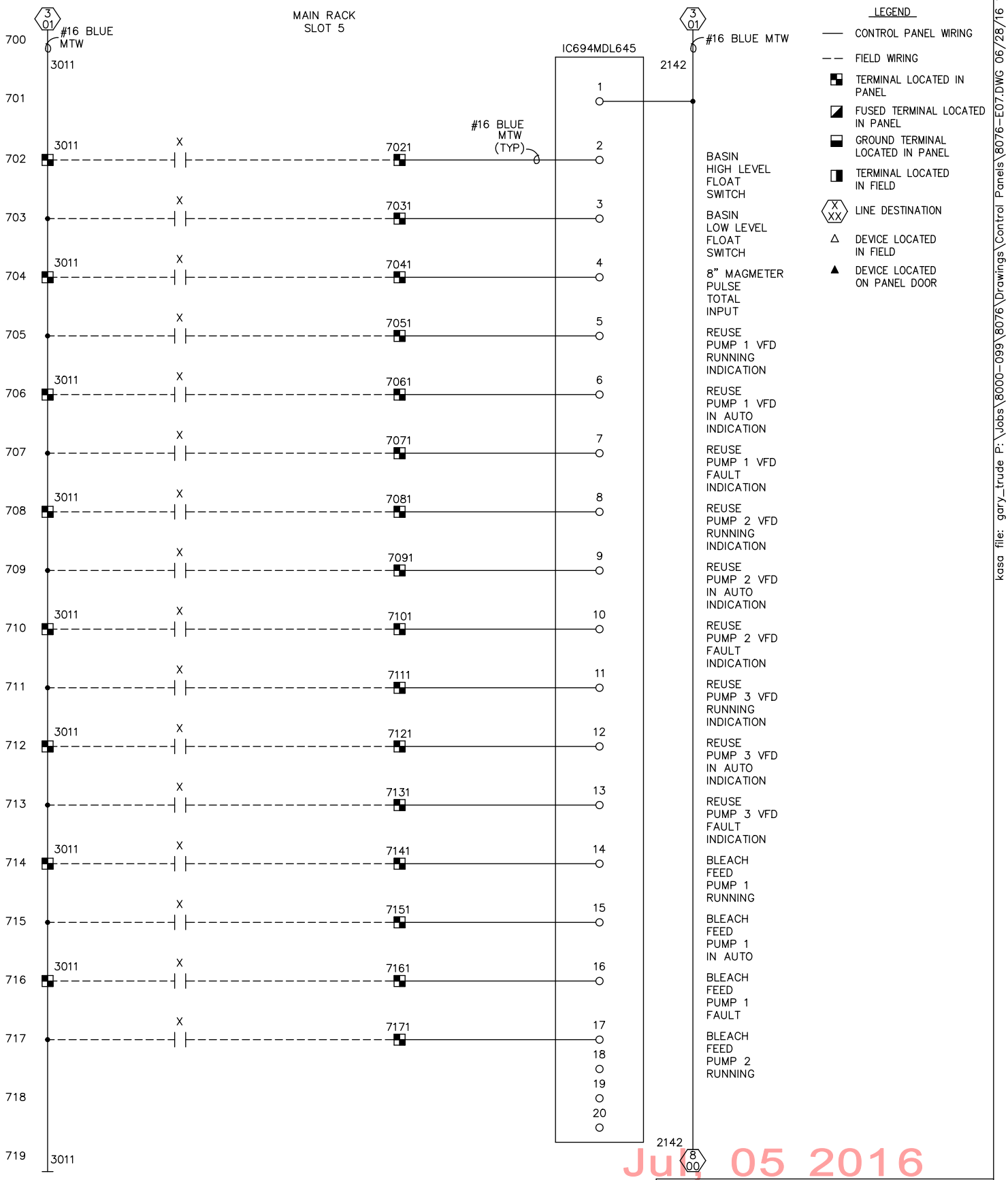
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
6 OF 22	8076	8076-E06



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July 05 2016

DISCRETE INPUTS – MAIN RACK, SLOT 5

REP
R.E. Pedrotti Co., Inc.
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NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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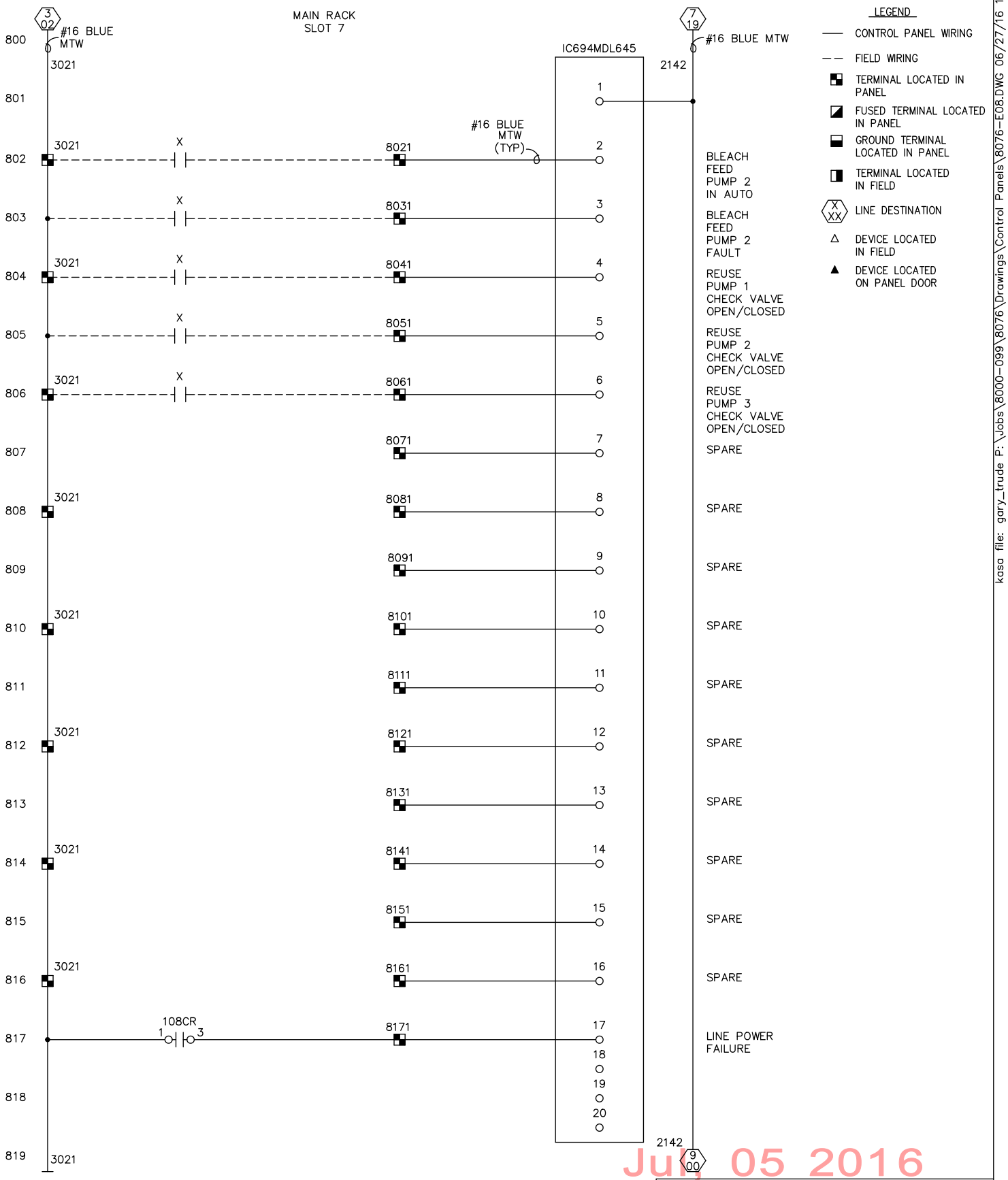
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
7 OF 22	8076	8076-E07



DISCRETE INPUTS – MAIN RACK, SLOT 6

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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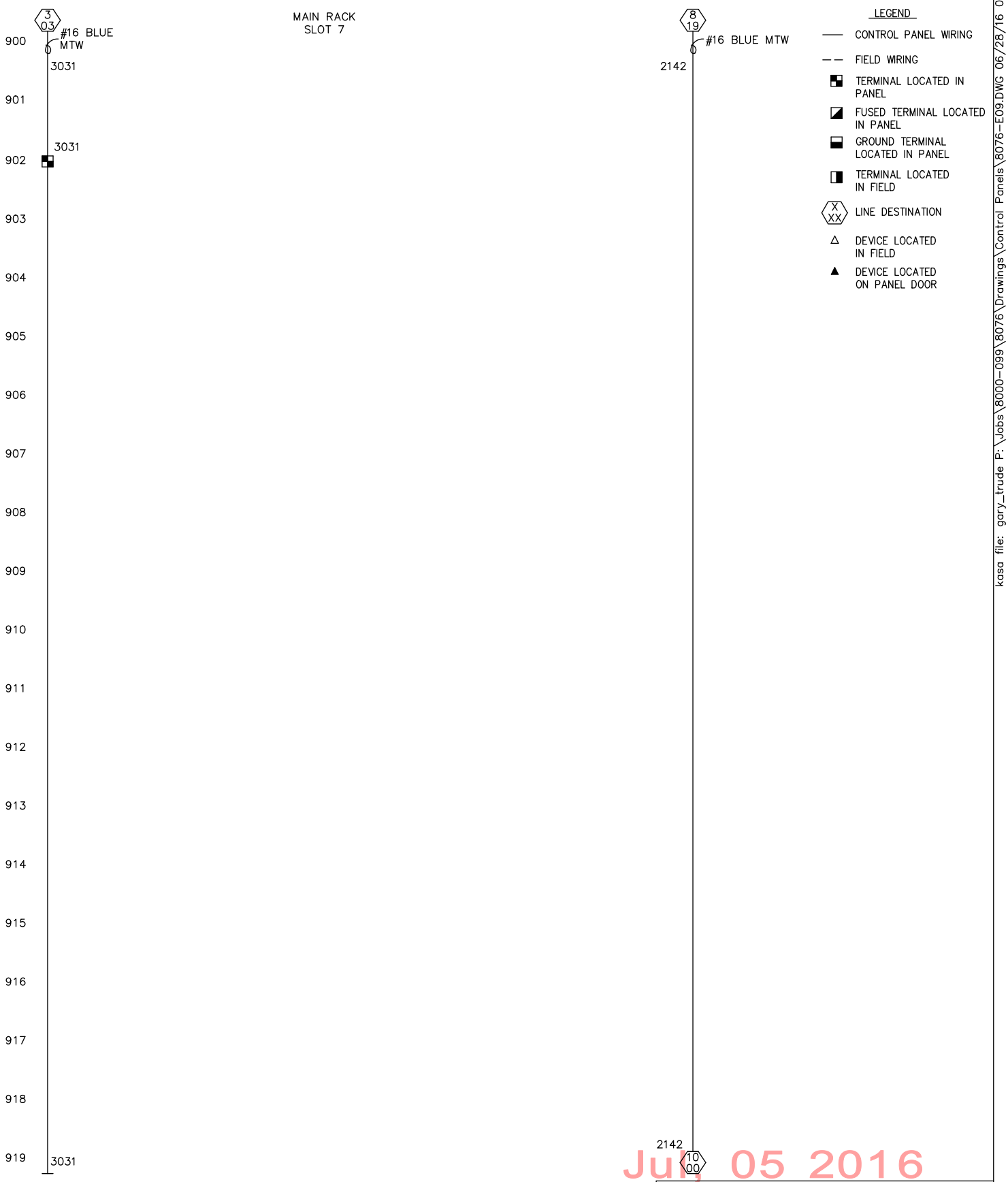
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
8 OF 22	8076	8076-E08



SPARE SLOT – MAIN RACK, SLOT 7

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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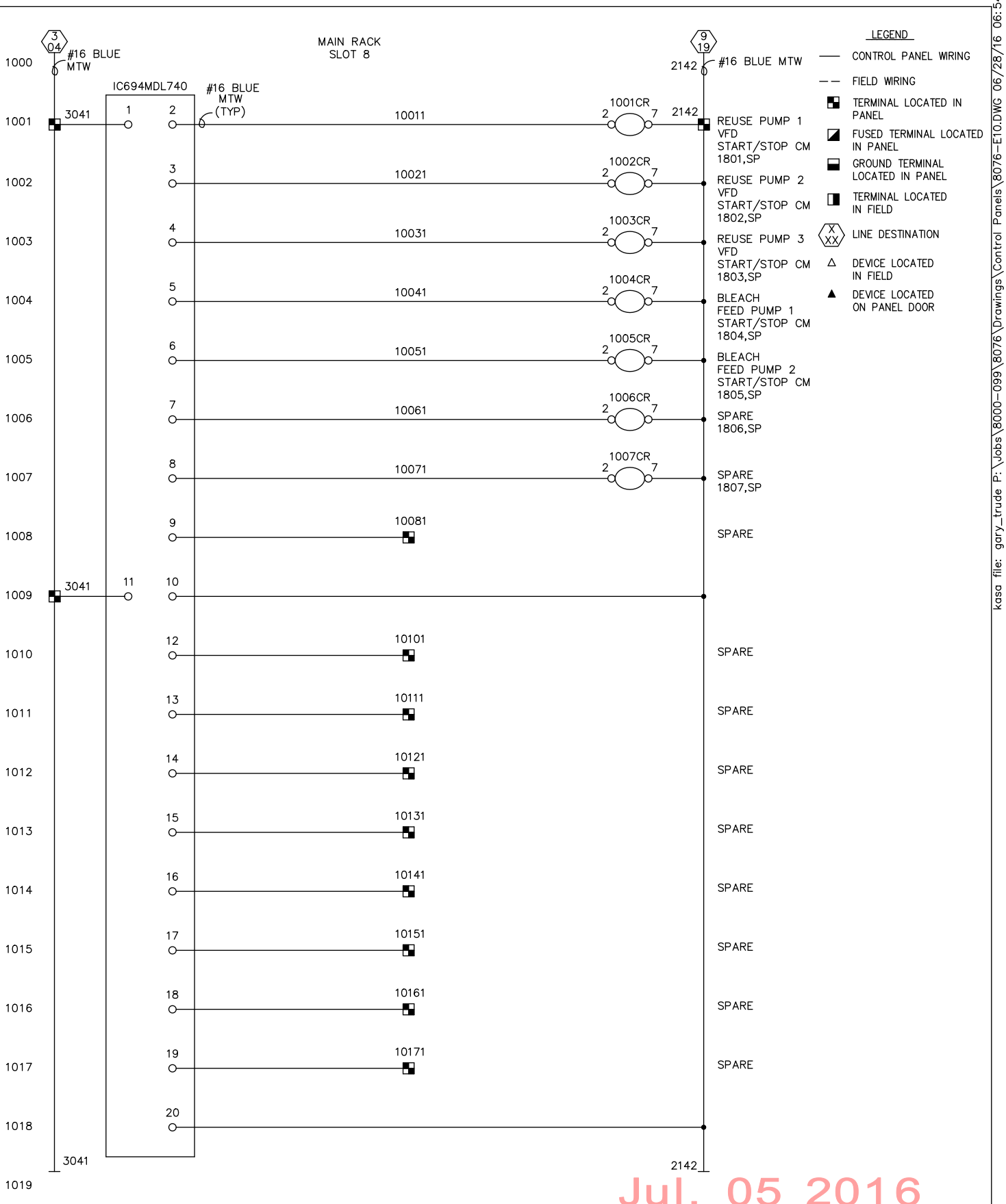
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
9 OF 22	8076	8076-E09



Jul, 05 2016

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DISCRETE OUTPUTS – MAIN RACK, SLOT 8

REP
R.E. Pedrotti Co., Inc.
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MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
10 OF 22	8076	8076-E10

MAIN RACK
SLOT 9
SPARE SLOT

1100

1101

1102

1103

1104

1105

1106

1107

1108

1109

1110

1111

1112

1113

1114

1115

1116

1117

1118

1119

LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- LINE DESTINATION (X / XX)
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

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SPARE SLOT – MAIN RACK, SLOT 9

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NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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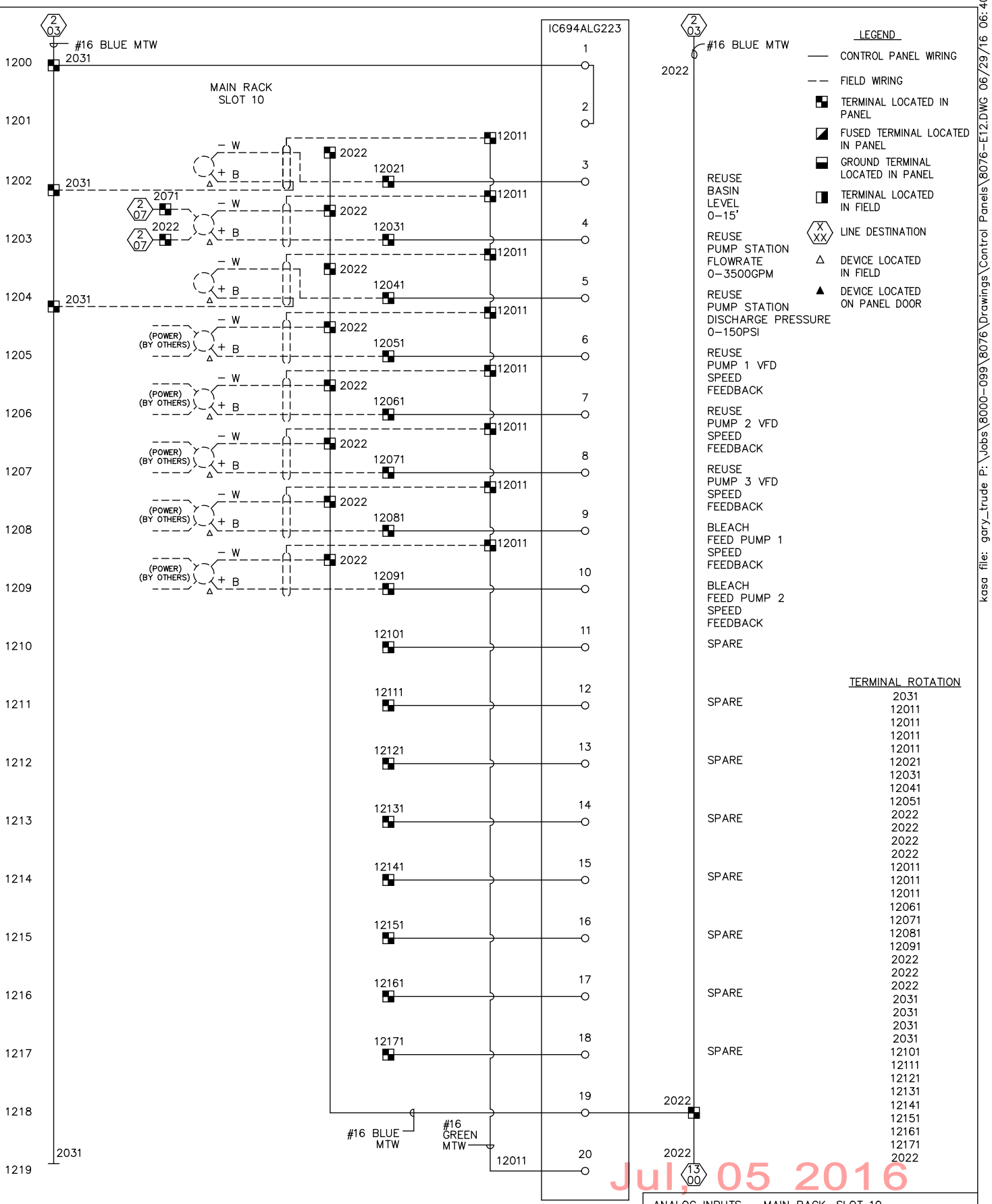
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
11 OF 22	8076	8076-E11



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ANALOG INPUTS – MAIN RACK, SLOT 10

REP
R.E. Pedrotti Co., Inc.
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(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
12 OF 22	8076	8076-E12

2
04
#16 BLUE MTW
2041

1300
1301
1302
1303
1304
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2041

12
19
#16 BLUE MTW
2022

2022

14
00

LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX — LINE DESTINATION
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E13.DWG 06/29/16 06:50

SPARE SLOT – MAIN RACK, SLOT 11

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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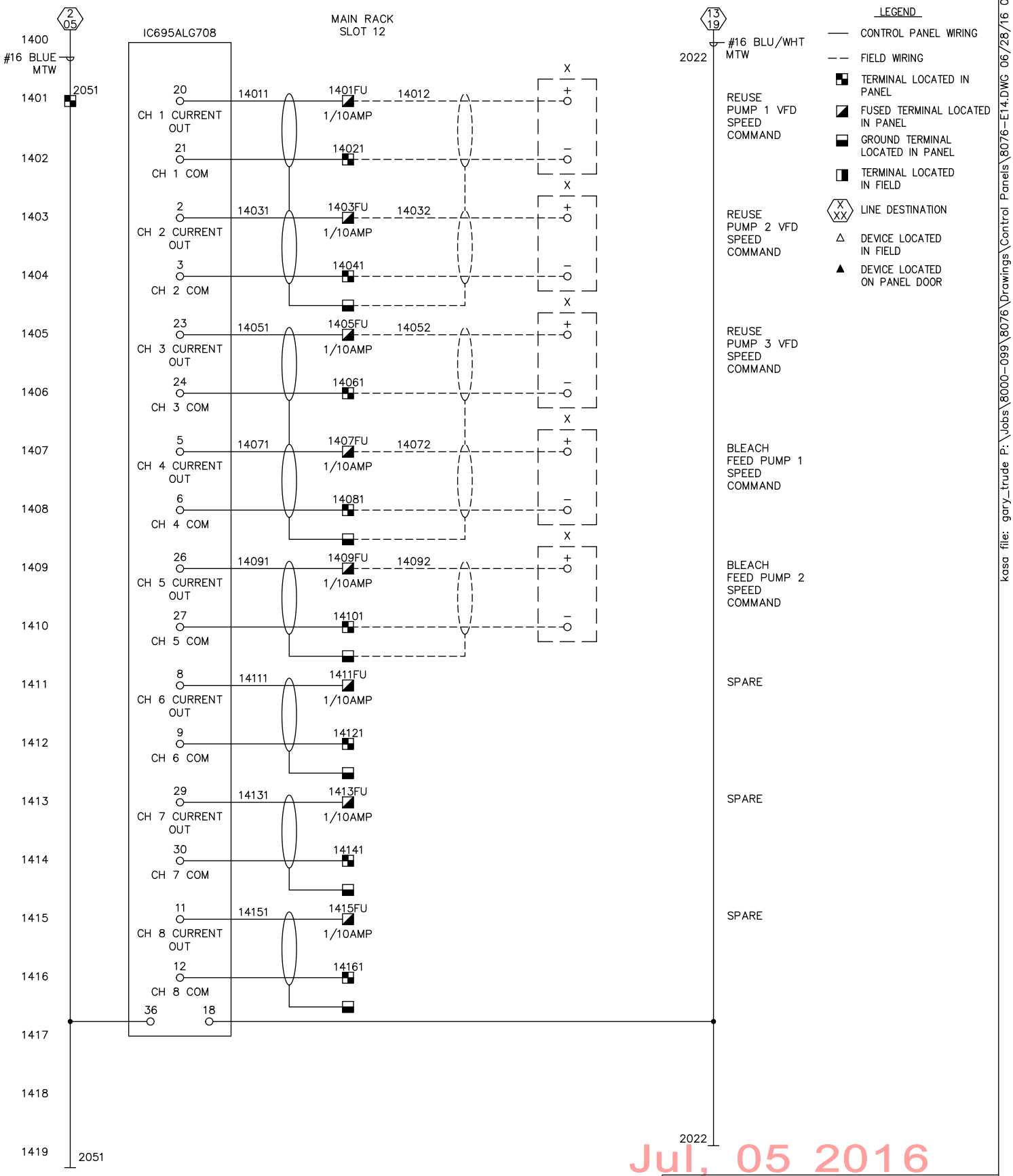
MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

kasa
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
13 OF 22	8076	8076-E13



Jul, 05 2016

ANALOG OUTPUTS – MAIN RACK, SLOT 12

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
14 OF 22	8076	8076-E14

MAIN RACK
SLOT 13
SPARE SLOT

1500

1501

1502

1503

1504

1505

1506

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LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX LINE DESTINATION
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E15.DWG 06/28/16 09:56

Jul, 05 2016

SPARE SLOT – MAIN RACK, SLOT 13

REP
R.E. Pedrotti Co., Inc.
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NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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418 East Ave. B
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Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
15 OF 22	8076	8076-E15

MAIN RACK
SLOT 14
SPARE SLOT

1600

1601

1602

1603

1604

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1606

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1619

LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX LINE DESTINATION
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E16.DWG 06/28/16 09:57

Jul, 05 2016

SPARE SLOT – MAIN RACK, SLOT 14

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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DATE	6/27/16
SCALE	–
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DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
16 OF 22	8076	8076-E16

MAIN RACK
SLOT 15
SPARE SLOT

1700

1701

1702

1703

1704

1705

1706

1707

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LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- LINE DESTINATION (X / XX)
- DEVICE LOCATED IN FIELD
- DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E17.DWG 06/28/16 09:58

Jul, 05 2016

SPARE SLOT – MAIN RACK, SLOT 15

REP
R.E. Pedrotti Co., Inc.
5855 Beverly, SUITE A
MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

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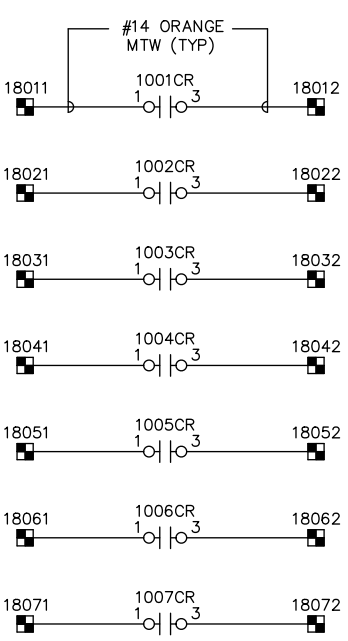
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
17 OF 22	8076	8076-E17



1800

1801 REUSE PUMP 1 VFD START/STOP COMMAND

1802 REUSE PUMP 2 VFD START/STOP COMMAND

1803 REUSE PUMP 3 VFD START/STOP COMMAND

1804 BLEACH FEED PUMP 1 START/STOP COMMAND

1805 BLEACH FEED PUMP 2 START/STOP COMMAND

1806 SPARE

1807 SPARE

1808

1809

1810

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1819

LEGEND

- CONTROL PANEL WIRING
- FIELD WIRING
- TERMINAL LOCATED IN PANEL
- FUSED TERMINAL LOCATED IN PANEL
- GROUND TERMINAL LOCATED IN PANEL
- TERMINAL LOCATED IN FIELD
- X / XX LINE DESTINATION
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

kasa file: gary_trude P:\Jobs\8000-099\8076\Drawings\Control Panels\8076-E18.DWG 06/28/16 10:17

Jul, 05 2016

INTERPOSING RELAY SCHEMATICS

REP
R.E. Pedrotti Co., Inc.
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MISSION, KANSAS 66202
(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	–	BF	DATE 6/27/16
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–	–	–	–	APPROVED –
–	–	–	–	P.O. NO. 49484-WIKSP2GW

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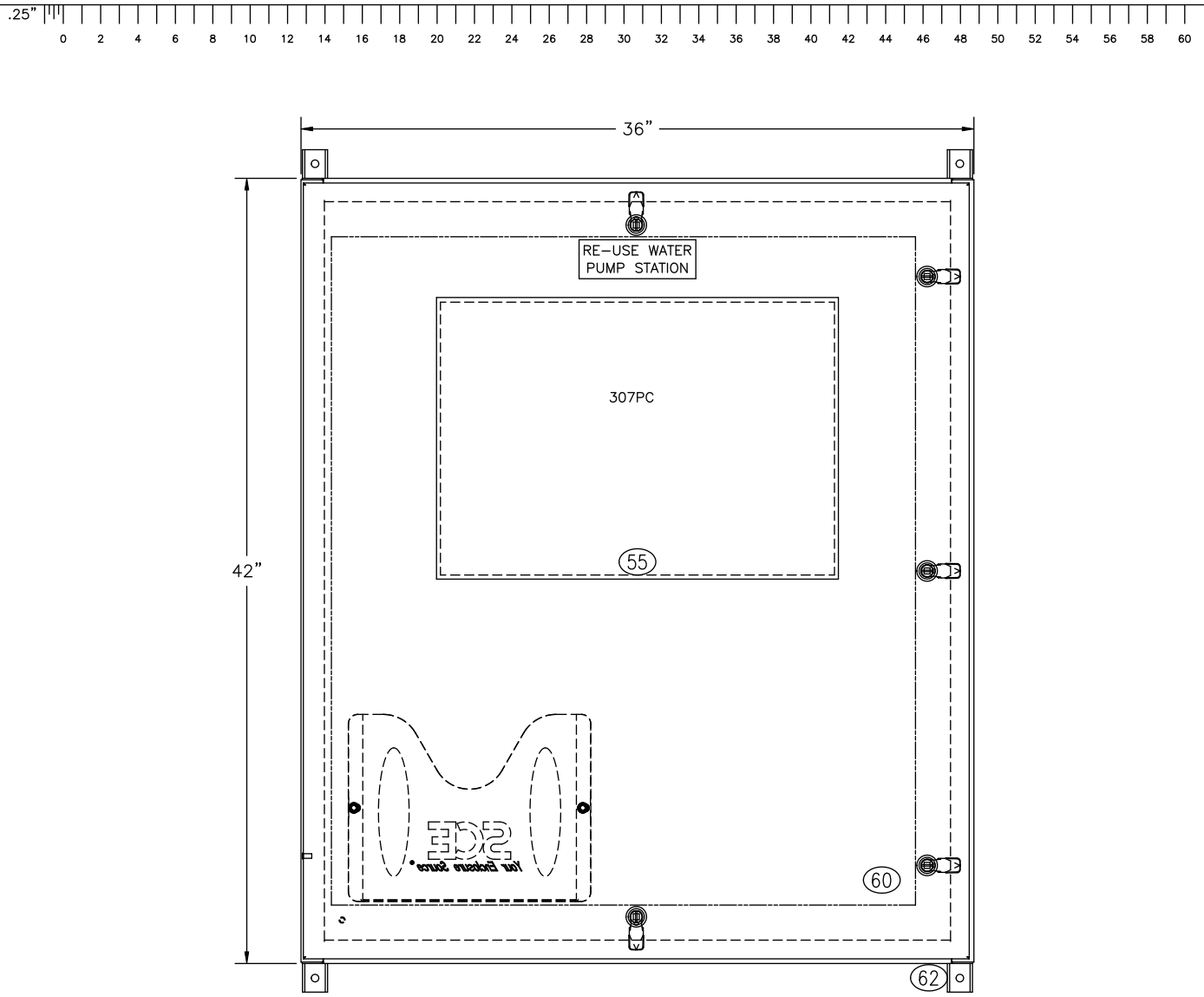
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
18 OF 22	8076	8076-E18



EXTERIOR LAYOUT

SHOP NOTES:

1. Print five (5) extra wire labels for every terminal that receives field wiring, for use by the install electrical contractor, and ship the labels inside the control panel.
2. Install 20% spare terminals at the end of each A/C and each D/C terminal strip group.
3. Install all terminals and quantities as shown in the schematics. Include all hot and neutral terminals as shown. Follow terminal strip rotation sheet if applicable.
4. Bond all D/C terminal strip rails to the ground bar with one 8awg green wire.
5. Package all spare parts listed in the Bill of Material Spare Parts column in zip-lock bag(s) and place inside the enclosure for shipment.
6. Save all customer supplied equipment (PLC and Computer component) boxes and ship these inside or with the enclosure. If the boxes will not fit in the panel crate, see the Project Manager for instructions.

Jul, 05 2016

EXTERIOR LAYOUT

REP
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(913) 677-3366 FAX (913) 677-3460

NO	REVISIONS	DATE	BY
1	SUBMITTAL	–	BF
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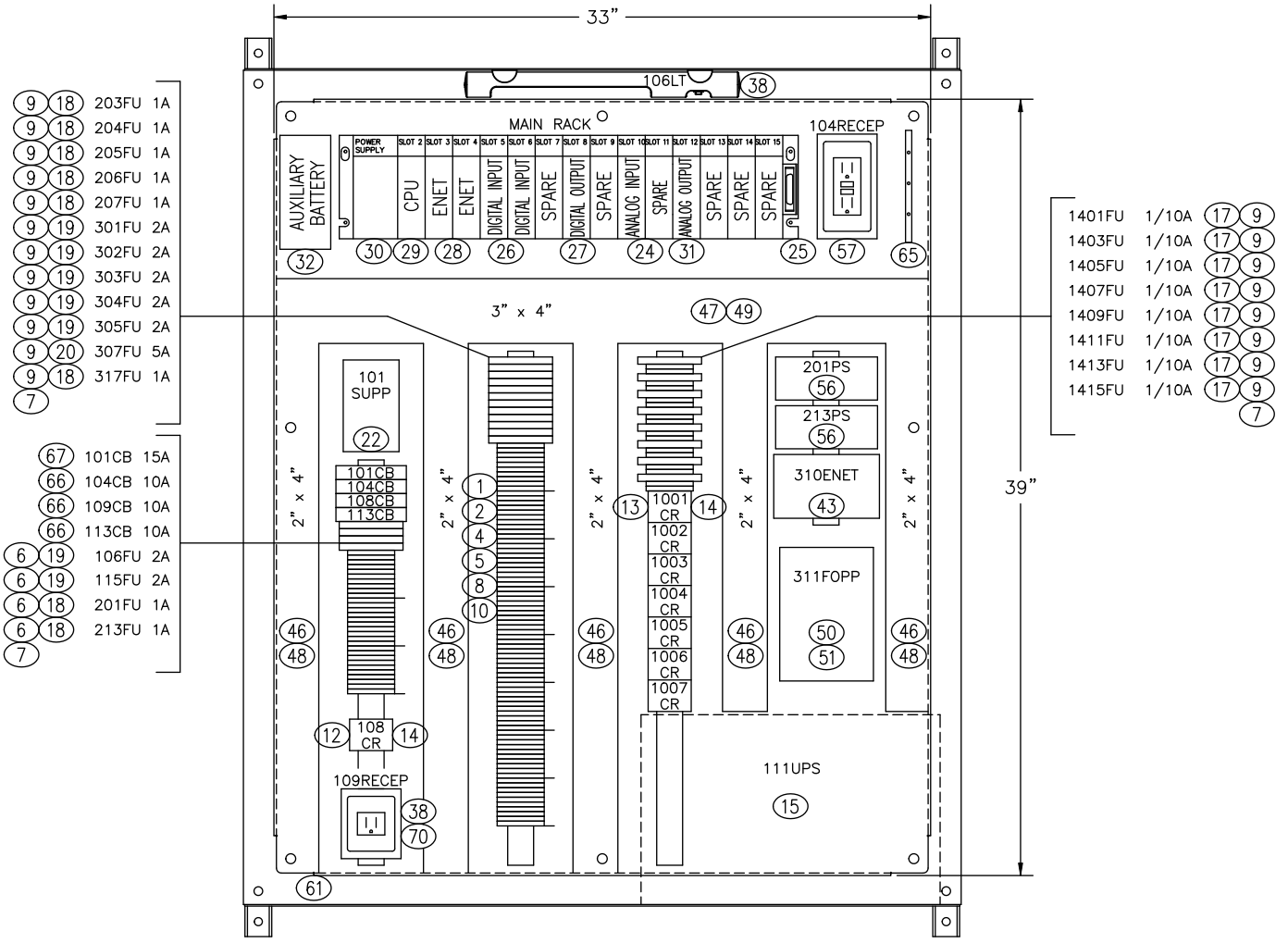
MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484-WIKSP2GW

kasa
INDUSTRIAL CONTROLS, INC.
PHONE 785-825-7181
418 East Ave. B
South Industrial Area
Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
GRAY WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
19 OF 22	8076	8076-L01



INTERIOR LAYOUT

SHOP NOTES:

1. Print five (5) extra wire labels for every terminal that receives field wiring, for use by the install electrical contractor, and ship the labels inside the control panel.
2. Install 20% spare terminals at the end of each A/C and each D/C terminal strip group.
3. Install all terminals and quantities as shown in the schematics. Include all hot and neutral terminals as shown. Follow terminal strip rotation sheet if applicable.
4. Bond all D/C terminal strip rails to the ground bar with one 8awg green wire.
5. Package all spare parts listed in the Bill of Material Spare Parts column in zip-lock bag(s) and place inside the enclosure for shipment.
6. Save all customer supplied equipment (PLC and Computer component) boxes and ship these inside or with the enclosure. If the boxes will not fit in the panel crate, see the Project Manager for instructions.

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1	SUBMITTAL	–	BF
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INTERIOR LAYOUT

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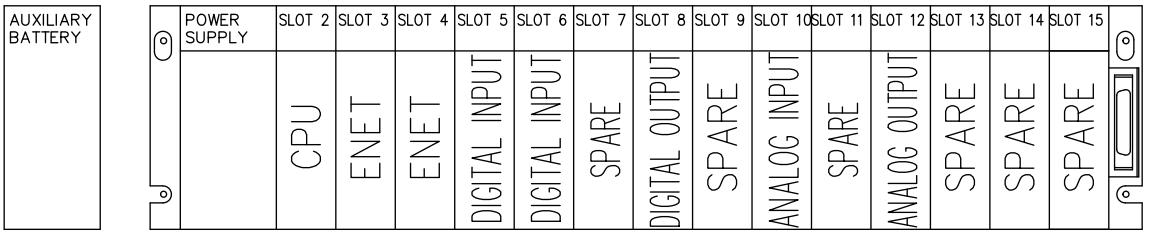
R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
20 OF 22	8076	8076-L02

MAIN RACK



Jul, 05 2016

PLC RACK LAYOUT

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R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE-USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET OF	JOB NO.	DWG. NO.
21 OF 22	8076	8076-L03

BILL OF MATERIALS

	ITEM	QTY	SPARE	MANUFACTURER	PART NO.	DESCRIPTION
	1	A/R	–	ALLEN BRADLEY	1492–DR6	TERMINAL, DIN RAIL MOUNTING, HIGH RISE
	2	15	–	ALLEN BRADLEY	1492–CJJ6–10	TERMINAL, IEC, JUMPER STRIP, CENTER, 10 POLE
	3	110	–	ALLEN BRADLEY	1492–J3	TERMINAL, IEC, 600V, 25A, 18–12AWG, GREY
	4	12	–	ALLEN BRADLEY	1492–EAJ35	TERMINAL, IEC, END ANCHOR
	5	3	–	ALLEN BRADLEY	1492–EBJ3	TERMINAL, IEC, END BARRIER, J3 TERM
	6	4	–	ALLEN BRADLEY	1492–H4	TERMINAL, FUSE HOLDER, INDICATING, 120VAC
	7	6	–	ALLEN BRADLEY	1492–N37	TERMINAL, NEMA, END BARRIER FOR FUSED TERMINAL
	8	9	–	ALLEN BRADLEY	1492–M5X12	TERMINAL, IEC, MARKER CARD, 144 LBLS, J3 TERMINALS
	9	20	–	ALLEN BRADLEY	1492–H5	TERMINAL, FUSE HOLDER, INDICATING, 24VDC
	10	10	–	ALLEN BRADLEY	1492–JG3	TERMINAL, IEC, 600V, 25A, 18–12AWG, YELLOW/GREEN
	11	–	–	–	–	–
	12	1	–	ALLEN BRADLEY	700–HA32A1	CONTROL RELAY, 2 POLE, 10A CONTACT, 120VAC COIL
	13	7	–	ALLEN BRADLEY	700–HA32Z24–4	CONTROL RELAY, 2 POLE, 10A CONTACT, 24VDC COIL
	14	8	–	ALLEN BRADLEY	700–HN125	RELAY SOCKET
‡ *	15	1	–	APC	BR1500G	UPS, AC120 V, 1500 VA
	16	–	–	–	–	–
	17	8	–	BUSSMANN	MDL 1/10–R	FUSE, 250V, 1A, 1/4" x 1 1/4", TIME DELAY
	18	8	–	BUSSMANN	MDL 1–R	FUSE, 250V, 1A, 1/4" x 1 1/4", TIME DELAY
	19	7	–	BUSSMANN	MDL 2–R	FUSE, 250V, 2A, 1/4" x 1 1/4", TIME DELAY
	20	1	–	BUSSMANN	MDL 5–R	FUSE, 250V, 5A, 1/4" x 1 1/4", TIME DELAY
	21	–	–	–	–	–
	22	1	–	EMERSON	EMC–240B	SURGE SUPPRESSOR, 120V, 15A, 700A SURGE, PARALLEL, NON–INTERRUPTING
	23	–	–	–	–	–
*	24	1	–	GENERAL ELECTRIC	IC694ALG223	PAC RX3, ANALOG INPUT, 16PT, CURRENT
*	25	1	–	GENERAL ELECTRIC	IC695CHS016	PAC RX3, 16 SLOT CHASSIS
*	26	2	–	GENERAL ELECTRIC	IC694MDL645	PAC RX3, DIGITAL INPUT, 24VDC, 16PT
*	27	1	–	GENERAL ELECTRIC	IC694MDL740	PAC RX3, DIGITAL OUTPUT, 24VDC, 16PT
*	28	2	–	GENERAL ELECTRIC	IC695ETM001	PAC RX3, ETHERNET MODULE
*	29	1	–	GENERAL ELECTRIC	IC695CPU305	PAC RX3, CPU, 1GHz, 5M MEMORY
*	30	1	–	GENERAL ELECTRIC	IC695PSA040	PAC RX3, RACK POWER SUPPLY
*	31	1	–	GENERAL ELECTRIC	IC694ALG392	PAC RX3, ANALOG OUTPUT, 8PT, CURRENT
*	32	1	–	GENERAL ELECTRIC	IC693ACC302	PLC, HIGH CAPACITY BATTERY
	33	–	–	–	–	–
	34	–	–	–	–	–
	35	A/R	–	E–RAIL	ER35P	TRACK, MOUNTING, DIN STYLE, 6ft.
	36	–	–	–	–	–
	37	1	–	EAGLE	2867	3 PRONG PLUG
	38	1	–	HOFFMAN	LEDA2S35	ENCLOSURE, LIGHTING PACKAGE, 90VAC–260VAC, WITH MOTION SWITCH
	39	8	–	IDEC	BNL–5	TERMINAL, END ANCHOR
	40	–	–	–	–	–
	41	–	–	–	–	–
	42	–	–	–	–	–
*	43	1	–	MOXA	EDS–508A–MM–SC	ETHERNET SWITCH, 6TX MM, 2 SC PORTS
	44	–	–	–	–	–
	45	–	–	–	–	–
	46	A/R	–	PANDUIT	C2WH6	WIRE DUCT, COVER, 2", WHITE, 6FT.
	47	A/R	–	PANDUIT	C3WH6	WIRE DUCT, COVER, 3", WHITE, 6FT.
	48	A/R	–	PANDUIT	G2X4WH6–A	WIRE DUCT, 2" X 4", ADHESIVE BACK, SLOT TYPE, WHITE, 6ft.
	49	A/R	–	PANDUIT	G3X4WH6–A	WIRE DUCT, 3" X 4", ADHESIVE BACK, SLOT TYPE, WHITE, 6ft.
*	50	1	–	PANDUIT	CBXF12IW–AY	FIBER OPTIC PATCH PANEL, 12 PT
*	51	12	–	PANDUIT	CMDEISCEI	PATCH PANEL ST INSERTS
	52	–	–	–	–	–
	53	–	–	–	–	–
	54	–	–	–	–	–
*	55	1	–	PHOENIX CONTACT	2402760/D27	INDUSTRIAL TOUCH PANEL PC 21.5"
*	56	2	–	PHOENIX CONTACT	29 38 58 1	POWER SUPPLY, 24VDC @ 5A, DIN–RAIL MOUNT
	57	1	–	PHOENIX CONTACT	56 00 46 2	RECEPTACLE, DUPLEX, GFCI, 20A
	58	1	–	PHOENIX CONTACT	29 63 86 0	RECEPTACLE, SIMPLEX, 15A
	59	–	–	–	–	–
	60	1	–	SAGINAW	SCE–42EL3612LP	ENCLOSURE, 42" X 36" X 12", WALL MOUNT, TYPE 12
	61	1	–	SAGINAW	SCE–42P36	ENCLOSURE, SUBPANEL
	62	1	–	SAGINAW	SCE–ELMFK4	ENCLOSURE, MOUNTING FOOT KIT
	63	–	–	–	–	–
	64	–	–	–	–	–
	65	1	–	SQUARE D	PK18GTA	GROUND BAR, 18 HOLE, 14–4AWG
	66	3	–	SQUARE D	QOU110	CIRCUIT BREAKER, 1 POLE, 120/240V, 10A
	67	1	–	SQUARE D	QOU115	CIRCUIT BREAKER, 1 POLE, 120/240V, 15A
	68	–	–	–	–	–
	69	–	–	–	–	–
	70	–	–	–	–	–

* =SUPPLIED R.E. PEDROTTI CO., INC.

‡ =SHIPS DIRECT TO JOBSITE.

Jul, 05 2016

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NO	REVISIONS	DATE	BY
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MISC.	
DATE	6/27/16
SCALE	–
DESIGNED	BF
DRAWN	GT
CHECKED	–
APPROVED	–
P.O. NO.	49484–WIKSP2GW

BILL OF MATERIALS

kasa
INDUSTRIAL CONTROLS, INC.
PHONE 785–825–7181
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Salina, KS. 67401

R.E. PEDROTTI CO., INC.
WICHITA WWTP PLANT 2
RE–USE WATER PUMP STATION
CONTROL PANEL
WICHITA, KANSAS

SHEET	JOB NO.	DWG. NO.
22 OF 22	8076	8076–BOM

PACSystems RX3i Controllers

PACSystems RX3i is the high performance, modular and scalable control system that supports the PACSystem engine. This rack-based system is built on PCI standards and provides fast, consistent control between the modules. In addition to more than one hundred discrete and process I/O points, the PACSystems RX3i features:

- **PACSystems High Availability** – This scalable, synchronized, hot-standby redundancy control platform helps ensure uninterrupted control of your applications and processes — with total transparency.
- **PACMotion Controller** – Our versatile servo motion controller combines the benefits of a highly integrated motion and machine logic solution, with the performance, flexibility and scalability required for advanced machine automation.
- **Proficy Process Systems** – A scalable, fully integrated system for process automation and control.
- **Integrated PROFINET** provides real time control of distributed I/O.
- **Proficy Machine Edition** – Develop, configure and maintain all of your control functions including motion, visualization and networking with complete software package.

PACSystems RX3i also offers an outstanding migration path for moving any Series 90 application to the PACSystems architecture.

Power Supplies pages 1.11-1.14

CPUs pages 1.7-1.8

Discrete Input Modules pages 1.14-1.16
Discrete Output Modules pages 1.22-1.26

Analog Input Modules pages 1.17-1.21
Analog Output Modules pages 1.27-1.30

Pneumatic Module page 1.51
Expansion Modules page 1.52

Baseplates page 1.10

Specialty Modules pages 1.31-1.42, 1.46

Serial Communication Modules page 1.45

PACMotion pages 1.47-1.48

Networks and Distributed I/O Systems pages 1.43-1.44

RX3i Accessories pages 1.53-1.57

RX3i Configuration Guidelines pages 1.58-1.60

α and βi Series Servo Amplifiers page 1.61

VersaMotion pages 1.62-1.70

Publication Reference Chart

GFK-2222	PACSystems CPU Reference Manual
GFK-2224	TCP/IP Ethernet Communications for PACSystems
GFK-2225	PACSystems Station Manager User's Manual
GFK-2259	C Programmer's Toolkit for PACSystems User's Manual
GFK-2308	PACSystems Hot Standby CPU Redundancy User's Manual
GFK-2314	PACSystems RX3i Hardware and Installation Manual

CPUs

The high-performance CPU is based on the latest technology processor with fast computation and high throughput. The controller can manage up to 32K of I/O in a number of standard languages. The powerful CPU enables complex applications to be easily solved with the high performance processor and up to 64 Mbytes of user memory. The RX3i supports multiple IEC languages and C programming to give you program flexibility. The RX3i increases machine cycle times, reduces downtime with its extensive diagnostics and hot swap capability, and enables you to store large amounts of data to reduce external hardware cost.

	IC695CPE305	IC695CPE310	IC695CPU320	IC695CPU315
Product Name	**RX3i CPU with built-in USB Master port, Ethernet port and serial port**	**RX3i CPU with built-in USB Master port, Ethernet port and 2 serial ports**	**RX3i CPU with two built-in serial ports**	**RX3i CPU with two built-in serial ports**
Lifecycle Status	Active	Active	Active	Active
Module Type	Controller	Controller	Controller	Controller
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Boolean Execution Speed (ms/K)	.072	.072	0.047	0.047
User Logic Memory	5Meg bytes	10Meg bytes	64Mega bytes	20Meg bytes
Battery Backed Real Time Clock	Yes	Yes	Yes	Yes
Dynamic Data Back-up	Energy Pack Support (Battery-less Backup)	Energy Pack Support (Battery-less Backup)	Battery Backup only	Battery Backup only
I/O Discrete Points	32K	32K	32K	32K
I/O Analog Points	32K	32K	32K	32K
Type of Memory Storage	SRAM, Flash	SRAM, Flash	SRAM, Flash	SRAM, Flash
Processor Speed (MHz)	1.1GHz	1.1GHz	1GHz	1GHz
USB -A 2.0 Master Port	Yes. CPU application upload/ download to a Thumb Drive or Smart Phone	Yes. CPU application upload/ download to a Thumb Drive or Smart Phone	No	No
Built-in Ethernet Ports	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only		
Built-in Serial Ports	One RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)
Total Number of Local Racks	8	8	8	8
Communications Options	Serial, Genius, CMX (Reflective Memory), Ethernet			
Field Busses/Device Networks	Ethernet (PROFINET, Ethernet Global Data, Channels, Modbus TCP Server and Client), Genius, PROFIBUS DP, DeviceNet			
Software Programming Support	Proficy Machine Edition Logic Developer Professional edition 7.0 SIM 3 or above	Proficy Machine Edition Logic Developer Professional edition 7.0 SIM 3 or above	Proficy Machine Edition Logic Developer Professional edition 5.6 or above	Proficy Machine Edition Logic Developer Professional edition 5.6 or above
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
Internal Power Used	+3.3 VDC: 1.0 A +5 VDC: 1.0 A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.5A at startup, 0.1 A during run time (Applies only if Energy Pack is connected to the CPE305.)	+3.3 VDC: 1.0 A +5 VDC: 1.0 A (up to 1.5 A if USB is fully loaded with 0.5 A) +24 VDC: 0.5A at startup, 0.1 A during run time (Applies only if Energy Pack is connected to the CPE305.)	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC	1750 mA @ 3.3VDC; 1200 mA @ 5VDC (Check Data sheet)
Number of Slots Module Occupies on Backplane	1	2	2	2

High Availability Redundant Controllers

High Availability CPU Redundancy family allows critical application or process to continue operating if a failure occurs in any single component. A High Availability system uses two or more CPUs; an active unit that actively controls the process, and one or more backup units that are synchronized with the active unit and can take over the process should it becomes necessary.

An RX3i QuadPAC solution utilizes four CRU320QP controllers — one is a master controller and three are synchronized backup controllers. The QuadPAC solution features "Smart Redundancy," a patent pending algorithm that calculates the relative system availability in real time and identifies the most available controller as master. The I/O racks may be grouped into either single (one I/O rack), redundant (two I/O racks), or triple redundant (three I/O racks) rack configurations.

	IC695CRU320	IC695CRU320QP
Product Name	**RX3i Bumpless Redundant High Availability CPU with two built-in serial ports. (Requires IC695RMX128 Data Sync Module)**	**QuadPAC CPU for RX3i Bumpless Redundant High Availability CPU with two built-in serial ports. (Requires IC695RMX128 Data Sync Module AND Quad Redundancy Solution Code)**
Lifecycle Status	Active	Active
Module Type	Redundant Controller	Quad System Redundant Controller
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Boolean Execution Speed (ms/K)	0.047	0.047
User Logic Memory	64Meg bytes	64Meg bytes
Battery Backed Real Time Clock	Yes	Yes
I/O Discrete Points	32K	32K
I/O Analog Points	32K	32K
Type of Memory Storage	SRAM, Flash	SRAM, Flash
Dynamic Data Back-up	Battery Backup only	Battery Backup only
Processor Speed	1GHz	1GHz
Built-in Communication Ports	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)	One RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master (Application code)
Total Number of Racks	8	8
Communications Options	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet
Field Busses/Device Networks	Ethernet (Ethernet Global Data, Channels, Modbus TCP Server and Client), PROFIBUS DP, DeviceNet	Ethernet (Ethernet Global Data, Channels, Modbus TCP Server and Client), PROFIBUS DP, DeviceNet
Software Programming Support	Proficy Machine Edition Logic Developer Professional edition 5.7 or above	Proficy Machine Edition Logic Developer Professional edition 7.0 SIM 8 or above
Program Languages Supported	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
Redundancy Maximum amount of data in for Syncronization	Up to 2 Mbytes beginning and end of scan	Up to 2 Mbytes beginning and end of scan
Redundancy Typical Base Sweep Time (Reference Data Transfer List Impact)	3.66 msec: 1K Discrete I/O, 125 Analog I/O and 1K Registers 3.87 msec: 2K Discrete I/O, 250 Analog I/O and 2K Registers 4.30 msec: 4K Discrete I/O, 500 Analog I/O and 4K Registers 5.16 msec: 8K Discrete I/O, 1K Analog I/O and 8K Registers	3.66 msec: 1K Discrete I/O, 125 Analog I/O and 1K Registers 3.87 msec: 2K Discrete I/O, 250 Analog I/O and 2K Registers 4.30 msec: 4K Discrete I/O, 500 Analog I/O and 4K Registers 5.16 msec: 8K Discrete I/O, 1K Analog I/O and 8K Registers
Redundancy Switchover Time	Maximum 1 logic scan, minimum 3.133 msec.	Maximum 1 logic scan, minimum 3.133 msec.
CPU Scan Syncronization	Automatic Each Scan	Automatic Each Scan
Redundant Synch LAN	Yes	Yes
Redundant I/O LAN	Yes	Yes
Internal Power Used	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC
Number of Slots Module Occupies on Backplane	2	2

High Availability Data Synch

The Redundancy Memory Xchange (RMX) module operates as a dedicated link between CPUs in an RX3i Hot Standby CPU (IC695CRU320) Redundancy system. The RMX modules provide a path for transferring data between the two redundancy CPUs in the redundant system. A complete communications path consists of one RMX in the primary unit, one RMX in the secondary unit, and two high-speed fiber optic cables connecting them to each other. One or two redundancy links are supported per high availability CPU.

	IC695RMX128
Product Name	**RX3i Control Memory Xchange Module for Peer to Peer network. 128Megbytes of user shared memory.**
Lifecycle Status	Active
Module Type	High Availability Data Syncronization Link
Backplane Support	Universal Backplane Only. Uses PCI Bus.
Sync Link Speed	2.1 Gbits/s
Communications Data Rate	2.12Gbaud
Synchronzed Link Transfer Rate	43 Mbyte/s (4 byte packets) to 174 Mbyte/s (64 byte packets)
Maximum Data Syncronization	Up to 2 megabytes. Twice per Scan.
Bus Diagnostics	Network error detection.
Redundant RMX Support	Yes
Maximum Distance Between Redundant Controllers	300 meters
Connector Type	-Fiber optic LC type, conforms to IEC 61754-20 - Zirconium ceramic ferrule -Insertion loss: 0.35 dB (maximum) -Return loss: -30dB
Internal Power Used	660 mA @ +3.3 VDC 253 mA @ +5 VDC
Number of Slots Module Occupies on Backplane	1

Baseplates

RX3i baseplates are available in 7, 12 and 16 slot configurations to the meet the needs of your application. The RX3i Universal baseplates support hot swap capability to reduce downtime. Expansion bases are available in 5 and 10 slot versions to maximize flexibility.

	IC695CHS007	IC695CHS012	IC695CHS016	IC694CHS398	IC693CHS399	IC694CHS392	IC693CHS393
Product Name	**PACSystems RX3i 7 slot high speed controller base supports only 5 serial bus slots supported. Not expandable.**	**PACSystems RX3i 12 slot high speed controller base supports PCI and serial bus**	**PACSystems RX3i 16 slot high speed controller base supports PCI and serial bus**	**PACSystems RX3i serial 5-slot Expansion Baseplate (serial bus only)**	**PACSystems RX3i serial 5-slot Remote Baseplate (serial bus only)**	**PACSystems RX3i serial 10-slot Expansion Baseplate (serial bus only)**	**PACSystems RX3i serial 10-slot Remote Baseplate (serial bus only)**
Lifecycle Status	Active	Active	Active	Active	Active	Active	Active
Module Type	Universal Controller and I/O Base	Universal Controller and I/O Base	Universal Controller and I/O Base	Standard I/O	Standard I/O	Standard I/O	Standard I/O
Backplane Support	Supports both PCI and High Speed Serial	Supports both PCI and High Speed Serial.	Supports both PCI and High Speed Serial.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.	Supports High Speed Serial Only. No PCI support.
Module Hot Swap Support	Yes	Yes	Yes	No	No	No	No
Baseplate Option	Controller Base and Ethernet Expansion Base. No local base expansion	Controller Base and Ethernet Expansion Base	Controller Base and Ethernet Expansion Base	Expansion	Expansion	Expansion	Expansion
Distance	N/A	N/A	N/A	Up to 50 feet	Up to 700 feet	Up to 50 feet	Up to 700 feet
Number of Slots	7	12	16	5	5	10	10
Dimension (W x H x D) in. (mm)	10.43 x 5.57 x 5.80 (265 x 141.5 x 147.32)	18.01 x 5.57 x 5.80 (457.5 x 141.5 x 147.32)	23.7 x 5.57 x 5.80 (601.98 x 141.5 x 147.32)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	10.43 x 5.12 x 5.59 (245 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)	17.44 x 5.12 x 5.59 (443 x 130 x 142)
Internal Power Used	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	170 mA @ 5 VDC	480 mA @ 5 VDC	150 mA @ 5 VDC	460 mA @ 5 VDC

Universal Bases Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features. The multipurpose power supplies can be configured for incremental capacity or redundancy.

	IC695PSA040	IC695PSD040	IC695PSA140	IC695PSD140
Product Name	**Power Supply, 120/240 VAC, 125 VDC (Can not be on the same backplane with more than one power supply)**	**Power Supply, 24 VDC (Can not be on the same backplane with more than one power supply)**	**Multipurpose Power Supply, 120/240 VAC, 125 VDC. Supports multiple multi-purpose power supplies.**	**Multipurpose Power Supply, 24 VDC. Supports multiple multipurpose power supplies.**
Lifecycle Status	Active	Active	Active	Active
Module Type	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	2	1	2	1
Power Source	100-240 VAC or 125 VDC	24 VDC	100-240 VAC or 125 VDC	24 VDC
Redundant and Added Capacity Support	No	No	Yes, Up to 4 Multipurpose power supplies supported on a Universal base	Yes, Up to 4 Multipurpose power supplies supported on a Universal base
Output Source	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available.	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available	40 watts total. 30 watts max at 3.3 VDC; 30 watts max at 5 VDC; 40 watts at 24 VDC Relay, no 24 VDC isolated available.
Number of Redundant Power Supplies Supported	N/A	N/A	Two Multipurpose Power Supplies are supported on the Universal Base configured for redundancy	Two Multipurpose Power Supplies are supported on the Universal Base configured for redundancy

Remote Base Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. RX3i power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC694PWR321	IC694PWR330	IC694PWR331	IC693PWR332
Product Name	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 120/240 VAC, 125 VDC**	**Power Supply, 24 VDC**	**Power Supply, 12 VDC**
Lifecycle Status	Active	Active	Active	Active
Module Type	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply
Backplane Support	Remote Bases Only	Remote Bases Only	Remote Bases Only	Remote Bases Only
Power Source	100-240 VAC or 125 VDC	100-240 VAC or 125 VDC	24 VDC	12 VDC
High Capacity	No	Yes	Yes	Yes
Output Source	30 watts total; 15 watts 5 VDC; 15 watts 24 VDC relay; 20 watts 24 VDC isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated	30 watts total; 30 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Cable Length to Redundant Power Supply Adapter	N/A	N/A	N/A	N/A
Redundant Power Supply Adapter Rack Compatibility	N/A	N/A	N/A	N/A
24 VDC Output Current Capacity	0.8 A	0.8 A	0.8 A	0.8 A

Remote Base Power Supplies

The RX3i power supply modules simply snap in just like I/O, and they work with any model CPU. Each version provides auto-ranging so there is no need to set jumpers for different incoming power levels, and they are current limiting so a direct short will shut the power supply down to avoid damage to the hardware. RX3i power supplies are tied into the performance of the CPU for simplex, fail-safe, and fault tolerance. Advanced diagnostics and built-in smart switch fusing are among the other performance and safety features.

	IC693PWR328
Product Name	**Power Supply, 48 VDC**
Lifecycle Status	Active
Module Type	Expansion Power Supply
Backplane Support	Remote Bases Only
Power Source	48 VDC
High Capacity	No
Output Source	30 watts total; 15 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
Cable Length to Redundant Power Supply Adapter	N/A
Redundant Power Supply Adapter Rack Compatibility	N/A
24 VDC Output Current Capacity	0.8 A

Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694ACC300	IC694MDL230	IC694MDL250	IC694MDL231	IC694MDL240
Product Name	**PACSystems RX3i DC Voltage Input Simulator, 8/16 Points**	**PACSystems RX3i AC Voltage Input Module, 120 VAC Isolated, 8 Point Input**	**PACSystems RX3i AC Voltage Input Module, 120 VAC Isolated, 16 Point Input**	**PACSystems RX3i AC Voltage Input Module, 240 VAC Isolated, 8 Point Input**	**PACSystems RX3i AC Voltage Input Module, 120 VAC, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Input Simulator	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	N/A	0-132 VAC	0-132 VAC	0-264 VAC	0-132 VAC
Input Current (mA)	N/A	14.5	14.5	15	12
Number of Points	16	8	16	8	16
Response Time (ms)	20 on/30 off	30 on/45 off	30 on/45 off	30 on/45 off	30 on/45 off
Trigger Voltage	N/A	74-132	74-132	148-264	74-132
Points per Common	16	1	1	1	16
Diagnostic Supported	N/A	N/A	N/A	N/A	N/A
Connector Type	Switches	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	120 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	60 mA @ 5 VDC	90 mA @ 5 VDC

Discrete I/O Modules (Input)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL260	IC694MDL241	IC694MDL632	IC694MDL634	IC694MDL645
Product Name	**PACSystems RX3i AC Voltage Input Module, 120 VAC, 32 Point Input**	**AC/DC Voltage Input Module, 24 VAC/VDC**	**PACSystems RX3i DC Voltage Input Module, 125 VDC Pos/Neg Logic, 8 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 8 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	0-132 VAC	0-30 VDC	0-150 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	12	7	4.5	7	7
Number of Points	32	16	8	8	16
Response Time (ms)	30 on/45 off	12 on/28 off	7 on/7 off	7 on/7 off	7 on/7 off
Trigger Voltage	74-132	11.5-30	90-150	11.5-30	11.5-30
Points per Common	16	16	4	8	16
Diagnostic Supported	N/A	N/A	N/A	N/A	N/A
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	90 mA @ 5 VDC	80 mA @ 5 VDC; 125 mA @ 24 VDC	40 mA @ 5 VDC	45 mA @ 5 VDC; 62 mA @ 24 VDC Isolated Isolated	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated

Discrete I/O Modules (Input)

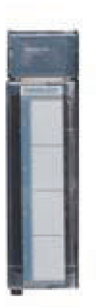
Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs

	IC694MDL646	IC694MDL654	IC694MDL655	IC694MDL660	IC695MDL664
Product Name	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, FAST, 16 Point Input**	**PACSystems RX3i DC Voltage Input Module, 5/12 VDC (TTL) Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24 VDC Pos/Neg Logic, 32 Point Input**	**PACSystems RX3i DC Voltage Input Module, 24VDC Positive Logic, Advanced Diagnostics, 16 Point Input**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	Universal PCI Slot Only
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Input Voltage Range	0-30 VDC	0-15 VDC	0-30 VDC	0-30 VDC	0-30 VDC
Input Current (mA)	7	3.0 @ 5 V, 8.5 @ 12 V	7	7	12.2
Number of Points	16	32	32	32	16
Response Time (ms)	1 on/1 off	1 on/1 off	2 on/2 off	0.5ms, 1.0ms, 2.0ms, 5ms, 10ms, 50ms and 100ms, selectable per module. On and off.	0.5ms, 1.0ms, 2.0ms, 5ms, 10ms, 50ms and 100ms, selectable per module. On and off.
Trigger Voltage	11.5-30	4.2-15	11.5-30	11.5-30	0.5 × VIN VDC
Points per Common	16	8	8	8	8
Diagnostic Supported	N/A	N/A	N/A	N/A	Open Wire, Short to DC Negative Input Pulse Test Short to DC Plus
Connector Type	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBB032 or IC694TBS032
Internal Power Used	80 mA @ 5 VDC; 125 mA @ 24 VDC Isolated	5 VDC -195 mA @ 5 VDC; 12 VDC -440 mA @ 5 VDC	195 mA @ 5 VDC	300 mA @ 5 VDC	225 mA @ 5 VDC; 95 mA @ 3.3 VDC

Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC694ALG232	IC694ALG233	IC695ALG600
Product Name	**PACSystems RX3i Analog Input, Voltage, High Density (16 Channel) 16 Bit with advanced diagnostics**	**PACSystemsRX3i Analog Input, Current, High Density (16 Channel) 16 Bit with advanced diagnostics**	**PACSystems RX3i Analog Input. Configurable per channel for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032). Cold Junction Compensation are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input	Analog Input	Universal Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	-10 V to +10 V, 0 to 10 V	0-20 mA, 4-20 mA, 4-20 mA Enhanced	Voltage: +50 mV, +150 mV, 0–5 V, 1–5 V, 0–10 V, +10 V; Current: 0–20 mA, 4–20 mA, +20 mA; Thermocouple Inputs: B, C, E, J, K, N, R, S, T; RTD Inputs: PT 385 / 3916, N 618 / 672, NiFe 518, CU 426: Resistance Inputs: 0 to 250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms
HART Support	N/A	N/A	N/A
Channel-to-Channel Isolation	No	No	Two Groups of Four
Number of Channels	16 Single Ended, 8 Differential	16	8
Update Rate	Single Ended: 5 ms for all channels Differential: 3 ms all channels	6 ms all channels	10ms per Channel; 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.
Resolution	16 bit; ±10 V, 0.3125 mV, 1 LSB; 0-10 V, 0.3125 mV, 1 LSB	16 bit; 0-20 mA, 0.625 @ 181A/bit; 4-20 mA, 0.5 @ 181A/bit; 4-20 mA Enhanced, 0.5 @181A/bit	11 to 16 bits, depending on configured range and A/D filter frequency
Accuracy	0.25% at 25ºC (77ºF)	0.25% at 25ºC (77ºF)	Calibrated Accuracy at 25°C. Better than 0.1% of range (except 10 ohm CU RTD) Accuracy depends on A/D filter, data format, input noise, and ambient temperature.
Input Impedance	500K Ohms (single-ended mode) 1 MegaOhms (differential mode)	250 ohms	Current 249 ohms ±1%
Input Filter Response	23 Hz (single-ended mode) 38 Hz (differential mode)	23 Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 1000Hz
Notch Filter	N/A	N/A	Yes
Diagnostics	Under Range/Over Range, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Under Range/Over Range, Open Wire, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open Wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low
Internal Power Used	112 mA (maximum) @ +5 VDC	120 mA @ +5 VDC	400 mA @ 5 V; 350 mA @ 3.3 V
External Power Requirement	110 mA (maximum) +24 VDC supply connected to TB1 on IC695CHSxxx	65 mA @ 24 VDC	N/A
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.



Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC695ALG608	IC695ALG616	IC695ALG628
Product Name	**PACSystems RX3i Analog Input. Configurable per channel for Current or Voltage. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Analog Input. Configurable per channel for Current or Voltage. High Density (16 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Analog Input with HART Communications. Configurable per channel for Current or Voltage. High Density (8 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input with HART Communications
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V
HART Support	N/A	N/A	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)
Channel-to-Channel Isolation	One Group of Eight	One Group of Sixteen	One Group of Eight
Number of Channels	8	16	8
Update Rate	All 8 Channels at 5 msec @ 500Hz. Performance is dependent on filtering.	All 16 Channels at 9 msec @ 500Hz. Performance is dependent on filtering.	All 8 Channels at 5 msec @ 500Hz. Performance is dependent on filtering and HART enabled channels could add 6 to 8 seconds.
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	Selectable per channel
Accuracy	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input types: 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA
Input Impedance	Current 249 ohms ±1%	Current 249 ohms ±1%	Current 249 ohms ±1%
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz
Notch Filter	Yes	Yes	Yes
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Internal Power Used	450 mA @ 5 V; 600 mA @ 3.3 V	450 mA @ 5 V; 600 mA @ 3.3 V	450 mA @ 5 V; 600 mA @ 3.3 V
External Power Requirement	N/A	N/A	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032 Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032 Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.

Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC695ALG626	IC695ALG106	IC695ALG112
Product Name	**PACSystems RX3i Analog Input with HART Communications. Configurable per channel for Current or Voltage. High Density (16 Channel) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Isolated Analog Input Configurable per channel for Current or Voltage. High Density (6 Isolated Channels) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**	**PACSystems RX3i Isolated Analog Input. Configurable per channel for Current or Voltage. High Density (12 Isolated Channels) Requires High Density Terminal Block (IC694TBB032 or IC694TBS032).**
Lifecycle Status	Active	Active	Active
Module Type	Analog Input with HART Communications	Analog Input with Channel to Channel Isolation	Analog Input with Channel to Channel Isolation
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V	Current: 0 to 20 mA, 4 to 20 mA, ±20 mA; Voltage: ±10 V, 0 to 10 V, ±5 V, 0 to 5 V, 1 to 5 V
HART Support	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)	N/A	N/A
Channel-to-Channel Isolation	One Group of Sixteen	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)
Number of Channels	16	6	12
Update Rate	All 16 Channels at 9 msec @ 500Hz. Performance is dependent on filtering and HART enabled channels could add 6 to 8 seconds.	1 ms for all channels.	1 ms for all channels
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy @ 13°C – 33°C with 8 Hz, 12 Hz and 16 Hz filter; 0 to 10 V, ±10 V input : types 10 mV0 to 5 V, 1 to 5 V, ±5 V input types: 5 mV0 to 20 mA, 4 to 20 mA, ±20 mA input types: 20 µA	±0.1% of span at 25°C, ±0.25% of span over operating temperature range	±0.1% of span at 25°C, ±.25% of span over operating temperature range
Input Impedance	Current 249 ohms ±1%	Current = 250 ohms ±1%, Voltage >= 500k Ohms	Current = 250 ohms ±1%, Voltage >= 500k Ohms
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable low-pass: 8Hz, 12Hz, 16Hz, 40Hz, 250Hz, and 1000Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 250Hz, and 1000Hz
Notch Filter	Yes	N/A	N/A
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, under range, over range, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, under range, over range, positive/negative rate of change, High, High-High, Low, Low-Low
Internal Power Used	450 mA @ 5 V; 600 mA @ 3.3 V	400 mA @ 5 V; 600 mA @ 3.3 V	800 mA @ 5 V; 600 mA @ 3.3 V
External Power Requirement	N/A	19.2 V to 30 VDC, Current required: 500 mA	19.2 V to 30 VDC, Current required: 500 mA
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.

Analog I/O Modules (Input)

GE offers easy-to-use analog modules and HART analog modules for control processes such as flow, temperature and pressure.

	IC694ALG220	IC694ALG221	IC694ALG222	IC694ALG223
Product Name	**PACSystems RX3i Analog Input, Voltage, 4 Channel**	**PACSystems RX3i Analog Input, Current, 4 Channel**	**PACSystems RX3i Analog Input,Voltage, High Density (16 Channel)**	**PACSystems RX3i Analog Input, Input, Current, High Density (16 Channel)**
Lifecycle Status	Active	Active	Active	Active
Module Type	Analog Input	Analog Input	Analog Input	Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	-10 V to +10 V	4-20 mA, 0-20 mA	-10 V to ±10 V, 0 to 10 V	0-20 mA, 4-20 mA
HART Support	N/A	N/A	N/A	N/A
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Number of Channels	4	4	1	16
Update Rate	4 ms all channels	2 ms all channels	13 ms all channels	13 ms all Channels
Resolution	12 bit; 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit	12 bit; ±10 V, 5 mV/20 µA/bit; 0-10 V, 5 mV/20 µA/bit	12 bit; 0-20 mA, 5 µA/bit; 4-20 mA, 4 µA/bit; 4-20 mA Enhanced, 5µA/bit
Accuracy	±10 mV/40µA at 25°C (77°F)	0.1 % full scale	0.25% at 25°C (77°F)	0.25% at 25°C (77°F)
Input Impedance	>9 Megohms	250 ohms	250 ohms	250 ohms
Input Filter Response	17 Hz	325 Hz	200 Hz	200 Hz
Notch Filter	N/A	N/A	N/A	N/A
Diagnositics	N/A	N/A	N/A	N/A
Internal Power Used	27 mA @ 5 VDC; 98 mA @ 24 VDC Isolated	25 mA @ 5 VDC; 100 mA @ 24 VDC Isolated	112 mA @ 5 VDC; 4150 mA- User Supplied 24 VDC	120 mA @ 5 VDC; 65 mA-User Supplied 24 VDC
External Power Requirement	N/A	N/A	N/A	N/A
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.

Analog I/O Modules (Input)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693ADC410	HE693ADC420
Product Name	**Isolated Analog Input Module, Voltage, 1500 VAC, Isolation**	**Isolated Analog Input Module, Current, 1500 VAC, Isolation**
Lifecycle Status	Active	Active
Module Type	Analog Input	Analog Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	±10 V	4-20 mA, ±20 mA
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Input Impedance	1 Megohm	100 ohms
A/D Type, Resolution	Integrating, 18 bits	Integrating, 18 bits
Useable Resolution	13 bits plus sign	13 bits plus sign
I/O Required	4 %AI, 4 %AQ, 16 %I	8 %AI, 8 %AQ, 16 %I
Sample Rate	45 channels/second	45 channels/second
Analog Filtering	1 KHz, 3 pole Bessel	1 KHz, 3 pole Bessel
Digital Filtering	1-128 samples/update	1-128 samples/update
Maximum Error	.05% full scale	.05% full scale
Common Mode Range	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Common Mode Rejection	>100 dB	>100 dB
Power Consumption at Steady State, Maximum	.7 W @ 5 V, 1.2 W @ 24 V	.7 W @ 5 V, 1.2 W @ 24 V
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
External Power Requirement	N/A	N/A
Internal Power Used	140 mA @ 5 VDC; 50 mA @ 24 VDC Relay	140 mA @ 5 VDC; 50 mA @ 24 VDC Relay

Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL310	IC694MDL330	IC694MDL340	IC694MDL390
Product Name	**PACSystems RX3i AC Voltage Output Module, 120 VAC, 0.5A, 12 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC, 1A, 8 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120 VAC, 0.5A, 16 Point Output**	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC Isolated, 2A, 5 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	85-132 VAC	85-264 VAC	85-132 VAC	85-264 VAC
Number of Points	12	8	16	5
Isolation	N/A	N/A	N/A	Yes
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	0.5 A	1 A	0.5 A	2 A
Response Time (ms)	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off
Output Type	Triac	Triac	Triac	Triac
Polarity	N/A	N/A	N/A	N/A
Points per Common	6	4	4	1
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	210 mA @ 5 VDC	160 mA @ 5 VDC	315 mA @ 5 VDC	110 mA @ 5 VDC

Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL350	IC694MDL732	IC694MDL734	IC694MDL740
Product Name	**PACSystems RX3i AC Voltage Output Module, 120/240 VAC Isolated, 2A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 8 Point Output**	**PACSystems RX3i DC Voltage Output Module, 125 VDC Pos/Neg Logic, 6 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 16 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	74-264 VAC	12-24 VDC	11-150 VDC	12-24 VDC
Number of Points	16	8	6	16
Isolation	Yes	N/A	N/A	N/A
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	Per Point 2A max. @ 30°C & 1A max. @ 60°C (Linear derating)	0.5 A	1 A	0.5 A
Response Time (ms)	1 on 1/2 cy off	2 on/2 off	7 on/5 off	2 on/2 off
Output Type	Triac	Transistor	Transistor	Transistor
Polarity	N/A	Positive	Positive/Negative	Positive
Points per Common	1	8	1	8
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	110 mA @ 5 VDC	50 mA @ 5 VDC	90 mA @ 5 VDC	110 mA @ 5 VDC

Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL741	IC694MDL742	IC694MDL752	IC694MDL753
Product Name	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Negative Logic, 0.5A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic ESCP, 1A, 16 Point Output**	**PACSystems RX3i DC Voltage Output Module, 5/24 VDC (TTL) Negative Logic, 0.5A, 32 Point Output**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic, 0.5A, 32 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	12-24 VDC	12-24 VDC	5, 12-24 VDC	12-24 VDC
Number of Points	16	16	32	32
Isolation	N/A	N/A	N/A	N/A
Diagnostics	N/A	N/A	N/A	N/A
Load Current per Point	0.5 A	1 A	0.5 A	0.5 A
Response Time (ms)	2 on/2 off	2 on/2 off	0.5 on/0.5 off	0.5 on/0.5 off
Output Type	Transistor	Transistor	Transistor	Transistor
Polarity	Negative	Positive	Negative	Positive
Points per Common	8	8	8	8
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector
Internal Power Used	110 mA @ 5 VDC	130 mA @ 5 VDC	260 mA @ 5 VDC	260 mA @ 5 VDC

Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL758	IC694MDL754	IC695MDL765	IC694MDL930
Product Name	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic with ESCP (Self Healing) per group, 0.5 A, 32 Point Output (Two groups of 16)**	**PACSystems RX3i DC Voltage Output Module, 12/24 VDC Positive Logic with ESCP (Self Healing), 0.75 A, 32 Point Output**	**RX3i DC Voltage Output Module, 24/125 volt DC 2 A Smart Digital Output module, 16 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 8 Point Output**
Lifecycle Status	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Output Voltage Range	12-24 VDC	12-24 VDC	18 to 30 VDC 105 to 132 VDC	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal
Number of Points	32	32	16	8
Isolation	N/A	N/A	N/A	Yes
Diagnostics	Electronic Short Circuit Detection Per 16 points	Short Circuit Detection	• Output Pulse Test • Over temperature • Failed Switch Detection • Overload Detection and Shutdown • No-load Detection	N/A
Load Current per Point	0.50 A	0.75 A	2 A	2 A
Response Time (ms)	0.5 on/0.5 off	0.5 on/0.5 off	1 msec maximum	15 on/15 off
Output Type	Transistor	Transistor	Transistor	Relay
Polarity	Positive	Positive	Positive	N/A
Points per Common	16	16	16	1
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	250 mA @ 5 VDC	300 mA @ 5 VDC	540 mA @ 5.1 VDC; 152 mA @ 3.3 VDC	6 mA @ 5 VDC; 70 mA @ 24 VDC Relay

Discrete I/O Modules (Output)

Input modules provide the interface between the PLC and external input devices such as proximity sensors, push buttons, switches, and BCD thumbwheels. Output modules provide the interface between the PLC and external output devices such as contactors, interposing relays, BCD displays and indicator lamps. GE offers a variety of modules that support different voltage ranges and types, current capacity, isolation and response time to meet your application needs.

	IC694MDL916	IC694MDL931	IC694MDL940	HE693RLY100	HE693RLY110
Product Name	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 4 A Isolated, 16 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.C. and Form C, 8 A Isolated, 8 Point Output**	**PACSystems RX3i AC/DC Voltage Output Module, Relay, N.O., 2 A, 16 Point Output**	**DC/AC Voltage Relay Output Module High Current**	**DC/AC Voltage Relay Output Module High Current (fused)**
Lifecycle Status	Active	Active	Active	Active	Active
Module Type	Discrete Output	Discrete Output	Discrete Output	Discrete Output	Discrete Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1	1
Output Voltage Range	5 to 125 VDC 5/24/125 VDC nominal 5 to 250 VAC (47 to 63 Hz), 120/240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	0 to 125 VDC, 5/24/125 VDC nominal 0 to 265 VAC (47 to 63 Hz), 120/240 VAC nominal	12-120 VAC, 12-30 VDC	12-120 VAC, 12-30 VDC
Number of Points	16	8	16	8	8
Isolation	Yes	Yes	N/A	N/A	Yes
Diagnostics	N/A	N/A	N/A	N/A	N/A
Load Current per Point	4 A	8 A	2 A	8 A	8 A
Response Time (ms)	10ms maximum (At nominal voltage excluding contact bounce)	15 on/15 off	15 on/15 off	11 on/11 off	11 on/11 off
Output Type	Relay	Relay	Relay	Relay	Relay
Polarity	N/A	N/A	N/A	N/A	N/A
Points per Common	1	1	4	N/A	1
Connector Type	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	300 mA @ 5 VDC from backplane maximum (all outputs ON)	6 mA @ 5 VDC; 110 mA @ 24 VDC Relay	7 mA @ 5 VDC; 135 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay	180 mA @ 5 VDC; 200 mA @ 24 VDC Relay

Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC694ALG392	IC695ALG704
Product Name	**PACSystems RX3i Analog Output, Current/Voltage, 8 Channel**	**PACSystems RX3i Analog Output, Current/Voltage, 4 Channel**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
Backplane Support	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	N/A	High and Low Alarm, Ramp Rate Control Clamping, Overrange and Underrange
Protection	Reverse polarity and undervoltage on external power supply	N/A
Range	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V
HART Support	N/A	N/A
Number of Channels	8	4
Channel-to-Channel Isolation	N/A	N/A
Update Rate	8 ms all channels	8 ms all channels
Resolution	16 bit; 0.312 mV/bit	±10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits
Accuracy	0-20 mA, 4-20 mA ±0.1% at 25ºC (77ºF); 0-10 V, -10F + 10 V ±0.25 at 25ºC (77ºF)	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C
Maximum Output Load	5 mA (2 K ohms)	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)
Output Load Capacitance	2000 pF, Inductance 1H	Current: 10uH max.; Voltage: 1uF max.
External Power Requirement	N/A	Voltage Range: 19.2 V to 30 V Current required: 160 mA
Connector Type	Terminal Block (20 screws), included with module.	IC694TBB032 or IC694TBS032. Sold Separately.
Internal Power Used	110 mA @ 5 VDC; 315 mA -User Supplied 24 VDC	375 mA @ 3.3 V (internal) 160 mA @ 24 V (external)

Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC695ALG708	IC695ALG728
Product Name	**PACSystems RX3i Analog Output, Current/Voltage, 8 Channel**	**PACSystems RX3i Analog Output with HART Communications, Current/Voltage, 8 Channel**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output with HART Communications
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	High and Low Alarm, Ramp Rate Control Clamping, Overrange and Underrange	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange
Protection	N/A	N/A
Range	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V
HART Support	N/A	-Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) -Enterprise HART Pass-Thru Command (Function 3)
Number of Channels	8	8
Channel-to-Channel Isolation	N/A	N/A
Update Rate	8 ms all channels	8 ms all channels and HART enabled channels could add 6 to 8 seconds.
Resolution	10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits	±10 V: 15.9 bits; 0 to 10 V: 14.9 bits; 0 to 20 mA: 15.9 bits; 4 to 20 mA: 15.6 bits
Accuracy	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C	Accurate to within 0.15% of full scale at 25°C. Accurate to within 0.30% of full scale at 60°C
Maximum Output Load	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)	Current -850ohm max @ Vuser = 20 V; Voltage -2k ohm max load (minimum resistance)
Output Load Capacitance	Current: 10uH max.; Voltage: 1uF max.	Current: 10uH max.; Voltage: 1uF max.
External Power Requirement	Voltage Range: 19.2 V to 30 V Current required: 315 mA	Voltage Range: 19.2 V to 30 V Current required: 315 mA
Connector Type	IC694TBB032 or IC694TBS032. Sold Separately	IC694TBB032 or IC694TBS032. Sold Separately.
Internal Power Used	375 mA @ 3.3 V (internal) 315 mA @ 24 V (external)	375 mA @ 3.3 V (internal) 315 mA @ 24 V (external)

Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	IC695ALG808	IC694ALG390	IC694ALG391
Product Name	**PACSystems RX3i Isolated Analog Output, Current/Voltage, 8 Isolated Channels**	**PACSystems RX3i Analog Output, Voltage, 2 Channel**	**PACSystems RX3i Analog Output, Current, 2 Channel**
Lifecycle Status	Active	Active	Active
Module Type	Analog Output with Channel to Channel Isolation	Analog Output	Analog Output
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Diagnostics	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange	N/A	N/A
Protection	N/A	N/A	N/A
Range	Current: 0 to 20 mA, 4 to 20 mA; Voltage: ±10 V, 0 to 10 V	-10 V to +10 V, 4-20 mA	1-5 V and 0-5 V, 0-20 mA, 4-20 mA
HART Support	N/A	N/A	N/A
Number of Channels	8	2	2
Channel-to-Channel Isolation	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)	N/A	N/A
Update Rate	8 ms all channels (1 msec per channel)	5 ms all channels	5 ms all channels
Resolution	±10 V @ 15.9 bits minimum 0 to 10 V @ 14.9 bits minimum 0 to 20 mA @ 15.9 bits minimum 4 to 20 mA @ 15.6 bits minimum	12 bit; 2.5 mV/bit	12 bit;0-20 mA, 5µA/bit
Accuracy	Accurate to within ±0.1% of span at 25C, ± 0.25% of span over operating temperature range	±5 mV at 25ºC (77ºF)	0-20 mA, ±8 µA at 25ºC (77ºF); 0-20 mA, 4-20 mA ±0.1% at 25ºC (77ºF)
Maximum Output Load	Current: 1350 ohm maximum resistance, 10uH max inductance Voltage: 2k Ohm minimum resistance, 1uF max capacitance	5 mA (2 K ohms)	5 mA (2 K ohms)
Output Load Capacitance	Current: 10uH max.; Voltage: 1uF max.	2000 pF	2000 pF, Inductance 1H
External Power Requirement	500 mA @ 24 VDC	N/A	N/A
Connector Type	IC694TBBx32 or IC694TBSx32 Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	450 mA @ 3.3 V Maximum, all channels on	32 mA @ 5 VDC; 120 mA @ 24 VDC Isolated	30 mA @ 5 VDC; 215 mA 24 VDC Isolated

Analog I/O Modules (Output)

GE offers easy-to-use analog modules for control processes such as flow, temperature and pressure.

	HE693DAC410	HE693DAC420
Product Name	**Isolated Analog Output Module, Voltage**	**Isolated Analog Output Module, Current**
Lifecycle Status	Active	Active
Module Type	Analog Output	Analog Output
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Diagnostics	N/A	N/A
Protection	N/A	N/A
Range	±10 V	4-20 mA or 0-20 mA
HART Support	N/A	N/A
Number of Channels	4	4
Channel-to-Channel Isolation	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
Update Rate	N/A	N/A
Resolution	1.2 5 mV	2.0 µA (4-20 mA); 2.5 µA (±20 mA)
Accuracy	N/A	N/A
Maximum Output Load	N/A	N/A
Output Load Capacitance	N/A	N/A
External Power Requirement	N/A	2-32 VDC
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	500 mA @ 5 VDC; 150 mA @ 24 VDC Relay	150 mA @ 5 VDC; 110 mA @ 24 VDC Relay

Analog Mixed I/O Modules (Input and Output)

The analog mixed modules (four in and two out) are available with or without advanced diagnostics. The advanced diagnostics includes alarms, open wire, rate of change, over range and under range. Additional features include 16 bit resolution, analog output clamp limits and output ramp mode option.

	IC694ALG542	IC694ALG442
Lifecycle Status	Active	Active
Module Type	**Analog Combination 4 In and 2 Out with Advanced Diagnostics, Output Clamp and Ramp Control**	**Analog Combination 4 In and 2 Out**
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA per Channel	0 V to +10 V, -10 V to +10 V, 0-20 mA, 4-20 mA per Channel
Channel-to-Channel Isolation	N/A	N/A
Number of Channels	4 in/2 out	4 in/2 out
Update Rate	2ms all channels	2ms all channels
Resolution	(Input)16 bit; 0 V to 10 V, 0.3125 mV/bit; -10 V to +10 V, 0.3125 mV/bit; 0-20 mA, 0.625 µA 4-20 mA 0.5 µA/bit (Output) 16 bit; 0 to 20 mA: 0.625 µA; 4 to 20 mA: 0.5 µA; –10 V to +10 V: 0.3125 mV; 0 to +10 V: 0.3125 mV	(Input)12 bit; 0 V to 10 V, 2.5 mV/bit; -10 V to +10 V, 5 mV/bit; 0-20 mA,4-20 mA 5&#0181A/bit (Output) 16 bit; 0.312 mV/bit; 4-20 mA 0.5 &#0181A/bit; 0-20 mA 0.625 &#0181A/bit
Accuracy	Current Input 0 to 20 mA ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range Current Input 4 to 20 mA ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range 4 to 20 mA Enhanced Mode ±0.25% of full scale @ 25°C (77°F); ±0.5% of full scale over specified operating temperature range Current Output ±0.1% of full scale @ 25°C (77°F), typical ±0.25% of full scale @ 25°C (77°F), maximum ±0.5% of full scale over operating temperature range (maximum) Voltage Output ±0.25% of full scale @ 25°C (77°F), typical ±0.5% of full scale @ 25°C (77°F), maximum ±1.0% of full scale over operating temperature range (maximum)	(Input) 0.25 % at 25&#0176C (77&#0176F) (Output) 0-20 mA, 4-20 mA ±0.1% at 25&#0176C (77&#0176F)
Input Impedence	Current mode - 250 ohms Voltage mode - 800 K ohms	Current mode - 250 ohms Voltage mode - 800 K ohms"
Input Filter Response	Current mode - 55 Hz Voltage mode - 55 Hz	Current mode - 38 Hz Voltage mode - 38 Hz
Maximum Output Load	Voltage: 5 mA (2 K ohms) Current Inductance:1 H (maximum)	Voltage: 5 mA (2 K ohms) Current Inductance:1 H (maximum) "
Output Load Capacitance	Voltage:1 µF (maximum) Current: 2000 pF (maximum)	Voltage:1 µF (maximum) Current: 2000 pF (maximum)"
Diagnostics	Under Range/Over Range, Open Wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	N/A
Internal Power Used	95 mA @ 5 VDC; 150 mA external 24 VDC Isolated	95 mA @ 5 VDC; 150 mA external 24 VDC Isolated
External Power Requirement	24VDC: Current: 5 µA/V (typical), 10 µA/V (maximum) Voltage: 25 mV/V (typical), 50 mV/V (maximum)	24VDC: Current: 5 µA/V (typical), 10 µA/V (maximum) Voltage: 25 mV/V (typical), 50 mV/V (maximum)
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.

Millivolt I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG600 Millivolt	IC695ALG306 Millivolt
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**
Lifecycle Status	Active	Active
Module Type	Millivolt Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Range	±150mV or ±50mV	±150mV or ±50mV
Diagnostics	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Number of Channels	8	6
Notch Filter	Yes	From 2.3 Hz to 28 Hz per channel
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format)	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format)
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.
Input Impedance	>1M ohm	Voltage: >=500k ohm
I/O Required	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Strain Gages Supported	Yes	Yes
Maximum Normal Voltage Input	N/A	N/A
Maximum Voltage Input	±14.5 VDC continuous	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5V; 400 mA @ 3.3V

Millivolt I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG312 Millivolt	HE693ADC409
Product Name	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Analog I/O Module, Millivolt Input**
Lifecycle Status	Active	Active
Module Type	Strain Gage Input	Millivolt Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Range	±150mV or±50mV	±25 mV, ±50 mV and ±100 mV
Diagnostics	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	N/A
Channel-to-Channel Isolation	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	N/A
Number of Channels	12	4
Notch Filter	From 2.3 Hz to 28 Hz per channel	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	3 µV, 6µV, 9µV (respectively)
Accuracy	±0.1% of voltage span at 25ºC ±0.25% of span over temperature range.	±0.5%
Input Impedance	Voltage: >=500k ohm	>20 Mohms
I/O Required	N/A	4% AI
A/D Conversion Type	Sigma Delta	Integrating
A/D Conversion Time	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	35 Channels/second
Strain Gages Supported	Yes	Bridged (load cells)
Maximum Normal Voltage Input	N/A	100 mV
Maximum Voltage Input	N/A	±35 V
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	300 mA @ 5 V; 400 mA @ 3.3 V	100 mA @ 5 VDC

RTD I/O Modules

The RTD Input Modules provide RTD inputs that allow the direct connection of 2 and 3-wire RTD temperature sensors without using external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module.

	IC695ALG600 RTD	IC695ALG508 RTD	HE693RTD600
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated RTD Input module (also supports Resistive) provides eight isolated differential Resistive or RTD input channels. Each channel can be individually configured for 2, 3, 4 wire RTD or Resistance.**	**RTD Input Module, Low Resolution**
Lifecycle Status	Active	Active	Active
Module Type	RTD Input	RTD (and Resistive) Input Channel to Channel Isolation	RTD Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Number of Channels	8	8	6
RTD Types Supported	2 and 3 wire PT 385 / 3916, N 618 / 672, NiFe 518, CU 426	2, 3 and 4 wire 50, 100, 200, 500, and 1000 ohm Pt 385; 50, 100, 200, 500, and 1000 ohm Pt 391.6; 100, 200, 500, and 1000 ohm Ni 618; 120 ohm Ni 672; 604 ohm NiFe 518; 10, 50 and 100 ohm Cu 426	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	N/A
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	N/A
Notch Filter	Yes	N/A	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	0.5ºC or 0.5ºF
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	Calibrated Accuracy at 25°C. Typical is ±0.5%	±0.5ºC, typical
Input Impedance	>1M ohm	N/A	>1000 Megohms
I/O Required	N/A	N/A	6 %AI
Fault Protection	N/A	N/A	Zener Diode Clamp
Update Time	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter)Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	50 Channels/second
A/D Conversion Type	Sigma Delta	Sigma Delta	18 bit, integrating
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 300 mA @ 3.3 V	70 mA @ 5 VDC

RTD I/O Modules

The RTD Input Modules provide RTD inputs that allow the direct connection of 2 and 3-wire RTD temperature sensors without using external signal processing (transducers, transmitters, etc.). All analog and digital processing of the RTD signal is performed on the module.

	HE693RTD601	HE693RTD660
Product Name	**RTD Input Module, High Resolution**	**RTD Input Module, Isolated**
Lifecycle Status	Active	Active
Module Type	RTD Input	RTD Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Number of Channels	6	6
RTD Types Supported	3-wire, Pt-100E, Pt-100C, Pt-100Z, Pt-1000, Cu-10, Cu-50, PT-100, Cu-53, Cu-100, Ni-120, TD5R, TD5R, Pt-90 (MIL-7990)	3 wire, Pt-100E, Pt-100C, Ni-120, Cu-10, Pt-1000,TD5R Si
Diagnostics	N/A	N/A
Channel-to-Channel Isolation	N/A	5 VAC
Notch Filter	N/A	None
Resolution	0.125ºC , 0.1ºC, or 0.1ºF	0.05ºC, 0.05ºF, 0.1ºC, 0.1ºF, 0.5ºC or 0.5ºF
Accuracy	±0.5ºC, typical	±0.3ºC
Input Impedance	>1000 Megohms	>1000 Megohms
I/O Required	6 %AI	6% AI, 6% AQ, 16% I
Fault Protection	Zener Diode Clamp	Suppression Diode
Update Time	50 Channels/second	50 Channels/second
A/D Conversion Type	18 bit, integrating	18 bit, integrating
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	70 mA @ 5 VDC	200 mA @ 5 VDC

Strain Gage I/O Modules

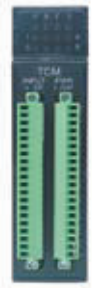
The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG600 Strain Gage	IC695ALG306 Strain Gage	IC695ALG312 Strain Gage
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**
Lifecycle Status	Active	Active	Active
Module Type	Strain Gage Input	Strain Gage Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1
Range	±150mV or ±50mV	±150mV or ±50mV	±150mV or ±50mV
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Number of Channels	8	6	12
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.
Input Impedance	>1M ohm	Voltage: >=500k ohm	Voltage: >=500k ohm
I/O Required	N/A	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Strain Gages Supported	Yes	Yes	Yes
Maximum Normal Voltage Input	N/A	N/A	N/A
Maximum Voltage Input	±14.5 VDC continuous	N/A	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 400 mA @ 3.3 V	300 mA @ 5 V; 400 mA @ 3.3 V

Strain Gage I/O Modules

The Millivolt Input Modules allow Millivolt level signals, such as bridged strain gages (load cells) to be directly connected to the PLC without external signal processing (transducers, transmitters, etc.) All analog and digital processing of the signal is performed on the module.

	IC695ALG412	HE693STG883	HE693STG884
Product Name	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV. Offers a 10 dB improvement in noise rejection compared to ALG312 thermocouple inputs.**	**Analog I/O Module, Strain Gage**	**Analog I/O Module, Strain Gage**
Lifecycle Status	Active	Active	Active
Module Type	Strain Gage Input	Strain Gage Input	Strain Gage Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Range	±50mV	N/A	N/A
Diagnostics	Open wire, Short Circuit, Positive/Negative rate of Change, High, High-High, Low, Low-Low	N/A	N/A
Channel-to-Channel Isolation	Channel to Channel Isolation. 250VAC Continuous; 1500VAC 1 minute; 2550VDC 1 second	N/A	N/A
Number of Channels	12	8	8
Resolution	32-bit IEEE floating point or 16 bit integer (in 32 bit field) input data format	0.6 µV, 0.8 µV, 0.9 µV (respectively)	0.8 µV, 1.6 µV, 3.2 µV (respectively)
Accuracy	± 0.1% of voltage sp+GC+GB59GD1+GC59163an at 25 °C. ± 0.25% of span over temperature range.	±0.3%	±0.3%
Input Impedance	Voltage: >=500k ohm	>1000 Mohms	>1000 Mohms
I/O Required	N/A	8% AI, 16% I, 8% AQ, 16% Q	8% AI, 16% I, 8% AQ, 16% Q
A/D Conversion Type	Sigma Delta	Integrating	Integrating
A/D Conversion Time	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	35 Channels/second	35 Channels/second
Strain Gages Supported	Yes	Bridged (load cells)	Bridged (load cells)
Maximum Normal Voltage Input		100 mV	100 mV
Maximum Voltage Input		±35 V	±35 V
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	425 mA @ 5 V; 400 mA @ 3.3 V	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay	60 mA @ 5 VDC; 30 mA @ 24 VDC Relay



Temperature Control Modules

The Temperature Control Module (TCM), is a high performance control module providing eight channels of thermocouple input and eight channels of control output in a single RX3i module. Each channel can operate in closed or open loop mode relieving the PLC of providing the temperature control functions. The module also supports Autotuning.

	IC693TCM302	IC693TCM303
Product Name	**PACSystems RX3i Temperature Control Module, (8) T/C, (1) RTD and (8) 24 VDC Output**	**PACSystems RX3i Temperature Control Module, Extended Range, (8) T/C, (1) RTD and (8) 24 VDC Output**
Lifecycle Status	Mature	Mature
Module Type	Temperature Control	Temperature Control
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Number of Channels	8 T/C In/ 8 DC Out	8 T/C In/ 8 DC Out
Range	J=0-600°C K=0-1050°C L=0-600°C	J=0-450°C K=0-600°C L=0-450°C
Output Voltage Range	18 to 30 volts DC	18 to 30 volts DC
Load Current per Point	100 mA maximum sourcing	100 mA maximum sourcing
Diagnostics	Open thermocouple and reverse connection detection capability Detection and indication of out-of-tolerance temperature readings	Open thermocouple and reverse connection detection capability Detection and indication of out-of-tolerance temperature readings
Connector Type	Two 20 pin connectors (screw type)	Two 20 pin connectors (screw type)
Internal Power Used	150 mA @ 5 VDC	150 mA @ 5 VDC

Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	IC695ALG600 Thermocouple	IC695ALG306	IC695ALG312	IC695ALG412
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Thermocouple Input module provides six isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±150mV or ±50mV.**	**Isolated Thermocouple Input module provides twelve isolated differential thermocouple input channels. Each channel can be individually configured for inputs from: Thermocouple types: J, K, T, E, R, S, B, N, or C and Voltage: ±50mV. The ALG412 offers a 10dB improvement in noise rejection compared to the ALG312 thermocouple input module.**
Lifecycle Status	Active	Active	Active	ACtive
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	B, C, E, J, K, N, R, S, T	J, K, T, E, R, S, B, N, or C	J, K, T, E, R, S, B, N, or C	J, K, T, E, R, S, B, N, or C
Diagnostics	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low	Open wire, Short Circuit, Positive/Negative Rate of Change, High, High-High, Low, Low-Low
Number of Channels	8	6	12	12
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Common Mode Rejection	120dB minimum @ 50/60 Hz with 8 Hz filter 110dB minimum @ 50/60 Hz with 12 Hz filter	2.3 Hz filter, 50/60Hz: 100 dB 4 Hz filter, 50Hz: 100 dB 4.7 Hz filter, 60Hz: 100 dB	2.3 Hz filter, 50/60Hz: 100 dB 4 Hz filter, 50Hz: 100 dB 4.7 Hz filter, 60Hz: 100 dB	All filters, 50/60 Hz: 110 dB
Chanel to Channel Crosstalk		70 dB minimum	70 dB minimum	70 dB minimum
Notch Filter	Yes	From 2.3 Hz to 28 Hz per channel	From 2.3 Hz to 28 Hz per channel	From 2.3 Hz to 28 Hz per channel
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	±0.1% of voltage span at 25°C. ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C ±0.25% of span over temperature range.	±0.1% of voltage span at 25°C ±0.25% of span over temperature range.
Update Rate	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	10ms per Channel; 4 Channels = 40ms (1KHz filter)127ms per Channel * 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	Configurable from 15 msec to 120 msec.
I/O Required	N/A	N/A	N/A	N/A
A/D Conversion Type	Sigma Delta	Sigma Delta	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Connector Type	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	225 mA @ 5V; 400 mA @ 3.3V	425mA @ 5V; 400 mA @ 3.3V	425mA @ 5V; 400 mA @ 3.3V

Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM166	HE693THM409	HE693THM449
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Active	Active	Active
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1
Range	J, K, N, T, E, R, S, B, C, X	J, K, N, T, E, R, S,	J, K, N, T, E, R, S,
Diagnostics	Yes	No	Yes
Number of Channels	16	4	4
Channel-to-Channel Isolation	N/A	N/A	N/A
Common Mode Rejection	N/A	N/A	N/A
Channel to Channel Crosstalk	N/A	N/A	N/A
Notch Filter	N/A	N/A	N/A
Resolution	0.5°C or 0.5°F	0.5°C or 0.5°F	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)
Update Rate	N/A	N/A	N/A
I/O Required	16% AI, 16% I	4% AI	4% AI, 16% I
A/D Conversion Type	Integrating	Integrating	Integrating
A/D Conversion Time	40 Channels/second	40 Channels/second	40 Channels/second
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 30 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay

Thermocouple I/O Modules

The Thermocouple Input Modules allow thermocouple temperature sensors to be directly connected to the PLC with external signal processing (transducers, transmitters, etc.). The module performs all analog and digital processing of the thermocouple signal. The enhanced thermocouple input modules add isolation or high-resolution. On these modules, each channel can be configured for a specific type of sensor wire. An autodetect external AD592 cold junction compensation feature is also available.

	HE693THM809	HE693THM884	HE693THM888	HE693THM889
Product Name	**Analog I/O Thermocouple Input Module**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module (Enhanced)**	**Analog I/O Thermocouple Input Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
Backplane Support	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Range	J, K, N, T, E, R, S	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S, B, C	J, K, N, T, E, R, S
Diagnostics	No	Yes	Yes	Yes
Number of Channels	8	8	8	8
Channel-to-Channel Isolation	N/A	N/A	N/A	N/A
Common Mode Rejection	N/A	N/A	N/A	N/A
Channel to Channel Crosstalk	N/A	N/A	N/A	N/A
Notch Filter	N/A	None	60 Hz	N/A
Resolution	0.5°C or 0.5°F	N/A	N/A	0.5°C or 0.5°F
Accuracy	±0.5°C, typical (J,K,N,T)	N/A	N/A	±0.5°C, typical (J,K,N,T)
Update Rate	N/A	N/A	N/A	N/A
I/O Required	8% AI	8% AI, 8% AQ, 16% I	8% AI, 8% AQ, 16% I	8% AI, 16% I
A/D Conversion Type	Integrating	Integrating	Integrating	Integrating
A/D Conversion Time	40 Channels/second	N/A	N/A	40 Channels/second
Connector Type	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
Internal Power Used	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	100 mA @ 5 VDC; 60 mA @ 24 VDC Relay	80 mA @ 5 VDC; 60 mA @ 24 VDC Relay

Resistive I/O Module

The Resistive module allows the user to easily connect to resistive loads without the need of external devices.

	IC695ALG600 Resistive	IC695ALG508 Resistive
Product Name	**Universal Analog and configurable for Current, Voltage, RTD, Thermocouple and Resistive. High Density (8 Channel) Requires Cold Junction Compensation; are available for Thermocouple configurations (IC695ACC600 contains 2 CJCs)**	**Isolated Resistive Input module (also supports RTD) provides eight isolated differential Resistive or RTD input channels. Each channel can be individually configured for 2, 3, 4 wire RTD or Resistance.**
Lifecycle Status	Active	Active
Module Type	Resistive Input	Resistive (and RTD) Input Channel to Channel Isolation
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1
Range	0 to 250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms	250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms
Diagnostics	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low	Open wire, short circuit, positive/negative rate of change, High, High-High, Low, Low-Low
Number of Channels	8	8
Channel-to-Channel Isolation	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
Notch Filter	Yes	N/A
Resolution	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format	32-bit IEEE floating point or 16-bit integer (in 32-bit field) input data format
Accuracy	Calibrated Accuracy at 25ºC. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	Calibrated Accuracy at 25ºC. Typical is ± 0.5%
Input Impedance	>1M ohm	N/A
Input Filter Response	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 1000Hz	Configurable: 2.3Hz, 4Hz, 4.7Hz, 24Hz, 28Hz
A/D Conversion Type	Sigma Delta	Sigma Delta
A/D Conversion Time	(Assumes 2 ADC's running in parallel, no CJC or lead resistance) 10ms per Channel 4 Channels = 40ms (1KHz filter) 127ms per Channel 4 Channels = 508ms (8Hz filter) Channels that are disabled are not scanned, shortening scan time.	15 msec @ 28 Hz to 120 msec @ 2.3 Hz
Maximum Voltage Input	±14.5 VDC continuous	N/A
Connector Type	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
Internal Power Used	400 mA @ 5 V; 350 mA @ 3.3 V	150 mA @ 5 V; 300 mA @ 3.3 V

Networks and Distributed I/O Systems

The RX3i features a variety of communications options for distributed control and/or I/O. Choose from PROFINET Controller, Ethernet EGD, PROFIBUS-DP, Genius and DeviceNet. These communication modules are easy to install and quick to configure.

	IC695ETM001	IC695PNC001	IC695PNS001	IC695CMX128
Product Name	**PACSystems RX3i Ethernet TCP/IP 10/100Mbits, two RJ-45 ports with built-in switch**	**PROFINET Controller (PNC) module, connects a PACSystems RX3i controller to a high-speed PROFINET local area network. It enables the RX3i controller to communicate with IO-Devices on the LAN.**	**PACSystems RX3i PROFINET Scanner (PNS) module, connects a remote node of 90-30 or RX3i modules to a PROFINET IO-Controller**	**RX3i Control Memory Xchange Module for Peer to Peer network. 128Megbytes of user shared memory.**
Lifecycle Status	Active	Active	Active	Active
Module Type	Ethernet	PROFINET Controller	PROFINET Scanner	Reflective Memory
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocol Support	SRT, Ethernet Global Data (EGD), Channels (Client and Server), Modbus TCP (Client and Server)	PROFINET	PROFINET	None Required
Entity Type	Client/Server	Master	I/O Device (Scanner)	Deterministic Peer to Peer. Programmable Interrupt support.
Communication Ports	Two RJ-45 ports one MAC Address	Two RJ-45 and Two SFP Cages (SFPs not included, available separately). 5 MAC addresses.	Two RJ-45 and Two SFP Cages (SFPs not included, available separately). 5 MAC addresses.	
Bus Speed	10/100Mbaud	10/100/1000Mbaud	10/100/1000Mbaud	Network link speed of 2.1 Gigabits/ sec. Network transfer rate of 43 Mbyte/s (4 byte packets) to 174 Mbyte/s (64 byte packets)
I/O Device Update Rate	N/A	Configurable: 1 ms to 512 ms	Configurable: 1 ms to 512 ms	
Maximum I/O Memory	N/A	128 Kbytes of combined input/output memory per PROFINET Controller	2880 bytes total: 1440 bytes of input data, 1440 bytes of output data	
System Maximum Limits	N/A	Up to 4 PNC001 per CPU IO 64 IO-Devices per Network 255 IO-Devices across 4 PROFINET controllers per CPU 256 PROFINET Slots per device 2048 Number of PROFINET Submodules per CPU	1 PNS per rack 32 input status bits and 32 output control bits	
Network Distance	Network Dependent	100 meters for cooper Up to 70,000 meters with Fiber	100 meters for cooper Up to 70,000 meters with Fiber	Multimode Fiber up to 300 meters between nodes. 10Km when HUB is used
Bus Diagnostics	Yes	Yes	Yes	Network error detection.
Number of Drops Supported	Network Dependent	64 Drops 256 Subslots	Supports number of modules allowed per rack Does not support LRE for Series 90-30 expansion racks	256
Message Size	N/A	N/A	N/A	Up to 128 Mbytes reflective memory with parity. Dynamic packet sizes of 4 to 64 bytes, automatically controlled by the CMX module
Connector Type	Two RJ-45	Two RJ-45 and two optional SFP plug connectors for copper or fiber (single or multimode) connections	Two RJ-45 and two optional SFP plug connectors for copper or fiber (single or multimode) connections	Fiber optic LC type, conforms to IEC 61754-20; Zirconium ceramic ferrule; Insertion loss 0.35 dB (maximum); Return loss -30 dB
Internal Power Used	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device) 5 V: 1.5 A maximum	3.3 V: 0.5 A with no SFP devices installed 1.2 A maximum (two SFP devices installed, 0.35 A per SFP device) 5 V: 1.5 A maximum	660 mA @ +3.3 VDC 253 mA @ +5 VDC

Networks and Distributed I/O Systems

The RX3i features a variety of communications options for distributed control and/or I/O. Choose from Ethernet EGD, PROFIBUS-DP, Genius and DeviceNet. These communication modules are easy to install and quick to configure.

	IC695PBM300	IC695PBS301	IC694BEM331	IC694DNM200
Product Name	**PACSystems RX3i PROFIBUS Master Module, Supports DPV1 Class 1 and Class 2.**	**PACSystems RX3i PROFIBUS Slave Module, Supports DPV1 Class 1 and Class 2.**	**PACSystems RX3i Genius Bus Controller**	**PACSystems RX3i DeviceNet Master Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	PROFIBUS Master	PROFIBUS Slave	Genius Bus Controller	DeviceNet Master
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	CPU Rack Only
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocol Support	PROFIBUS DPV1	PROFIBUS DPV1	Genius	DeviceNet
Entity Type	Master	Slave	Master	Master
Communication Ports	PROFIBUS DB-9 connector	PROFIBUS DB-9 connector	Screw Terminal	Screw Terminal
Bus Speed	12Mbaud	12Mbaud	153.6Kbaud	500Kbaud
I/O Device Update Rate				
Maximum I/O Memory				
System Maximum Limits				
Network Distance	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	Baud Rate Dependent. Supports all standard data rates (9.6 kBit/s, 19.2 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s and 12 MBit/s)	7500 feet (2286 meters) at 38.4 Kbaud; 4500 feet (1371 meters) at 76.8 Kbaud; 3500 feet (1066 meters) at 153.6 Kbaud extended; 2000 feet (609 meters) at 153.6 Kbaud standard. Maximum length at each baud rate also depends on cable type.	500Kbaud 100 meters to 125Kbaud 500 meters. Maximum length at each baud rate also depends on cable type.
Bus Diagnostics	Yes, Slave Status Bit Array Table, Network Diagnostic Counters, DP Master Diagnostic Counters, Firmware Module Revision, Slave Diagnostic Address	Yes, Alarms	Yes	Yes
Number of Drops Supported	Up To 125 (Requires repeater every 25 nodes)	N/A	32	64
Message Size	244 bytes of input and 244 bytes of output for each slave. Not to exceed 3584 bytes input and 3584 bytes outputs total for the system.	244 bytes of input and 244 bytes of output	128 bytes	127 bytes
Connector Type	PROFIBUS Connector	PROFIBUS Connector	Screw Terminal	Screw Terminal
Internal Power Used	420 mA @ 5 VDC	420 mA @ 5 VDC	300 mA @ 5 VDC	300 mA @ 5 VDC

Co-Processor and Serial Communications Modules

RX3i features a wide range of Specialty Modules to meet all of your application needs. From temperature controls, high-speed counters, I/O processors, coprocessors, to PID auto-tuning modules, these Specialty Modules are designed to meet the demand for versatile industrial solutions.

	IC695CMM002	IC695CMM004	IC695PRS015	HE693ASC900
Product Name	**Two Port Serial Module**	**Four Port Serial Module**	**Pressure Transducer Module supporting Honeywell LG1237 Smart Sensors**	**Horner ASCII Basic Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	Serial Communications 2 Isolated Serial Ports	Serial Communications 4 Isolated Serial Ports	Serial Communications	Serial Communications 4 Isolated Serial Ports ASCII Basic Co-Processor
Backplane Support	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Protocols Supported	Serial Read/Write Modbus Master/Slave DNP 3.0 Master/ Slave CCM Slave and Custom Protocols	Serial Read/Write Modbus Master/Slave DNP 3.0 Master/ Slave CCM Slave and Custom Protocols	Pressure Transducer Honeywell LG1237 Smart Pressure Transducer sensors (Up to 15 sensors)	N/A
Programming Languages	None required. Communications set up in Proficy Machine Edition	None required. Communication set up in Proficy Machine Edition		BASIC
Program Storage	FLASH	FLASH	FLASH	EEPROM
Communication Ports	(2) Isolated RS-232 or RS-485/422	(4) Isolated RS-232 or RS-485/422	(1) RS-485	RS-232, RS-232/485
Network Data Rate	Selectable Baud Rates: 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K	Selectable Baud Rates: 1200, 2400, 4800, 9600, 19.2K, 38.4K, 57.6K, 115.2K	375K baud	N/A
Internal Power Used	0.7 Amps maximum @ 3.3 VDC 0.115 Amps maximum @ 5 VDC	0.7 Amps maximum @ 3.3 VDC 0.150 Amps maximum @ 5 VDC	0.7 Amps maximum @ 3.3 VDC 0.115 Amps maximum @ 5.0 VDC	375 mA @ 5 VDC

Motion Control (High Speed Counting)

The High Speed Counters can be used for a wide range of applications. The following types are supported.
Type A - Up or Down-Independent Pulse-4 counters

Type B - Both Directions-A QUAD B Encoder Inputs-2 Counters

Type C - Difference Between 2 changing values-A QUAD B Encoder Inputs -1 Counter

Type D - provides homing capability with count inputs and a Home Marker input. In A quad B mode, the counter detects quadrature errors

Type E - Pre-defined Counter Type that occupies two of the module's internal counters, primarily a down counter, but can handle up counts to account for A quad B jitter

Type E counter counts down to zero, it uses a second counter block to turn on a dedicated output for a configurable time. Type E can be set up for sequenced strobing, which links all four strobes on so that they are all triggered by strobe input 1

Type Z - Two regular Clock inputs, a software controlled Preload and a special Clock Input Z. The Z input triggers a store of the Accumulator value to the Strobe 1 register. After the store, the counter can optionally reset the Accumulator to 0. It can then either restart immediately or after wait until the Clock Input Z is no longer set User-Defined Counter Type - Create a customized counter type by selecting High-Speed Counter features that are suited to the application. This counter type provides a Clear input that can be used to immediately reset the Accumulator to the starting value.

	IC694APU300	IC695HSC304	IC695HSC308	IC694APU305
Product Name	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i High Speed Counter**	**PACSystems RX3i I/O Processor Module**
Lifecycle Status	Active	Active	Active	Active
Module Type	High Speed Counter (*Enhanced Mode support: 1Mhz input frequency, expanded filtering, single ended, differential encoders, 32 bit counters, Z counter and windowing)	High Speed I/O Processing (4 counters) Module supports High Speed Counting, PLS (Programmable Limit Switch), Camming, Input Interrupts and Pulse Width Timing	High Speed I/O Processing (8 counters) Module supports High Speed Counting, PLS (Programmable Limit Switch), Camming, Input Interrupts and Pulse Width Timing	I/O Processor Module
Backplane Support	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1	1	1
Input/Output Type	Positive Logic	Positive Logic	Positive Logic	N/A
Off State Leakage Current	10 µA per point	200 µA	200 µA	10 µA per point
Output Protection	3 Amp Fuse for all points, Enhanced Module will have ESCP protection	1.5 A maximum per channel, 10.5 A maximum per module	1.5 A maximum per channel, 10.5 A maximum per module	5 A Fuse for all points
Counter Operation	Type A, Type B, and Type C Enhanced Mode Type Z	Type A, Type B, Type C, Type D, Type E, Type Z and User-Defined Counter	Type A, Type B, Type C, Type D, Type E, Type Z and User-Defined Counter	Gray Code Encoder or A Quad B Encoder every 500 microseconds
CPU Interrupt Support	No	Yes	Yes	N/A
PLS and Camming Support	No	Yes	Yes	N/A
Input Filters (Selectable)	High Frequency Filter - 2.5 µs; Low Frequency Filter - 12.5 ms; *Enhancement Mode: 5 ms, 500 µs, 10 µs and no filter	30 Hz, 5 KHz, 50 KHz, 500 KHz, 5 MHz	30 Hz, 5 KHz, 50 KHz, 500 KHz, 5 MHz	N/A
Count Rate	High Frequency - 80 kHz; Low Frequency - 20 Hz; *Enhanced Mode Up to 1MHz with 2MHz internal Oscillator	High Frequency 1.5 MHz (internal 2 MHz oscillator)	High Frequency 1.5 MHz (internal 2 MHz oscillator)	30 kHz (Absolute Encoder) 200 kHz (A Quad B Encoder)
Counter Range	-65,535 to 65,535 ; *Enhanced Mode -2,147,483,648 to 2,147,483,647 with roll over detection	-2,147,483,648 to 2,147,483,648	-2,147,483,648 to 2,147,483,648	N/A
Selectable On/Off Output Presets	Each Counter has 2 present points, On and Off; *Enhanced Mode up to 4 configurable outputs	Each Counter has 4 present points, On and Off	Each Counter has 4 present points, On and Off	N/A
Counters per Timebase	Each counter stores the number of counts that have occurred in a specified time. A timebase value measurement from 1 ms to 65535 ms is configurable.	A Timebase from 100 nanoseconds to 429,496 milliseconds can be selected for each counter.	A Timebase from 100 nanoseconds to 429,496 milliseconds can be selected for each counter.	N/A
Strobe Register	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	Each counter has one or more strobe registers that capture the current accumulator value when a strobe input transition in the direction selected during the last configuration of the module.	N/A
Local Fast Inputs	(12) 5 VDC or 10 to 30 VDC	(8 inputs) 5 VDC nominal: 4.7 VDC to 5.5 VDC 12 to 24 VDC nominal: 10 VDC to 26.4 VDC Inputs are mapped to any counter or to the controller as interrupts.	(16 inputs) 5 VDC nominal: 4.7 VDC to 5.5 VDC 12 to 24 VDC nominal: 10 VDC to 26.4 VDC Inputs are mapped to any counter or to the controller as interrupts.	(12) 8.0 VDC (non-VTTL), 1.5 VDC (TTL)
Local Fast Outputs	(4) 10 to 30 VDC @ 500 mA maximum; *Enhanced Mode: 1.5 A with ESCP 4.75 to 6 VDC @ 20 mA maximum	(7 outputs) 4.7 to 40 VDC 1.5 A maximum per channel, 10.5 A maximum per module Outputs can be used by the counters or as standard outputs from the controller.	(14 outputs) 4.7 to 40 VDC 1.5 A maximum per channel, 10.5 A maximum per module Outputs can be used by the counters or as standard outputs from the controller.	Continuous Output Current (10°V30 VDC supply) 1.0 A (each output 1-V4) 0.5 A (each output 5-V8)
Connector Type	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
Internal Power Used	250 mA @ 5 VDC	64 mA maximum @ 5 V; 457 mA maximum @ 3.3 V	94 mA maximum @ 5 V; 561 mA maximum @ 3.3 V	360 mA @ 5 VDC

PACMotion Servo Control

The PACMotion controller is a versatile servo motion controller that combines the benefits of a highly integrated motion and machine logic solution with the performance, flexibility and scalability required for advanced machine automation. PACMotion is designed to deliver unsurpassed machine productivity required for today's high-speed machines and lean manufacturing environments. The 4-axis servo motion controller is built on a high performance hardware platform, with a new enhanced motion engine, operating system, and open standard integrated programming paradigm. Add to that world-class reliability of FANUC servos and you have a motion system designed to give you the best productivity and accuracy possible. Please see GE Intelligent Platforms Motion Solutions Catalog GFA-483 for more information about motion offerings.

	IC695PMM335
Product Name	**PACMotion Module**
Lifecycle Status	Active
Module Type	Servo Motion
Backplane Support	Universal Backplane Only. Uses PCI Bus.
Number of Slots Module Occupies on Backplane	1
Motion Path Planning	1 ms, Consistent update regardless of the number of axes in the system
Position Loop Update Rate	500 µs, All axes in the RX3i rack are updated simultaneously
Velocity Loop Update Rate	125 µs, All axes in the RX3i rack are updated simultaneously
Torque Loop Update Rate	62.5 µs, All axes in the RX3i rack are updated simultaneously
Controlled Axes/Module	4 ßi, ßHVi or αHVi series servos are supported via a fiber optic interface
Master Axes/Module	1, Can be a virtual time-based or incremental encoder master
Servo Command Interface	Fiber Optic 50 Mb/s FANUC Serial Servo Bus (FSSB)
Fiber Terminal Block Cable Length	Max. 100 meters between nodes 400 meters maximum for a 4 axis system
Maximum Axes per RX3i	DC Power Supplies: 40 + 10 master axes (Requires 16 slot backplane, CPU and 4 DC power supplies) AC Power Supplies: 32 + 8 master axes (Requires 16 slot backplane, CPU and 3 AC power supplies)
Position Resolution	αHVi Series 1,048,576 counts/rev, ßi and ßHVi Series 65,536 or 131,072 counts/rev. ß2i and larger motors support the higher resolution.
Feedback Type	Incremental/Absolute Serial Encoder. Optional battery backup required for absolute feedback mode.
Faceplate I/O	24V General Purpose Inputs: 4 optically isolated; source/sink 24V High-Speed Inputs: 2 optically isolated; source/sink Open circuit detection; can be used to connect a quadrature master encoder (500 kHz max) 24V General Purpose Inputs/Outputs: 2 optically isolated; source/sink 125 mA maximum output current each "Connecto" Plug-on Screw Terminal
Floating Point Support	Yes, Double precision IEEE 754.
Module Hot Insertion/Removal	Yes
Cam Profiles per Module	256 at one time. Up to 2048 profiles can be stored in the RX3i file system for use by any module.
Synch/Delayed Start	Up to 8 axes Axes can be on any module and are synchronized over the backplane.
High Speed Position Capture	±2 Inputs per axis: ±1 count = 10 µs jitter
Connector Type	Plug-on Screw Terminal and Fiber
Internal Power Used	5 VDC 0.45A @ 5 VDC; 1.1A & 3.3 VDC

PACMotion I/O Fiber Terminal Block

The optional Fiber Terminal Block enables PACMotion controller to connect remote I/O over a fiber cable. The Fiber Terminal Block is DIN-rail mounted and can be up to 100 meters away from the PACMotion module. The module is configurable per point for 5 VDC, 24 VDC and analog I/O. The Fiber Terminal Block provides a unique ID that prevents connection to wrong PACMotion modules. The module supports up to 5 incremental encoders without marker or 4 encoders with marker pulse.

	IC695FTB001
Product Name	**PACMotion I/O Fiber Terminal Block**
Lifecycle Status	Active
Module Type	I/O Terminal Block for PACMotion
Mounting/Dimensions	35 mm DIN-rail (5.56 W x 4.94 H x 2.46 D inches; 141.2 W x 125.5 H x 62.5 D mm)
Interface to PACMotion Module	Fiber Optic Cable. Maximum cable length is 100 meters; Interface uses a unique ID for each PMM/FTB pair to prevent cross-connection.
Power Requirements	19.2 VDC —28.8 VDC; 0.45 Amps @ 24 V
24 V Outputs (differential)	Eight optically isolated; source; open load & short detection. 2 groups of 4; 0.5 A max. per point; 4 A max. per group
24 V General Purpose Inputs	Sixteen optically isolated; source/sink 4 groups of 4
5 V Outputs (differential)	Four RS422 Line Driver with short circuit protection; 48 mA max.
5 V Inputs (differential/single-ended)	Six RS422 / RS485 Line Receiver with fault detection
5 V Inputs (differential)	Six RS422 / RS485 Line Receiver with fault detection
Analog Inputs	Two, ±10V differential 14 bit resolution
Analog Outputs	Two, ±10V differential 14 bit resolution
24 V Power Output	Reverse polarity protected by replaceable fuse
5 V Power Output	0.5 amp max. electronic overload protected
Quad Encoder Open Circuit Detection	Yes
I/O Function Assignment	Configurable I/O functions are assigned during module hardware configuration
Terminal Header Options	IC694TBxx32

Motion Control (Servo Control)

Motion control integrated into the RX3i fosters high performance point-to-point applications. GE Motion Control modules can be flexibly applied to a variety of digital, analog, and stepper motion applications.

	IC694DSM324	IC694DSM314
Product Name	**PACSystems RX3i Digital Servo Module, 4-Axis (Fiber Optic Interface to Amplifiers)**	**PACSystems RX3i Digital Servo Module, 4-Axis**
Lifecycle Status	Active	Active
Module Type	Servo Motion	Servo Motion
Backplane Support	No Backplane Restrictions	No Backplane Restrictions
Number of Slots Module Occupies on Backplane	1	1
Drive	Beta i Series Digital Servos	Alpha and Beta Series Digital and Analog Servos
Drive Interface	Fiber Optic, Up to 100 meters between amplifiers with total length of 400 meters.	Digital for Alpha and Beta Series; ±10 V velocity or torque command for analog
Axes	4 Digital	2 Digital and 1 Analog or 4 Analog
Master Encoder Support	Incremental Master (1Mhz)	Incremental Master (1Mhz)
Electronic Cam	Yes	Yes
Velocity Feed-Forward	Yes	Yes
Encoder Feedback (Serial)	Yes	Yes
Temposonic Feedback	Yes	Yes
Number of Programs	15 Kbytes (10 + 40 Subroutines)	15 Kbytes (10 + 40 Subroutines)
User Memory (Number of Programs)	15 KBytes	15 KBytes
Feedback Inputs	3	3
Encoder Input Type/Maximum Rate	TTL Diff/Single, 175kHz	TTL Diff/Single, 175kHz
Analog Inputs	2	4 - In Digial Mode 8 - In Analog Mode
Analog Outputs	2	4 - In Digial Mode 0 - In Analog Mode
Internal Power Used	1360 mA @ 5 VDC	1300 mA @ 5 VDC

Power Measurement Modules

The Power Transducer Module (PTM) and Power Synchronization and Measurement (PSM) module measure and calculate critical data for control of electrical power systems and synchronization of power grids. Both the PTM and PSM connect to user supplied current and potential transformers, which translate power grid signals to proportionate, low-level signals for measurement and analysis. The PTM module is not intended to provide a protective relay function or be used for energy billing purposes. The PSM module provides ANSI protective relay calculations and revenue grade monitoring for a complete genset, paralleling switchgear or infrastructure management solution. Both the PTM and PSM consist of a processing module that plugs into the PLC backplane, an interface module for field wiring connections, and cables to interconnect the two modules. The PTM and PSM can be used with Wye or Delta type three-phase power or with single-phase power systems.

	IC693PTM101	IC694PSM001
Product Name	**Power Transducer Module Processing Module interface board (a panel mounted circuit board). This board interfaces between the Power Transducer module and the input transformers (current and potential), 1.0 meter Interface cable that connects the module to the Interface board.**	**Power Synchronization and Measurement Module and Interface Module (a panel mounted terminal block). The interface module translates power grid signals from external, user supplied potential and current transformers (PT's and CT's) to low voltage signals suitable for the processing module. 2.0 meter Interface cables connect the processing module to the Interface module.**
Lifecycle Status	Mature	Active
Module Type	Power Transducer Modules	Power Synch and Measurement Module
Input Voltage Range	10-120 VAC (nominal)	20-600 VAC (nominal)
Power Measurement Configurations	Grids / Circuits 1 / 0 0 / up to 4	Grids / Circuits 2 / 0 1 / up to 3 0 / up to 6
Current Input Range	0 to 7.5 Amps RMS (5 A RMS nominal)	0 to 7.5 Amps RMS (5 A RMS nominal)
Frequency Range	35Hz to 70Hz	40Hz to 70Hz
Output Rating	N/A	150 VAC/VDC, 1 A
Number of Outputs	0	1 (provided as redundant, isolated, solid-state contacts)
Data	Data availability • Data calculation rate: 20ms @ 50Hz, 16.67ms @ 60Hz • Data latency: 15ms @ 50Hz, 16.67ms @ 60Hz Measured Data • RMS voltage of phase A, B, and C (in Volts x 10) • RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid • DC component of measured RMS voltages (in Volts x 10) • Frequency of phase A grid 1 (in Hz x 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10) Power and Energy Data • Active and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Active and reactive total energy consumption in Watt-Seconds and Volt-Amperes-Reactive-Seconds (updated once per second), re-settable by the user • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)	Data availability • Data measurement rate: 20ms @ 50Hz, 16.67ms @ 60Hz. • Data latency: 8ms Measured Data • RMS voltage of phase A, B, and C (in Volts x 10) • RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid • DC component of measured RMS voltages (in Volts x 10) • Frequency of phase A grid 1 and phase A grid 2 (in Hz x 100) • Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10) Calculated Data • Real and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR) • Real and reactive total energy consumption, integrated over the past 1-second, in Kilo Watt-Hours (kWh) and Kilo Volt-Amperes-Reactive-Hours (kVARh) • Total power factor • Average real and reactive power consumption (sliding 15 minute window updated once per second)
Status and Diagnostics	• Module Heartbeat (indicates module health) • Utility Phase A voltage present • Phase polarity valid • Voltage measurements valid • Current measurements valid	• Module Heartbeat (indicates module health) • Field connection OK • Any grid alarm (single bit indication of power grid health) • Grid Voltage fault • Grid Current fault • Mixed Polarity fault • ANSI Protection Relay Calculations Grid Synchronization (ANSI 25) Phase Shift OK Voltage Difference OK Frequency Difference OK Close Relay OK Under Voltage alarm (ANSI 27) Reverse Power alarm (ANSI 32) Negative Sequence alarm (ANSI 46) Over Current alarm (ANSI 50) Over Voltage alarm (ANSI 59) VA Imbalance alarm (ANSI 60) Under Frequency alarm (ANSI 81U) Over Frequency alarm (ANSI 81O)
Internal Power Used	400 mA @ 5 VDC	190 mA @ 5 VDC

RX3i Pneumatic Module

This IC693MDL760 output module provides eleven pneumatic outputs and five 24 VDC sourcing outputs. For each pneumatic output, the module contains an internal 3-way solenoid-actuated valve and an associated output fitting, which is located on the front panel. When an output is turned ON, its internal valve connects a user supplied pressure source (100 psi maximum) to the output fitting. The pressure source is connected to the fitting on the bottom of the module. When the output is turned OFF, the valve's output port is vented to atmosphere inside the module. Solenoid power is supplied from an external 24 VDC source to the "DC Outputs" connector on the front panel.

	IC693MDL760
Product Name	**RX3i Solenoid Module**
Lifecycle Status	Active
Number of Points	(11) Pneumatic Outputs (5) 24 VDC Outputs
Pneumatic Outputs	11
Supply Pressure	100 PSI
Pressure Drop	25 psi max.@ 0.25scfm
External Solenoid Power	21.6-26.4 VDC, 24 VDC nominal
ON Response Time/Off Response Time	12ms max. ON 12ms max. OFF
Solenoid Inrush Current	33 mA/valve @ 24 VDC
Solenoid Holding Current	13 mA/valve @ 24 VDC
Output Fitting	Threaded for 10-32 adapter, 1/16" hose barb provided
Supply Fitting	Threaded for 10-32 adapter, 1/8" hose barb provided
Load Current per Point	0.5A @ 30 VDC per point, 2.0A total for all five points
Response Time (ms)	0.5 on/0.5 off
Output Type	Transistor
Polarity	Positive
Internal Power Used	75 mA from 5 VDC bus (solenoid LEDs are powered from external power source)

Expansion Modules for Local and Remote I/O

The RX3i supports various expansion options for local and remote I/O to optimize configurations. The RX3i can be expanded up to 8 expansion bases using local remote expansion module. The RX3i also supports Ethernet remote I/O using the RX3i Ethernet Network Interface module (IC695NKT001) Series 90-30 Ethernet Network Interface module (IC693NIU004) for more distributed I/O.

	IC695NKT001	IC693NIU004	IC695LRE001
Product Name	**PACSystems RX3i Ethernet Remote I/O Expansion Kit. Kit includes a NIU001 with two built-in serial ports and ETM001**	**PACSystems RX3i Ethernet Remote I/O Expansion (Slave)**	**PACSystems RX3i Expansion Module**
Lifecycle Status	Active	Active	Active
Module Type	Ethernet Communications (Supports redundant Ethernet modules)	Ethernet Communications	High Speed Serial Expansion Module
Backplane Support	Universal Backplane Only. Uses PCI Bus.	Compatible with Series 90-30 bases only	Universal Backplane Only
Number of Slots Module Occupies on Backplane	3 (2 for NIU and 1 for Ethernet module)	N/A	No I/O slot used
Built-in Communication Ports	RJ-45 with built-in switch. 1 RS-485 port and one RS-232 port. Supports SNP, Serial I/O, Modbus Slave and Modbus Master	N/A	N/A
I/O Discrete Points	2048 Inputs/2048 Outputs maximum	2048 Inputs/2048 Outputs maximum	N/A
I/O Analog Points	1264 Inputs and 512 Outputs maximum	1264 Inputs and 512 Outputs maximum	N/A
User Logic Memory	5Kbytes of local logic	No local logic	N/A
Network Data Rate	10/100Mbit ports (RJ-45)	10/100Mbit ports (RJ-45)	1 Mbaud
Entity Type	Slave	Slave	Master
Network Distance	Network Dependent	Network Dependent	Up to 700 feet (213 meters)
Bus Diagnostics	Supported	Supported	Yes
Number of Drops Supported	Network Dependent Each Ethernet NIU can also support up to 7 additional local I/O racks (IC694CHSxxx)	Network Dependent Each Ethernet NIU can also support up to 7 additional local I/O racks (IC694CHSxxx)	Supports 7 local expansion racks. Discrete I/O: Maximum 320 In, 320 Out, Analog I/O: Maximum 160 In, 80 Out per base
Internal Power Used	1250 mA @ 3.3 VDC; 1000 mA @ 5 VDC for NIU controller and 840 mA @ 3.3 VDC; 614 mA @ 5 VDC for each Ethernet module	1.4 Amps @ 5 VDC	132 mA @ 5 VDC

Accessories

IC694TBB032	High Density 32 Point Terminal Block Box Style	Active
IC694TBB132	High Density 32 Point Terminal Block Box Style with Extended Shroud for Large Wiring Bundles	Active
IC694TBS032	High Density 32 Point Terminal Block Spring Style	Active
IC694TBS132	High Density 32 Point Terminal Block Spring Style with Extended Shroud for Large Wiring Bundles	Active
IC694TBC032	High Density 32 Point Terminal Block with a 40 pin Fujitsu connector. Compatible with DC Inputs, Analog Modules only. Not compatible with DC or AC output modules.	Active
IC694ACC310	Filler Module, Blank Slot	Active
IC694ACC311	Terminal blocks, 20 terminals (qty 6) for IC694xxx low density modules	Active
IC695ACC600	RX3i Cold Junction Compensation Kit (Contains 2 CJCs) for Universal Analog and Thermocouple Input Modules	Active
IC698ACC701	Lithium Batter pack that installs in CPU for CPU310 and CMU310 only (28 days of continuous battery backup)	Active
IC693ACC302	External High capacity battery pack. (1.3 years of continuous battery backup for CPU310/CMU310 and 1 month for CPU320/CRU320.)	Active
IC690RBK001	Rechargeable battery kit. Includes battery (IC690RBT001) and battery charger (IC690CRG001). The rechargeable battery is compatible with PAC controllers CPU310,CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs.	Active
IC690CRG001	Battery charger. Compatible with rechargeable battery (IC690RBT001) only. The rechargeable battery is compatible with PAC controllers CPU310,CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs.	Active
IC690RBT001	Rechargeable battery is compatible with IC690CRG001 battery charger only. The rechargeable battery is compatible with PAC controllers CPU310, CPU315, CPU320 and CRU320 only. Also compatible with Series 90-30 and Series 90-70 CPUs., Series 90-30 and Series 90-70.	Active
IC690ACC001	Real Time Clock Battery for CPE305 and CPE310	Active
IC695ACC400	CPE305 and CPE310 CPU Battery-less Energy Pack for backing up dynamic data	Active
IC695CBL001	Energy Pack Cable	Active
IC690ACC901	Mini-Converter Kit with cable (RS-485/RS-232)	Active
IC690ACC903	RS-485 Port Isolator	Active
IC693CBL316	RS-232 cable for RX3i CPE305 programming port and also the Station Manager Cable for the Ethernet ETM001	Active
IC690CDR002	User Manuals, InfoLink CD-ROM Documentation, single-user license	Active
IC693ACC307	I/O Bus Terminator Plug	Active
IC693ACC311	Series 90-30 style IC693 I/O modules Terminal Blocks, 20 terminals (qty 6)	Active

External Power Supplies

IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply	Active
IC690PWR124	24 VDC, 10 Amp Output Power and 120/230 VAC Input Power Power Supply	Active

Terminal Block Quick Connect

Terminal Block Quick Connect (TBQC) for selected I/O modules enables the user to easily connect interposing terminal blocks. The TBQC consists of an I/O faceplate adapter that includes a 24 pin Fujitsu male connector (the faceplate replaces the 20 screw terminal connector on front of I/O module, not compatible with the high density 36 screw terminals), cable and interposing terminal block.

TBQC I/O Module Face Plate Adapter

IC693ACC334	I/O module face plate adapter for 20 screw type I/O modules. Faceplate provides a 24 pin male Fujitsu connector.	Active

TBQC Interposing Terminal Block

IC693ACC329	Interposing terminal block base for IC694MDL645, IC694MDL646, and IC694MDL240. The base can also be used with any 20 point terminal discrete or analog modules not listed.	Active
IC693ACC330	Interposing terminal block base for IC694MDL740 and IC694MDL742	Discontinued
IC693ACC331	Interposing terminal block base for IC694MDL741	Discontinued
IC693ACC332	Interposing terminal block base for IC694MDL940	Active
IC693ACC333	Interposing terminal block base for IC694MDL340	Active
IC693ACC337	Interposing terminal block base for IC693MDL654/655/752/753 and IC694MDL654/655/752/753	Active

TBQC Cables

IC693CBL327	Cable, Left Side, One -24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Active
IC693CBL328	Cable, Right Side, One -24 Pin 90 Degree Connector, 3 Meter. Cable has a connector on only one end and open on the other. Cable used with TBQC I/O Face Plate Adapter or Fujitsu style I/O modules.	Active
IC693CBL329	Cable, Left Side, One -24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL330	Cable, Right Side, One -24 Pin 90 Degree Connector, 1 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL331	Cable, Left Side, One -24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL332	Cable, Right Side, One -24 Pin 90 Degree Connector, 2 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL333	Cable, Left Side, One -24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active
IC693CBL334	Cable, Right Side, One -24 Pin 90 Degree Connector, 0.5 Meter. from TBQC I/O Face Plate Adapter to TBQC Interposing Terminal Block.	Active

High Density Terminal Block Quick Connect (32 point I/O terminals)

High Density Terminal Block Quick Connect (TBQC) for selected I/O modules enables the user to easily connect interpossing terminal blocks. The HDTBQC consist of a I/O module terminal block with a 40 pin Fujitsu male connector, cable and interposing terminal block. The HDTBQC is compatible with modules that accept IC694TBC032 (24 VDC discrete inputs and analog input and output modules. The HDTBQC is not compatible with discrete output modules).

HDTBQC I/O Module Face Plate Adapter

IC694TBC032	High-density, 36-point, terminal block with cable connector. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Active

HDTBQC Interposing Terminal Block

IC694RTB032	High-density remote base, 36-point, with shield ground lug and removable terminal blocks. IC695ALGxxx, IC69xMDL660 and IC694MDL664 modules only. Discrete output modules not supported.	Active

HDTBQC Interface Cables

IC694CBL005	Shielded 0.5 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL010	Shielded 1.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL030	Shielded 3.0 meter cable with termination on both ends. IC694TBC032 and IC694RTB032 only.	Active
IC694CBL130	Shielded 3.0 meter cable with termination on one end that connects to the IC694TBC032 terminal block. The other end of the cable is non-terminated wires.	Active

RMX and CMX Reflective Memory Fiber Optic Cables

Simplex LC to LC connector, Fiber-Optic Cable – Multimode 62.5 Micron core.
Simplex (single) cabling is used for daisy chaining Tx to Rx to/from another node until final device circles back to beginning node.
Each CMX module requires two Simplex cables per module.

CBL-000-F5-000	.5 feet (0.15 m)	Active
CBL-000-F5-001	1 foot (.31 m)	Active
CBL-000-F5-002	5 feet (1.52 m)	Active
CBL-000-F5-003	10 feet (3.04 m)	Active
CBL-000-F5-004	25 feet (7.62 m)	Active
CBL-000-F5-005	50 feet (15.24 m)	Active
CBL-000-F5-006	80 feet (24.40 m)	Active
CBL-000-F5-007	100 feet (30.49 m)	Active
CBL-000-F5-008	150 feet (45.72 m)	Active
CBL-000-F5-009	200 feet (60.98 m)	Active
CBL-000-F5-010	250 feet (76.20 m)	Active
CBL-000-F5-011	350 feet (106.68 m)	Active
CBL-000-F5-012	500 feet (152.15 m)	Active
CBL-000-F5-014	656 feet (200 m)	Active
CBL-000-F5-015	820 feet (250 m)	Active
CBL-000-F5-016	1,000 feet (304.30 m)	Active

Duplex LC to LC connector, Fiber-Optic Cable - Multimode 62.5 Micron core.
Duplex cabling is generally used with RMX system and is also good for CMX module to HUB connections. Duplex has a pair of cables connected together.
Each CMX module requires one Duplex cable per module to a hub.

CBL-000-F6-000	3 feet (0.9144 m)	Active
CBL-000-F6-001	6 feet (1.8288 m)	Active
CBL-000-F6-002	10 feet (3.048 m)	Active
CBL-000-F6-003	16 feet (4.8768 m)	Active
CBL-000-F6-004	32 feet (9.7536 m)	Active
CBL-000-F6-005	66 feet (20.1168 m)	Active
CBL-000-F6-006	98 feet (29.8704 m)	Active
CBL-000-F6-007	164 feet (49.9872 m)	Active
CBL-000-F6-008	230 feet (70.104 m)	Active
CBL-000-F6-009	328 feet (99.9744 m)	Active
CBL-000-F6-010	393 feet (119.7864 m)	Active
CBL-000-F6-011	426 feet (129.8448 m)	Active
CBL-000-F6-012	492 feet (149.9616 m)	Active
CBL-000-F6-013	557 feet (169.7736 m)	Active
CBL-000-F6-014	656 feet (199.9488 m)	Active
CBL-000-F6-015	721 feet (219.7608 m)	Active
CBL-000-F6-016	754 feet (229.8192 m)	Active
CBL-000-F6-017	820 feet (249.936 m)	Active
CBL-000-F6-018	885 feet (269.748 m)	Active
CBL-000-F6-019	984 feet (299.9232 m)	Active

Reflective Memory Interface Modules for PCs

PMC 5565 Reflective Memory PMC Module

PMC-5565PIORC-110000	PMC, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PMC-5565PIORC-111000	PMC, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4 K FIFOs, Single Mode Transmission	Active
PMC-5565PIORC-210000	PMC, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PMC-5565PIORC-211000	PMC, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4 K FIFOs, Single Mode Transmission	Active

PCI 5565 Reflective Memory PCI Module

PCI-5565PIORC-110000	PCI, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PCI-5565PIORC-111000	PCI, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4K FIFOs, Single Mode Transmission	Active
PCI-5565PIORC-210000	PCI, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PCI-5565PIORC-211000	PCI, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4K FIFOs, Single Mode Transmission	Active

PCI Express 5565 Reflective Memory PCIE Module

PCIE-5565RC-100000	PCI Express, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PCIE-5565RC-101000	PCI Express, 2 GIGA Baud RM w/FO Options, 128 Mbyte Memory, 4K FIFOs, Single Mode Transmission	Active
PCIE-5565RC-200000	PCI Express, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4K FIFOs, Multimode Transmission	Active
PCIE-5565RC-201000	PCI Express, 2 GIGA Baud RM w/FO Options, 256 Mbyte Memory, 4K FIFOs, Single Mode Transmission	Active

CMX and RMX Reflective Memory HUB (Contact GE for additional HUB configurations)

HUB-5595-308	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Multimode Pluggable transceivers	Active
HUB-5595-380	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Single mode Pluggable transceivers	Active
ACC-5595-208	Rack Mount or Desktop Reflective Memory Hub. Universal power supply, 1x 10BaseT Ethernet, 1x RS232, 8x multimode pluggable transceivers	Active
ACC-5595-280	Rack Mount or Desktop, 8 Single mode Pluggable Transceivers. And no Multimode Pluggable Transceivers	Active

Starter Kits (Only one starter kit per customer per customer site)

IC695STK001	RX3i Controller PACkage 1 Starter Kit includes RX3i with software. (includes one each IC695CPU305, IC695CHS012, IC695LRE001, IC695PSA040, IC695ETM001, IC694ACC300, IC694MDL940 and IC646MPP001.) Limited one RX3i starter kit per customer site.	Active
IC695STK002	RX3i with Control and View. Power PACkage 2 Starter Kit includes RX3i and QuickPanel View 6" STD with software. (includes one each IC695CPU305, IC695CHS012, IC695LRE001, IC695PSA040, IC695ETM001, IC694ACC300, IC694MDL940, IC754VSI06STD, BC646MQP001, IC646MPP001 and DC power supply for QuickPanel) Limited one RX3i starter kit per customer site.	Active
IC695STK003	RX3i, The Complete PACkage with Control, Motion and View. Power PACkage 3 Starter Kit includes RX3i, motion module (Servo and Amplifier sold separately) and QuickPanel View 6" STD with software. (includes one each IC695CPU305, IC695CHS012, IC695LRE001, IC695PSA040, IC695ETM001, IC694DSM314, IC694ACC300, IC694MDL940, IC754VSI06STD, BC646MQP001, IC646MPP001 and DC power supply for QuickPanel) Limited one RX3i starter kit per customer site.	Active
IC695STK004	RX3i Power PACkage 4 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSA040, IC695ETM001, IC646MPP101)	Active
IC695STK005	RX3i Power PACkage 5 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSA040, IC646MPP101)	Active
IC695STK006	RX3i Power PACkage 6 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSD040, IC695ETM001, IC646MPP101)	Active
IC695STK007	RX3i Power PACkage 7 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSD040, IC646MPP101)	Active
IC695STK010	RX3i CPE 305, RX3i PROFINET Controller Module, RX3i 7-slot base, RX3i AC Power Supply, RX3i 8 Point Input Simulator, RX3i 16 Point DC Outlet Module, VersaMax PROFINET Slave Module, VersaMax AC Power Supply, Mixed Discrete Module, Input Simulator, I/O Base, Proficy* Machine Edition Professional Software	Active

Demo Cases

IC695DEM001	RX3i Power PACkage 1 Demo Case that includes CPU, P/S, discrete I/O and analog I/O, high speed counter, Ethernet and analog simulator. Proficy Machine Edition Professional Edition included.	Active
IC695DEM002	RX3i Power PACkage 2 Demo Case that includes RX3i and QP Control/View. Includes CPU, P/S, discrete I/O and analog I/O, Ethernet, analog simulator, 6" TFT QuickPanel View/Control. Proficy Machine Edition Professional Edition included.	Active
IC695DEM004	Beta i Series 1-Axis Motion Demo Case. Demo case is a self contained table top demo that includes a DSM324i module, Beta i motor and amplifier prewired for connection to a DSM324i motion module. The cables (1 meter) for connection to the DSM324i 5 V I/O and FSSB fiber optic command interface are included. Demo includes an E-stop push button and toggle switches for 5 DSM324i I/O points.	Active

IC694 Rack to Rack Expansion Cables

IC693CBL300	Cable, I/O Base Expansion, 1 Meter, Shielded	Active
IC693CBL301	Cable, I/O Base Expansion, 2 Meters, Shielded	Active
IC693CBL302	Cable, I/O Base Expansion, 15 Meter, Shielded with built-in terminator	Active
IC693CBL312	Cable, I/O Base Expansion, 0.15 Meter, Shielded	Active
IC693CBL313	Cable, I/OBase Expansion, 8 Meters, Shielded	Active
IC693CBL314	Cable, I/O Base Expansion, 15 Meters, Shielded with no built-in terminator	Active
IC693ACC307	I/O Bus Terminator Plug	Active

Configuration Guidelines

When configuring a RX3i the following guidelines should be considered:

1. IC695 part numbers can only be installed in a Universal Rack (IC695CHSxxx).
2. CPU, NIU and AC Power Supply require 2 slots each on the base plate.
3. IC695 I/O modules and high density IC694 I/O modules require a terminal block assembly. IC694TBSxxx (spring clamp termination) or IC694TBBxxx (box style termination) are required.
4. If the CPU is powered down frequently a high capacity battery should be considered. (IC693ACC302)

Examples of Typical Application

Configuration for Controller (Example application requiring (120) 24 VDC inputs and (80) Relay outputs AC power supply)

Backplane Slots Required	Power Supply Current Required (mA)	Qty	Part Number	Description
2	1000 mA @ 3.3 VDC; 1000 mA @ 5 VDC	1	IC695CPE310	CPU with two built-in serial ports
2		1	IC695PSA040	120/240 VAC, 125 VDC Power Supply, current available 9 Amps @ 3.3 VDC; 6 Amps @ 5 VDC; 1.6 Amps @ 24 VDC maximum
	600 mA @ 3.3 VDC; 240 mA @ 5 VDC	1	IC695CHS016	16 Slot Universal Base
4	1200 @ 5 V	4	IC694MDL660	Discrete Input Module, 24 VDC Positive Logic, 32 points (Requires terminal block)
5	35 mA @ 5 V; 110 mA @ 24 VDC Relay	5	IC694MDL940	Discrete Output Module, Relay 2.0 A per point Form A, 16 points (Terminal block included).
		4	IC694TBB032	Terminal Block, Box Style
		1	IC646MPP001	Logic Developer -PLC Professional
13	Total current from power supply required: 2475 mA @ 5 V; 1600 @ 3.3 V; 110 mA @ 24 VDC Relay. Only one power supplied needed.			

Options to consider

	840 mA @ 3.3 VDC; 614 mA @ 5 VDC	1	IC695ETM001	Ethernet module 10/100Mbits
		1	IC690PWR024	24 VDC, 5 Amp Output Power and 120/230 VAC Input Power Power Supply
		1	IC754VSI06STD	QuickPanel View Intermediate 6 inch STN Touch Operator Interface

EDS-505A/508A/516A Series

5, 8, and 16-port managed Ethernet switches

- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Easy network management by web browser, CLI, Telnet/serial console, Windows utility, and ABC-01

Introduction

The EDS-505A/508A/516A are standalone 5, 8, and 16-port managed Ethernet switches. With their advanced Turbo Ring and Turbo Chain technology (recovery time < 20 ms), RSTP/STP, and MSTP support the EDS-505A/508A/516A switches increase the reliability and availability of your industrial Ethernet network. Models with an wide operating temperature range of -40 to 75°C are also available, and the switches support advanced management and security features, making the EDS-505A/508A/516A switches suitable for any harsh industrial environment.

Features and Benefits

- Command Line Interface (CLI) for quickly configuring major managed functions
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Software-based IEEE 1588 PTPv2 (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Support EtherNet/IP and Modbus/TCP protocols for device management and monitoring
- Compatible with PROFINET protocol for transparent data transmission
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- RMON for efficient network monitoring and proactive capability
- SNMPv1/v2c/v3 for different levels of network management
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Bandwidth management to prevent unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Automatic warning by exception through e-mail, relay output

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
IEEE 802.1D-2004 for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1s for Multiple Spanning Tree Protocol
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, EtherNet/IP, Modbus/TCP, LLDP, IEEE 1588 PTPv2, IPv6, NTP Server/Client
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit (EDS-505A/508A), 2 Mbit (EDS-516A)

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve (EDS-505A/508A series only)

LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
- +13 to +30V for state "1"
- -30 to +3V for state "0"
- Max. input current: 8 mA

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable
d. 9/125 µm single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current:
EDS-505A: 0.24 A @ 24 V
EDS-505A-MM/SS: 0.35 A @ 24 V
EDS-508A: 0.26A @ 24 V
EDS-508A-MM/SS: 0.36 A @ 24 V
EDS-516A: 0.41 A @ 24 V
EDS-516A-MM: 0.51 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection
Dimensions:
EDS-505A/508A Series: 80.2 x 135 x 105 mm
(3.16 x 5.31 x 4.13 in)
EDS-516A Series: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight:
EDS-505A/508A Series: 1040 g
EDS-516A Series: 1586 g
Installation: DIN-rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Standards and Certifications

Safety: UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN 60950-1
Hazardous Location:
UL/cUL Class 1 Division 2 Groups A/B/C/D,
ATEX Zone 2 Ex nA nC IIC T4 Gc
EMI: FCC Part 15 Subpart B Class A, EN 55022 Class A
EMS:
EN 61000-4-2 (ESD) (EDS-505A/508A: Level 3; EDS-516A: Level 2),
EN 61000-4-3 (RS) Level 3, EN 61000-4-4 (EFT) Level 2,
EN 61000-4-5 (Surge) Level 3, EN 61000-4-6 (CS) Level 3,
EN 61000-4-8
Marine: DNV, GL
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)

Time:
EDS-505A Series: 352,000 hrs
EDS-508A Series: 339,000 hrs
EDS-516A Series: 247,000 hrs
Database: Telcordia (Bellcore), GB

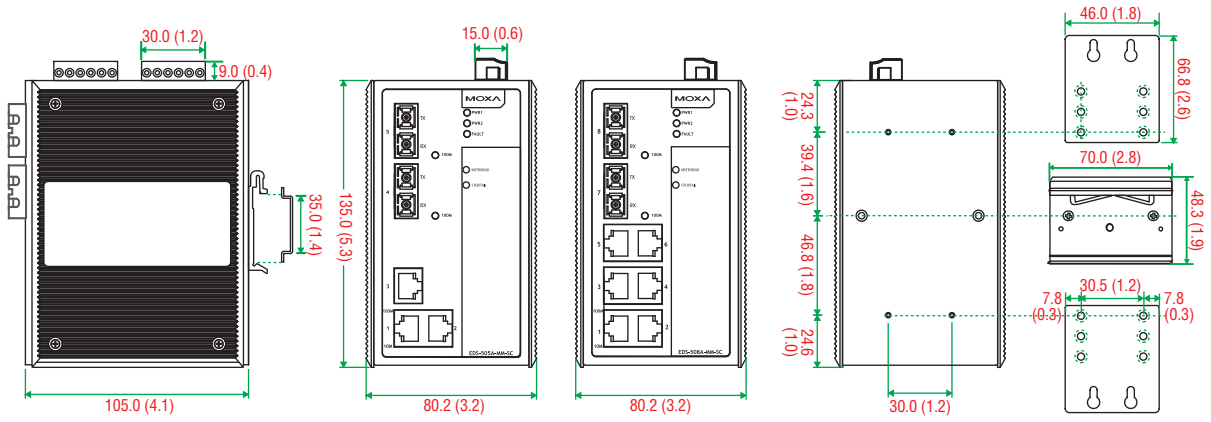
Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)

EDS-505A/508A Series

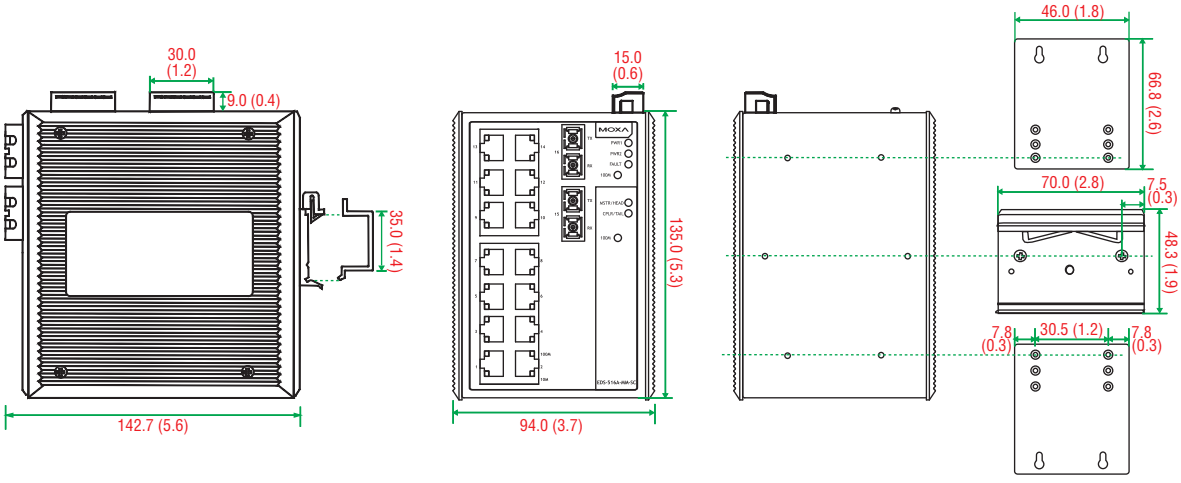


Side View | Front View | Rear View | DIN-Rail/Panel Mounting Kit

Dimensions

Unit: mm (inch)

EDS-516A Series



Side View | Front View | Rear View | DIN-Rail/Panel Mounting Kit

Ordering Information

Available Models		Port Interface				
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 75˚C)	10/100BaseT(X)	100BaseFX			
			Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
EDS-505A/508A Series						
EDS-505A/508A	EDS-505A/508A-T	5/8	–	–	–	–
EDS-505A/508A-MM-SC	EDS-505A/508A-MM-SC-T	3/6	2	–	–	–
EDS-505A/508A-MM-ST	EDS-505A/508A-MM-ST-T	3/6	–	2	–	–
EDS-505A/508A-SS-SC	EDS-505A/508A-SS-SC-T	3/6	–	–	2	–
EDS-508A-SS-SC-80	–	6	–	–	–	2
EDS-516A Series						
EDS-516A	EDS-516A-T	16	–	–	–	–
EDS-516A-MM-SC	EDS-516A-MM-SC-T	14	2	–	–	–
EDS-516A-MM-ST	EDS-516A-MM-ST-T	14	–	2	–	–

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, 500, 1000, or 2000 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

Package Checklist

- EDS-505A or EDS-508A or EDS-516A switch
- RJ45 to DB9 console port cable
- Protective caps for unused ports
- Documentation and software CD
- Hardware installation guide (printed)
- Warranty card

Panel PC - VL PPC 2000 - 2402760

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15" display shown

IP65-rated industrial panel PC (PPC) with fanless design. Energy-efficient Intel® quad-core Celeron® N2930 processor. Up to 8 GB of RAM. Mass storage options include CFast®, HDD and SSD formats.

Product Description

Phoenix Contact Valueline industrial computer with configuration options. Options include display, data storage, RAM, CFast® slots, and mounting method.

Product Features

- Wide variety of touch screen display sizes with or without USB port
- Compact, rugged housing
- 12-in. to 24-in. touch screen displays
- Flexible mounting options
- Wall, bookshelf or panel mounting
- Easily removable rotating or solid-state hard drives in a variety of sizes
- Two integrated 10/100/1000 Ethernet ports with independent MAC addresses
- USB 2.0 and 3.0 ports
- Up to 16 GB RAM

Key Commercial Data

Packing unit	1 pc
Weight per Piece (excluding packing)	1.0 g
Custom tariff number	84714100
Country of origin	Taiwan

Configuration

Display	21.5" LCD RTOUCH [D27]
Mounting	Panel Mounting [A20]
IPC Module	Celeron QuadCore 1.86 GHz [I32]
Main memory	8 GB DDR3 [R27]
Master Storage	80GB Solid State Drive (MLC) [M51]
Operating system	WIN 7 Pro SP1 64 - English [OS38]

Panel PC - VL PPC 2000 - 2402760

Expansion Option	None [T00]
PCI Option 1	None [EP0]
PCI Option 2	None [EP0]
Software Option	None [S00]

Technical data

Note

Utilization restriction	EMC: class A product, see manufacturer's declaration in the download area

Display

Display	30.7 cm/12.1" TFT
	38.1 cm/15" TFT
	43.0 cm/ 17" TFT
	48.3 cm/19" TFT
	54.6 cm/21.5" TFT
	47.0 cm/18.5" TFT
	38.1 cm/15" TFT STAINLESS
	38.1 cm / 15"-TFT USB BK
	30.7 cm / 12.1"-TFT FRONT USB
	38.1 cm / 15"-TFT FRONT USB
	43.0 cm / 17" TFT FRONT USB
	48.3 cm / 19" TFT FRONT USB
	60.9 cm / 24" TFT FRONT USB
Resolution	800 x 600 Pixel (SVGA)
	1024 x 768 Pixel (XGA)
	1280 x 1024 Pixel (SXGA)
	1366 x 768 Pixel (HD)
	1920 x 1080 Pixel (Full HD)
Backlighting	LED
Display backlight MTBF	Dependent on configuration

Computer data

Processor	Intel® Celeron® N2930 1.83 GHz/2.16 GHz
Processor fan	without fan
Operating systems	without operating system
	Windows® 7 Professional, German
	Windows® 7 Professional SP1 (32-Bit), English
	Windows® 7 Professional SP1, German
	Windows® 7 Professional SP1 (64-Bit), English

Panel PC - VL PPC 2000 - 2402760

Technical data

Computer data

	Windows® 7 Professional SP1 64 bit (German)
	Windows® 7 Ultimate SP1 (64 bit), Multi-language
	Windows® 7 Ultimate SP1, Multi-language
	Windows® Embedded Standard 7 SP1
RAM	4 GB DDR3 SODIMM
	8 GB DDR3 SODIMM
Mass storage	without mass storage
	16 GB SSD (SLC)
	32 GB SSD (SLC)
	80 GB SSD (MLC)
	160 GB SSD (MLC)
	4 GB CFast® card
	8 GB CFast® card
	16 GB CFast® card
	32 GB CFast® card
	320 GB HDD 2,5" SATA
Network	2x Ethernet (10/100/1000 Mbps), RJ45
Network chipset	Intel® I210-AT
Interfaces	1x COM (RS-232/422/485)
	3x USB 2.0
	1x USB 3.0
Monitor output	1x DisplayPort
	1x VGA
Optional interfaces	with front USB
Optical drive	Without drive
Realtime clock	Yes (battery-backed)
Service life of battery	5 years (typical)

General

Mounting type	Front installation

Ambient conditions

Degree of protection	IP65 (front), IP20 (back)
Ambient temperature (operation)	-20 °C ... 55 °C (Configuration options can affect the operating temperature. See user manual for details)
Ambient temperature (storage/transport)	-40 °C ... 70 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)

Panel PC - VL PPC 2000 - 2402760

Technical data

Ambient conditions

Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)
Vibration (operation)	IEC 60068-2-27
Shock	15g, 11 ms impulse in accordance with IEC 60068-2-27

Device supply

Supply voltage	24 V DC (typical)
Supply voltage range	19.2 V DC ... 28.8 V DC
Power supply unit	24 V DC ±20 %

Standards and Regulations

Shock	15g, 11 ms impulse in accordance with IEC 60068-2-27
Vibration (operation)	IEC 60068-2-27

Classifications

eCl@ss

eCl@ss 4.0	27360102
eCl@ss 4.1	27360102
eCl@ss 5.0	27360102
eCl@ss 5.1	27242301
eCl@ss 6.0	27242301
eCl@ss 7.0	27242301
eCl@ss 8.0	27242301
eCl@ss 9.0	19200103

ETIM

ETIM 3.0	EC001414
ETIM 4.0	EC001414
ETIM 5.0	EC001414

UNSPSC

UNSPSC 6.01	43172015
UNSPSC 7.0901	43201404
UNSPSC 11	43172015
UNSPSC 12.01	43201404
UNSPSC 13.2	43201404

Accessories

Accessories

Wonderware HMI and Supervisory Solutions

What's New in 2014 R2

With smart new engineering tools and rich content, Wonderware InTouch 2014 R2 and Wonderware System Platform 2014 R2 do more than ever to simplify design, increase efficiency, improve usability, increase operator awareness and effectiveness, and maximize the management and efficient storage and utilization of historical alarm and event data. 2014 R2 also includes improved diagnostics and improved support for continued operation of redundant environments during upgrades, plus so much more...

Wonderware® by Schneider Electric

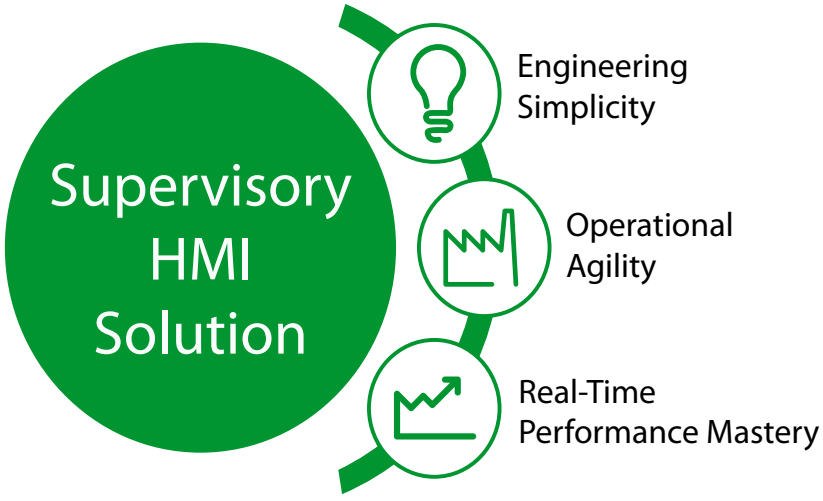
Wonderware HMI and Supervisory Solutions Features

RELEASE AT A GLANCE

- Improves Best Practices in HMI Design
- Advances Situational Awareness even further
- Improves Engineering Usability
- Extends Connectivity and Integration

Why upgrade to System Platform and InTouch 2014 R2?

1. Simple to follow Best Practices in HMI Design and new out-of-the-box content
2. Extensive Design Tools to deliver Situational Awareness
3. Simplified Installation Workflow
4. Simplified Design Workflow and Graphic Library
5. Localized InTouch Graphic Editor
6. Improved Alarm management
7. Improved Engineering Workflows for connectivity
8. Superior upgrade experience of redundant environments
9. Exceptional Engineering Re-use
10. Improved diagnostics and management capabilities
11. Continuation of unrivaled uninterrupted migration path from legacy applications



Wonderware HMI and Supervisory Solutions Features (continued)

Overview - What's New in 2014 R2?

Wonderware System Platform

Wonderware Application Server

Wonderware InTouch

Promote Best Practices in HMI Design

Simple to follow Best Practices in HMI Design and new easy-to-use conversion tools reduce engineering costs and time and ensure consistency of HMI designs. These shorten design time and the learning curve for novice engineers. Design efficiency is maximized so engineers attain the greatest gains with less effort and continue to take advantage of engineering re-use. Upgrading existing applications is quick and convenient — easily convert older applications to advanced graphics using the latest technology.

Increase Operator Awareness

Extensive improvements in Situational Awareness and alarm management capabilities extend real-time visibility into your processes and minimize nuisance alarms. These improvements greatly enhance the ability for both experienced and entry-level operators to focus on what is most important and helps them identify, understand, react to and resolve, abnormal situations more easily. The Situational Awareness Symbol Library has been expanded to enable faster HMI design, greater standardization, and superior operator proficiency. Anything you can imagine for HMI can be created quickly and easily with a few clicks. Millions of preconfigured and pretested combinations and orientations of Symbols are available making this the largest Situational Awareness object library on the planet.

Superior Engineering Usability

New and extensive design tools, simplified design workflows and an enhanced graphical library enable engineers to deliver consistent goal-oriented HMI designs. Designs like these maximize operator focus, improve business value and increase the safety of the entire industrial system.

Simplest Field Device Connectivity

Wonderware software is built upon an unequalled open architecture that easily connects to any device. 2014 R2 makes device connectivity even simpler – improved engineering workflows for connectivity to all major brand controllers drastically reduces engineering time and pre-validation of connections improves connectivity accuracy and minimizes the need for troubleshooting.

Wonderware HMI and Supervisory Solutions Features (continued)

Application Server - New Features and Benefits

More Effective Alarming

New Alarm Shelving and 'Plant State' based alarm suppression features minimize nuisance alarms, which improves operator attention to more critical events. An audit trail of the nuisance alarms is logged to Historian so nothing is lost. New Alarm Client Symbols take advantage of the these capabilities to present aggregated active and historical alarms. Alarms are grouped by severity and shelving status to further simplify the engineering effort and improve operator awareness and prioritization of alarms. All this functionality is built into each Symbol in the Situational Awareness Library for extremely easy alarm configuration.

Simplified Attribute Definition

An ergonomically redesigned Attribute Definition Editor for local and field I/O references simplifies the attribute definition workflow by consolidating several tabs into one. Everything you need is in one place to accelerate engineering, improve consistency, and reduce troubleshooting effort.

Simple Field Device Connectivity

Every PLC manufacturer has different naming conventions which means that manual configuration of each assignment can be tedious and error-prone. A new I/O Auto Assignment feature, matches attribute references to field devices based on manufacturer naming conventions to enable drag-and-drop association of objects to field references prior to deployment. This powerful new feature drastically reduces engineering time and frustration, enables live pre-validation of connectivity, and improves accuracy. All major brand controllers are supported.

Advanced Administration and Diagnostics

The System Management Console (SMC) has been upgraded with a number of new features that accelerate troubleshooting, reduce installation time, minimize maintenance effort, and improve system management and diagnostics especially during version upgrades and deployment. System health monitoring improvements give engineers greater insight into Engine state and association between Platforms and Engines as well as more sophisticated diagnostics. The Platform Remover tool has been improved and fully integrated. Platforms can now be sorted in various ways, for example in order of Platform name, computer name, or Platform ID, in an easy to understand Platform list. Actual States of Engines are displayed including OnScan, Stand-by (redundant), Off Scan, and Shutdown. Redundant Engines always show on the associated Platform with their respective states. Failover support for Engines has been added.

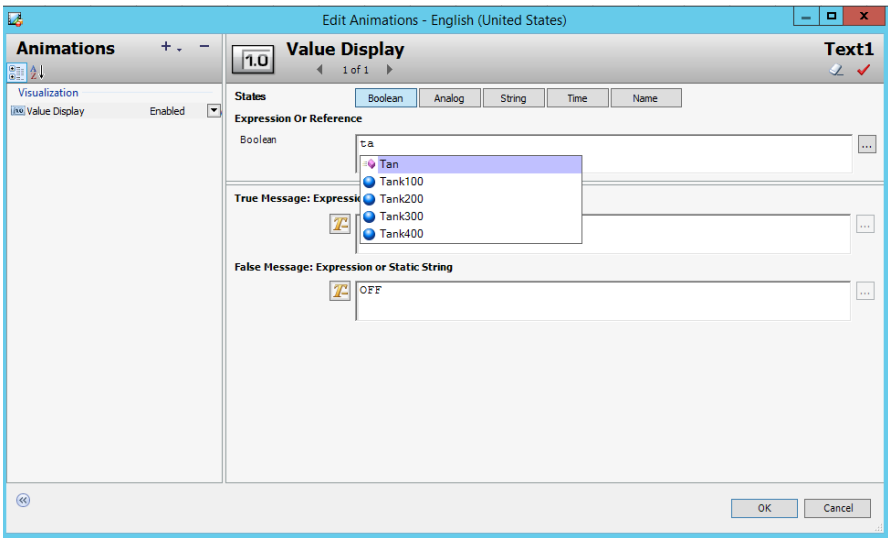
2014 R2 also includes an integrated Galaxy Scrubber which compresses and validates the entire Galaxy to ensure a complete migration process. The Galaxy Scrubber reduces database size by more than half and eliminates failures due to 'out of disk' issues during migration.

For distributed installations, the Application Server installer can be separated from the main System Platform DVD to create a lighter standalone installation package for faster distribution over slow networks. This is especially helpful when installing to multiple nodes or over geographically distributed networks.

Wonderware HMI and Supervisory Solutions Features (continued)

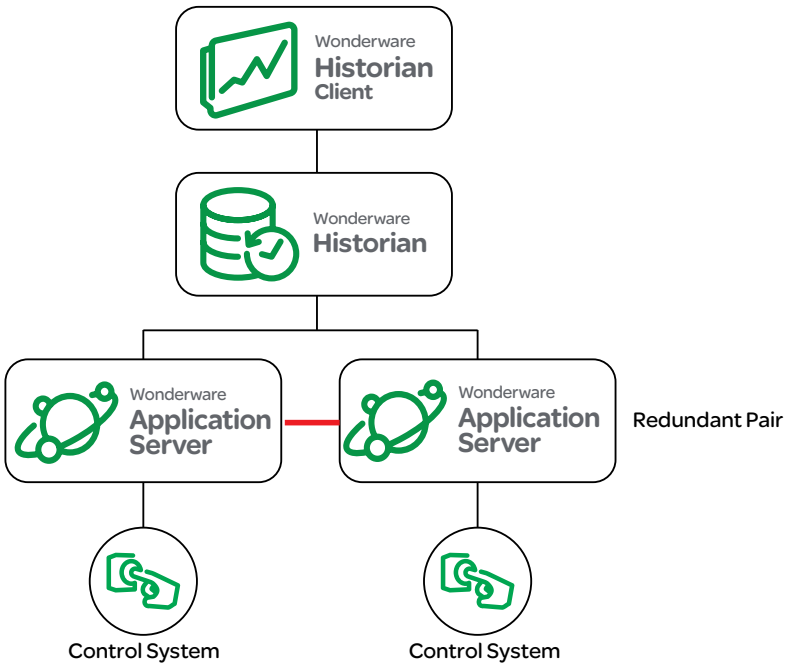
Faster More Accurate Scripting, Less Troubleshooting

The Auto-Complete capabilities in naming and scripting have been extended for absolute references.



Smooth Transition for Redundant Engine Pair Upgrades

Continued operation is vital for many types of systems and improvements in the upgrade procedure for Redundant Engine pairs enable engineers to maintain full production operations by upgrading each of the pair independently with no downtime or loss of data.



Wonderware HMI and Supervisory Solutions Features (continued)

The Latest Technology

2014 R2 continues to evolve with support of new versions of Microsoft Windows and Microsoft SQL Server.

Automatic port management of ArchestrA Services improves cybersecurity and IT compliance by minimizing the requirement for ArchestrA Services to a single port.

Faster Installation Improved Performance

2014 R2 also brings you faster installation and improved integration and performance with Microsoft SQL Server. The optimal default settings for Microsoft SQL Server are set automatically when creating a new Galaxy which speeds up the overall install process and ensures system configuration performance as the Galaxy grows.

Propagation of engineering changes to InTouch View Applications has improved dramatically, now 10 to 50 times faster depending on the number of changes and number of nodes. As an example, propagation of changes to a large system that used to take as much as 10 minutes will now occur in less than 10 seconds.

The Wonderware Device Integration library has been updated with several new DAServer versions and a new OmronFINS DAServer. In addition, the new DASim DAServer simulates PID controller type behavior during development and testing with the ability to configure specific process variables such as setpoint, deadband range, and noise. This improves design simulation, testing and troubleshooting.

InTouch - New Features and Benefits

The Most Advanced Graphics

2014 R2 introduces a new type of InTouch application called ‘Modern App’ that provides the versatility, power and benefits of ArchestrA Graphics with traditional InTouch ease of use. Modern Apps make using ArchestrA Graphics very easy because the application is fully designed within WindowMaker, no IDE required. The improved development workflow enables engineers familiar with InTouch WindowMaker and Tag based applications to continue utilizing their standard design practices yet with the more flexible and powerful ArchestrA Graphics. The Modern App design workflow also shortens the training cycle for new design engineers.

ArchestrA Graphics are one of the most significant enhancements in InTouch over the past several years. They provide numerous advantages over traditional symbols for both engineers and operators. They have become the standard graphics of choice due their ease of use, versatility, reusability, power and proven track record.

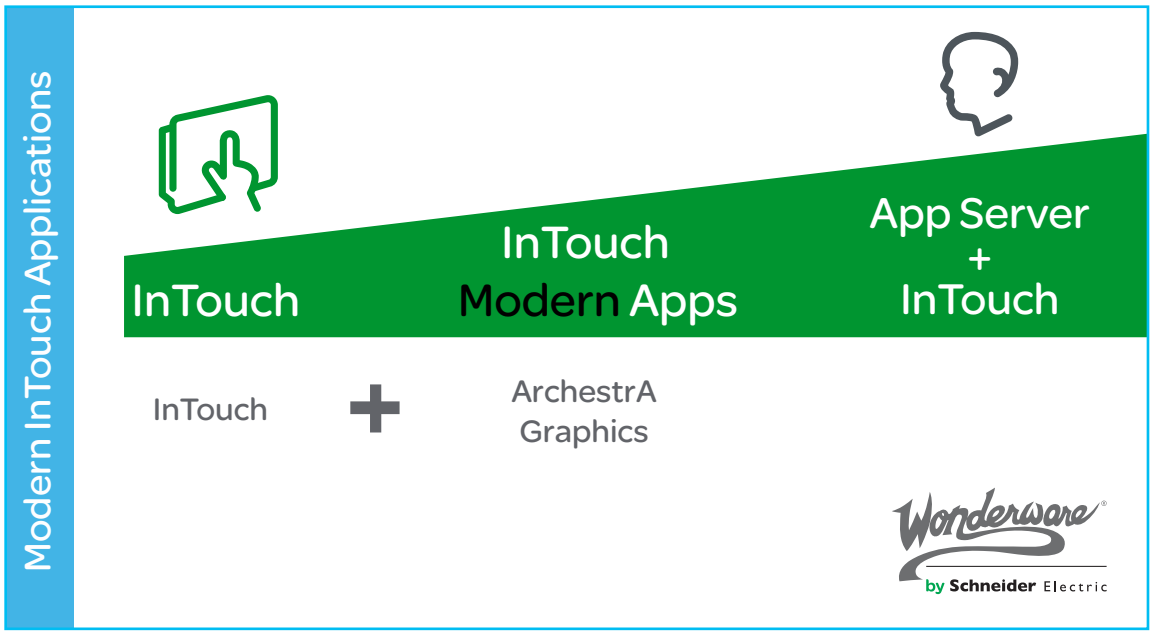
Wonderware HMI and Supervisory Solutions Features (continued)

For Engineers: Higher Application Integrity, Faster Implementations, Lower Engineering Costs

- Design, distribute and enforce graphical component standards for greater application consistency and optimized application design and maintenance using Element Styles, Numeric Formatting, and graphic protection.
- Shorten initial and maintenance design phases using graphic template change propagation which enables engineers to make a change once and propagate it throughout the entire application
- Resolution independent graphics can be resized or stretched without losing original visual quality, they improve Window display performance, and can be designed in one resolution and reused without distortion in a different resolution
- Save time and effort in your multiple language projects by entering translations as you design the application using multi-language switching in-place translations capability
- Design highly configurable optimized templates without any code development using a richer set of intuitive animation and graphical design tools for flexible, reusable, and lean graphics
- Integrate the power of the latest feature-rich Microsoft technology .NET controls and third party designed controls to enhance application usability
- Expand the power of each graphic with unlimited use of Custom Properties and scripts

For Operators: More Efficient and Intuitive UIs, Improved Operator Awareness, Fewer Shutdowns

- Convey more information in less time using less window real estate and decrease multiple screen navigation
- More consistent standards based application design increases operator awareness and decreases training time for new operators
- The Situational Awareness Library of ArchestrA Graphics are a superior approach to presenting more information in less time to operators. This enables operators to focus on more useful informational displays, shortens the time to identify a problem, and minimizes distraction and fatigue. This results in greater visibility to the most important situations, prevention of excursions from “normal”, reduction in disruptions and downtime, and greater focus on opportunities to improve performance, safety and reduction in costs of operations.



Wonderware HMI and Supervisory Solutions Features (continued)

Capitalize on Your Existing Investment in Engineering

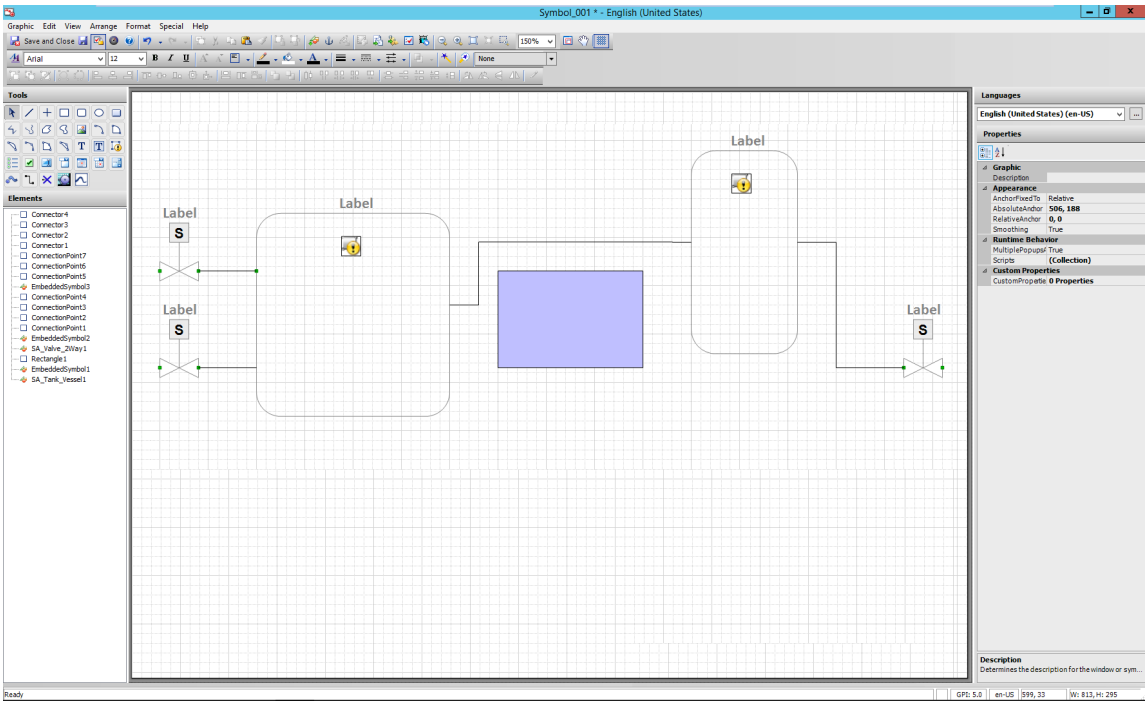
Continuing the Wonderware reputation of unrivaled uninterrupted migration path and preserving previous engineering investment, two new features take the work, worry, and guesswork out of transitioning your legacy existing InTouch application to the most current technology.

When migrating a legacy standalone InTouch application to the new 2014 R2 version, you are given the option to migrate into a 'Modern' type application which allows you to use ArchestrA Graphics and leverage the latest technology and years of advancement in visualization, such as the Situational Awareness Library, or to keep it as a classic InTouch application with legacy graphics.

Convert InTouch Windows to ArchestrA Graphics with one click. A Window backup is automatically created, elements are converted to ArchestrA Graphics and replaced in the Window, ActiveX controls remain in place, and a detailed conversion report is generated. Your old Window has now been updated to the most current technology.

Reduce Graphics Design Time in Half

Every HMI design includes graphic elements and connectors between elements, such as a pipe, wire, or line. Much of the design time goes into connecting graphic elements to one another. For most HMIs, this connecting can be a tedious effort and can prove especially frustrating when graphics are repositioned in the design phase or even if the graphic is required to move at runtime as a result of animation. In 2014 R2 there is a new combination of Connection Points and Connectors which provide resilient connections between graphics with simple point, click, drag and drop operations. With these new features, whenever graphics are repositioned, either in design or runtime, the Connectors adjust and move with the graphics to maintain the connections. This eliminates tedious connector redrawing and refinements.

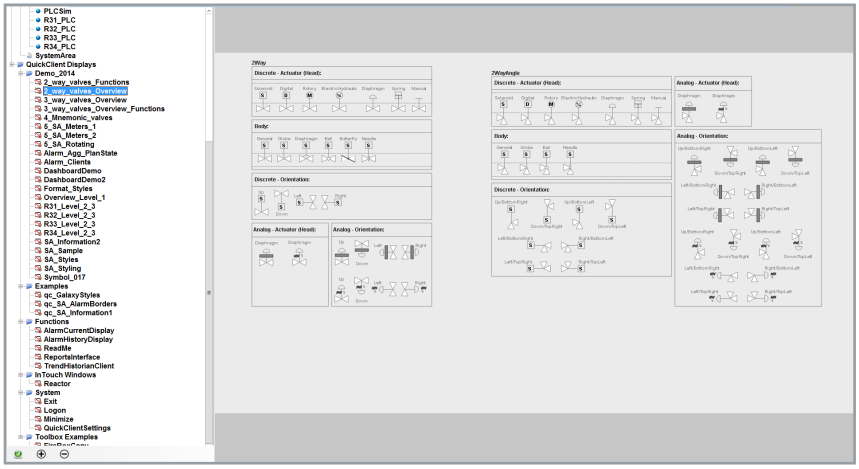


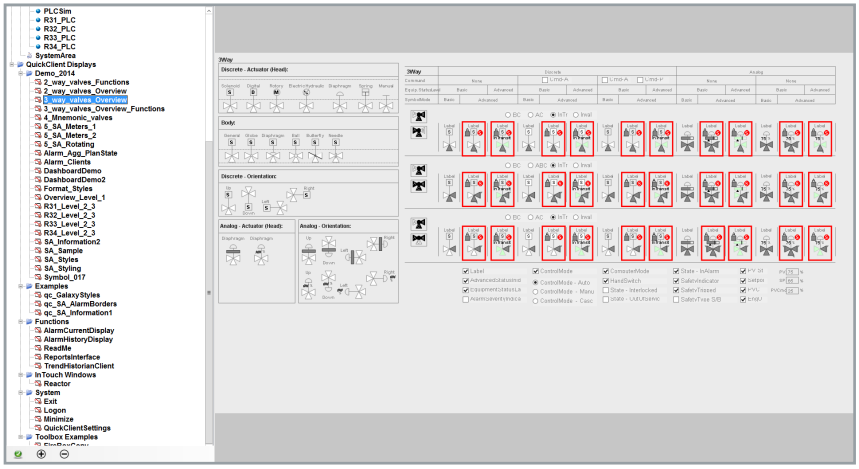
Wonderware HMI and Supervisory Solutions Features (continued)

New Situational Awareness Symbols

The Situational Awareness Library continues to be expanded with the addition of new Symbol Wizards for Valves and Trends.

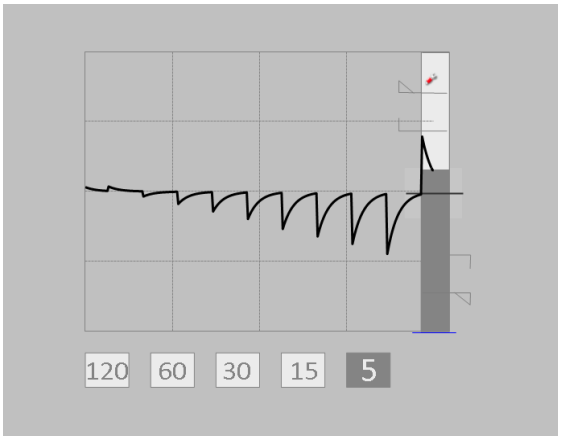
Valve Situational Awareness Symbols – The new set of Symbol Wizards for Valves greatly expand the possibilities to over one million combinations and orientations.

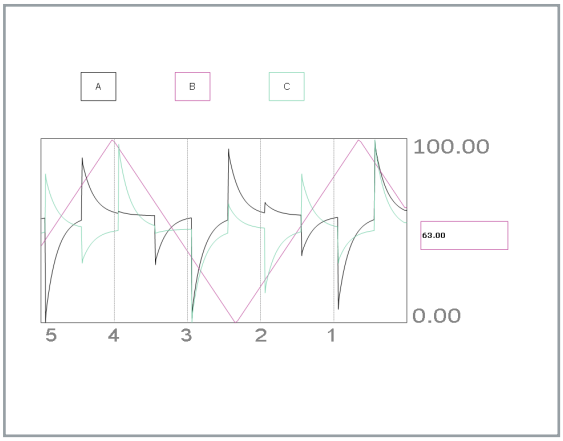


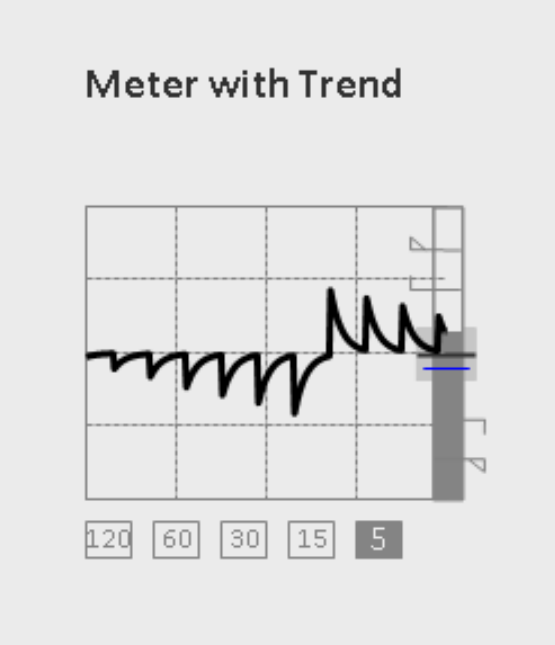


Wonderware HMI and Supervisory Solutions Features (continued)

Situational Awareness Trend Symbols – Easy to configure, Single Pen and Multi Pen Trend Symbols provide instant visualization of recent historical data for enhanced operator situational awareness.







Wonderware HMI and Supervisory Solutions Features (continued)

Localized ArchestrA Graphics Editor

The ArchestrA Graphic Editor, which is now integrated into WindowMaker for an intuitive design workflow with InTouch Modern applications, has been localized into the five languages of InTouch: English, French, German, Japanese, and Simplified Chinese.

New and Enhanced Script Functions Accelerate Design

Script functions reduce design effort and enable completely new design options for engineers. The ShowGraphic and HideGraphic script functions are enhanced to allow opening and closing InTouch Windows from ArchestrA Graphics. The new GetCPQuality and GetCPTimeStamp script functions expand the versatility of Custom Properties by accessing quality and time stamp data for use in scripts and visualization.

InTouch with System Platform - New Features and Benefits

Wonderware InTouch

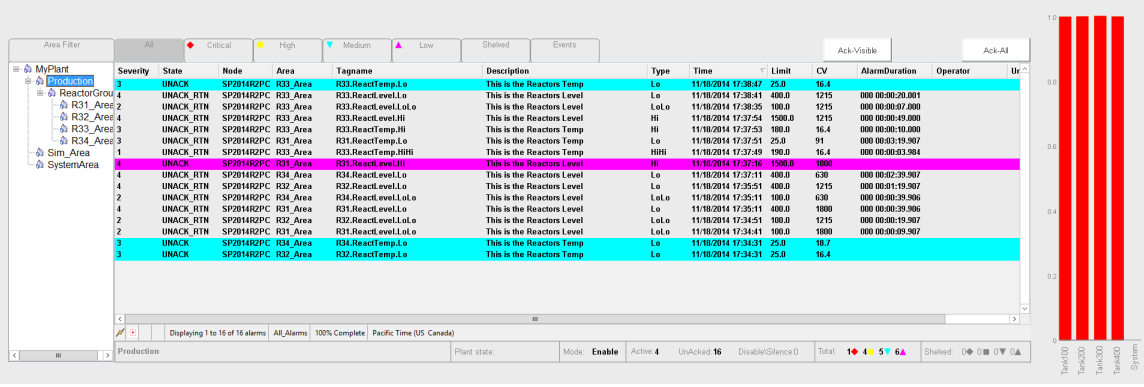
Wonderware System Platform

Easily Visualize Summarized Historical Data

Much of the information operators utilize is data which has been aggregated or summarized over a period of time such as average, minimum, maximum, standard deviation, and duration in a particular state. Wonderware Historian automatically calculates this summary data and now, with the new History Summary data type, this aggregated information can be easily accessed and displayed in InTouch. This not only saves considerable engineering effort, but can be used to provide aggregated data in graphical form to operators enhancing their situational awareness for more efficient operations.

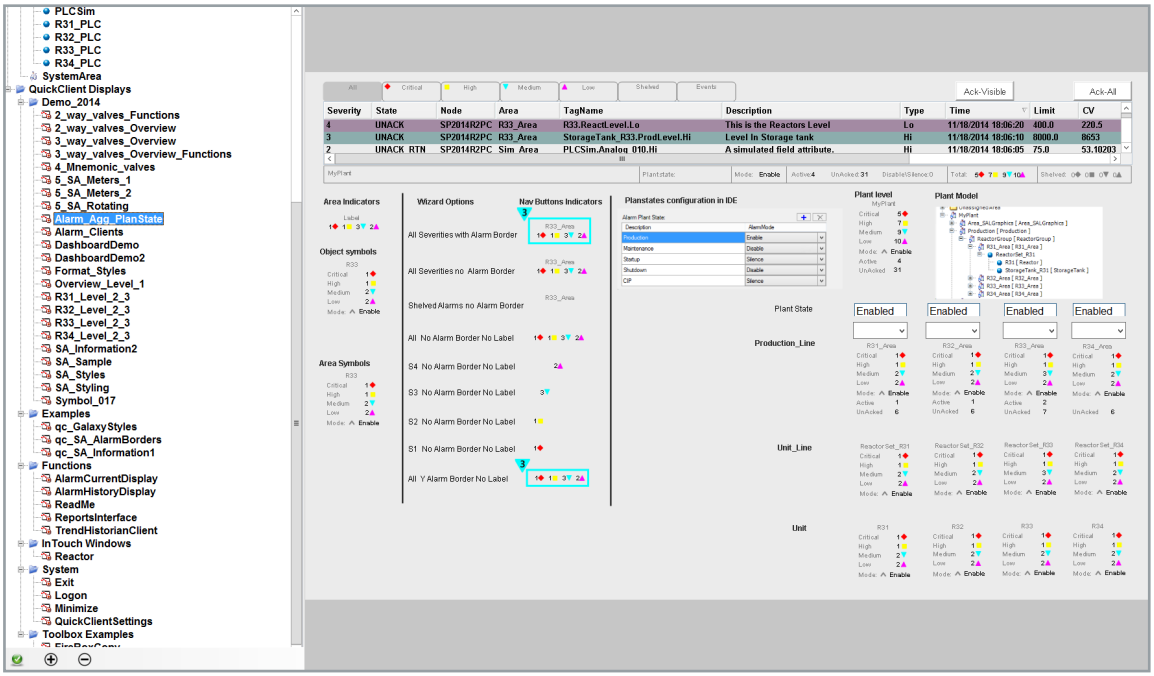
New Situational Awareness Symbols

Another addition to the Situational Awareness Library is a new set of Alarm Symbols including three new pre-built Alarm Dashboards and an Alarm Severity Panel. These new alarming capabilities are built into System Platform 2014 R2 for much simpler alarm design and operator alarm visualization and management.



Wonderware HMI and Supervisory Solutions Features (continued)

Severity Panel



Fully Compatible and Easily Upgradable

The 2014 R2 release is the leading Supervisory HMI on the market specializing in open system compatibility and easy upgradeability so our users always get the most from their investment.

Wonderware products enable you to create well designed, standards-driven, industrial solutions that reduce development time and effort, shorten implementation schedules, maximize productivity, increase quality, optimize user effectiveness, and lower maintenance and operational costs, helping to maximize your profitability and flexibility to accommodate change. In short, whatever you do, you can do it better, faster, safer and cheaper with Wonderware software.

Learn more about Wonderware System Platform and InTouch 2014 R2. Contact your Wonderware distributor today! And check out our YouTube Channel: Wonderware HMI SCADA.

Schneider Electric Software 26561 Rancho Pkwy South, Lake Forest, CA 92630 Telephone: +1 (949)-727-3200 Fax: +1 (949)-727-3270 software.schneider-electric.com

PN WW-4227 Rev. 01/15

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

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DIN rail power supply unit 24 V DC/5 A, primary switched-mode, 1-phase.

Product Description

QUINT POWER is the powerful 60 - 960 W DC power supply unit for universal use. With its wide-range input, single and three-phase versions, and international approval package, this solution is unrivalled. QUINT POWER provides reliable power supply: generously dimensioned capacitors ensure mains buffering of over 20 ms at full load. Full output power is provided by all three-phase devices, even in the event of a permanent phase failure. The Power Boost power reserve easily starts loads with high inrush currents and ensures that fuses are reliably tripped. Preventive function monitoring diagnoses impermissible operating states and minimizes downtimes in your system. Remote monitoring is provided by an active transistor switching output and a floating relay contact. All devices are idling-proof and short-circuit-proof, and are available with a regulated and adjustable output voltage of 12, 24, and 48 V DC with output currents of 2.5, 5, 10, 20, 30, and 40 A. Power supply units for use in Ex zone 2, uninterruptible solutions, AS-i power supply units, and a QUINT diode complete this comprehensive product range.

Key Commercial Data

Packing unit	1 pc
Weight per Piece (excluding packing)	1206.4 g
Custom tariff number	85044030
Country of origin	Thailand

Technical data

Dimensions

Width	55 mm
Height	130 mm
Depth	125 mm
Width with alternative assembly	122 mm
Height with alternative assembly	130 mm
Depth with alternative assembly	58 mm

Ambient conditions

Degree of protection	IP20

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Ambient conditions

Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C Derating: 2,5 %/K)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	95 % (at 25 °C, non-condensing)
Noise immunity	EN 61000-6-2:2005

Input data

Nominal input voltage range	100 V AC ... 240 V AC
Input voltage range	85 V AC ... 264 V AC
	90 V DC ... 350 V DC
AC frequency range	45 Hz ... 65 Hz
Frequency range DC	0 Hz
Current consumption	approx. 1.6 A (120 V AC)
	approx. 0.84 A (230 V AC)
Nominal power consumption	120 W
Inrush surge current	< 20 A (typical)
Power failure bypass	> 30 ms (120 V AC)
	> 130 ms (230 V AC)
Input fuse	5 A (slow-blow, internal)
Choice of suitable circuit breakers	6 A ... 16 A (Characteristics B, C, D, K)
Type of protection	Transient surge protection
Protective circuit/component	Varistor

Output data

Nominal output voltage	24 V DC ±1 %
Setting range of the output voltage (U_{Set})	22.5 V DC ... 28.5 V DC
Nominal output current (I_N)	5 A (up to 60°C)
POWER BOOST (I_{Boost})	7.5 A
Derating	60 °C ... 70 °C (2.5%/K)
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	Yes
Max. capacitive load	Unlimited
Active current limitation	Approx. I_{BOOST} = 7.5 A (for short-circuit)
Control deviation	< 1 % (change in load, static 10 % ... 90 %)
	< 2 % (change in load, dynamic 10 % ... 90 %)
	< 0.1 % (change in input voltage ±10 %)
Residual ripple	< 10 mV_{PP} (with nominal values)
Output power	120 W
Typical response time	< 1 s

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Output data

Peak switching voltages nominal load	< 30 mV_{PP} (20 MHz)
Maximum power dissipation in no-load condition	< 2 W
Power loss nominal load max.	< 14 W

General

Net weight	0.83 kg
Operating voltage display	Green LED
Efficiency	> 89 %
Insulation voltage input/output	4 kV AC (type test)
	2 kV AC (routine test)
Protection class	I (with PE connection)
MTBF (IEC 61709, SN 29500)	> 500000 h
Mounting position	horizontal DIN rail NS 35, EN 60715
Assembly instructions	Can be aligned: Horizontally 0 mm, vertically 50 mm

Connection data, input

Connection method	Pluggable screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Stripping length	7 mm
Screw thread	M3

Connection data, output

Connection method	Pluggable screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Stripping length	7 mm
Screw thread	M3

Signaling

Output name	DC OK active

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Signaling

Output description	U_{OUT} > 0.9 x U_N: High signal
Maximum switching voltage	≤ 24 V
Output voltage	+ 24 V DC (Signal)
Maximum inrush current	≤ 40 mA
Continuous load current	≤ 40 mA
Status display	"DC OK" LED green
Note on status display	U_{OUT} < 0.9 x U_N: LED flashing
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm
Screw thread	M3
Output name	DC OK floating
Output description	Relay contact, U_{OUT} > 0.9 x U_N: Contact closed
Maximum switching voltage	≤ 30 V AC/DC
Maximum inrush current	≤ 1 A
Continuous load current	≤ 1 A
Status display	"DC OK" LED green

Standards and Regulations

Electromagnetic compatibility	Conformance with EMC directive 89/336/EC
Shock	30g in each direction, according to IEC 60068-2-27
Noise emission	EN 55011 (EN 55022)
Noise immunity	EN 61000-6-2:2005
Connection in acc. with standard	CUL
Standards/regulations	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-6
Standard – Electrical equipment of machines	EN 60204-1
Standard - Safety of transformers	EN 61558-2-17
Standard - Electrical safety	EN 60950-1/VDE 0805 (SELV)
	EN 61558-2-17
Standard – Electronic equipment for use in electrical power installations and their assembly into electrical power installations	EN 50178/VDE 0160 (PELV)

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Standards and Regulations

Standard – Safety extra-low voltage	EN 60950-1 (SELV)
	EN 60204 (PELV)
Standard - Safe isolation	DIN VDE 0100-410
Standard – Protection against shock currents, basic requirements for protective separation in electrical equipment	EN 50178
Standard – Limitation of mains harmonic currents	EN 61000-3-2
Standard - Equipment safety	GS (tested safety)
Shipbuilding approval	Germanischer Lloyd (EMC 2), ABS
UL approvals	UL/C-UL Recognized UL 60950
	UL/C-UL listed UL 508
	UL ANSI/ISA-12.12.01 Class I, Division 2, Groups A, B, C, D (Hazardous Location)
Vibration (operation)	< 15 Hz, amplitude ±2.5 mm (according to IEC 60068-2-6)
Information technology equipment - safety (CB scheme)	CB Scheme

Classifications

eCl@ss

eCl@ss 4.0	27040702
eCl@ss 4.1	27040702
eCl@ss 5.0	27049002
eCl@ss 5.1	27049002
eCl@ss 6.0	27049002
eCl@ss 7.0	27049002
eCl@ss 8.0	27049002
eCl@ss 9.0	27040701

ETIM

ETIM 2.0	EC001039
ETIM 3.0	EC001039
ETIM 4.0	EC000599
ETIM 5.0	EC002540

UNSPSC

UNSPSC 6.01	30211502
UNSPSC 7.0901	39121004
UNSPSC 11	39121004
UNSPSC 12.01	39121004

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Classifications

UNSPSC

UNSPSC 13.2	39121004

Approvals

Approvals

Approvals

UL Recognized / UL Listed / cUL Recognized / cUL Listed / GL / DNV / IECEE CB Scheme / EAC / cULus Recognized / cULus Listed

Ex Approvals

UL Listed / cUL Listed / cULus Listed

Approvals submitted

Approval details

UL Recognized

UL Listed

cUL Recognized

cUL Listed

GL

DNV

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Approvals

IECEE CB Scheme

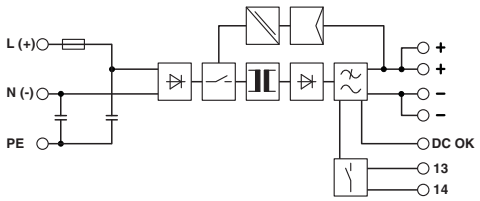
EAC

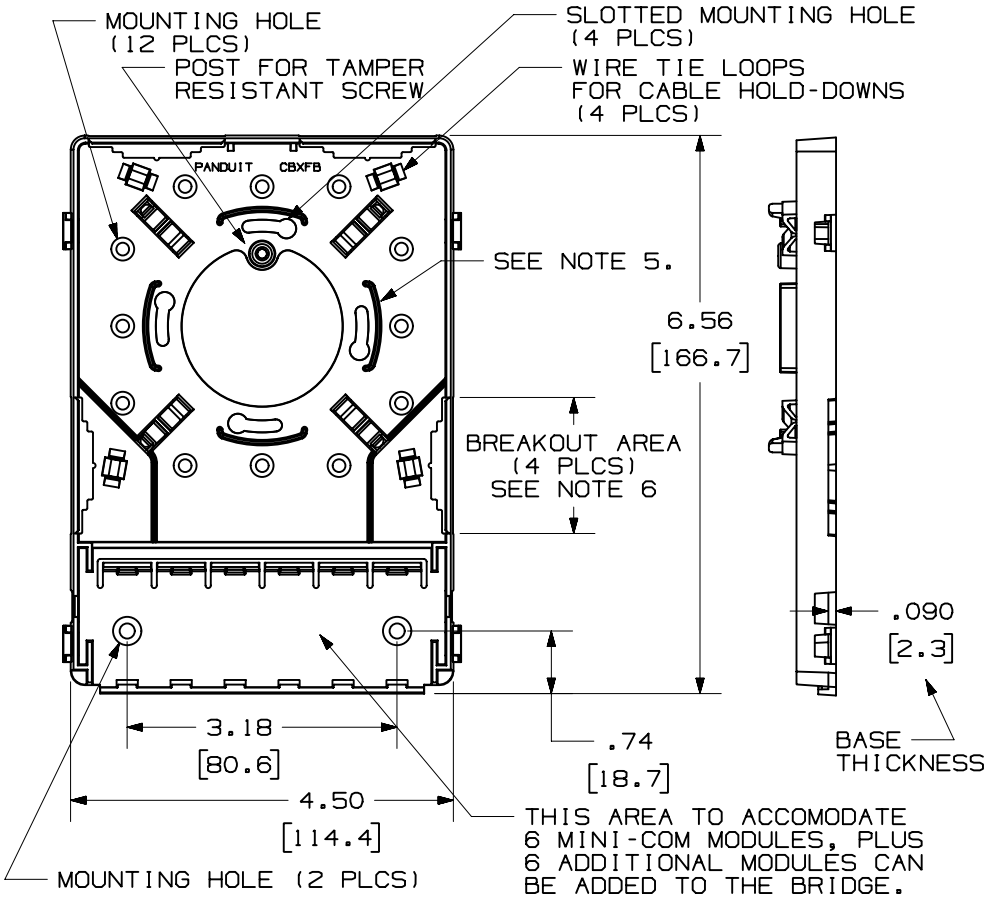
cULus Recognized

cULus Listed

Drawings

Block diagram





PANDUIT PART NO.	WEIGHT
CBXF12**-A	3.3 LB/10 PCS (1480 g/10 PCS)

NOTES:

1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
3. SURFACE MOUNT BOX HOLDS UP TO 12 MINI-COM CONNECTOR MODULES.
4. ALSO INCLUDED WITH BOX:
   a. (2) PLT1.5I-C PAN-TY
   b. (1) STRIPS OF 3.00" X .75" FOAM TAPE
   c. (2) STRIPS OF 1.50" X .75" FOAM TAPE
   d. (2) #6-32 MOUNTING SCREW
   e. (1) TAMPER RESISTANT SCREW (TO SECURE COVER TO BASE)
   f. (1) LABEL
   g. (1) LABEL COVER
5. THE BUILT IN FIBER SPOOL MAINTAINS THE RECOMMENDED MINIMUM BEND RADIUS FOR FIBER OPTIC AND CATEGORY 5 CABLES.
6. CAN BE USED WITH PAN-WAY LD3, CD3, LD5, CD5, LD10, CD10 RACEWAYS.
7. DIMENSIONS IN PARENTHESES ARE IN METRIC.

CAD FILENAME/LAYERS: D35544BZ_DC_CBXF12_00B.PRT

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP
1	1-8-02	JsP		A. REVISED NOTE #4.	35544-24		
R	12-4-96	RCA	CEF	RELEASED TO PRODUCTION.	35544-24		

PANDUIT CORP. TINLEY PARK, ILLINOIS

12 MODULE SPACE MULTI-MEDIA FIBER OUTLET (CBXF12**-A)
CUSTOMER DRAWING

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ± .010(.3)
(.XX) ± .03(.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.

DRAWN BY: RCA
DATE: 12-4-96
CHK'D: CEF
MAT'L: ABS
SCALE: NONE
DRAWING NO.: 35544-24
SHT 1 OF 2
DWG SIZE: A

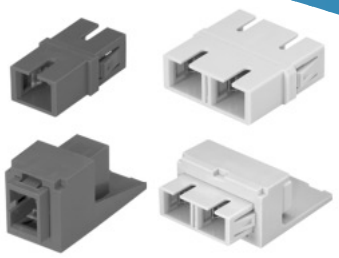
SC Fiber Optic Adapters

PANDUIT®

SPECIFICATION SHEET

specifications

SC fiber optic adapters with integrated panel retention clips are TIA/EIA-604 FOCIS-3 compliant. Each SC simplex adapter shall connect one SC connector pair in one module space. Each SC duplex adapter shall connect two SC connector pairs in two module spaces. SC adapters and adapter modules shall include phosphor bronze split sleeves for multimode applications or zirconia ceramic split sleeves for singlemode applications.



technical information

Standards requirements:	TIA/EIA-604 FOCIS-3 compliant; exceeds TIA/EIA-568-B.3 requirements
Split sleeve material:	Phosphor bronze or zirconia ceramic (required for singlemode applications)
Insertion loss:	.1dB average (multimode), .15dB average (singlemode); supports the performance of FOCIS-3 compliant connectors/patch cords
Return loss:	Supports singlemode (>40dB for SPC and >55dB for UPC) and multimode (>20dB) connector polish performance

•*PANDUIT* LC Connector/Adapter connection

key features and benefits

Integrated panel retention clips	No metal clips to become bent, damaged or lost; clips automatically adjust for FOCIS-3 compliant panel thickness variations for improved mounting
High glass transition temperature latch material (Tg>100°C)	Meets Telcordia GR-326-CORE, Issue 3; maintains latch integrity/geometry in high temperature environments for improved reliability
Improved adapter protective cap design	Maximum protection from contamination; protective cap fully surrounds split sleeve opening
Short flange design	Improved modularity and higher density usage
Choice of phosphor bronze or zirconia ceramic split sleeves	Provides an adapter split sleeve material option to fit specific network requirements
Q.C. number and split sleeve material laser marked on every adapter	Assures 100% traceability; quick and easy identification of split sleeve material: SC-P = Phosphor Bronze and SC-Z = Zirconia Ceramic
Adapters available in Mini-Com® Modules	System flexibility; adapter modules can be used in all *Mini-Com*® closet products and work area outlets
Adapters available in patch panels, fiber adapter panels (FAPs) and Opticom® QuickNet™ Pre-Terminated MTP* Cassettes	Provides a complete SC system solution
Adapters and modules available in multiple colors	Allows color-coding for network segregation

applications

PANDUIT SC Fiber Optic Adapters can be used with *Mini-Com*® Modules, Patch Panels, Faceplates and Surface Mount Boxes for a complete SC system solution. SC adapters provide a robust solution for LANs, public networks, storage area networks and fiber-to-the-desk applications. SC adapters can also be mounted in high-density applications within *Opticom*® *QuickNet*™ Pre-Terminated MTP* Cassettes and Fiber Enclosures, and *Opticom*® Fiber Adapter Panels (FAPs) and Enclosures.

*MTP is a registered trademark of US Conec Ltd.

www.panduit.com

SC Fiber Optic Adapters

Simplex MM:	FASSCEI-L
Duplex MM:	FADSCEI-L
Simplex 10GIG™:	FASSCAQ-L
Duplex 10GIG™:	FADSCAQ-L
Simplex 10GIG™(zirc.):	FASSCZAQ-L
Duplex 10GIG™(zirc.):	FADSCZAQ-L
Simplex SM (zirc.):	FASSCZBU-L
Duplex SM (zirc.):	FADSCZBU-L
Simplex APC (zirc.):	FASSCZAG-L
Duplex APC (zirc.):	FADSCZAG-L

L = Bag of 50 adapters; 100 per carton.

Mini-Com® SC Adapter Modules

Simplex MM:	CMSEISCEI
Duplex MM:	CMDEISCEI
Simplex 10GIG™:	CMSAQSCBL
Duplex 10GIG™:	CMDAQSCBL
Simplex 10GIG™(zirc.):	CMSAQSCZBL
Duplex 10GIG™(zirc.):	CMDAQSCZBL
Simplex SM (zirc.):	CMSBUSCZBU
Duplex SM (zirc.):	CMDBUSCZBU
Simplex APC (zirc.):	CMSAGSCZBL
Duplex APC (zirc.):	CMDAGSCZBL

Opticom® SC Fiber Adapter Panels

6 duplex MM:	FAP6WEIDSC
6 duplex 10GIG™:	FAP6WAQDSCZ
6 duplex SM (zirc.):	FAP6WBUDSCZ
12 simplex SM (zirc.):	FAP12WBUSCZ

Opticom® *QuickNet*™ Pre-Terminated MTP* Cassettes

12 SC to MTP* (12f):	FC^-12-3S
6 SC to MTP* (12f):	FC^-12-3

SC Simplex Fiber Optic Connectors

MM (900µm/3mm, black):	FSCMBL
MM (900µm/3mm, red):	FSCMRD
SM (900µm/3mm, blue):	FSCSBU
MM (900µm/2mm, black):	FSCM2.0BL
MM (900µm/2mm, red):	FSCM2.0RD
SM (900µm/2mm, blue):	FSCS2.0BU

SC Duplex Fiber Optic Connectors

Multimode (3mm only):	FSCDM

Opti-Core® Fiber Optic Patch Cords

Duplex SC to SC:	F^D3-3M‡
Simplex SC to SC:	F^S3-3M‡
Simplex SC to pigtail:	F^B3-NM‡

HD Connector Removal Tool

For LC and SC:	HDCRT

**Substitute for module color:

EI = Electric Ivory	BU = Blue
IG = International Gray	WH = White
TG = Technical Gray	BL = Black
AW = Arctic White	IW = Off White
EW = European White	

^Substitute for fiber type:
X (OM3 – *10GIG*™ 50/125µm), 5 (OM2 – 50/125µm), 6 (OM1 – 62.5/125µm) or 9 (OS1 – 9/125µm).

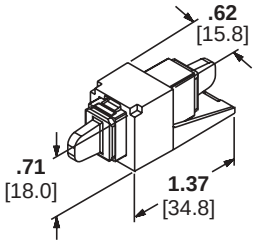
‡Substitute for length in meters: 1, 2, 3, 5 or 10 for patch cords, and 1, 2 or 3 for pigtails; singlemode patch cords are also available in 12, 15, 25 or 30 meter lengths. Contact Customer Service for other available lengths.

selection information

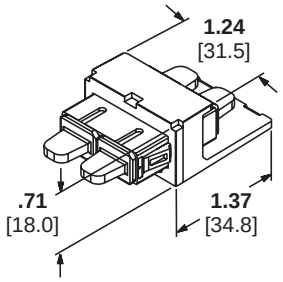
Part Number	Adapter Type	Split Sleeve Material	Adapter Color	Module Color	Average Insertion Loss^	Return Loss^
SC Adapters						
FASSCEI-L	Multimode Simplex	Phosphor Bronze	Electric Ivory	N/A	.1dB	>20dB
FADSCEI-L	Multimode Duplex	Phosphor Bronze	Electric Ivory	N/A		
FASSCAQ-L	*10GIG*™ Multimode Simplex	Phosphor Bronze	Aqua	N/A		
FADSCAQ-L	*10GIG*™ Multimode Duplex	Phosphor Bronze	Aqua	N/A		
FASSCZAQ-L	*10GIG*™ Multimode Simplex	Zirconia Ceramic	Aqua	N/A		
FADSCZAQ-L	*10GIG*™ Multimode Duplex	Zirconia Ceramic	Aqua	N/A		
FASSCZBU-L	Singlemode Simplex	Zirconia Ceramic	Blue	N/A	.15dB	>40dB
FADSCZBU-L	Singlemode Duplex	Zirconia Ceramic	Blue	N/A		
FASSCZAG-L	APC Singlemode Simplex	Zirconia Ceramic	Green	N/A		
FADSCZAG-L	APC Singlemode Duplex	Zirconia Ceramic	Green	N/A		
SC Adapter Modules						
CMSEISCEI	Multimode Simplex	Phosphor Bronze	Electric Ivory	Various**	.1dB	>20dB
CMDEISCEI	Multimode Duplex	Phosphor Bronze	Electric Ivory	Various**		
CMSAQSCBL	*10GIG*™ Multimode Simplex	Phosphor Bronze	Aqua	Black		
CMDAQSCBL	*10GIG*™ Multimode Duplex	Phosphor Bronze	Aqua	Black		
CMSAQSCZBL	*10GIG*™ Multimode Simplex	Zirconia Ceramic	Aqua	Black		
CMDAQSCZBL	*10GIG*™ Multimode Duplex	Zirconia Ceramic	Aqua	Black		
CMSBUSCZBU	Singlemode Simplex	Zirconia Ceramic	Blue	Various**	.15dB	>40dB
CMDBUSCZBU	Singlemode Duplex	Zirconia Ceramic	Blue	Various**		
CMSAGSCZBL	APC Singlemode Simplex	Zirconia Ceramic	Green	Black		
CMDAGSCZBL	APC Singlemode Duplex	Zirconia Ceramic	Green	Black		

^*PANDUIT* SC Connector/Adapter connection
**For other colors, replace suffix EI or BU with EI (Electric Ivory), BU (Blue), IG (International Gray), WH (White), TG (Technical Gray), BL (Black), AW (Arctic White), IW (Off White) or EW (European White).

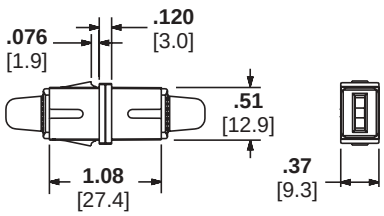
Mini-Com® SC Simplex Adapter Module



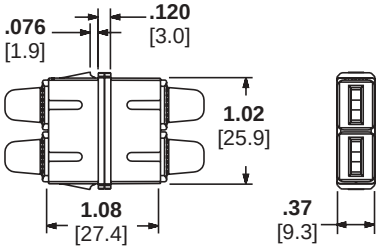
Mini-Com® SC Duplex Adapter Module



SC Simplex Adapter



SC Duplex Adapter



Dimensions are in inches [Dimensions in brackets are in millimeters]

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Victoria, Australia
cs-aus@panduit.com
Phone: 61.3.9794.9020

For a copy of *PANDUIT* product warranties, log on to www.panduit.com/warranty

For more information
Visit us at www.panduit.com
Contact Customer Service by email: cs@panduit.com
or by phone: 800-777-3300 and reference FBSP16

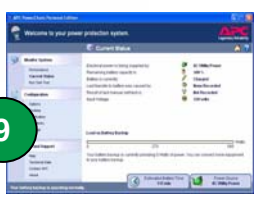
WW-FBSP16
Replaces SA-NC10SP01E
10/2005

APC Back-UPS® Pro ~~1300~~/1500

Power-Saving, high performance power protection for office computers

The Back-UPS Pro provides abundant battery backup power, so you can work through medium and extended length power outages. It safeguards your equipment against damaging surges and spikes that travel along utility and data lines. The Back-UPS Pro also features automatic voltage regulation (AVR), which instantly adjusts high and low voltages to safe levels, so you can work indefinitely during brownouts and overvoltages.

The Back-UPS Pro also includes unique “green” features, like power-saving outlets that automatically turn off idle peripherals. A high efficiency charging system and “AVR Bypass” also reduce power consumption. With the rest of the Back-UPS Pro’s standard features, this is the perfect unit to protect your productivity from the constant threat of bad power and lost data.



Product Features:

1. LCD (Liquid Crystal Display) gives the status of over 20 different utility and battery backup conditions.
2. Automatic Voltage Regulation (AVR) instantly corrects voltages fluctuations so you can work indefinitely through brownouts and overvoltages.
3. 5 “Battery Backup & Surge Protected” outlets keep a CPU, monitor and other critical devices running when the power goes out. (Includes one power-saving “*Controlled*” outlet).
4. 5 “Surge Only” outlets protect printers, faxes or other equipment without reducing battery capacity. (Includes three power-saving “*Controlled*” outlets).
5. Data line surge protection guards against surges and spikes traveling over Ethernet or coax cable lines.
6. Push button circuit breaker enables quick recovery from overloads.
7. 3 yr warranty, $150,000 Equipment Protection Policy, free technical support and data recovery services.
8. Automatic Diagnostic Testing ensures your unit is ready when you need it.
9. Auto shutdown software allows management of the Back-UPS from your computer via USB or serial connectivity:
   - Gracefully shuts down system when battery is low
   - Records utility power and battery conditions
   - Allows for customized set up.
10. External Battery Pack Compatibility allows you to dramatically increase your run time. (BR1500G only)

APC by Schneider Electric

Back-UPS RS 1300 & 1500 Specifications

Model Number	BR1300G	BR1500G
	Output	
Output Capacity	1300 VA / 780 Watts	1500 VA / 865 Watts
Output Volt. / Freq. (on utility)	120V / 60Hz	120V / 60Hz
Output Volt. / Freq. (on battery)	115V +/-8% / 60Hz	115V +/-8% / 60Hz
Output Connections	10 total NEMA 5-15R outlets: 5 battery & surge (incl. 1 *Master* & 1 *Controlled*) 5 surge protection only (incl. 3 *Controlled* outlets)	10 total NEMA 5-15R outlets: 5 battery & surge (incl. 1 *Master* & 1 *Controlled*) 5 surge protection only (incl. 3 *Controlled* outlets)
Waveform Type	Stepped Approximation to Sine Wave	Stepped Approximation to Sine Wave
	Input	
Input Voltage / Frequency	120V / 60 Hz	120V / 60 Hz
Input Connection	6 ft cord with NEMA 5-15 plug	6 ft cord with NEMA 5-15 plug
	Surge Protection	
AC Power Surge Protection	All outlets	All outlets
Data Line Surge Protection	Network: to 1000 Base-T (gigabit) Ethernet Coax cable (CATV, SATV, modem, A/V)	Network: to 1000 Base-T (gigabit) Ethernet Coax cable (CATV, SATV, modem, A/V)
	Physical	
Unit Dimensions (H x W x D)	11.9 x 4.4 x 15.0“ (30.2 x 11.2 x 38.1 cm)	11.9 x 4.4 x 15.0“ (30.2 x 11.2 x 38.1 cm)
Unit Weight	28.3 lbs (12.9 kg)	29.4 lbs (13.4 kg)
Shipping Dims. (H x W x D)	15.0 x 9.25 x 19.0“ (38.1 x 22.9 x 48.3 cm)	15.0 x 9.25 x 19.0“ (38.1 x 22.9 x 48.3 cm)
Shipping Weight	30.8 lbs (14.0 kg)	31.9 lbs (14.5 kg)
Color	Black	Black
UPC Code	731304268765	731304268772
	Battery	
Battery Type	Sealed, lead-acid, maintenance-free	Sealed, lead-acid, maintenance-free
Extended run battery pack compatibility	No	Yes, use BR24BPG (note: the BR24BP can also be used, but it has a different color & style)
	Management	
Alarms	Visual (LCD) and audible alarms	Visual (LCD) and audible alarms
Auto-Shutdown Software	PowerChute Personal Edition (with USB & serial communications)	PowerChute Personal Edition (with USB & serial communications)
	Safety	
Certification/Approvals	FCC Part 15 Class B, FCC Part 68, NOM, TUV	FCC Part 15 Class B, FCC Part 68, NOM, TUV

APC *by Schneider Electric*
132 Fairgrounds Rd
West Kingston, RI 02892
Tel: 800-800-4272
www.apc.com

APC by Schneider Electric

IEC Terminal Block Accessories

Screw Type Center Jumpers, Jumper Links, and Jumper Covers

Used On	Cat. No.	Pcs/Pkg
1492-J3, JD3..., JDG3..., J2Q, J3TW, J3F, JD3F	1492-CJJ5-2	50
	1492-CJJ5-3	50
	1492-CJJ5-4	50
	1492-CJJ5-10	20
1492-J4, J4M	1492-CJJ6-2	50
	1492-CJJ6-3	50
	1492-CJJ6-4	50
	1492-CJJ6-10	20
1492-J6	1492-CJJ8-2	50
	1492-CJJ8-3	50
	1492-CJJ8-4	50
	1492-CJJ8-10	20
1492-J10	1492-CJJ10-2	50
	1492-CJJ10-3	50
	1492-CJJ10-4	50
	1492-CJJ10-10	20
1492-J16	1492-CJJ12-2	20
	1492-CJJ12-3	20
	1492-CJJ12-4	20
	1492-CJJ12-10	10
1492-J35	1492-CJJ16-2	20
	1492-CJJ16-3	20
	1492-CJJ16-4	20
	1492-CJJ16-10	10
1492-J50	1492-CJJ18-2	10
	1492-CJJ18-3	10
	1492-CJJ18-4	10
1492-J70	1492-CJJ20-2	5
	1492-CJJ20-3	5
	1492-CJJ20-4	5
1492-WM3	1492-CJM5-2	10
	1492-CJM5-3	10
	1492-CJM5-4	10
	1492-CJM5-5	10
	1492-CJM5-10	10
1492-W3, WM3, WR3, WTF3..., WTS3...	1492-CJL5 (Link)	10
1492-WR3	1492-CJD5-50	5
	1492-CJD5-2	10
	1492-CJD5-3	10
	1492-CJD5-4	10
	1492-CJD5-5	10
	1492-CJD5-10	10

Note: Notching out one or more jumper poles, with the notched jumpers going across different potentials, will require de-rating to 400V.

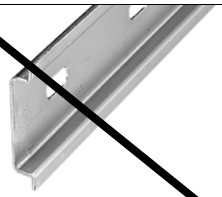
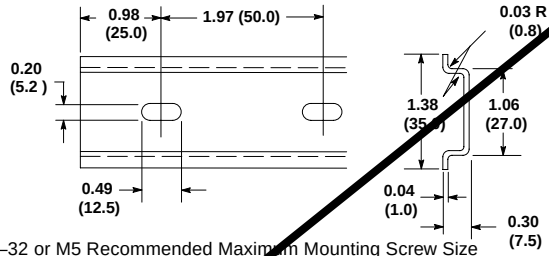
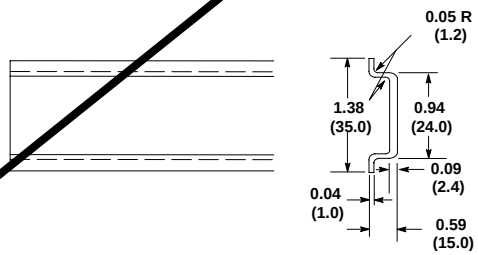
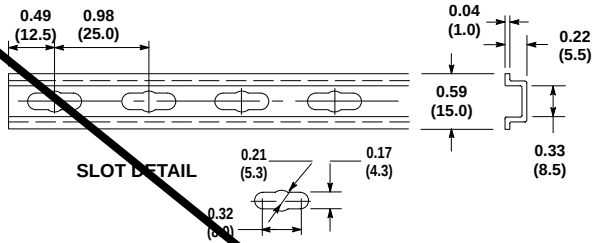
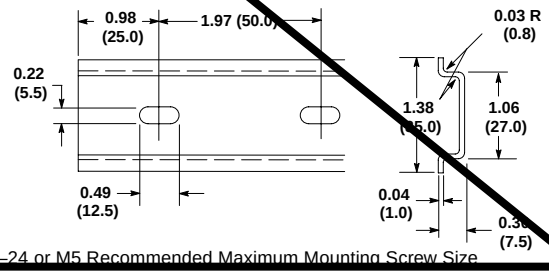
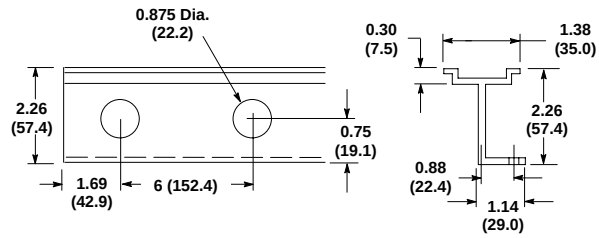
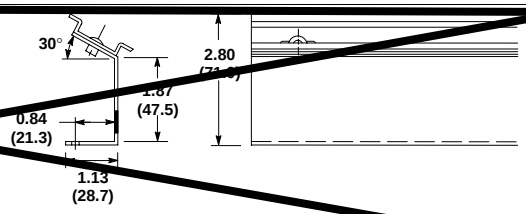
Used On	Cat. No.	Pcs/Pkg
1492-WM4	1492-CJD6-50	5
	1492-CJD6-2	10
	1492-CJD6-3	10
	1492-CJD6-4	10
	1492-CJD6-5	10
	1492-CJD6-10	10
1492-WM4, W4TW	1492-CJLD6 (Link)	10
1492-W3	1492-CJ5-2	10
	1492-CJ5-3	10
	1492-CJ5-10	10
	1492-CJCW5 (CJ Cover)*	20
1492-WTF3..., WT33...	1492-CJT5-50	5
	1492-CJT5-2	10
	1492-CJT5-3	10
	1492-CJT5-4	10
	1492-CJT5-5	10
	1492-CJT5-10	10
1492-W4, W4TW	1492-CJ6-50	5
	1492-CJ6-2	10
	1492-CJ6-3	10
	1492-CJ6-4	10
	1492-CJ6-5	10
	1492-CJ6-10	10
1492-W4	1492-CJL6 (Link)	10
1492-W4, W6, W10	1492-CJCW6 (CJ Cover)*	20
1492-W6	1492-CJ7-40	5
	1492-CJ7-2	10
	1492-CJ7-3	10
	1492-CJ7-4	10
	1492-CJ7-5	10
	1492-CJ7-10	10
1492-W6	1492-CJL7 (Link)	10
1492-W10	1492-CJ8-40	5
	1492-CJ8-2	10
	1492-CJ8-3	10
	1492-CJ8-4	10
	1492-CJ8-5	10
	1492-CJ8-10	10
1492-W10	1492-CJL8 (Link)	10
1492-W16S	1492-CJS11-2	10
	1492-CJS11-3	10
	1492-CJS11-4	10
	1492-CJS11-5	10
	1492-CJS11-10	10

* May only be used as a marking surface. May not be installed over center jumper.

Accessories

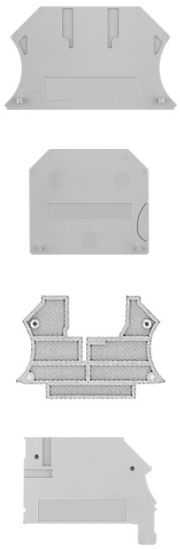
Mounting Rails

DIN Mounting Rails

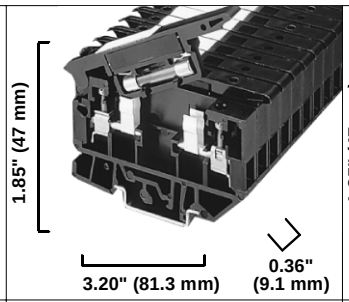
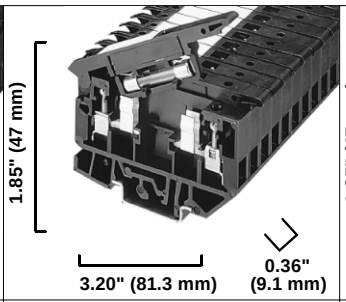
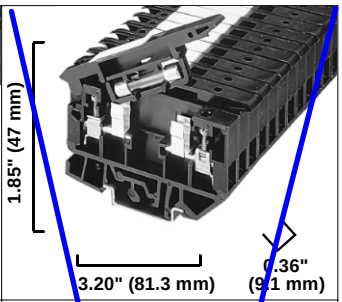
Item	Description	Pcs./Pkg.	Dimensions ❶
199-DR1 	Symmetrical Rail 35 mm x 7.5 mm 3.28' (1 m) long Zinc-Plated, Yellow Chromated Steel EN50022 **DIN #3**	10	 #10–32 or M5 Recommended Maximum Mounting Screw Size
199-DR4 	Heavy Duty Symmetrical Rail 35 mm x 15 mm 3.28' (1 m) long Zinc-Plated, Yellow Chromated Steel EN50022 **DIN #3**	5	
1492-DR3 	Mini 15 mm x 5.5 mm Rail 3.28' (1 m) long Zinc-Plated, Yellow Chromated Steel EN50045 **DIN #2**	5	 #8–32 or M4 Recommended Maximum Mounting Screw Size
1492-DR5 	Symmetrical Rail 35 mm x 7.5 mm 3.28' (1 m) long Copper-Free Aluminum EN50022 For 1492 Terminal Blocks Only **DIN #3**	10	 #12–24 or M5 Recommended Maximum Mounting Screw Size
1492-DR6 ❷ 	Symmetrical Rail 35 mm x 7.5 mm 2.26" (57.4 mm) high 3.28' (1 m) long Copper-Free Aluminum For 1492 Terminal Blocks Only **DIN #3**	2	 Wire insulator plug for wire access through rail — use Heyco
1492-DR7 ❷ 	Symmetrical Rail 35 mm x 7.5 mm 2.80" (71.0 mm) high 3.28' (1 m) long Angled 30° Zinc-Plated, Chromated Steel **DIN #3**	2	 For mounting rail details, see Cat. No. 199-DR1

❶ Dimensions shown in inches (millimeters). Dimensions are not intended to be used for manufacturing purposes.
❷ 0.218" (5.5 mm) x 0.50" (12.7 mm) slotted mounting holes every 3" (76.2 mm) starting 1.69" (42.9 mm) from end.

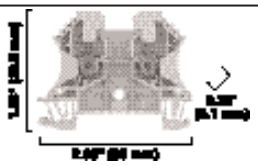
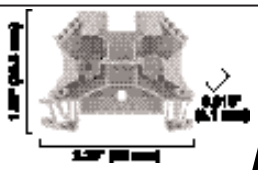
For Screw Type Products



Dimensions Width x Length x Height	Used With	Color	Cat. No.	Pcs/Pkg
0.06 x 1.31 x 2.36 in (1.5 x 33.35 x 60 mm)	1492-J3, J4, J6, J10, J2Q, J3TW, J4M, J3F, JG2Q, JG3, JG3TW, JKD3, JKD3TP, J3P, J3PTP, JTC3…	Gray	1492-EBJ3	50
		Blue	1492-EBJ3-B	50
		Yellow	1492-EBJ3-Y	50
0.06 x 1.93 x 2.36 in (1.5 x 49 x 60 mm)	1492-J16, J35	Gray	1492-EBJ16	20
		Blue	1492-EBJ16-B	20
		Yellow	1492-EBJ16-Y	20
0.06 x 2.15 x 2.72 in (1.5 x 54.5 x 69 mm)	1492-JD3, JD3C, JD3F, JD3DF, JD3DR, JD3RB…, JD3RC001, JD3SS	Gray	1492-EBJD3	20
		Blue	1492-EBJD3-B	20
		Yellow	1492-EBJD3-Y	20
0.06 x 1.31 x 2.36 in (1.5 x 33.35 x 60 mm)	1492-JPO	Gray	1492-EBJO	20
0.10 x 1.45 x 1.77 in (2.5 x 36.7 x 45 mm)	1492-JC3	Gray	1492-BKJC3	10 Start Barriers / 10 End Barriers
0.10 x 1.78 x 2.28 in (2.5 x 45.2 x 58 mm)	1492-JDC3	Gray	1492-BKJDC3	10 Start Barriers / 10 End Barriers
0.06 x 3.15 x 2.31 in (1.5 x 80.2 x 58.8 mm)	1492-JD3P, JD3PTP, JD3PSS, JD3PSSTP, JDG3P, JDG3PTP, JDG3PSS, JDG3PSSTP	Gray	1492-EBJD3P	20
0.06 x 1.10 x 0.97 in (1.5 x 28 x 24.6 mm)	1492-WM3	Gray	1492-EBM3	50
0.06 x 1.22 x 1.09 in (1.5 x 31 x 27.7 mm)	1492-WM4	Gray	1492-EBM4	50
0.06 x 1.65 x 1.32 in (1.5 x 42 x 33.5 mm)	1492-WMD1	Gray	1492-EBMD1	50
0.06 x 1.46 x 1.38 in (1.5 x 37 x 35 mm)	1492-W3, W4, WG4	Gray	1492-EB3	50
		Yellow	1492-EB3-Y	50
0.06 x 1.77 x 1.61 in (1.5 x 45 x 41 mm)	1492-W6, W10, W16S, WG6, WG10S, WG16S	Gray	1492-EB10	50
		Yellow	1492-EB10-Y	50
0.06 x 1.65 x 2.19 in (1.5 x 42 x 55.5 mm)	1492-WR3	Gray	1492-EBR3	50
0.06 x 1.79 x 1.64 in (1.5 x 45.4 x 41.6 mm)	1492-W4TW	Gray	1492-EB3TW	50
0.06 x 3.51 x 1.74 in (1.5 x 89.1 x 44.1 mm)	1492-WTF3…	Gray	1492-EBTF3	50
0.06 x 2.61 x 1.74 in (1.5 x 66.2 x 44.1 mm)	1492-WTS3…	Gray	1492-EBTS3	50
0.11 x 2.81 x 1.96 in (2.8 x 71.4 x 49.8 mm)	1492-H4, H5, H6, H7	Black	1492-N37	50

	1492-H4			1492-H5			1492-H6		
Dimensions are not intended to be used for manufacturing purposes. **Note:** Height dimension is measured from top of rail to top of terminal block.									
Specifications	*Single-circuit fusible terminal block with neon blown fuse indicator.*			*Single-circuit fusible terminal block with LED blown fuse indicator.*			*Single-circuit fusible terminal block without a blown fuse indicator.*		
Approvals		CSA	IEC		CSA	IEC		CSA	IEC
Voltage Rating	300V AC/DC	300V AC/DC	500V AC/DC	300V AC/DC	300V AC/DC	500V AC/DC	300V AC/DC	300V AC/DC	500V AC/DC
Maximum Current	12 A	12 A	12 A	12 A	12 A	12 A	12 A	12 A	12 A
Wire Range (Rated Cross Section)	#30… #12 AWG	#30… #12 AWG	0.05… 4 mm²	#30… #12 AWG	#30… #12 AWG	0.05… 4 mm²	#30… #12 AWG	#30… #12 AWG	0.05… 4 mm²
Indicator Type	Neon			LED			Non-Indicating		
Leakage Current	2 mA @ 300V			2 mA @ 24V			—		
Working Voltage	100…300V AC			10…57V AC/DC			Per Fuse Rating		
Fuse Size (Not Supplied)	1/4" x 1-1/4"			1/4" x 1-1/4"			1/4" x 1-1/4"		
Wire Strip Length	0.38" (9.7 mm)			0.38" (9.7 mm)			0.38" (9.7 mm)		
Recommended Tightening Torque	3…7 lb-in. (0.3…0.8 Nm)			3…7 lb-in. (0.3…0.8 Nm)			3…7 lb-in. (0.3…0.8 Nm)		
Density	33 pcs./ft (109/m)			33 pcs./ft (109/m)			33 pcs./ft (109/m)		
Insulation Temperature Range	–40…+221°F (–40…+105°C)			–40…+221°F (–40…+105°C)			–40…+221°F (–40…+105°C)		
Terminal Blocks	**Cat. No.**		**Pcs./ Pkg.**	**Cat. No.**		**Pcs./ Pkg.**	**Cat. No.**		**Pcs./ Pkg.**
Terminal Block	1492-H4		25	1492-H5		25	1492-H6		25
Accessories (page 12-172)	**Cat. No.**		**Pcs./ Pkg.**	**Cat. No.**		**Pcs./ Pkg.**	**Cat. No.**		**Pcs./ Pkg.**
Mounting Rails: 1 m Symmetrical DIN (Steel)	199-DR1		10	199-DR1		10	199-DR1		10
1 m Symmetrical DIN (Aluminum)	1492-DR5		10	1492-DR5		10	1492-DR5		10
1 m Hi-Rise Sym. DIN (Aluminum)	1492-DR6		2	1492-DR6		2	1492-DR6		2
1 m Angled Hi-Rise Sym. DIN (Steel)	1492-DR7		2	1492-DR7		2	1492-DR7		2
End Barrier	1492-N37		50	1492-N37		50	1492-N37		50
End Anchors: DIN Rail — Normal Duty	1492-EA35		50	1492-EA35		50	1492-EA35		50
DIN Rail — Heavy Duty	1492-EAH35		10	1492-EAH35		10	1492-EAH35		10
Jumpers: Side Jumper — 10-pole Uninsulated	1492-N49		10	1492-N49		10	1492-N49		10
Side Jumper — Insulating Sleeve	1492-SJS		10	1492-SJS		10	1492-SJS		10
Other Accessories: Group Marking Carrier	1492-GM35		10	1492-GM35		10	1492-GM35		10
Marking Systems: Snap-in Marker Card	1492-SM8X12		5	1492-SM8X12		5	1492-SM8X12		5

Accessories — Page 12-172

	1492-J3				1492-J4				1492-J6			
Dimensions are not intended to be used for manufacturing purposes. **Note:** Height dimension is measured from top of rail to top of terminal block.												
Specifications	*Feed-Through Terminal Block*				*Feed-Through Terminal Block*				*Feed-Through Terminal Block*			
Certifications		CSA	IEC	EEx e II		CSA	IEC	EEx e II		CSA	IEC	EEx e II
Voltage Rating	600V AC/DC		800V AC/DC	550V AC/DC	600V AC/DC		800V AC/DC	750V AC/DC	600V AC/DC		800V AC/DC	550V AC/DC
Maximum Current	25 A	20 A	24 A	21 A	35 A		32 A	28 A	50 A		41 A	36 A
Wire Range (Rated Cross Section)	30… 12 AWG	26… 12 AWG	2.5 mm²	2.5 mm² (20… 14 AWG)	22… 10 AWG		4 mm²	4 mm² (20… 12 AWG)	20… 8 AWG		6 mm²	6 mm² (20… 10 AWG)
Wire Strip Length	0.39 in (10 mm)				0.39 in (10 mm)				0.47 in (12 mm)			
Recommended Tightening Torque	3.7…7.1 lb•in (0.4…0.8 Nm)				4.4…8.8 lb•in (0.5…1.0 Nm)				7.1…12.4 lb•in (0.8…1.4 Nm)			
Density (Blocks per ft/meter)	59 per ft/196 per meter				49 per ft/163 per meter				37 per ft/123 per meter			
Housing Temperature Range	–58…+248 °F (–50…+120 °C)				–58…+248 °F (–50…+120 °C)				–58…+248 °F (–50…+120 °C)			
Terminal Blocks	**Cat. No.**			**Pcs/ Pkg**	**Cat. No.**			**Pcs/ Pkg**	**Cat. No.**			**Pcs/ Pkg**
Color: Gray	1492-J3			100	1492-J4			100	1492-J6			100
Red	1492-J3-RE			100	1492-J4-RE			100	1492-J6-RE			100
Blue	1492-J3-B			100	1492-J4-B			100	1492-J6-B			100
Black	1492-J3-BL			100	1492-J4-BL			100	1492-J6-BL			100
Green	1492-J3-G			100	1492-J4-G			100	1492-J6-G			100
Yellow	1492-J3-Y			100	1492-J4-Y			100	1492-J6-Y			100
Orange	1492-J3-OR			100	1492-J4-OR			100	1492-J6-OR			100
Brown	1492-J3-BR			100	1492-J4-BR			100	1492-J6-BR			100
White	1492-J3-W			100	1492-J4-W			100	1492-J6-W			100
Accessories	**Cat. No.**			**Pcs/ Pkg**	**Cat. No.**			**Pcs/ Pkg**	**Cat. No.**			**Pcs/ Pkg**
Mounting Rails: 1 m Symmetrical DIN (Steel)	199-DR1			10	199-DR1			10	199-DR1			10
1 m Symmetrical DIN (Aluminum)	1492-DR5			10	1492-DR5			10	1492-DR5			10
1 m Hi-Rise Sym. DIN (Aluminum)	1492-DR6			2	1492-DR6			2	1492-DR6			2
1 m Angled Hi-Rise Sym. DIN (Steel)	1492-DR7			2	1492-DR7			2	1492-DR7			2
End Barriers Gray	1492-EBJ3			50	1492-EBJ3			50	1492-EBJ3			50
Blue	1492-EBJ3-B			50	1492-EBJ3-B			50	1492-EBJ3-B			50
Yellow	1492-EBJ3-Y			50	1492-EBJ3-Y			50	1492-EBJ3-Y			50
End Anchors and Retainers: Screwless End Retainer	1492-ERL35			20	1492-ERL35			20	1492-ERL35			20
DIN Rail — Normal Duty	1492-EAJ35			100	1492-EAJ35			100	1492-EAJ35			100
DIN Rail — Heavy Duty	1492-EAHJ35			50	1492-EAHJ35			50	1492-EAHJ35			50
Jumpers:* Screw Center Jumper — 10 pole	1492-CJJ5-10			20	1492-CJJ6-10			20	1492-CJJ8-10			20
Screw Center Jumper — 4 pole	1492-CJJ5-4			50	1492-CJJ6-4			50	1492-CJJ8-4			50
Screw Center Jumper — 3 pole	1492-CJJ5-3			50	1492-CJJ6-3			50	1492-CJJ8-3			50
Screw Center Jumper — 2 pole	1492-CJJ5-2			50	1492-CJJ6-2			50	1492-CJJ8-2			50
Plug-in Center Jumper — 50 Pole	1492-CJLJ5-50			10	1492-CJLJ6-41 (41-pole)			10	—			—
Plug-in Center Jumper — 10 Pole	1492-CJLJ5-10			20	1492-CJLJ6-10			20	—			—
Plug-in Center Jumper — 9 Pole	1492-CJLJ5-9			20	—			—	—			—
Plug-in Center Jumper — 8 Pole	1492-CJLJ5-8			20	—			—	—			—
Plug-in Center Jumper — 7 Pole	1492-CJLJ5-7			20	—			—	—			—
Plug-in Center Jumper — 6 Pole	1492-CJLJ5-6			20	—			—	—			—
Plug-in Center Jumper — 5 Pole	1492-CJLJ5-5			20	—			—	—			—
Plug-in Center Jumper — 4 Pole	1492-CJLJ5-4			60	1492-CJLJ6-4			60	—			—
Plug-in Center Jumper — 3 Pole	1492-CJLJ5-3			60	1492-CJLJ6-3			60	—			—
Plug-in Center Jumper — 2 Pole	1492-CJLJ5-2			60	1492-CJLJ6-2			60	—			—
Insulated Side Jumper — 24 Pole	1492-SJ5B-24			50	—			—	—			—
Insulated Side Jumper — 10 Pole	1492-SJ5B-10			50	—			—	—			—
Screw Type Jumper Notching Tool	1492-T1			1	1492-T1			1	1492-T1			
Other Accessories: Partition Plate	1492-EBJ16			20	1492-EBJ16			20	1492-EBJ16			20
Test Plug Socket	1492-TPS23			20	1492-TPS23L			50	1492-TPS23L			50
Test Plug	1492-TP23			20	1492-TP23			20	1492-TP23			20
Test Plug (Stackable)	1492-TPJ5			25	1492-TPJ6			25	—			—
Electrical Warning Plate	1492-EWPJ5			25	1492-EWPJ5			25	1492-EWPJ8			50
Group Marking Carrier	1492-GM35			25	1492-GM35			25	1492-GM35			25
Marking Systems: Snap-in Marker Cards	1492-M5X12 (144/card) 1492-M5X5 (200/card)			5 5	1492-M6X12 (120/card) 1492-M6X5 (200/card)			5 5	1492-M7X12 (108/card) 1492-M8X5 (160/card)			5 5

* Use of Center Jumpers may affect spacings, requiring derating of terminal blocks. See page 77 for details.

IEC Terminal Block Accessories

Marking Systems and Electrical Warning Plate Markers

Terminal Block Snap-In Markers

Photo	Used With	Markers per Card	Color	Cat. No.	Pcs/ Pkg
	1492-L	100	White	1492-M3X5	5
	1492-L	100	White	1492-M3X12	5
	1492-J, L	200	White	1492-M5X5	5
	1492-J, L	144	White	1492-M5X8	5
	1492-J, L	144	White	1492-M5X10	5
	1492-J, L	144	White	1492-M5X12	5
	1492-J, L	96	White	1492-M5X15	5
	1492-J, L	200	White	1492-M6X5	5
	1492-J, L	120	White	1492-M6X10	5
	1492-J, L	120	White	1492-M6X12	5
	1492-J, L	108	White	1492-M7X12	5
	1492-J, L	160	White	1492-M8X5	5
	1492-K	144	White	1492-SM5X10	5
	1492-K	120	White	1492-SM6X10	5
	1492-L	96	White	1492-MH5X10	5
	1492-L	96	White	1492-MH5X15	5
	1492-L	80	White	1492-MH6X12	5
	NEMA Terminal Blocks, Circuit Breakers	120	White	1492-MN81	5
	NEMA Terminal Blocks, Circuit Breakers	60	White	1492-MN83	5
	1492-WM3, WMD1	80	White	1492-MS5X5	5
	1492-W, 700-HA Relays	80	White	1492-MS5X9	5
	1492-W, 700-HA Relays	80	White	1492-MS5X12	5
	1492-W,R, 700-HA Relays	80	White	1492-MS6X9	5
	1492-W, 700-HA Relays	80	White	1492-MS6X12	5
	1492-W,R, 700-HA Relays	56	White	1492-MS8X9	5
		56	White	1492-MS8X12	5
	1492-W, Bulletin 1667 PanelConnect™	40	White	1492-MS9X20	5
	Bulletins 100 and 140 Products	40	White	1492-MS10X17	5

Competitive Terminal Block Markers

Photo	Used With	Markers per Card	Color	Cat. No.	Pcs/ Pkg
	Phoenix, Entrelec, Telemecanique, Legrand Products∗	120	White	1492-MC5X8	5
	Phoenix, Wago, Wieland, Entrelec, Telemecanique, and Legrand Products†	120	White	1492-MC5X10	5
	Wago, Wieland, and Telemecanique Products‡	120	White	1492-MC5X12	5
	700-HL Relays, Phoenix, Wago, Wieland, Entrelec, Telemecanique, and Legrand Products§	120	White	1492-MC6X10	5

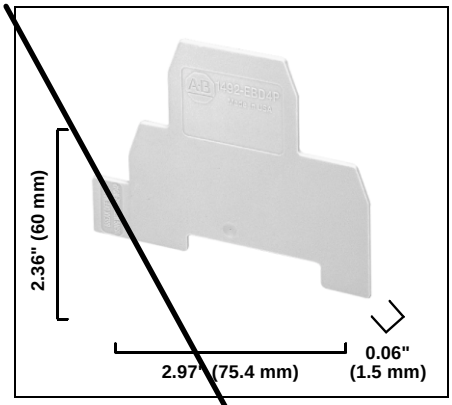
∗ May have some mounting limitations with Telemecanique Earthing Terminals.
† May have some mounting limitations with Telemecanique Initiator/Actuator Terminals.
‡ May have some mounting limitations with Legrand Standard Terminals.
§ May have some mounting limitations with Telemecanique Initiator/Actuator Terminals, and Legrand Standard Terminals.

Wire Markers

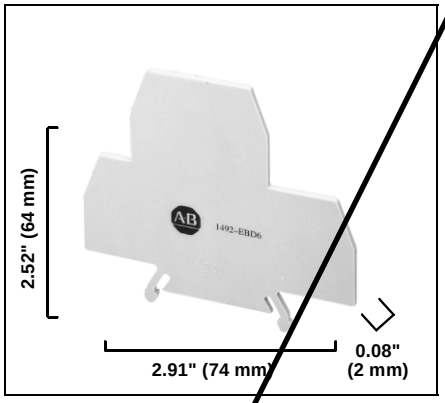
Wire Size	Insulation Dia.	Markers per Card	Color	Cat. No.	Pcs/ Pkg
#20… #18 AWG (0.5… 1.0 mm²)	0.059… 0.098 in (1.5… 2.5 mm²)	40	White	1492-MWC1-12	5
#18… #14 AWG (0.75… 2.5 mm²)	0.078… 0.138 in (2.0… 3.5 mm²)	40	White	1492-MWC3-12	5
#12 AWG (2.5… 4.0 mm²)	0.098… 0.197” in (2.5… 5.0 mm²)	24	White	1492-MWC4-12	5

IEC, Continued

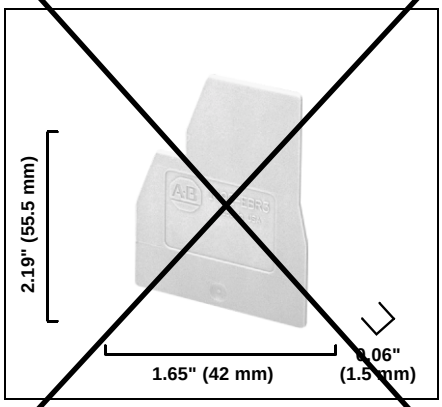
1492-EBD4P



1492-EBD6

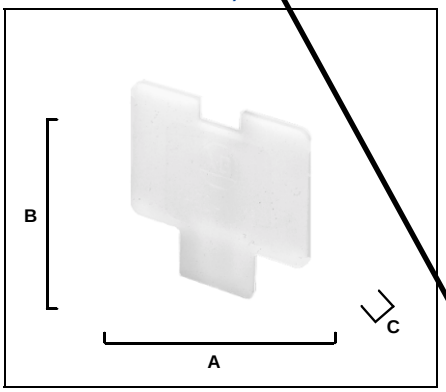


1492-EBR3



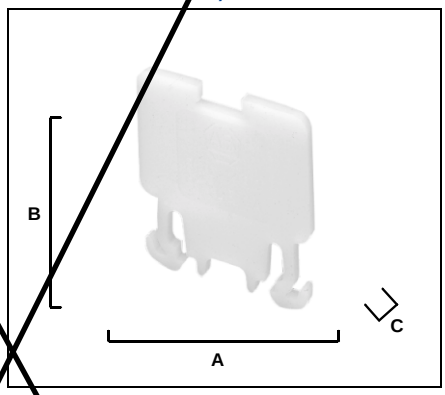
NEMA/EEMAC

1492-NM16, 1492-NM16BL, 1492-NM16GL, 1492-NM36



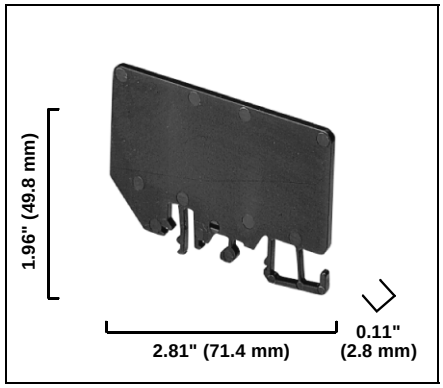
Cat. No.	A	B	C
1492-NM16	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM16BL	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM16GL	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM36	1.56" (39.6 mm)	1.45" (36.8 mm)	0.07" (1.78 mm)

1492-N16, 1492-N17, 1492-N18, 1492-N36

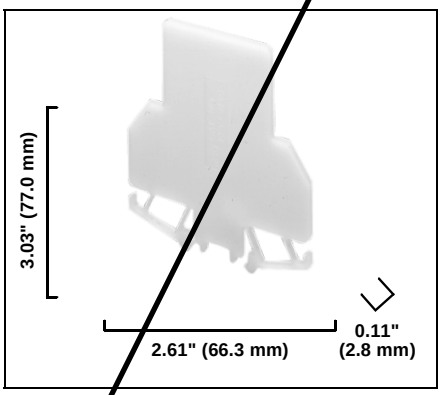


Cat. No.	A	B	C
1492-N16	1.50" (38.1 mm)	1.78" (45.2 mm)	0.11" (2.8 mm)
1492-N17	1.75" (44.5 mm)	2" (50.8 mm)	0.14" (3.6 mm)
1492-N18	1.25" (31.8 mm)	1.13" (28.7 mm)	0.11" (2.8 mm)
1492-N36	1.56" (39.6 mm)	1.68" (42.5 mm)	0.11" (2.8 mm)

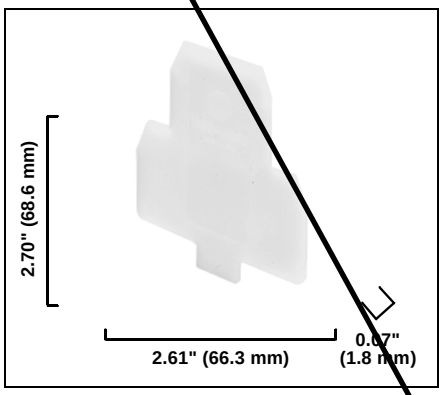
1492-N37



1492-N40

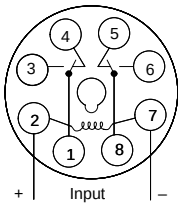
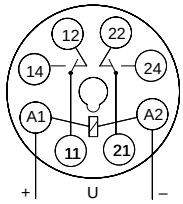
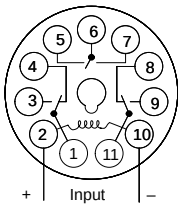
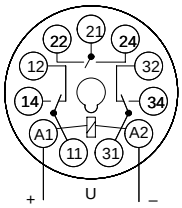


1492-NM40



General Purpose Relays and Timing Relays

Bulletin 700-HA Tube Base Relay with PIN Terminals (Single Contact) — Mechanical ON/OFF Indicator included ❶

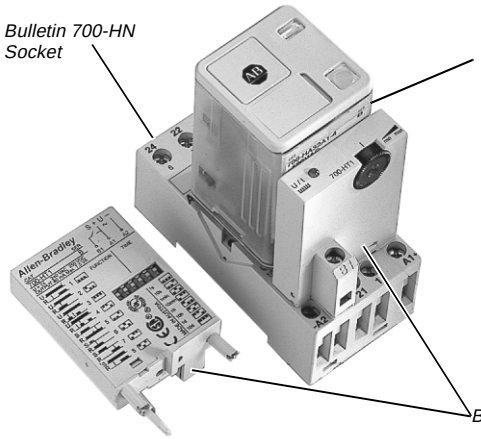
	Description	Contact Rating	Wiring Diagrams		Coil Voltage	Cat. No. ❷❸
			U.S./Canada	International		
	DPDT 2-Pole 2 Form C Single AgNi Contact	10 A B300			6V AC	~~700-HA32A06~~
					12V AC	700-HA32A12
					24V AC	~~700-HA32A24 ❹~~
					120V AC	700-HA32A1 ❹
					240V AC	~~700-HA32A2 ❹~~
					277V AC	700-HA32A27
					6V DC	700-HA32Z06
					12V DC	700-HA32Z12 ❹
					24V DC	700-HA32Z24 ❹
					36V DC	700-HA32Z36
					48V DC	700-HA32Z48
					110V DC	700-HA32Z1
					125V DC	700-HA32Z01
	Sockets		*700-HN125*	*700-HN100* *700-HN202*	140V DC	700-HA32Z3
	3PDT 3-Pole 3 Form C Single AgNi Contact	10 A B300			6V AC	700-HA33A06
					12V AC	700-HA33A12
					24V AC	700-HA33A24 ❹
					120V AC	700-HA33A1 ❹
					240V AC	700-HA33A2
					6V DC	700-HA33Z06
					12V DC	700-HA33Z12
					24V DC	700-HA33Z24 ❹
					48V DC	700-HA33Z48
					110V DC	700-HA33Z1
					125V DC	700-HA33Z01
	Sockets		*700-HN126*	*700-HN101* *700-HN203*	140V DC	~~700-HA33Z3~~

❶ For Time Module and Surge Suppressor Module, see page 9-24.

❷ Pilot Light Option: Add suffix **(-4)** to the selected Bulletin 700-HA Relay Cat. No., except for the 240V AC Units, add (**-4L**).

❸ Manual Operator and Pilot Light Option: Add suffix **(-1-4)** to the selected Bulletin 700-HA Relay Cat. No., except for the 240V AC units, add (**-1-4L**).

❹ Bulk Package Option: Relay can be purchased at discounted prices in bulk quantities of 10. Add suffix (**-99**) to the selected relay catalog number. The following relays are also available in the Bulk Package Option: Cat. Nos. 700-HA32A1-4, 700-HA32A1-1-4, 700-HA33A1-4, and 700-HA33A1-1-4.



The Bulletin 700-HA Relays can be used together with Timing or Surge Suppressor Modules by plugging in to the Cat. No. 700-HN202 8-Pin Socket, or the Cat. No. 700-HN203 11-Pin Socket.

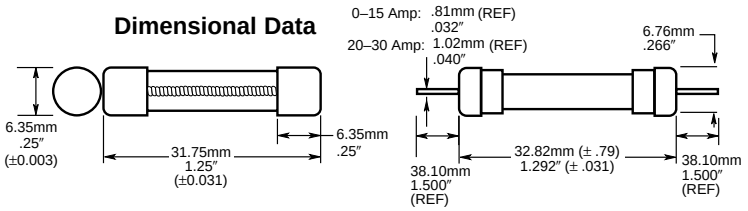
Time-Delay Glass Fuses

For 1/4" x 1-1/4" (6.3mm x 32mm)

MDL
MDL-V

Actual Size

Dimensional Data



Catalog Symbol: MDL
1/4″ x 1-1/4″ (3AG)
Characteristics: Time-Delay
Agency Approvals*: UL/CSA 248-4
Construction: Glass Tube,
Albaloy Plated Brass Endcaps

Time-Current Characteristics:

Rated Current	Percent of Rating 110%	135%	200%
0-30	4 hrs. (min)	60 min. (max)	120 sec. (max)

Packaging & Ordering Information:

	MDL	—	V	—	(See Table)
Package Code **Blank** 5 in **BK/** 100 in **Weight = .93 lbs/100**	Product Symbol		Lead **Blank -no lead** **V-Axial lead**		Rated Current

CE logo denotes compliance with European Union Low Voltage Directive (50-1000 VAC, 75-1500 VDC). Refer to BIF document #8002 or contact Bussmann Application Engineering at 314-527-1270 for more information.

Electrical Characteristics

Rated Current[5]	Rated Voltage AC (Max.)	Rated Voltage DC[6] (Max.)	Interrupting Rating[1] AC	Interrupting Rating[1] DC[6]	Pre-arcing I^2T (A^2sec) AC	Pre-arcing I^2T (A^2sec) DC[6]	Typical Total Clearing[3] I^2T (A^2sec) AC	Typical Total Clearing[3] I^2T (A^2sec) DC[6]	Typical Voltage Drop[2] Volts at 100% Rated Current	Agency* Approvals U.L.	U.R.	CSA
1/16	250V	250V	35A	35A	.21	.02	.51	3.59	5.56	•		•
1/10	250V	250V	35A	35A	.04	.60	.11	1.31	2.02	•		•
1/8	250V	250V	35A	35A	.05	.06	.06	.06	1.68	•		•
3/16	250V	250V	35A		.08		.52		1.12	•		•
2/10	250V	250V	35A	35A	.08		.68		1.00	•		•
1/4	250V	250V	35A	35A	.43	.44	.96	.45	1.02	•		•
3/10	250V	250V	35A	35A	.41	.43	1.13	.66	1.48	•		•
3/8	250V	250V	35A	35A	.72	.83	1.86	2.00	.85	•		•
1/2	250V	250V	35A	35A	1.48	2.02	2.52	2.14	1.26	•		•
3/4	250V	250V	35A	35A	3.75	4.25	5.11	4.62	1.01	•		•
1	250V	250V	35A	35A	10.24	9.80	12.65	10.25	.98	•		•
1 1/4	250V	250V	100A	100A	10.70		21.40		.77	•		•
1 1/2	250V	250V	100A	100A	19.10		30.90		.74	•		•
2	250V	250V	100A	100A	68.60		79.70		.59	•		•
2 1/4	250V	250V	100A	100A	55.40		78.20		.27	•		•
2 1/2	250V	250V	100A	100A	63.50		77.10		.42	•		
3	250V	250V	100A	100A	43.10	30.27	68.60	76.09	.35	•		•
4	250V	32V	200A	1000A	181.90		203.50		.20	•		•
5	250V	32V	200A	1000A	311.30		374.00		.19	•		•
6	250V	32V	200A	1000A	368.30		427.50		.17	•		•
7	250V	32V	200A	1000A	457.50		507.60		.15	•		•
8	250V	250V	200A	200A	280.90	422.00	455.20	531.00	.12	•		•
9	32V	32V	1000A	1000A	568.00		685.00		.14		•	
10	32V	32V	1000A	1000A	671.00		874.00		.12		•	
15	32V	32V	1000A	1000A	1931.00		2296.00		.14		•	
20	32V	32V	1000A	1000A	5652.00		5992.00		.05		•	
25	32V	32V	1000A	1000A	15356.00		15789.00		.07		•	
30	32V	32V	1000A	1000A	28033.00		28499.00		.07		•	

*Approvals: UL Listed, Std. 248-14, Guide JDYX, File E19180; CSA Certification Class 1422-01, File 53787; U.L. Recognized, Guide #JDYX2, File E19180.

1. Interrupting ratings were measured at 70% - 80% power factor on AC, and at a time constant described in UL 198L.
2. Voltage drop was measured at 25°C±3°C ambient temperature at rated current.
3. I^2t was measured at listed interrupting rating and rated voltage.
4. Interrupting rating for MDL 1/16-8A @ 125 VAC is 10000A. Interrupting rating listed corresponds to maximum rated voltage.
5. Other available sizes include 1/100, 1/32, 15/100, 175/100, 4/10, 6/10, 7/10, 8/10, 1-2/10, 1-6/10, 1-8/10, 2-8/10, 3-2/10, 3-1/2, 6-1/4, 7-1/2 and 12.
6. 1-10A, UL Recognized: 125 VDC and 500 AIC. Other DC ratings are self-certified.

COOPER Bussmann

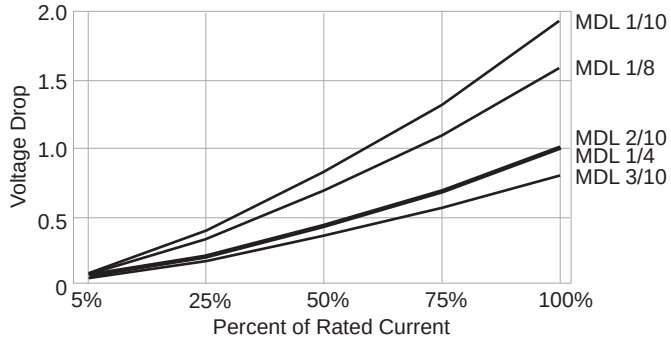
rev. 4/14/97

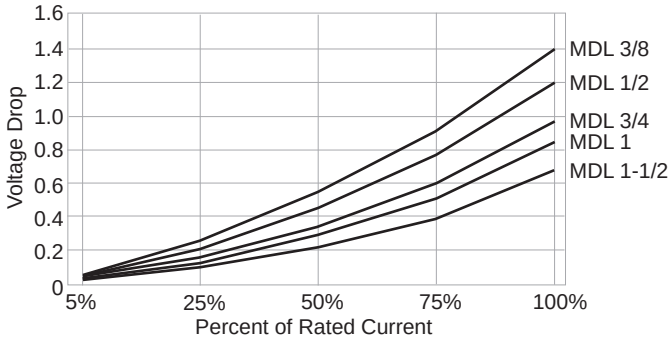
Time-Delay Glass Fuses

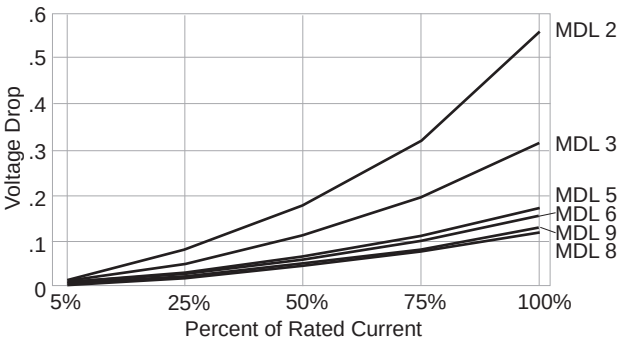
For 1/4” x 1-1/4” (6.3mm x 32mm)

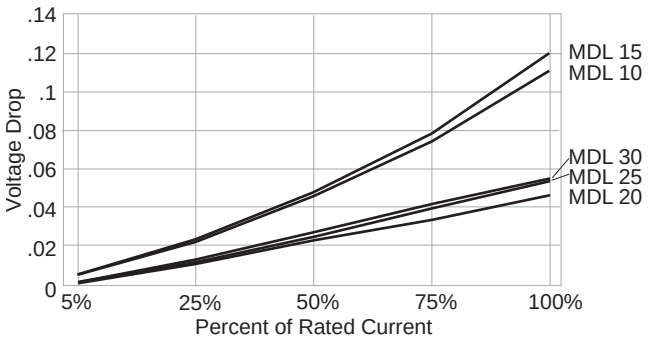
MDL
MDL-V

1.0 Typical Voltage Drop (At 25° C Ambient Temperature)

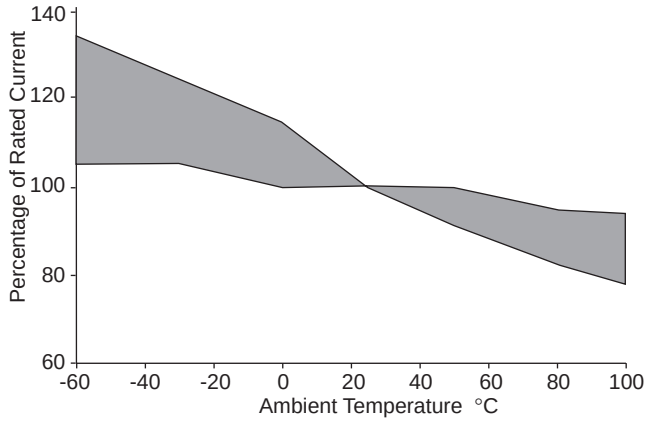




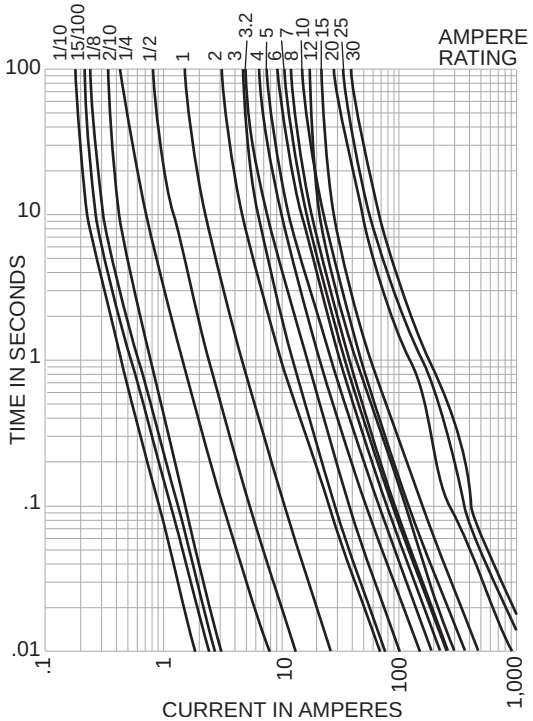




2.0 Ambient Temperature Effect Chart (Derating Curve)



Time-Current Characteristic Curves–Average Melt (Full Size Curves Available)



Eagle Armored Plug & Connector

ELECTRICAL SUPPLIES

- Steel clamps and armor are heavy plated for corrosion resistance
- Armor is knurled for easy gripping
- Solid brass plug blades are firmly embedded into body
- Terminal screws are large head type for easy wiring, separated by barriers to prevent flashover or short circuits
- Strain relief clamps are superior designs, providing a secure mechanical grip
- Vinyl Dead-Front Construction
- 2-Pole, 3-Wire Grounding with cord clamp
- Cord diameter .250" - .625"
- UL & CSA listed, NEMA 5-15
- 15 AMP, 125 Volts
- Made in the U.S.A.

EAGLE

QUALITY MADE IN THE U.S.A.

15 AMP TYPE (125V):					
Part Number		**Dia.**	**Eagle Length**	**P/N**	**Each**
91-1168-00 Buy	Armored Plug Male	1-½"	2"	2867	View Price
91-1169-00 Buy	Armored Connector Female	1-½"	2-19/32"	2887	View Price

■ Surge Protection
For *Business-Critical Continuity™*

PowerSure™ EMC-240B

120/240 VAC Surge Protection

The PowerSure EMC-240B surge suppressor is designed to protect AC distribution panel circuits or 120V power supplies feeding sensitive electronic equipment. Electrically, the unit incorporates MOV fusing technology. The PowerSure EMC-240B is designed to be installed in parallel on standard split phase 120/240 VAC (3W+G) or single phase 120 VAC (2W+G) circuits.

General Technical Specifications

Operating Voltage	120/240 VAC
Total Peak Surge Current	80 kA (8 x 20 μs)
Short Circuit Current Rating	42kAIC
Location Type	Type 2
I-Nominal (In)	3kA
Operating Current	NA, Parallel
Operating Frequency	47-63 Hz
EMI Attenuation (100 kHz to 100 MHz)	>40 dB
SPD Technology	Metal Oxide Varistors (MOVs)
Modes of Protection	Line-to-Line Line-to-Neutral
Status Indication	Power On & MOVs functional
Connection Type	Wire Leads
Operating Temperature	-40°C to +85°C
Dimensions (Inches)	4.6H x 2.2W x 2.8L
Weight	13.5 oz
Certifications	ANSI/UL 1449 Third Edition

Features

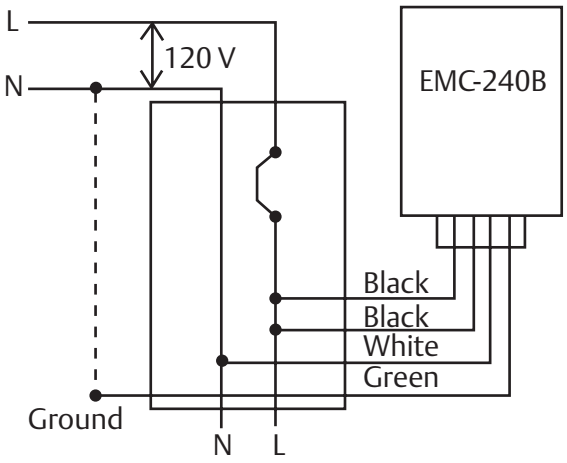
- Fast response time
- 40,000 Amps per phase capacity
- Failsafe and fused
- Operational status indicators
- ANSI/UL 1449 Third Edition
- 5 year warranty

Models

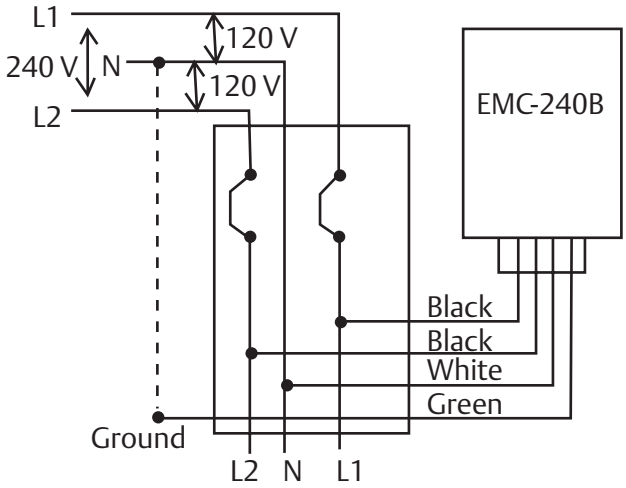
EMC-240B	with 1/2” Chase Nipple
EMC-240BK	with 1/2” Conduit Offset, 2.5” Long
EMC-240BK90	with 1/2” Conduit 90˚, 3.25” Long

EMERSON™
Network Power

Installation

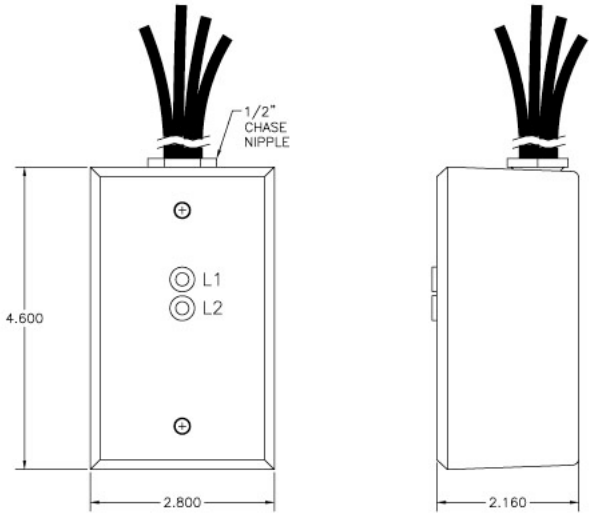


120V applications use a single pole 30Amp breaker



120/240V applications, use a 2 pole 30Amp breaker

Dimensions



Caution

1. *Installation and service should be performed by qualified electricians only.*
2. *Before installing EMC, remove all electrical power from circuits.*
3. *Connect on load side of main breakers.*
4. *Preferably use a single-2 pole circuit breaker*
   a. *120V applications use a single pole 30amp breaker.*
   b. *120/240V applications, use a 2 pole 30amp breaker*

Emerson Network Power.
The global leader in enabling *Business-Critical Continuity™*.

- AC Power
- Connectivity
- DC Power
- Embedded Computing
- Embedded Power
- Monitoring
- Outside Plant
- Power Switching & Control
- Precision Cooling
- Racks and Integrated Cabinets
- Services
- **Surge Protection**

Emerson Network Power Contact information

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T: (800) 288-6169
F: (607) 722-8713
E: contactsurge@emerson.com

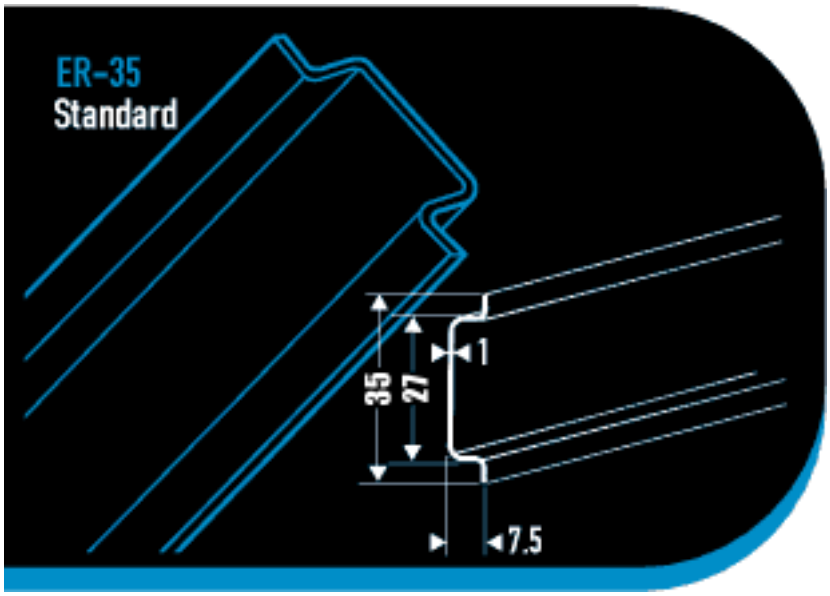
www.emersonnetworkpower.com

EMERSON™
Network Power

IO-50101 4/10 Rev. 4 Printed in USA

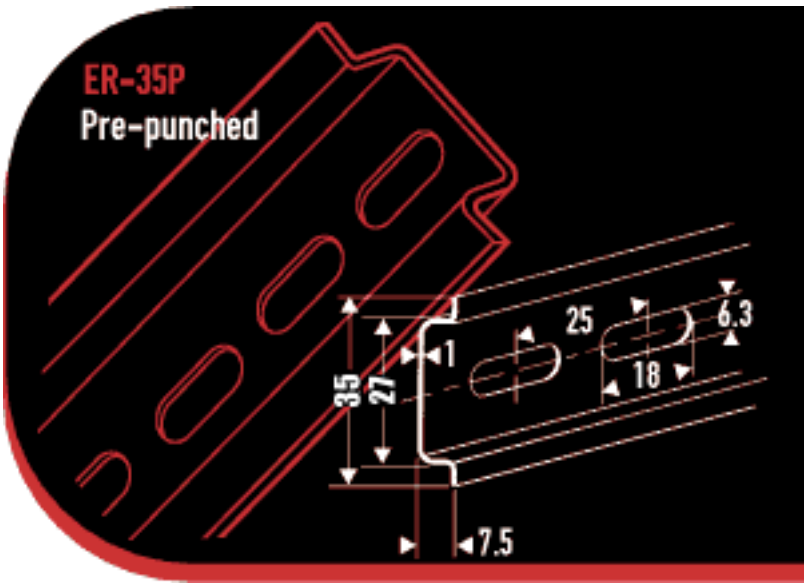
E-Rails

As one of the world's leading manufacturers of DIN rail, E-Rail provides over forty years of experience producing high-quality products. Our factory's quality assurance program (ISO 9002 Certification since 1994) is based on international standards and is designed to provide you with the highest quality products and insure complete customer satisfaction.



~~#111.011 Zinc-bichromate Cold rolled electrolitically plated steel per DIN EN 50022. 2 meters in length~~

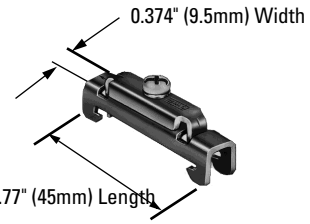
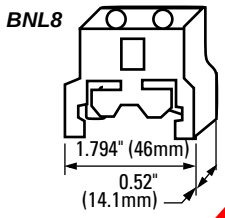
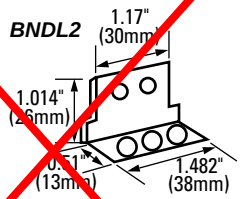
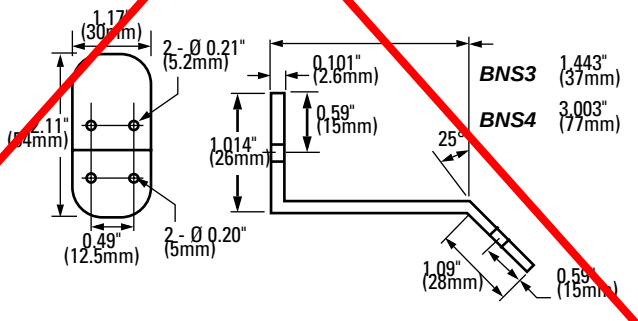
#111.013 Zinc-bichromate Cold rolled electrolitically plated steel per DIN EN 50022. 2 meters in length.
~~#111.103 Zinc-bichromate Cold rolled steel per DIN EN 50022. 1 meter in length.~~
~~#111.037-Stainless Steel~~



Part numbers 111.013 and ER-35P are equivalent per Daniel Baker with E-RAIL LLC.

Dimensions: Accessories, continued

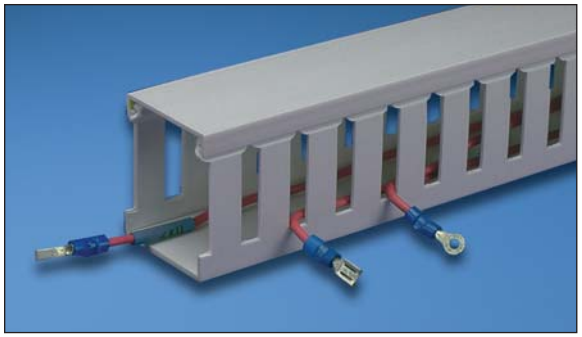
Dimensions: DIN Rail Stops and Stand-Offs

Part No.	Dimensions
BNL-5	
~~BNL-8~~	
BNL-8	
BNDL2	
BNS3	
BNS4	

P

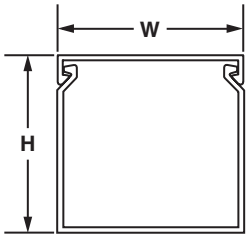
Wiring Duct *Control Panel*

PANDUCT® Type G — Wide Slot Wiring Duct



- Wide slot/finger design provides greater sidewall rigidity and can be used with a wide range of wire bundle sizes
- Made of rigid PVC
- UL Recognized continuous use temperature: 50°C (122°F)
- UL94 Flammability Rating of V-0
- Provided with mounting holes
- Conforms with NFPA 79-2002 section 14.3.1 requirement for flame retardant material

- nonmetallic, non-flame propagating CDS
- medium impact resistance
- 331 temperature classification
- cover removal without tools



Reference	Page(s)
Color Availability	F14
Adhesive Tape	E12, E13
Dimensions	F2
Wirefill Guide	F8
Material Specifications	F13
Tools & Accessories	D11, D12, Section E
Installation Tips	F15

Part Number	Duct Size W x H In.	Duct Size W x H mm	Cover Part Number	Duct Std. Ctn. Qty.	Cover Std. Ctn. Qty.	Length (ft)
G.5X.5LG6	.69 x .60	17.5 x 15.2	C.5LG6	120	120	6
G.5X1LG6	.69 x 1.06	17.5 x 26.9		120		
G.5X2LG6	.69 x 2.03	17.5 x 51.6		120		
G.5X4LG6	.69 x 4.10	17.5 x 104.1		60		
G.75X.75LG6	.93 x .82	23.6 x 20.8	C.75LG6	120	120	6
G.75X1LG6	.93 x 1.06	23.6 x 26.9		120		
G.75X1.5LG6	.93 x 1.57	23.6 x 39.9		120		
G.75X2LG6	.93 x 2.03	23.6 x 51.6		120		
G1X1LG6	1.26 x 1.12	32.0 x 28.4	C1LG6	120	120	6
G1X1.5LG6	1.26 x 1.62	32.0 x 41.1		120		
G1X2LG6	1.26 x 2.12	32.0 x 53.8		120		
G1X3LG6	1.26 x 3.12	32.0 x 79.2		120		
G1X4LG6	1.26 x 4.10	32.0 x 104.1		60		
G1.5X1LG6	1.75 x 1.12	44.5 x 28.4	C1.5LG6	120	120	6
G1.5X1.5LG6	1.75 x 1.62	44.5 x 41.1		120		
G1.5X2LG6	1.75 x 2.12	44.5 x 53.8		120		
G1.5X3LG6	1.75 x 3.12	44.5 x 79.2		120		
G1.5X4LG6	1.75 x 4.10	44.5 x 104.1		60		
G2X1LG6	2.25 x 1.12	57.2 x 28.4	C2LG6	120	120	6
G2X1.5LG6	2.25 x 1.62	57.2 x 41.1		120		
G2X2LG6	2.25 x 2.12	57.2 x 53.8		120		
G2X3LG6	2.25 x 3.12	57.2 x 79.2		60		
G2X4LG6	2.25 x 4.10	57.2 x 104.1		60		
G2X5LG6	2.25 x 5.10	57.2 x 129.5		60		
G2.5X3LG6	2.75 x 3.12	69.9 x 79.2	C2.5LG6	120	120	6
G3X1LG6	3.25 x 1.12	82.6 x 28.4	C3LG6	120	120	6
G3X2LG6	3.25 x 2.12	82.6 x 53.8		120		
G3X3LG6	3.25 x 3.12	82.6 x 79.2		60		
G3X4LG6	3.25 x 4.10	82.6 x 104.1		60		
G3X5LG6	3.25 x 5.10	82.6 x 129.5		60		
G4X1.5LG6	4.25 x 1.62	108.0 x 41.1	C4LG6	120	120	6
G4X2LG6	4.25 x 2.12	108.0 x 53.8		60		
G4X3LG6	4.25 x 3.12	108.0 x 79.2		60		
G4X4LG6	4.25 x 4.10	108.0 x 104.1		60		
G4X5LG6	4.25 x 5.10	108.0 x 129.5		60		
G6X4LG6	6.25 x 4.15	158.8 x 105.4	C6LG6	60	120	6

Part Number shown for LG (Light Gray). For other color availability see Color Selection Guide, page F14.

Order number of feet required, in multiples of 6' or Standard Carton Quantity. Base and cover sold separately.

Extract from the online catalog

Rail-mountable socket, with light indicator, housing color: gray, with screw connection, national version: USA, housing width 45 mm

The illustration shows a combination of versions, SD-US/SC/LA/GY and SD-D/SC/LA in gray, green and yellow

Order No.	2963860
Ord designation	SD-US/SC/LA/GY
EAN	4017918859138
Pack	10 Pcs.
Customs tariff	85366990
Catalog page information	Page 432 (IF-2005)

Technical data

General data

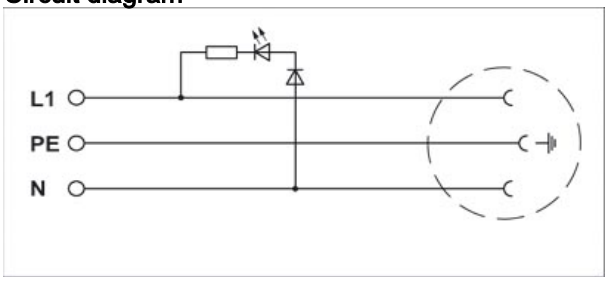
Nominal voltage U_N	125 V AC
Nominal current I_N	15 A AC
Status display	Glow lamp or LED with preresistor
Material contact	CuZn37
For country-specific use in	USA
Color	gray
Insulating material	PA
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	IEC 83
Standards/regulations	DIN 49440-1

Connection data

Conductor cross section, rigid min.	0.2 mm
Conductor cross section, rigid max.	4 mm
Conductor cross section flexible min.	0.2 mm
Conductor cross section, flexible max.	2.5 mm
Conductor cross section AWG/kcmil min.	30
Conductor cross section AWG/kcmil max	12
Type of connection	Screw connection
Stripping length	8 mm
Screw thread	M 3

Drawings

Circuit diagram



Address

PHOENIX CONTACT GmbH & Co. KG
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32825 Blomberg
Germany
Phone +49 5235 3 00
Fax +49 5235 3 41200
http://www.phoenixcontact.com
Phoenix Contact

GFI-Dual Utility Outlet EM-DUO/120/15/GFI

Data Sheet 1090A

September 1999

Features

- DIN-rail mount dual utility outlet
- Vertical or horizontal mounting
- Fits on 35 mm wide DIN-rail
- Ground fault protection circuit

Description

The EMG-DUO 120/15/GFI is a fully enclosed, dual utility outlet rated for 120 V ac/15 A. The outlet is equipped with Ground Fault Circuit Interruption (GFCI) for protection against shock hazards associated with ground shorts. For enhanced safety, the grounding pins of the receptacles are located at the top when vertically mounted. This prevents any metallic parts from inadvertently shorting the “hot” and neutral blade connections. This feature is particularly important in a control cabinet where ongoing maintenance and upgrades occur.

The dual outlet is packaged in a touch safe enclosure to eliminate the possibility of shock caused by accidental contact with live terminals. The universal mounting foot allows the outlet box to be DIN-rail mounted either vertically or horizontally. VDFK 4 self-locking screw terminal blocks provide reliable input power connections.

This utility outlet can be used for connecting test equipment, diagnostic equipment, power tools, soldering irons, displays, lighting, fans or anything that needs a 120 V power source.

This part is manufactured in the United States and is a stock item in Harrisburg as well as at our stocking distributor locations.

The device is UL listed under file #E123528.

Figure 7. EM-DUO/120/15/GFI

Table 3. EM-DUO/120/15/GFI Specifications

General Specifications	
Technical Data	
Rated voltage	120 V ac
Rated current	15 amps
Maximum wire size	#10 AWG
GFI response time	25 mS @ 4-6 mA
Housing Data	
Color	Ivory
Material	PVC 94 V-0
Minimum temperature	–35°C
Maximum temperature	66°C
Dimensions	
Length	5.33 in. (135 mm)
Width	3.25 in. (82 mm)
Depth	2.45 in. (62 mm)

1090A003

Phoenix Contact Inc. • P.O. Box 4100 • Harrisburg, PA 17111 • Phone: (717) 944-1300 • Fax: (717) 944-1625

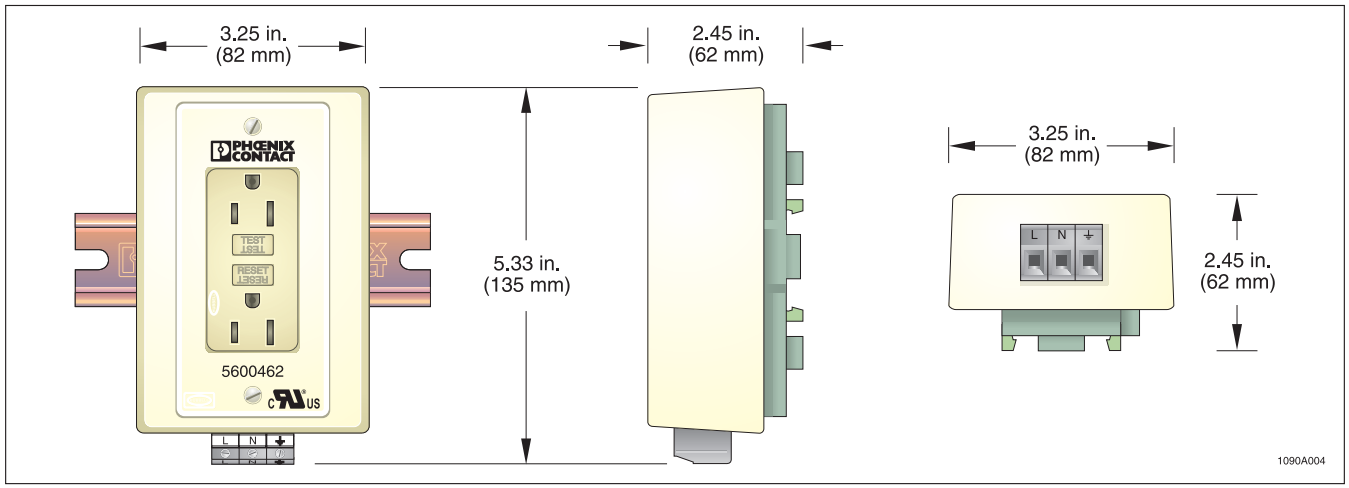

Figure 8. EM-DUO/120/15/GFI Dimensions

Ordering Information

Description	Part Number	Pieces/Package
EM-DUO-120/15/GFI	5600462	1

Dual Utility Outlet.
A fully enclosed receptacle offering two 120 V outlets for mounting on DIN-rail with GFCI protection.

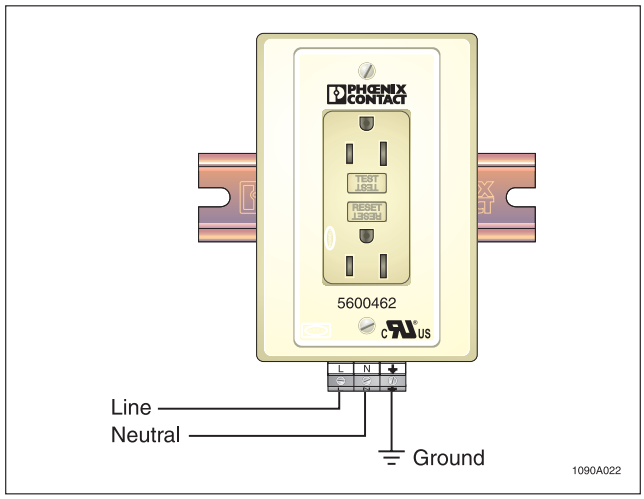

Figure 9. EM-DUO/120/15/GFI Wiring Diagram

Visit us at our website
www.em-duo.com

Headquarters, U.S.

Phoenix Contact Inc.
P.O. Box 4100
Harrisburg, PA 17111-0100
Technical Support and Information: (800) 322-3225
Fax: (717) 948-3475
Fax-On-Demand: (800) 944-9901
Email: info@phoenixcon.com
Web Site: http://www.phoenixcontact.com

Headquarters, Canada

Phoenix Contact Ltd.
235 Watline Avenue
Mississauga, Ontario L4Z 1P3
Phone: (905) 890-2820
Fax: (905) 890-0180

Saginaw Control & Engineering
95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-42EL3612LP

SCE-42EL3612LP

Application -
Designed to house electrical and electronic controls, instruments and components. Provides protection from dust, oil and water. For outdoor application a drip shield is recommended.

Construction -
- 0.075" carbon steel.
- Seams continuously welded and ground smooth.
- Flange trough collar around all sides of door opening.
- Oil-resistant gasket.
- Collar studs provided for mounting optional panels.
- Concealed hinge.
- Removable and interchangeable doors.
- Black quarter turn latches.
- Latches are opened or closed with a screwdriver.
- Mounting holes in back of enclosure.
- Mounting hardware, sealing washer and hole plug included.
- Removable print pocket furnished on enclosures with width greater than 12 Inches.
- Ground studs on door and body.

Options -
- Optional tamper-resistant inserts are available.
- Optional mounting feet available.
- Door hardware available.

Finish -
ANSI-61 gray powder coating inside and out. Optional sub-panels are powder coated white.

Industry Standards - (IS2)
NEMA Type 4, 12 and Type 13
UL Listed Type 4 and 12
CSA Type 4 and 12
IEC 60529 IP 66

Notes -
Interchangeable latches and handles available in the accessory section.

Product Specifications -
Part Number: SCE-42EL3612LP
Description: EL Enclosure
Height: 42.00"
Width: 36.00"
Depth: 12.00"
Price Code: E3
List Price: $551.11
Catalog Page: 71
Est. Ship Weight: 123.00 lbs

Download CAD Package
Add to Bill of Material

Optional Accessories -
SCE-42P36 - Subpanel, Bent
SCE-BV4XKIT - Kit, Breather Vent
SCE-DF42EL36LP - Panel, Dead Front (Wall Mount)
SCE-DS36N4 - Shield, Drip
SCE-DV4XKIT - Kit, Drain Vent
SCE-ELMFK4 - Foot Kit, EL Mounting (4pc.)
SCE-ELSP3 - KIT, Swing-Out Panel (20 High & Up)
SCE-PLWKB - Padlocking Wingknob Door Latch (Black)

Similar Part Numbers -
SCE-30EL2406LP - EL Enclosure
SCE-30EL2408LP - EL Enclosure
SCE-30EL2410LP - EL Enclosure
SCE-30EL2412LP - EL Enclosure
SCE-30EL2416LP - EL Enclosure
SCE-30EL2420LP - EL Enclosure
SCE-30EL2424LP - EL Enclosure
SCE-30EL3008LP - EL Enclosure
SCE-30EL3010LP - EL Enclosure
SCE-30EL3012LP - EL Enclosure

Installation Information -
Mounting Foot Kit for Enviroline Enclosures
Sealing Washer Specifications
EL Flush Mount Frame
Drip Shield Kit Assembly
Drain/Vents
Dead Front Wall Mount Installation Instructions
Swing Panel Assembly for Enviroline Enclosures
Swing Panel ELSP for Encl. Height > 16
Dead Front Wall Mount < 20 In Height Installation Instructions
Swing Panel ELSP for Encl. Height <= 16

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SCE@SaginawControl.com

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Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-42P36

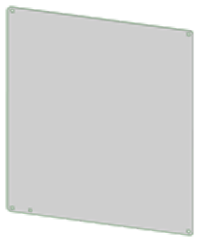
SCE-42P36

Options -
Sub-plates can be special ordered in Stainless Steel or Galvanized material. Please consult a factory representative for assistance.

Finish -
Powder Coated White.

Industry Standards - (IS17)
NEMA Not Applicable
UL Not Applicable
CSA N/A

Product Specifications -
Part Number: SCE-42P36
Description: Subpanel, Bent
Height: 39.00"
Width: 33.00"
Depth: 0.88"
Price Code: P3
List Price: $136.72
Catalog Page: 308
Est. Ship Weight: 39.00 lbs
Edge Flanges: Four
Configuration: C



Download CAD Package
Add to Bill of Material

Similar Part Numbers -
SCE-30P24 - Subpanel, Bent
SCE-30P30 - Subpanel, Bent
SCE-36P24 - Subpanel, Bent
SCE-36P30 - Subpanel, Bent
SCE-36P36 - Subpanel, Bent
SCE-40P24 - Subpanel, Bent
SCE-42P24 - Subpanel, Bent
SCE-42P30 - Subpanel, Bent
SCE-42P42 - Subpanel, Bent
SCE-48P48 - Subpanel, Bent

Installation Information -
Sub-Plate Layout & Grounding for 3/8-16

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95 Midland Road
Saginaw, MI 48638-5770
Phone: (800)234-6871
Fax: (989)799-4524
http://www.saginawcontrol.com

Part Information - SCE-ELMFK4

SCE-ELMFK4

Application -

Made for use with all SCE Enviroline enclosures and two-door wall-mount enclosures. Chemical and Corrosion resistant Polyamide material rated for type 3, 3R, 4, 4X and 12. Available in kits of four or six, and with plated steel fastener or stainless steel fasteners to maintain type 3, 3R, 4, 4X and 12 rating of your enclosure.

Industry Standards - (IS17)

NEMA Not Applicable
UL Not Applicable
CSA N/A

Product Specifications -

Part Number: SCE-ELMFK4
Description: Foot Kit, EL Mounting (4pc.)
Height: 5.00"
Width: 3.00"
Depth: 1.25"
Price Code: P2
List Price: $17.69
Catalog Page: 305
Est. Ship Weight: 2.00 lbs
Feet Per Kit: 4
Kits Per Package: 1

Download CAD Package
Add to Bill of Material

Similar Part Numbers -

SCE-ELMFK4SS - Foot Kit, S.S. EL Mounting (4pc.)
SCE-ELMFK6 - Foot Kit, EL Mounting (6pc.)
SCE-ELMFK6SS - Foot Kit, S.S. EL Mounting (6pc.)
SCE-ELMFK4-25 - Foot Kit, EL Mounting (4pc.) - Bulk
SCE-ELMFK4SS-25 - Foot Kit, S.S. EL Mounting (4pc.) - Bulk

Installation Information -

Mounting Foot Kit for Enviroline Enclosures
Mounting Foot Kit for WFLP Enclosures

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

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http://www.saginawcontrol.com

Part Information - SCE-SLMS

SCE-SLMS

Application -
LED Strip Lights have a compact design to provide interior lighting for smaller enclosures.

Construction -
- Magnets provided for quick installation to any surface inside the enclosure, also provided with clips that can be mechanically fastened
- Wire connector for direct power supply wiring
- Feed in / Feed out Push fit connecter on each end of fixture
- Daisy chain multiple lights continuously up to 16 lights AC or 8 lights DC
- Combined AC and DV voltage range in one light 24 VDC to 265 VAC 50/60 HZ
- ON/OFF switch or motion sensor available
- 6500K Cool White
- 400 Lumens

Industry Standards - (IS24)
UL Component Recognized

Notes -
UL File # E358386

Product Specifications -
Part Number: SCE-SLMS
Description: LED Strip Light - Motion Sensor
Height: 13.80"
Width: 1.38"
Depth: 1.25"
Price Code: P2
List Price: $200.00
Catalog Page: 1000
Est. Ship Weight: 0.30 lbs
UL File Model Number: SL-400000

Download CAD Package
Add to Bill of Material

Optional Accessories -
SCE-SLCC - LED Strip Light Connection Cord
SCE-SLDCC - LED Strip Light Daisy Chain Cord

Similar Part Numbers -
SCE-SLOF - LED Strip Light - On/Off Switch

Installation Information -
LED Strip Light

Saginaw Control and Engineering
95 Midland Road
Saginaw, MI 48638-5770
(800)234-6871
Fax: (989)799-4524
SCE@SaginawControl.com

Product Data Sheet

PK18GTA

LOAD CENTER EQUIPMENT GROUND BAR ASSY

SQUARE D by Schneider Electric

List Price $18.80 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Application	Load Centers
Circuit Breaker Type	PK
Marketing Trade Name	QO and Homeline

Shipping and Ordering

Category	00102 - Load Centers, Accessories, Type QO
Discount Schedule	DE3A
GTIN	00785901026426
Package Quantity	10
Weight	0.18 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Schneider Electric

Product Data Sheet

QOU110

Miniature Circuit Breaker (QOU) Standard, 10A, 1-Pole, 120/240VAC, HACR Rated

SQUARE D by Schneider Electric

List Price $40.20 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Ampere Rating	10A
Approvals	UL489 Listed - CSA 22.2 #5.1 Certified - IEC Rated 60947-2
Circuit Breaker Type	Standard
For Use With	OEM Panels and Enclosures
HACR Rated	Yes
Marketing Trade Name	QOU
Voltage Rating	120/240VAC
Mounting Type	Flush, Surface or DIN Rail (35mm)
Number of Poles	1-Pole
Short Circuit Current Rating	5kA@277VAC - 10kA@120/240VAC
Terminal Type	Line: Box Lug - Load: Box Lug
Type	QOU
Wire Size	#14-2 AWG(Al/Cu)
Depth	2.98 Inches
Height	4.05 Inches
Width	0.75 Inches

Shipping and Ordering

Category	00900 - Circuit Breakers, 1 Pole: 10 - 100 Amp, 2 Pole: 10 - 125 Amp, 3 Pole: 10 -125 Amp, Type QOU
Discount Schedule	DE2
GTIN	00785901205678
Package Quantity	40
Weight	0.36 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	MX

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Schneider Electric

Product Data Sheet

QOU115

Miniature Circuit Breaker (QOU) Standard, 15A, 1-Pole, 120/240VAC, HACR Rated

SQUARE D by Schneider Electric

List Price $40.20 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Ampere Rating	15A
Approvals	UL489 Listed - CSA 22.2 #5.1 Certified - IEC Rated 60947-2
Circuit Breaker Type	Standard
For Use With	OEM Panels and Enclosures
HACR Rated	Yes
Marketing Trade Name	QOU
Voltage Rating	120/240VAC
Mounting Type	Flush, Surface or DIN Rail (35mm)
Number of Poles	1-Pole
Short Circuit Current Rating	5kA@277VAC - 10kA@120/240VAC
Switching Duty Rated	Yes
Terminal Type	Line: Box Lug - Load: Box Lug
Type	QOU
Wire Size	#14-2 AWG(Al/Cu)
Depth	2.98 Inches
Height	4.05 Inches
Width	0.75 Inches

Shipping and Ordering

Category	00900 - Circuit Breakers, 1 Pole: 10 - 100 Amp, 2 Pole: 10 - 125 Amp, 3 Pole: 10 -125 Amp, Type QOU
Discount Schedule	DE2
GTIN	00785901418504
Package Quantity	40
Weight	0.36 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	MX

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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Schneider Electric

Item	Qty	UV PLC CONTROL PANEL MODIFICATIONS
6.00	**1**	**R.E. Pedrotti Co.** **Primary Control Panel Components**

NETWORK SWITCH

(1) Moxa EDS-508A-MM-SC, 8-port Ethernet Switch, 6-port Copper/2-port Fiber, Multi-mode Type SC (24 VDC)

POWER SUPPLY

(1) Phoenix Contact 2938581 120 VAC In/24 VDC Out, 5A

PATCH PANEL

(1) Panduit CBXF12IW-AY 12-port Fiber Optic Patch Panel with (12) CMDEISCEI Type SC multi-mode connectors

EDS-505A/508A/516A Series

5, 8, and 16-port managed Ethernet switches

- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Easy network management by web browser, CLI, Telnet/serial console, Windows utility, and ABC-01

Introduction

The EDS-505A/508A/516A are standalone 5, 8, and 16-port managed Ethernet switches. With their advanced Turbo Ring and Turbo Chain technology (recovery time < 20 ms), RSTP/STP, and MSTP support the EDS-505A/508A/516A switches increase the reliability and availability of your industrial Ethernet network. Models with an wide operating temperature range of -40 to 75°C are also available, and the switches support advanced management and security features, making the EDS-505A/508A/516A switches suitable for any harsh industrial environment.

Features and Benefits

- Command Line Interface (CLI) for quickly configuring major managed functions
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Software-based IEEE 1588 PTPv2 (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Support EtherNet/IP and Modbus/TCP protocols for device management and monitoring
- Compatible with PROFINET protocol for transparent data transmission
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- Port Trunking for optimum bandwidth utilization
- RMON for efficient network monitoring and proactive capability
- SNMPv1/v2c/v3 for different levels of network management
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- Bandwidth management to prevent unpredictable network status
- Lock port function for blocking unauthorized access based on MAC address
- Automatic warning by exception through e-mail, relay output

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100BaseFX
IEEE 802.3x for Flow Control
IEEE 802.1D-2004 for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1s for Multiple Spanning Tree Protocol
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP
Protocols: IGMPv1/v2, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTP, SMTP, RARP, GMRP, LACP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, SNMP Inform, EtherNet/IP, Modbus/TCP, LLDP, IEEE 1588 PTPv2, IPv6, NTP Server/Client
MIB: MIB-II, Ethernet-Like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256
MAC Table Size: 8 K
Packet Buffer Size: 1 Mbit (EDS-505A/508A), 2 Mbit (EDS-516A)

Interface

Fiber Ports: 100BaseFX ports (SC/ST connector)
RJ45 Ports: 10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port: RS-232 (RJ45 connector)
DIP Switches: Turbo Ring, Master, Coupler, Reserve (EDS-505A/508A series only)

LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact: 2 relay outputs with current carrying capacity of 1 A @ 24 VDC
Digital Inputs: 2 inputs with the same ground, but electrically isolated from the electronics.
- +13 to +30V for state "1"
- -30 to +3V for state "0"
- Max. input current: 8 mA

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable
d. 9/125 µm single-mode fiber optic cable (80 km)

Power Requirements

Input Voltage: 24 VDC (12 to 45 VDC), redundant dual inputs
Input Current:
EDS-505A: 0.24 A @ 24 V
EDS-505A-MM/SS: 0.35 A @ 24 V
EDS-508A: 0.26A @ 24 V
EDS-508A-MM/SS: 0.36 A @ 24 V
EDS-516A: 0.41 A @ 24 V
EDS-516A-MM: 0.51 A @ 24 V
Overload Current Protection: Present
Connection: 2 removable 6-contact terminal blocks
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP30 protection
Dimensions:
EDS-505A/508A Series: 80.2 x 135 x 105 mm
(3.16 x 5.31 x 4.13 in)
EDS-516A Series: 94 x 135 x 142.7 mm (3.7 x 5.31 x 5.62 in)
Weight:
EDS-505A/508A Series: 1040 g
EDS-516A Series: 1586 g
Installation: DIN-rail mounting, wall mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)

Standards and Certifications

Safety: UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN 60950-1
Hazardous Location:
UL/cUL Class 1 Division 2 Groups A/B/C/D,
ATEX Zone 2 Ex nA nC IIC T4 Gc
EMI: FCC Part 15 Subpart B Class A, EN 55022 Class A
EMS:
EN 61000-4-2 (ESD) (EDS-505A/508A: Level 3; EDS-516A: Level 2),
EN 61000-4-3 (RS) Level 3, EN 61000-4-4 (EFT) Level 2,
EN 61000-4-5 (Surge) Level 3, EN 61000-4-6 (CS) Level 3,
EN 61000-4-8
Marine: DNV, GL
Shock: IEC 60068-2-27
Freefall: IEC 60068-2-32
Vibration: IEC 60068-2-6
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)

Time:
EDS-505A Series: 352,000 hrs
EDS-508A Series: 339,000 hrs
EDS-516A Series: 247,000 hrs
Database: Telcordia (Bellcore), GB

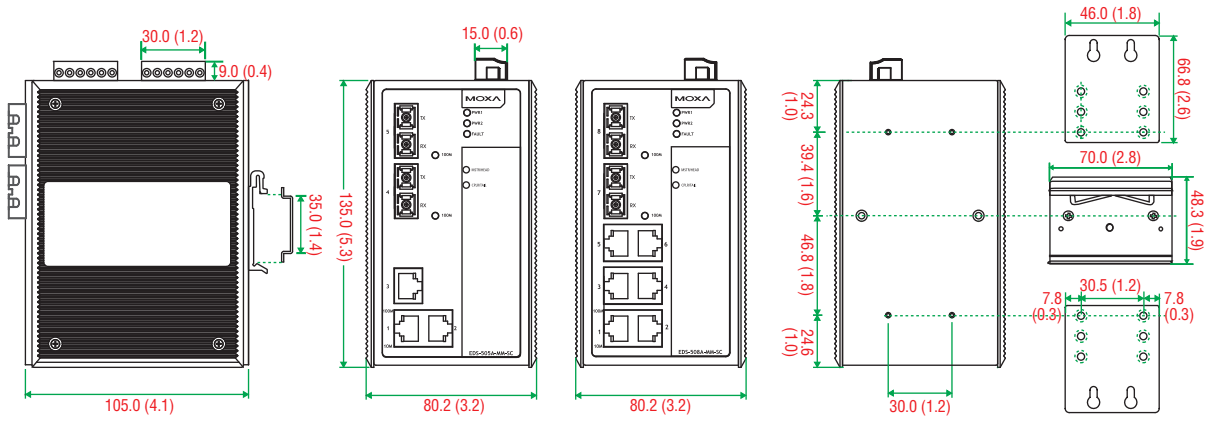
Warranty

Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

Unit: mm (inch)

EDS-505A/508A Series

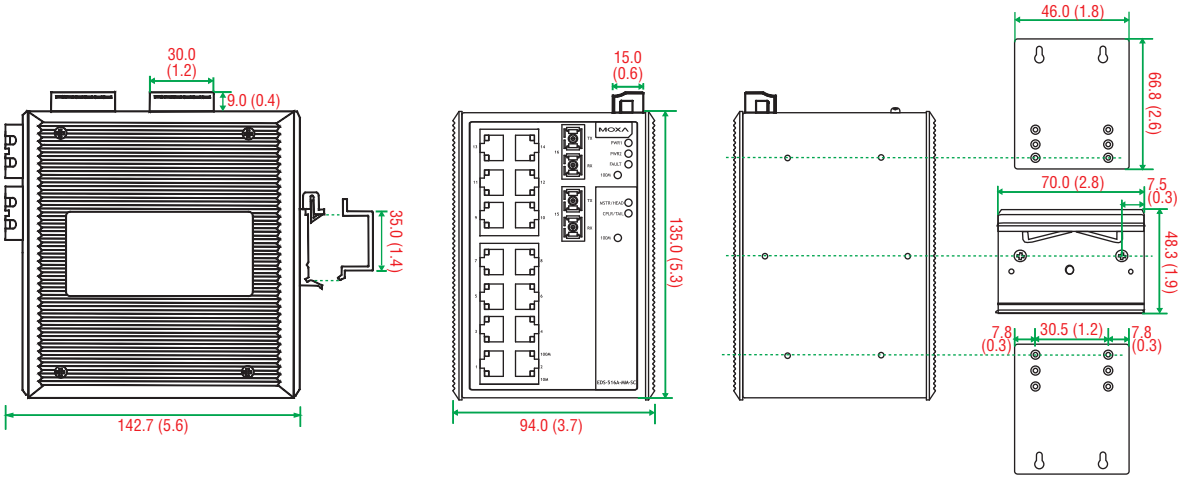


Side View | Front View | Rear View | DIN-Rail/Panel Mounting Kit

Dimensions

Unit: mm (inch)

EDS-516A Series



Side View | Front View | Rear View | DIN-Rail/Panel Mounting Kit

Ordering Information

Available Models		Port Interface				
Standard Temperature (0 to 60˚C)	Wide Temperature (-40 to 75˚C)	10/100BaseT(X)	100BaseFX			
			Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km
EDS-505A/508A Series						
EDS-505A/508A	EDS-505A/508A-T	5/8	–	–	–	–
EDS-505A/508A-MM-SC	EDS-505A/508A-MM-SC-T	3/6	2	–	–	–
EDS-505A/508A-MM-ST	EDS-505A/508A-MM-ST-T	3/6	–	2	–	–
EDS-505A/508A-SS-SC	EDS-505A/508A-SS-SC-T	3/6	–	–	2	–
EDS-508A-SS-SC-80	–	6	–	–	–	2
EDS-516A Series						
EDS-516A	EDS-516A-T	16	–	–	–	–
EDS-516A-MM-SC	EDS-516A-MM-SC-T	14	2	–	–	–
EDS-516A-MM-ST	EDS-516A-MM-ST-T	14	–	2	–	–

Optional Accessories (can be purchased separately)

MXview: Moxa industrial network management software with 50, 100, 250, 500, 1000, or 2000 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
DR-4524/75-24/120-24: 45/75/120 W DIN-rail 24 VDC power supplies
MDR-40-24/60-24: 40/60 W DIN-rail 24 VDC power supplies, -20 to 70°C operating temperature
WK-46: Wall mounting kit
RK-4U: 4U-high 19" rack mounting kit

Package Checklist

- EDS-505A or EDS-508A or EDS-516A switch
- RJ45 to DB9 console port cable
- Protective caps for unused ports
- Documentation and software CD
- Hardware installation guide (printed)
- Warranty card

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

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DIN rail power supply unit 24 V DC/5 A, primary switched-mode, 1-phase.

Product Description

QUINT POWER is the powerful 60 - 960 W DC power supply unit for universal use. With its wide-range input, single and three-phase versions, and international approval package, this solution is unrivalled. QUINT POWER provides reliable power supply: generously dimensioned capacitors ensure mains buffering of over 20 ms at full load. Full output power is provided by all three-phase devices, even in the event of a permanent phase failure. The Power Boost power reserve easily starts loads with high inrush currents and ensures that fuses are reliably tripped. Preventive function monitoring diagnoses impermissible operating states and minimizes downtimes in your system. Remote monitoring is provided by an active transistor switching output and a floating relay contact. All devices are idling-proof and short-circuit-proof, and are available with a regulated and adjustable output voltage of 12, 24, and 48 V DC with output currents of 2.5, 5, 10, 20, 30, and 40 A. Power supply units for use in Ex zone 2, uninterruptible solutions, AS-i power supply units, and a QUINT diode complete this comprehensive product range.

Key Commercial Data

Packing unit	1 pc
Weight per Piece (excluding packing)	1206.4 g
Custom tariff number	85044030
Country of origin	Thailand

Technical data

Dimensions

Width	55 mm
Height	130 mm
Depth	125 mm
Width with alternative assembly	122 mm
Height with alternative assembly	130 mm
Depth with alternative assembly	58 mm

Ambient conditions

Degree of protection	IP20

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Ambient conditions

Ambient temperature (operation)	-25 °C ... 70 °C (> 60 °C Derating: 2,5 %/K)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Max. permissible relative humidity (operation)	95 % (at 25 °C, non-condensing)
Noise immunity	EN 61000-6-2:2005

Input data

Nominal input voltage range	100 V AC ... 240 V AC
Input voltage range	85 V AC ... 264 V AC
	90 V DC ... 350 V DC
AC frequency range	45 Hz ... 65 Hz
Frequency range DC	0 Hz
Current consumption	approx. 1.6 A (120 V AC)
	approx. 0.84 A (230 V AC)
Nominal power consumption	120 W
Inrush surge current	< 20 A (typical)
Power failure bypass	> 30 ms (120 V AC)
	> 130 ms (230 V AC)
Input fuse	5 A (slow-blow, internal)
Choice of suitable circuit breakers	6 A ... 16 A (Characteristics B, C, D, K)
Type of protection	Transient surge protection
Protective circuit/component	Varistor

Output data

Nominal output voltage	24 V DC ±1 %
Setting range of the output voltage (U_{Set})	22.5 V DC ... 28.5 V DC
Nominal output current (I_N)	5 A (up to 60°C)
POWER BOOST (I_{Boost})	7.5 A
Derating	60 °C ... 70 °C (2.5%/K)
Connection in parallel	Yes, for redundancy and increased capacity
Connection in series	Yes
Max. capacitive load	Unlimited
Active current limitation	Approx. I_{BOOST} = 7.5 A (for short-circuit)
Control deviation	< 1 % (change in load, static 10 % ... 90 %)
	< 2 % (change in load, dynamic 10 % ... 90 %)
	< 0.1 % (change in input voltage ±10 %)
Residual ripple	< 10 mV_{PP} (with nominal values)
Output power	120 W
Typical response time	< 1 s

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Output data

Peak switching voltages nominal load	< 30 mV_{PP} (20 MHz)
Maximum power dissipation in no-load condition	< 2 W
Power loss nominal load max.	< 14 W

General

Net weight	0.83 kg
Operating voltage display	Green LED
Efficiency	> 89 %
Insulation voltage input/output	4 kV AC (type test)
	2 kV AC (routine test)
Protection class	I (with PE connection)
MTBF (IEC 61709, SN 29500)	> 500000 h
Mounting position	horizontal DIN rail NS 35, EN 60715
Assembly instructions	Can be aligned: Horizontally 0 mm, vertically 50 mm

Connection data, input

Connection method	Pluggable screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Stripping length	7 mm
Screw thread	M3

Connection data, output

Connection method	Pluggable screw connection
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Stripping length	7 mm
Screw thread	M3

Signaling

Output name	DC OK active

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Signaling

Output description	U_{OUT} > 0.9 x U_N: High signal
Maximum switching voltage	≤ 24 V
Output voltage	+ 24 V DC (Signal)
Maximum inrush current	≤ 40 mA
Continuous load current	≤ 40 mA
Status display	"DC OK" LED green
Note on status display	U_{OUT} < 0.9 x U_N: LED flashing
Conductor cross section solid min.	0.2 mm²
Conductor cross section solid max.	2.5 mm²
Conductor cross section flexible min.	0.2 mm²
Conductor cross section flexible max.	2.5 mm²
Conductor cross section AWG min.	24
Conductor cross section AWG max.	12
Tightening torque, min	0.5 Nm
Tightening torque max	0.6 Nm
Screw thread	M3
Output name	DC OK floating
Output description	Relay contact, U_{OUT} > 0.9 x U_N: Contact closed
Maximum switching voltage	≤ 30 V AC/DC
Maximum inrush current	≤ 1 A
Continuous load current	≤ 1 A
Status display	"DC OK" LED green

Standards and Regulations

Electromagnetic compatibility	Conformance with EMC directive 89/336/EC
Shock	30g in each direction, according to IEC 60068-2-27
Noise emission	EN 55011 (EN 55022)
Noise immunity	EN 61000-6-2:2005
Connection in acc. with standard	CUL
Standards/regulations	EN 61000-4-3
	EN 61000-4-4
	EN 61000-4-6
Standard – Electrical equipment of machines	EN 60204-1
Standard - Safety of transformers	EN 61558-2-17
Standard - Electrical safety	EN 60950-1/VDE 0805 (SELV)
	EN 61558-2-17
Standard – Electronic equipment for use in electrical power installations and their assembly into electrical power installations	EN 50178/VDE 0160 (PELV)

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Technical data

Standards and Regulations

Standard – Safety extra-low voltage	EN 60950-1 (SELV)
	EN 60204 (PELV)
Standard - Safe isolation	DIN VDE 0100-410
Standard – Protection against shock currents, basic requirements for protective separation in electrical equipment	EN 50178
Standard – Limitation of mains harmonic currents	EN 61000-3-2
Standard - Equipment safety	GS (tested safety)
Shipbuilding approval	Germanischer Lloyd (EMC 2), ABS
UL approvals	UL/C-UL Recognized UL 60950
	UL/C-UL listed UL 508
	UL ANSI/ISA-12.12.01 Class I, Division 2, Groups A, B, C, D (Hazardous Location)
Vibration (operation)	< 15 Hz, amplitude ±2.5 mm (according to IEC 60068-2-6)
Information technology equipment - safety (CB scheme)	CB Scheme

Classifications

eCl@ss

eCl@ss 4.0	27040702
eCl@ss 4.1	27040702
eCl@ss 5.0	27049002
eCl@ss 5.1	27049002
eCl@ss 6.0	27049002
eCl@ss 7.0	27049002
eCl@ss 8.0	27049002
eCl@ss 9.0	27040701

ETIM

ETIM 2.0	EC001039
ETIM 3.0	EC001039
ETIM 4.0	EC000599
ETIM 5.0	EC002540

UNSPSC

UNSPSC 6.01	30211502
UNSPSC 7.0901	39121004
UNSPSC 11	39121004
UNSPSC 12.01	39121004

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Classifications

UNSPSC

UNSPSC 13.2	39121004

Approvals

Approvals

Approvals

UL Recognized / UL Listed / cUL Recognized / cUL Listed / GL / DNV / IECEE CB Scheme / EAC / cULus Recognized / cULus Listed

Ex Approvals

UL Listed / cUL Listed / cULus Listed

Approvals submitted

Approval details

UL Recognized

UL Listed

cUL Recognized

cUL Listed

GL

DNV

Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

Approvals

IECEE CB Scheme

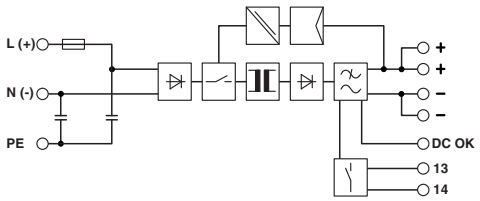
EAC

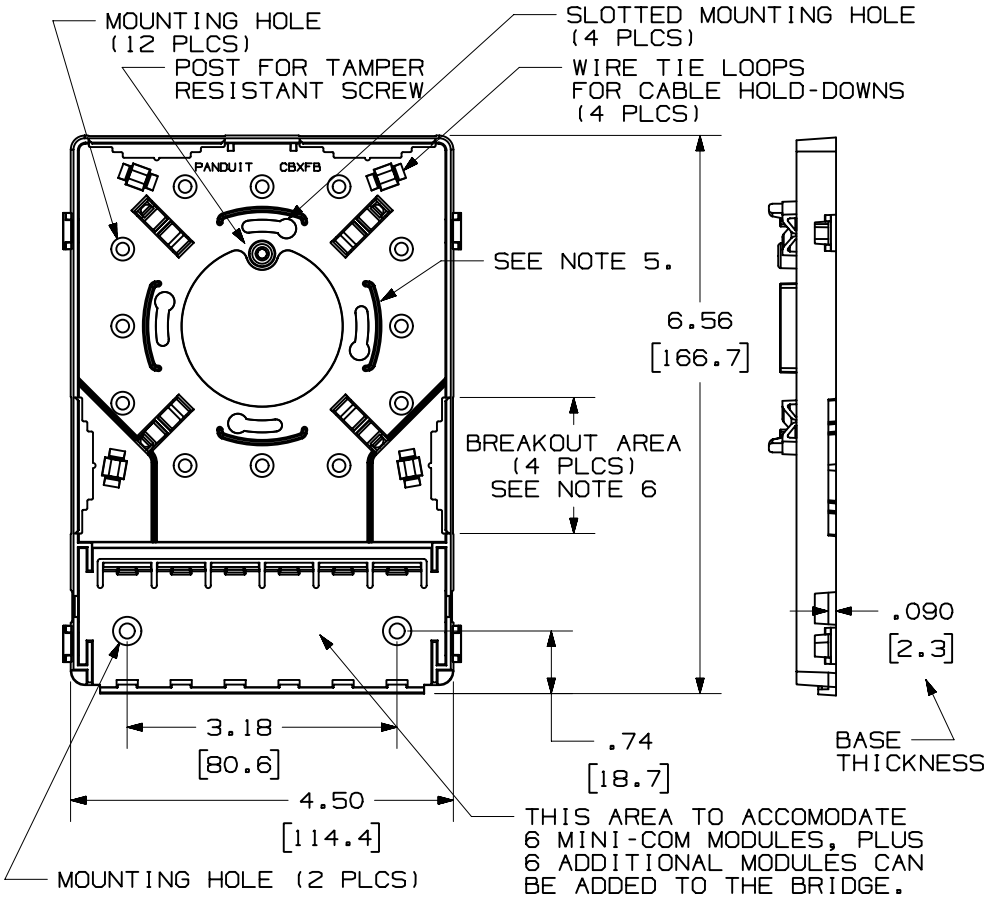
cULus Recognized

cULus Listed

Drawings

Block diagram





PANDUIT PART NO.	WEIGHT
CBXF12**-A	3.3 LB/10 PCS (1480 g/10 PCS)

NOTES:

1. SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
2. SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
3. SURFACE MOUNT BOX HOLDS UP TO 12 MINI-COM CONNECTOR MODULES.
4. ALSO INCLUDED WITH BOX:
   a. (2) PLT1.5I-C PAN-TY
   b. (1) STRIPS OF 3.00" X .75" FOAM TAPE
   c. (2) STRIPS OF 1.50" X .75" FOAM TAPE
   d. (2) #6-32 MOUNTING SCREW
   e. (1) TAMPER RESISTANT SCREW (TO SECURE COVER TO BASE)
   f. (1) LABEL
   g. (1) LABEL COVER
5. THE BUILT IN FIBER SPOOL MAINTAINS THE RECOMMENDED MINIMUM BEND RADIUS FOR FIBER OPTIC AND CATEGORY 5 CABLES.
6. CAN BE USED WITH PAN-WAY LD3, CD3, LD5, CD5, LD10, CD10 RACEWAYS.
7. DIMENSIONS IN PARENTHESES ARE IN METRIC.

CAD FILENAME/LAYERS: D35544BZ_DC_CBXF12_00B.PRT

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP
1	1-8-02	JsP		A. REVISED NOTE #4.	35544-24		
R	12-4-96	RCA	CEF	RELEASED TO PRODUCTION.	35544-24		

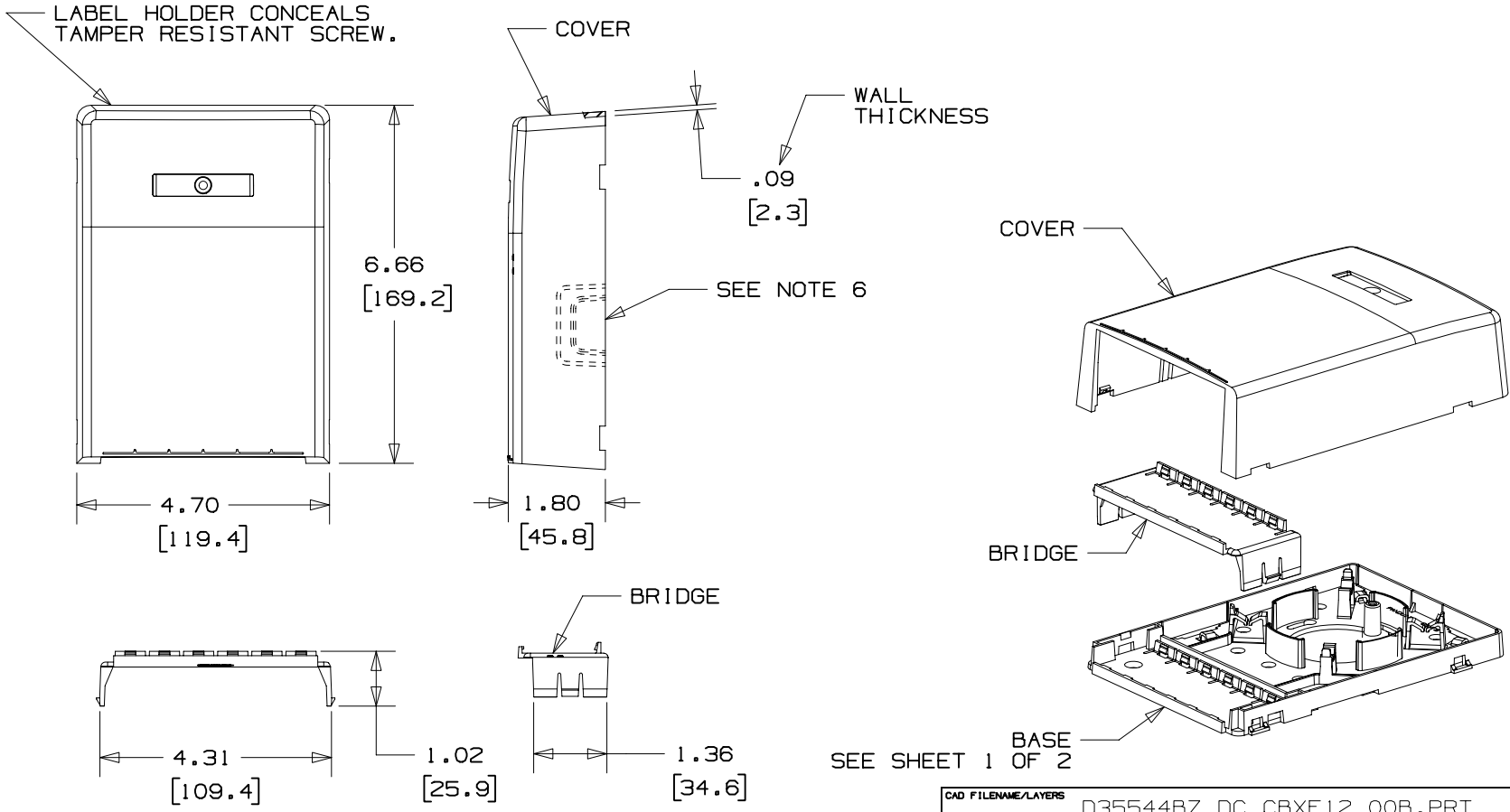
PANDUIT CORP. TINLEY PARK, ILLINOIS

12 MODULE SPACE MULTI-MEDIA FIBER OUTLET (CBXF12**-A)
CUSTOMER DRAWING

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ± .010(.3)
(.XX) ± .03(.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.

DRAWN BY: RCA
DATE: 12-4-96
CHK'D: CEF
MAT'L: ABS
SCALE: NONE
DRAWING NO.: 35544-24
SHT 1 OF 2
DWG SIZE: A



SEE SHEET 1 OF 2

CAD FILENAME/LAYERS: D35544BZ_DC_CBXF12_00B.PRT

PANDUIT CORP. TINLEY PARK, ILLINOIS

12 MODULE SPACE MULTI-MEDIA FIBER OUTLET (CBXF12**-A)

CUSTOMER DRAWING

UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE:
(.X) ± (.XXX) ± .010(.3)
(.XX) ± .03(.8) ANGLES ±

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.

REV	DATE	BY	CHK	DESCRIPTION	ECN - R	CUST	SUP
1	1-8-02	JsP		REFER TO SHEET 1 OF 2	35544-24		
R	12-4-96	RCA	CEF	REFER TO SHEET 1 OF 2	35544-24		

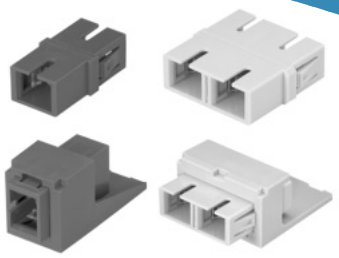
DRAWN BY: RCA
DATE: 12-4-96
CHK'D: CEF
MAT'L: ABS
SCALE: NONE
DRAWING NO.: 35544-24 SHT 2 OF 2
DWG SIZE: A

SC Fiber Optic Adapters

SPECIFICATION SHEET

specifications

SC fiber optic adapters with integrated panel retention clips are TIA/EIA-604 FOCIS-3 compliant. Each SC simplex adapter shall connect one SC connector pair in one module space. Each SC duplex adapter shall connect two SC connector pairs in two module spaces. SC adapters and adapter modules shall include phosphor bronze split sleeves for multimode applications or zirconia ceramic split sleeves for singlemode applications.



technical information

Standards requirements:	TIA/EIA-604 FOCIS-3 compliant; exceeds TIA/EIA-568-B.3 requirements
Split sleeve material:	Phosphor bronze or zirconia ceramic (required for singlemode applications)
Insertion loss:	.1dB average (multimode), .15dB average (singlemode); supports the performance of FOCIS-3 compliant connectors/patch cords
Return loss:	Supports singlemode (>40dB for SPC and >55dB for UPC) and multimode (>20dB) connector polish performance

•*PANDUIT* LC Connector/Adapter connection

key features and benefits

Integrated panel retention clips	No metal clips to become bent, damaged or lost; clips automatically adjust for FOCIS-3 compliant panel thickness variations for improved mounting
High glass transition temperature latch material (Tg>100°C)	Meets Telcordia GR-326-CORE, Issue 3; maintains latch integrity/geometry in high temperature environments for improved reliability
Improved adapter protective cap design	Maximum protection from contamination; protective cap fully surrounds split sleeve opening
Short flange design	Improved modularity and higher density usage
Choice of phosphor bronze or zirconia ceramic split sleeves	Provides an adapter split sleeve material option to fit specific network requirements
Q.C. number and split sleeve material laser marked on every adapter	Assures 100% traceability; quick and easy identification of split sleeve material: SC-P = Phosphor Bronze and SC-Z = Zirconia Ceramic
Adapters available in Mini-Com® Modules	System flexibility; adapter modules can be used in all *Mini-Com*® closet products and work area outlets
Adapters available in patch panels, fiber adapter panels (FAPs) and Opticom® QuickNet™ Pre-Terminated MTP* Cassettes	Provides a complete SC system solution
Adapters and modules available in multiple colors	Allows color-coding for network segregation

applications

PANDUIT SC Fiber Optic Adapters can be used with *Mini-Com*® Modules, Patch Panels, Faceplates and Surface Mount Boxes for a complete SC system solution. SC adapters provide a robust solution for LANs, public networks, storage area networks and fiber-to-the-desk applications. SC adapters can also be mounted in high-density applications within *Opticom*® *QuickNet*™ Pre-Terminated MTP* Cassettes and Fiber Enclosures, and *Opticom*® Fiber Adapter Panels (FAPs) and Enclosures.

*MTP is a registered trademark of US Conec Ltd.

www.panduit.com

SC Fiber Optic Adapters

Simplex MM:	FASSCEI-L
Duplex MM:	FADSCEI-L
Simplex 10GIG™:	FASSCAQ-L
Duplex 10GIG™:	FADSCAQ-L
Simplex 10GIG™(zirc.):	FASSCZAQ-L
Duplex 10GIG™(zirc.):	FADSCZAQ-L
Simplex SM (zirc.):	FASSCZBU-L
Duplex SM (zirc.):	FADSCZBU-L
Simplex APC (zirc.):	FASSCZAG-L
Duplex APC (zirc.):	FADSCZAG-L

L = Bag of 50 adapters; 100 per carton.

Mini-Com® SC Adapter Modules

Simplex MM:	CMSEISCEI
Duplex MM:	CMDEISCEI
Simplex 10GIG™:	CMSAQSCBL
Duplex 10GIG™:	CMDAQSCBL
Simplex 10GIG™(zirc.):	CMSAQSCZBL
Duplex 10GIG™(zirc.):	CMDAQSCZBL
Simplex SM (zirc.):	CMSBUSCZBU
Duplex SM (zirc.):	CMDBUSCZBU
Simplex APC (zirc.):	CMSAGSCZBL
Duplex APC (zirc.):	CMDAGSCZBL

Opticom® SC Fiber Adapter Panels

6 duplex MM:	FAP6WEIDSC
6 duplex 10GIG™:	FAP6WAQDSCZ
6 duplex SM (zirc.):	FAP6WBUDSCZ
12 simplex SM (zirc.):	FAP12WBUSCZ

Opticom® *QuickNet*™ Pre-Terminated MTP* Cassettes

12 SC to MTP* (12f):	FC^-12-3S
6 SC to MTP* (12f):	FC^-12-3

SC Simplex Fiber Optic Connectors

MM (900µm/3mm, black):	FSCMBL
MM (900µm/3mm, red):	FSCMRD
SM (900µm/3mm, blue):	FSCSBU
MM (900µm/2mm, black):	FSCM2.0BL
MM (900µm/2mm, red):	FSCM2.0RD
SM (900µm/2mm, blue):	FSCS2.0BU

SC Duplex Fiber Optic Connectors

Multimode (3mm only):	FSCDM

Opti-Core® Fiber Optic Patch Cords

Duplex SC to SC:	F^D3-3M‡
Simplex SC to SC:	F^S3-3M‡
Simplex SC to pigtail:	F^B3-NM‡

HD Connector Removal Tool

For LC and SC:	HDCRT

**Substitute for module color:

EI = Electric Ivory	BU = Blue
IG = International Gray	WH = White
TG = Technical Gray	BL = Black
AW = Arctic White	IW = Off White
EW = European White	

^Substitute for fiber type:
X (OM3 – *10GIG*™ 50/125µm), 5 (OM2 – 50/125µm), 6 (OM1 – 62.5/125µm) or 9 (OS1 – 9/125µm).

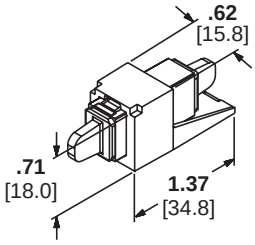
‡Substitute for length in meters: 1, 2, 3, 5 or 10 for patch cords, and 1, 2 or 3 for pigtails; singlemode patch cords are also available in 12, 15, 25 or 30 meter lengths. Contact Customer Service for other available lengths.

selection information

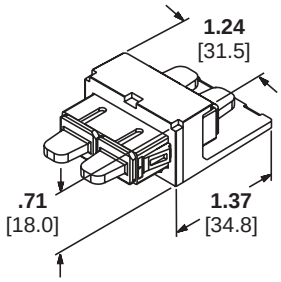
Part Number	Adapter Type	Split Sleeve Material	Adapter Color	Module Color	Average Insertion Loss^	Return Loss^
SC Adapters						
FASSCEI-L	Multimode Simplex	Phosphor Bronze	Electric Ivory	N/A	.1dB	>20dB
FADSCEI-L	Multimode Duplex	Phosphor Bronze	Electric Ivory	N/A		
FASSCAQ-L	*10GIG*™ Multimode Simplex	Phosphor Bronze	Aqua	N/A		
FADSCAQ-L	*10GIG*™ Multimode Duplex	Phosphor Bronze	Aqua	N/A		
FASSCZAQ-L	*10GIG*™ Multimode Simplex	Zirconia Ceramic	Aqua	N/A		
FADSCZAQ-L	*10GIG*™ Multimode Duplex	Zirconia Ceramic	Aqua	N/A		
FASSCZBU-L	Singlemode Simplex	Zirconia Ceramic	Blue	N/A	.15dB	>40dB
FADSCZBU-L	Singlemode Duplex	Zirconia Ceramic	Blue	N/A		
FASSCZAG-L	APC Singlemode Simplex	Zirconia Ceramic	Green	N/A		
FADSCZAG-L	APC Singlemode Duplex	Zirconia Ceramic	Green	N/A		
SC Adapter Modules						
CMSEISCEI	Multimode Simplex	Phosphor Bronze	Electric Ivory	Various**	.1dB	>20dB
CMDEISCEI	Multimode Duplex	Phosphor Bronze	Electric Ivory	Various**		
CMSAQSCBL	*10GIG*™ Multimode Simplex	Phosphor Bronze	Aqua	Black		
CMDAQSCBL	*10GIG*™ Multimode Duplex	Phosphor Bronze	Aqua	Black		
CMSAQSCZBL	*10GIG*™ Multimode Simplex	Zirconia Ceramic	Aqua	Black		
CMDAQSCZBL	*10GIG*™ Multimode Duplex	Zirconia Ceramic	Aqua	Black		
CMSBUSCZBU	Singlemode Simplex	Zirconia Ceramic	Blue	Various**	.15dB	>40dB
CMDBUSCZBU	Singlemode Duplex	Zirconia Ceramic	Blue	Various**		
CMSAGSCZBL	APC Singlemode Simplex	Zirconia Ceramic	Green	Black		
CMDAGSCZBL	APC Singlemode Duplex	Zirconia Ceramic	Green	Black		

^*PANDUIT* SC Connector/Adapter connection
**For other colors, replace suffix EI or BU with EI (Electric Ivory), BU (Blue), IG (International Gray), WH (White), TG (Technical Gray), BL (Black), AW (Arctic White), IW (Off White) or EW (European White).

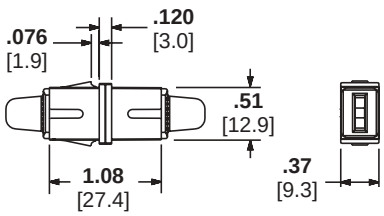
Mini-Com® SC Simplex Adapter Module



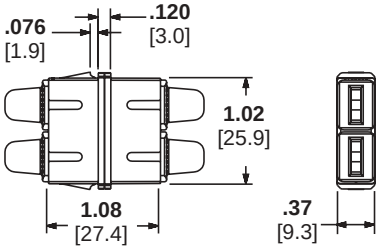
Mini-Com® SC Duplex Adapter Module



SC Simplex Adapter



SC Duplex Adapter



Dimensions are in inches [Dimensions in brackets are in millimeters]

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