

**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:**

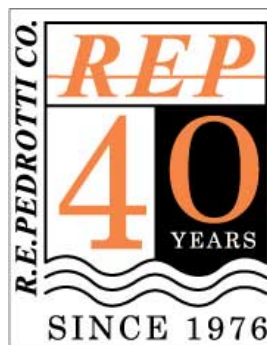
**R.E. PEDROTTI COMPANY, INC.  
5855 BEVERLY AVE.  
MISSION, KS 66202  
(913) 677-3366**

I have reviewed the submittal. I have a couple of minor changes that need to be made.

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.
  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..
  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...

**INSTRUMENTATION AND CONTROLS PACKAGE**

**JULY 2016**



**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: 07/13/2016

**CITY OF WICHITA  
RE-USE WATER PUMP STATION**

**INSTRUMENTATION & CONTROLS**

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

Project Code: WIKSP2GW

Page:1

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

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

**Foxboro<sup>®</sup> 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.

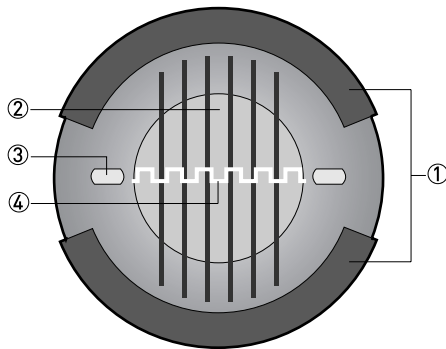


Figure 1-1: Measuring principle

- 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
<b>Measured value</b>	
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 <i>Measuring accuracy</i> on page 14.
Repeatability	±0.1% of the measured value, minimum 1 mm/s
Calibration / Verification	<b>Standard:</b>
	2 point calibration by a direct volume comparison.
	Only in combination with the signal converter IMT33A.

**Operating conditions**

<b>Temperature</b>	
For detailed information in pressure / temperature refer to <i>Pressure derating</i> 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	<b>Standard</b> (with aluminum signal converter housing): standard flanges
	-20...+65°C / -4...+149°F
	<b>Option</b> (with aluminum signal converter housing): low temperature carbon steel flanges or stainless steel flanges
	-40...+65°C / -40...+149°F
	<b>Option</b> (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
<b>Measuring range</b>	-12...+12 m/s / -40...+40 ft/s
<b>Pressure</b>	
For detailed information in pressure / temperature refer to <i>Pressure derating</i> 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)	<b>Option:</b>
	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 <i>Vacuum load</i> on page 17.
Pressure loss	Negligible
<b>Chemical properties</b>	
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 <i>Installation</i> 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 <i>Dimensions and weights</i> on page 18.

**Materials**

Flow sensor housing	Sheet steel
Measuring tube	Austenitic stainless steel
Flanges	Carbon steel
Liner	<b>Standard:</b>
	DN25...150 / 1...6": polypropylene
	DN200...2000 / 8...80": hard rubber
	<b>Option:</b>
	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.
<b>Signal cable</b> (remote versions only)	
Type A (DS)	<b>In combination with the signal converter IMT30A, IMT31A and IMT33A</b> Standard cable, double shielded. Max. length: 600 m / 1968 ft (depends on electrical conductivity and flow sensor)
Type B (BTS)	<b>Only in combination with the signal converter IMT33A</b> 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

<b>CE</b>	
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.
<b>Hazardous area</b>	
ATEX	Please check the relevant Ex documentation for details.
	<b>Compact version with signal converter IMT31A</b>
	II 2 GD
	<b>Compact version with signal converter IMT33A</b>
	II 2 GD or II 2(1) GD
	<b>Remote version</b>
	II 2 GD
FM	<b>In combination with signal converter IMT33A</b>
	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	<b>In combination with signal converter IMT33A</b>
	Class I, Div. 2, Groups A, B, C and D
	Class II, Div. 2, Groups F and G
<b>Other approvals and standards</b>	
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	<b>Standard:</b>
	IP66 / 67 (NEMA 4/4X/6)
	<b>Option:</b>
	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

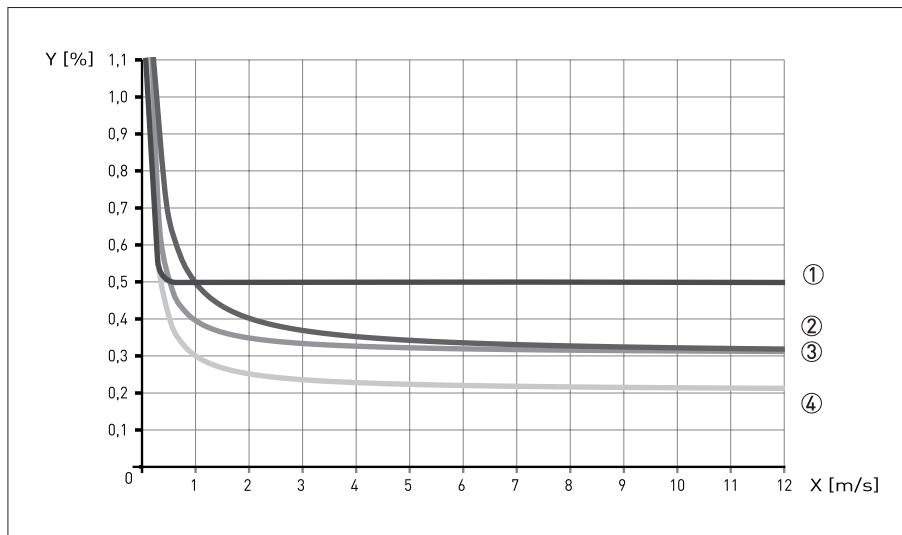


Figure 2-1: Flow velocity vs. accuracy  
 X [m/s] : flow velocity  
 Y [%]: deviation from the actual measured value (mv)

### 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]

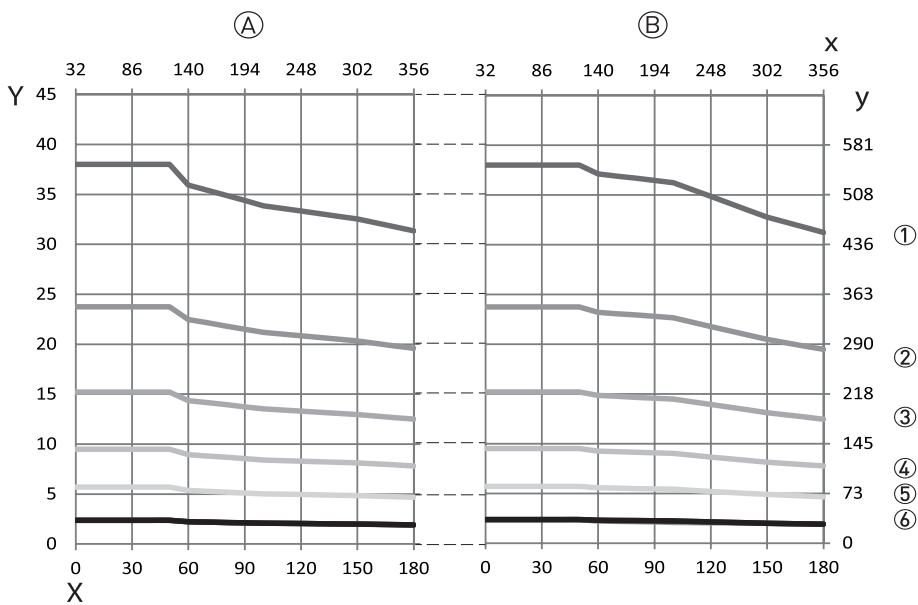


Figure 2-2: Pressure derating; EN 1092-1

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

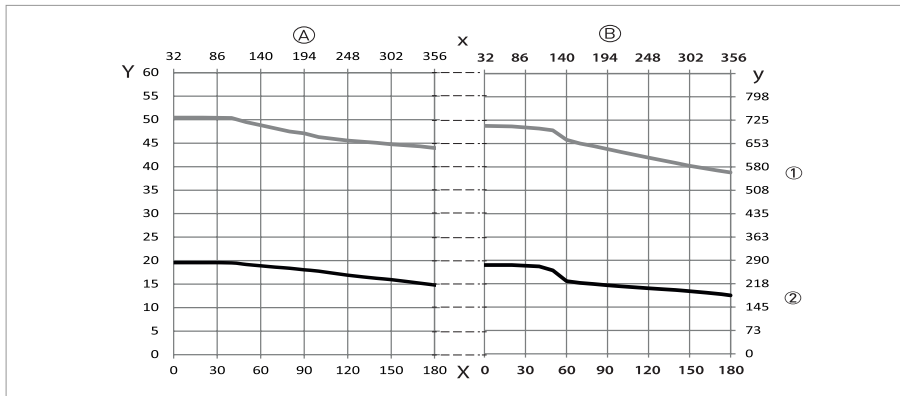


Figure 2-3: Pressure derating; ANSI B16.5

- ① 300 lbs
- ② 150 lbs

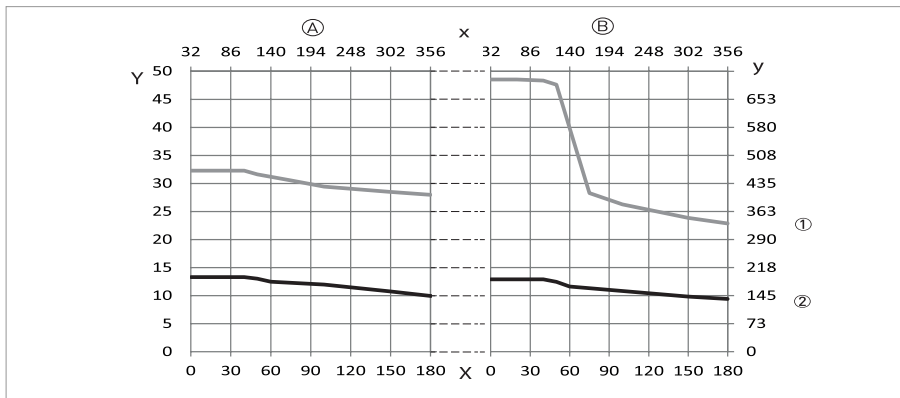


Figure 2-4: Pressure derating; JIS B2220

- ① 20K
- ② 10K

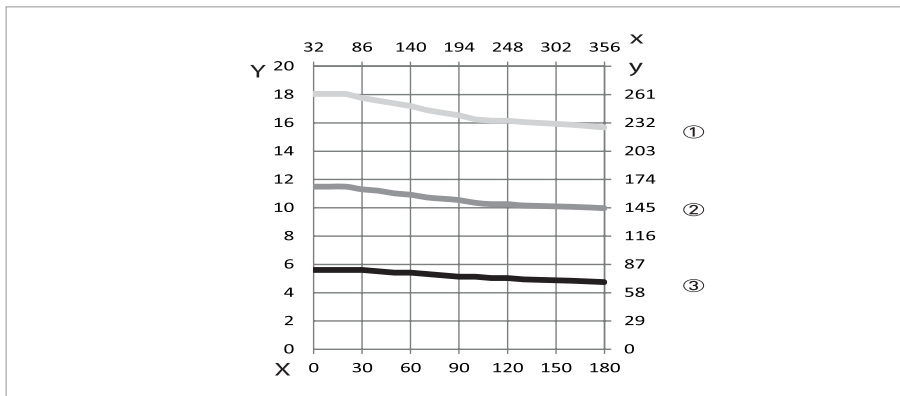


Figure 2-5: Pressure derating; AWWA C207

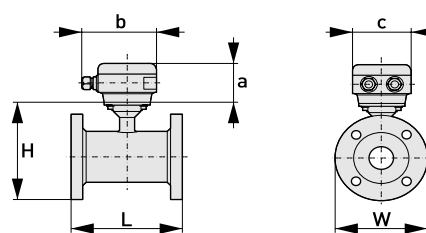
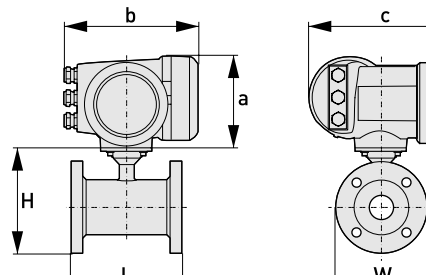
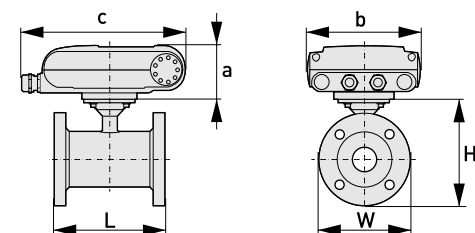
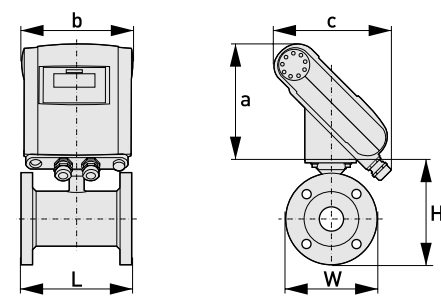
- ① Class D2 [ $>12''$ ]
- ② Class D1 [4...12"]
- ③ Class B

## 2.4 Vacuum load

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

Diameter	Vacuum load in psia at process temperature of			
[inch]	68°F	104°F	140°F	176°F
<b>Hard rubber</b>				
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
<b>Polypropylene</b>				
1...6	3.6	3.6	5.8	5.8
<b>Polyolefin</b>				
8...40	0	0	0	0

2.5 Dimensions and weights

<p>Remote version</p>		<p>a = 88 mm / 3.5"</p> <p>b = 139 mm / 5.5" ①</p> <p>c = 106 mm / 4.2"</p> <p>Total height = H + a</p>
<p>Compact version with : IMT33A</p>		<p>a = 155 mm / 6.1"</p> <p>b = 230 mm / 9.1" ①</p> <p>c = 260 mm / 10.2"</p> <p>Total height = H + a</p>
<p>Compact version with: IMT31A (0°)</p>		<p>a = 82 mm / 3.2"</p> <p>b = 161 mm / 6.3"</p> <p>c = 257 mm / 10.1" ①</p> <p>Total height = H + a</p>
<p>Compact version with: IMT31A (45°)</p>		<p>a = 186 mm / 7.3"</p> <p>b = 161 mm / 6.3"</p> <p>c = 184 mm / 7.3" ①</p> <p>Total height = H + a</p>

<p>Compact version with: IMT30A (10°)</p>		<p><math>a = 101 \text{ mm} / 3.98''</math></p>
		<p><math>b = 157 \text{ mm} / 6.18''</math></p>
		<p><math>c = 260 \text{ mm} / 10.24''</math> ①</p>
		<p>Total height = <math>H + a</math></p>

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 9500A electromagnetic 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

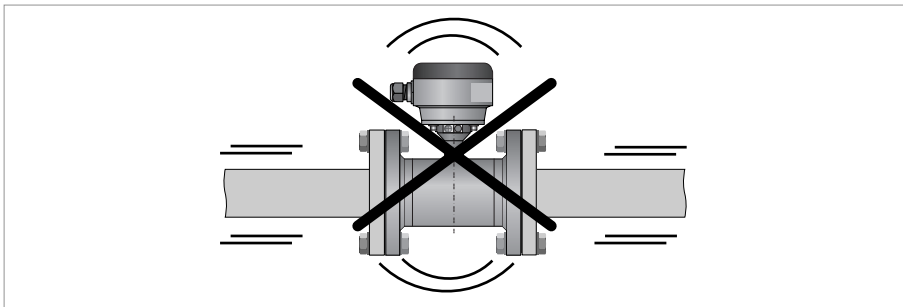


Figure 3-1: Avoid vibrations

#### 3.1.2 Magnetic field

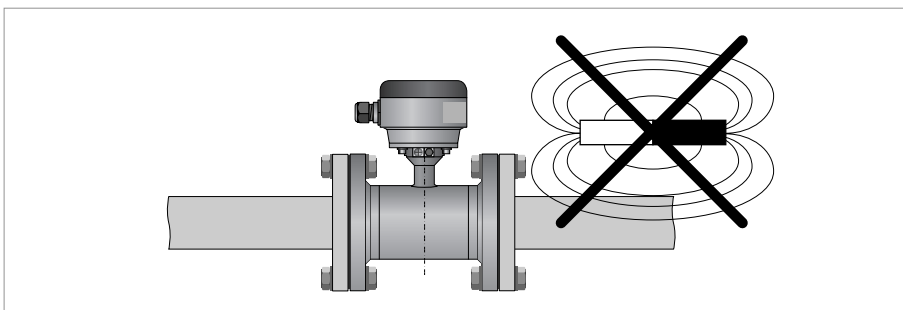


Figure 3-2: Avoid magnetic fields

### 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.

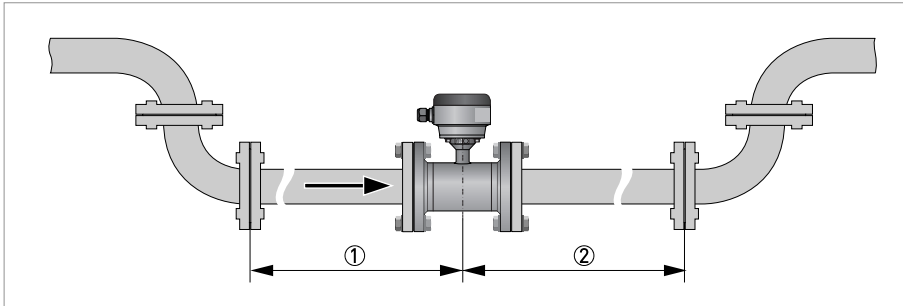


Figure 3-3: Recommended inlet and outlet section

- ① Refer to chapter "Bends in 2 or 3 dimensions"
- ②  $\geq 2$  DN

#### 3.2.2 Bends in 2 or 3 dimensions

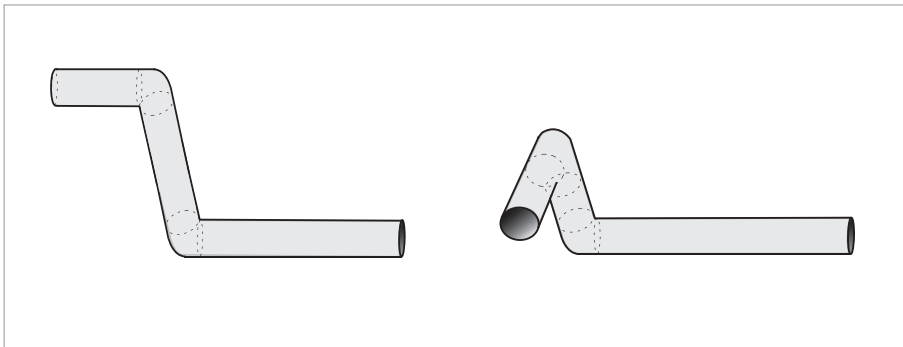


Figure 3-4: Inlet when using 2 and/or 3 dimensional bends in front of the flowmeter

Inlet length: using bends in 2 dimensions:  $\geq 5$  DN; when having bends in 3 dimensions:  $\geq 10$  DN

3.2.3 T-section

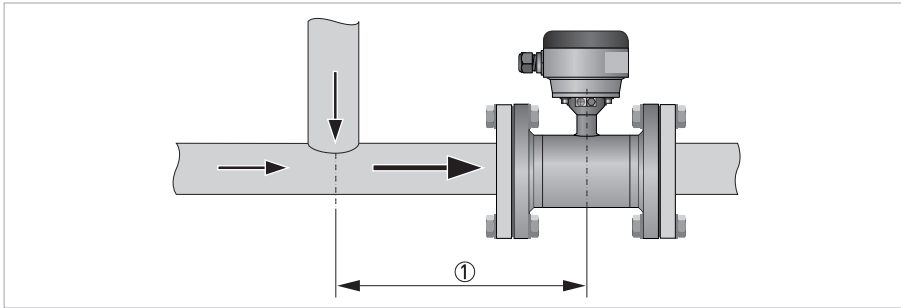


Figure 3-5: Distance behind a T-section

①  $\geq 10$  DN

3.2.4 Bends

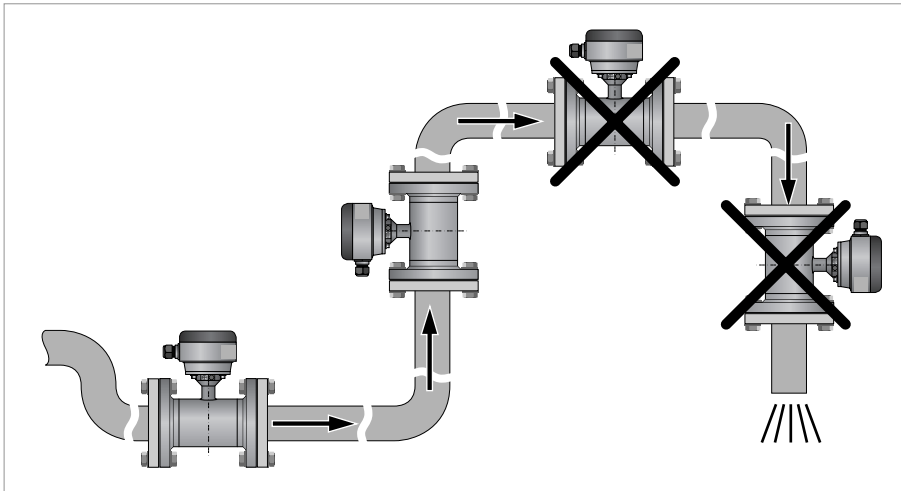


Figure 3-6: Installation in bending pipes

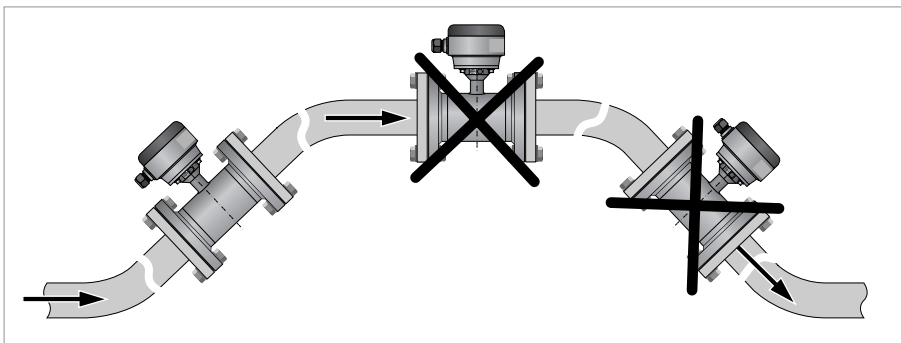


Figure 3-7: Installation in bending pipes

*Avoid draining or partial filling of the flow sensor*

### 3.2.5 Open feed or discharge

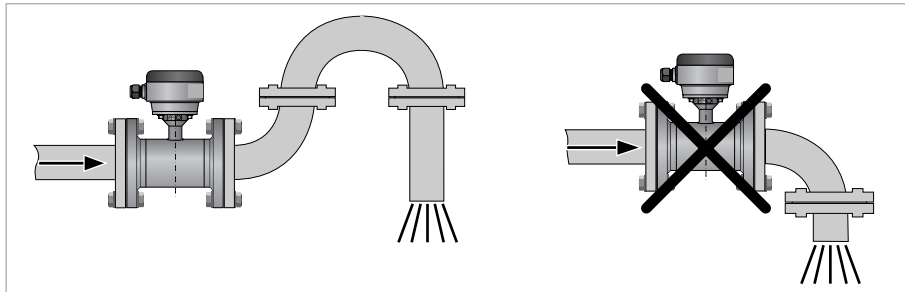


Figure 3-8: Installation in front of an open discharge

### 3.2.6 Flange deviation

*Max. permissible deviation of pipe flange faces:*

$$L_{max} - L_{min} \leq 0.5 \text{ mm} / 0.02''$$

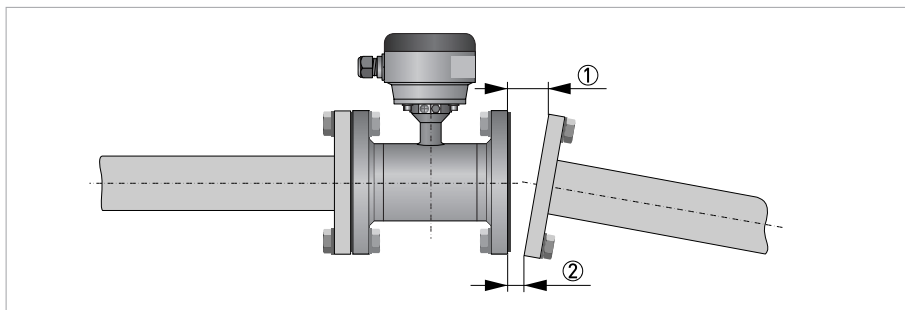


Figure 3-9: Flange deviation

- ①  $L_{max}$
- ②  $L_{min}$

### 3.2.7 Pump

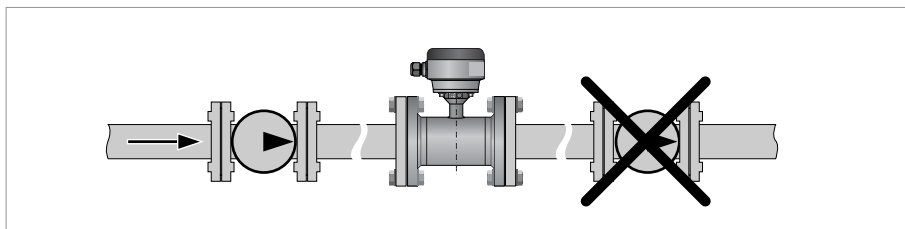


Figure 3-10: Installation behind a pump

3.2.8 Control valve

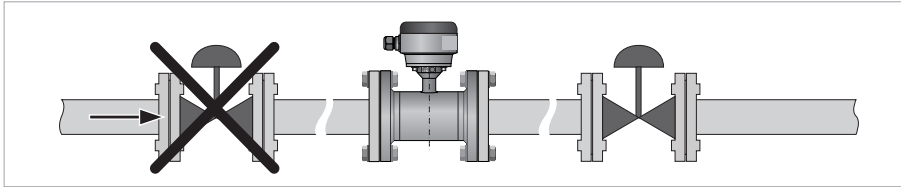


Figure 3-11: Installation in front of a control valve

3.2.9 Air venting and vacuum forces

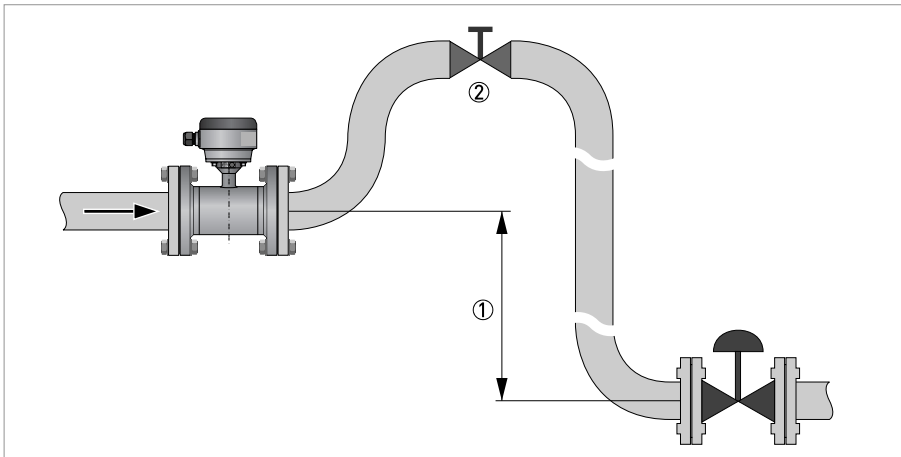


Figure 3-12: Air venting

- ①  $\geq 5$  m
- ② Air ventilation point

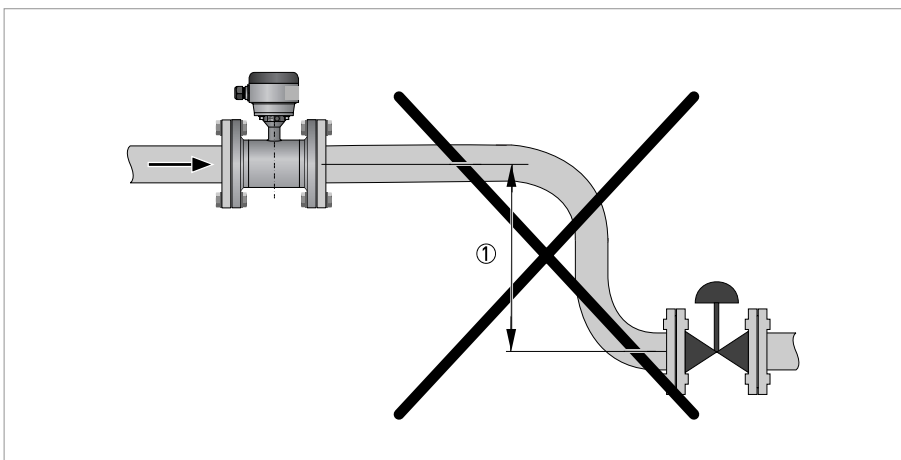


Figure 3-13: Vacuum

- ①  $\geq 5$  m

### 3.2.10 Mounting position

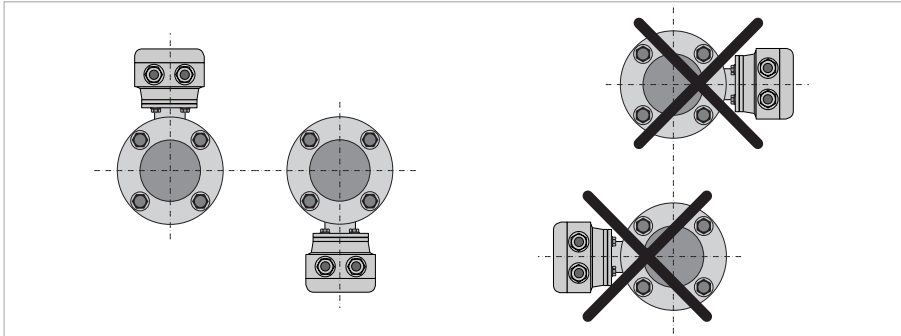


Figure 3-14: Mounting position

- 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.

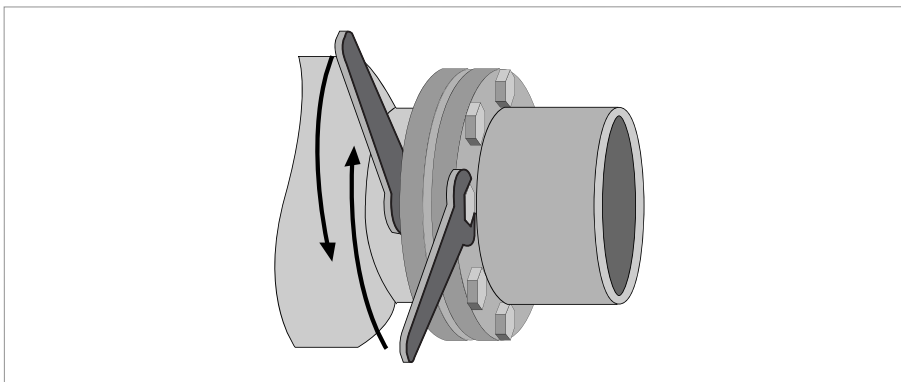


Figure 3-15: Tightening of bolts

- 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] <sup>①</sup>		
			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 [lb.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!*

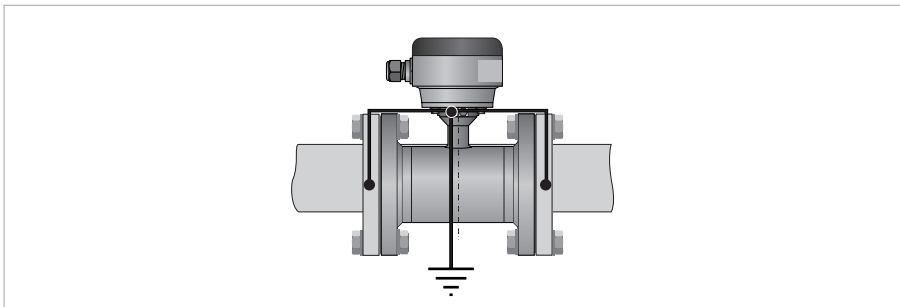
*Observe the national regulations for electrical installations!*

*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.

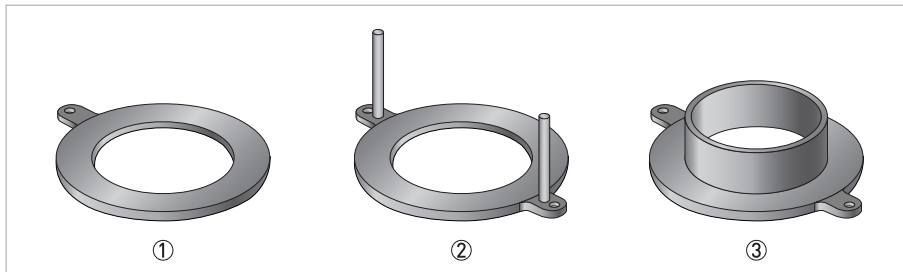


Figure 4-2: Different types of grounding rings

- 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.

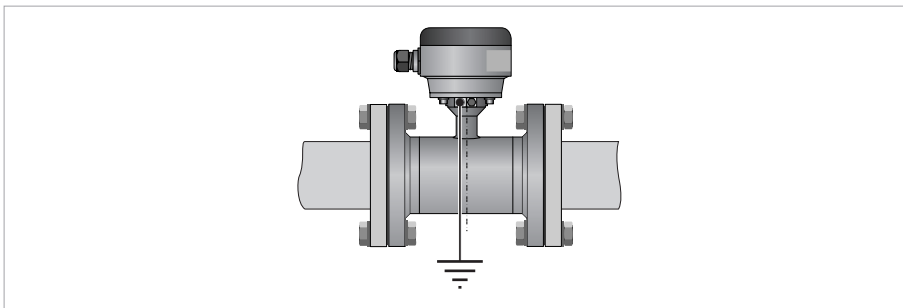


Figure 4-3: Virtual reference

**Minimum requirements:**

- Size:  $\geq$  DN10
- Electrical conductivity:  $\geq$  200  $\mu$ S/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
9501A 951QA 951HA 9502A 952HA 9503A 9504A 9505A 9506A 9508A 9510A 9512A 9514A 9516A 9518A 9520A 9524A 9528A 9532A 9536A 9540A 9548A 9556A 9564A 9572A 9580A	<b>Nominal diameter and liner</b> DN25,1" PP DN32,1¼" PP DN40,1½" PP DN50,2" PP DN65,2½" PP DN80,3" PP DN100,4" PP DN125,5" PP DN150,6" PP DN200,8" Hardrubber DN250,10" Hardrubber DN300,12" Hardrubber DN350,14" Hardrubber DN400,16" Hardrubber DN450,18" Hardrubber DN500,20" Hardrubber DN600,24" Hardrubber DN700,28" Hardrubber DN800,32" Hardrubber DN900,36" Hardrubber DN1000,40" Hardrubber DN1200,48" Hardrubber DN1400,56" Hardrubber DN1600,64" Hardrubber DN1800,72" Hardrubber DN2000,80" Hardrubber
-1 -2 -3 -5 -A -B -M -N -4 -W	<b>Nominal pressure</b> PN 6 EN 1092-1 (DN 1200-2000) PN 10 EN 1092-1 (DN 200-2000) PN 16 EN 1092-1 (DN 25... 1000) PN 40 EN 1092-1 (DN25...600) 150 lbs RF ASME B 16.5 (1" ... 24") 300 lbs RF ASME B 16.5 (1" ... 24") JIS 20 K (DN 25 ... 40   1" ... 1 1/2") & (DN200 ... 600   8" ... 24") JIS 10 K (DN 50 ... 1400   2" ... 56") PN 25 EN 1092-1 (DN 200 ... 600 ) Class D AWWA (DN 700 ... 2000   28" ... 80")
0 1 3 5 A C D F T U V W X Y	<b>Ex version ①</b> non Ex EEx zone 1 (for IMT33A compact and field, IMT31A compact and wall only) Ex zone 2 (for IMT33A compact and field only) FM Class I DIV 2 (for IMT33A compact and field, IMT31A compact and wall only) cCSAus OL (for IMT33A compact and field, IMT31A compact and wall only) CSA Class I DIV 2 (for IMT33A compact and field, IMT31A compact and wall only) NEPSI zone 1 (for IMT33A compact and field only) IECEx zone 1 (for IMT33A compact and field, IMT31A compact and wall only) BE-Ex EAC (Belarus IMT33A compact and field, IMT31A compact and wall only) RU-Ex EAC (Russia IMT33A compact and field, IMT31A compact and wall only) KA- Ex EAC (Kazakhstan IMT33A compact and field, IMT31A compact and wall only) RU-EAC ( Russia ) KA-EAC ( Kazakhstan ) BE-EAC ( Belarus )

Model	Description
	<b>System design</b>
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 / 1/2" NPT
5	Separate with aluminum connection box / PF 1/2
6	Separate with aluminum connection box / M20 x 1.5 A
A	Separate with stainless steel connection box / 1/2" NPT
B	Separate with stainless steel connection box / PF 1/2
C	Separate with stainless steel connection box / M20 x 1.5
	<b>Converter model</b>
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)
	<b>Lining</b>
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)
	<b>Electrodes (fixed)</b>
1	Stainless steel DIN 1.4571 316 Ti
3	Hastelloy C4
6	Titanium
B	Hastelloy C22
	<b>Construction of electrodes</b>
1	fixed
	<b>Housing- / flange material</b>
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.)
	<b>Protection class / dimension ( face-to-face )</b>
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)
	<b>Cable</b>
0	Compact - without / separate DS
1	Separate BTS
2	Separate LIYCY (only for FM / CSA Class 1 DIV 2)
Y	Without

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

Project Code: WIKSP2GW

Page:2

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

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

**Tag Set**

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

\*\*\*\*\*ENGINEER – PLEASE SPECIFY CONFIGURED FLOW RANGE\*\*\*\*\*

**Foxboro<sup>®</sup> 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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<b>5</b>	<b>Model code</b>	<b>35</b>
<hr/>		
<b>6</b>	<b>Notes</b>	<b>37</b>
<hr/>		

## 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<sup>®</sup>), 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



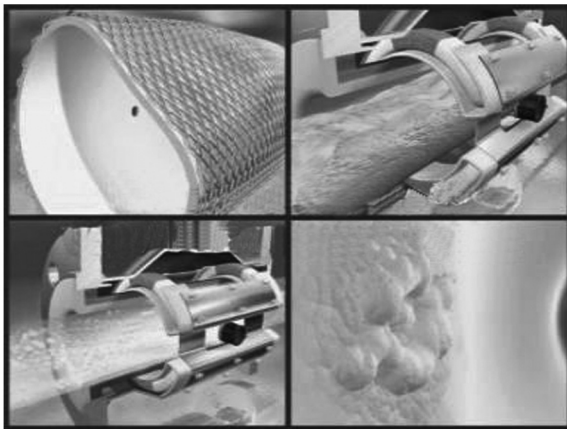
[signal converter in wall-mounted housing]

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.

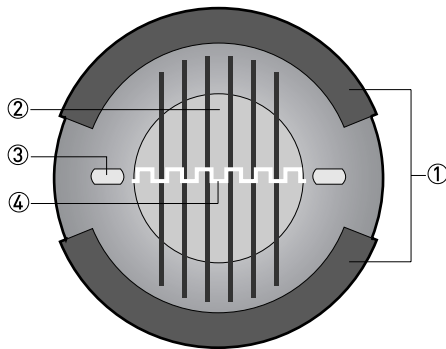


Figure 1-1: Measuring principle

- 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.
<b>Flow sensor</b>	
9500A	DN25...1200 / 1...48"
9600A	DN2.5...150 / 1/10...6"
	All flow sensors are also available in an Ex version.
<b>Signal converter</b>	
Compact version (C)	9500A & 9600A with IMT31A <b>C</b> (0° & 45° version)
Wall-mounted remote version (W)	IMT31A <b>W</b>
	All signal converters are also available in an Ex version.
<b>Options</b>	
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

<b>Display and user interface</b>	
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.
<b>Display functions</b>	
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

<b>Temperature</b>	
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
<b>Pressure</b>	
Medium	Refer to technical data for the flow sensor.
Ambient pressure	Atmospheric
<b>Chemical properties</b>	
Electrical conductivity	All media except for water: $\geq 5 \mu\text{S}/\text{cm}$ (also refer to the technical data for the flow sensor)
	Water: $\geq 20 \mu\text{S}/\text{cm}$
State of aggregation	Conductive, liquid media
Solid content (volume)	$\leq 10\%$
Gas content (volume)	$\leq 3\%$
Flow rate	For detailed information, refer to chapter "Flow tables".
<b>Other conditions</b>	
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 <b>not</b> included in the tolerance range.
Power consumption	AC: 7 VA
	DC: 4 W
Signal cable	Only necessary for remote versions.
	<b>DS 300 (type A)</b> 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

<b>Current output</b>		
Output data	Volume flow, mass flow, diagnostic value, flow velocity, coil temperature, conductivity	
Settings	<b>Without HART®</b>	
	Q = 0%: 0...20 mA; Q = 100%: 10...21.5 mA	
	Error identification: 20...22 mA	
	<b>With HART®</b>	
	Q = 0%: 4...20 mA; Q = 100%: 10...21.5 mA	
		Error identification: 3...22 mA
<b>Operating data</b>	<b>Basic I/Os</b>	<b>Ex i I/Os</b>
Active	U <sub>int, nom</sub> = 20 VDC I ≤ 22 mA R <sub>L</sub> ≤ 750 Ω	-
	HART® at terminals A	
Passive	U <sub>ext</sub> ≤ 32 VDC I ≤ 22 mA U <sub>0</sub> ≥ 2 V at I = 22 mA R <sub>L</sub> ≤ (U <sub>ext</sub> - U <sub>0</sub> ) / I <sub>max</sub>	U <sub>ext</sub> ≤ 32 VDC I ≤ 22 mA U <sub>0</sub> ≥ 4 V R <sub>L</sub> ≤ (U <sub>ext</sub> - U <sub>0</sub> ) / I <sub>max</sub>
		U <sub>i</sub> = 30 V I <sub>i</sub> = 130 mA P <sub>i</sub> = 1 W C <sub>i</sub> = 10 nF L <sub>i</sub> ~ 0 mH
	HART® at terminals A	HART® at terminals C
<b>HART®</b>		
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	

<b>Pulse output / frequency output</b>		
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)	
<b>Operating data</b>	<b>Basic I/Os</b>	<b>Ex i I/Os</b>
Passive	$U_{ext} \leq 32 \text{ VDC}$  $f_{max}$ in operating menu set to $f_{max} \leq 100 \text{ Hz}$ :  $I \leq 100 \text{ mA}$  open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$  closed: $U_{0, max} = 0.2 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, max} = 2 \text{ V}$ at $I \leq 100 \text{ mA}$	-
	$f_{max}$ in operating menu set to $100 \text{ Hz} < f_{max} \leq 10 \text{ kHz}$ :  $I \leq 20 \text{ mA}$  open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$  closed: $U_{0, max} = 1.5 \text{ V}$ at $I \leq 1 \text{ mA}$ $U_{0, max} = 2.5 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, max} = 5.0 \text{ V}$ at $I \leq 20 \text{ mA}$	-
NAMUR	-	Passive to EN 60947-5-6  open: $I_{nom} = 0.77 \text{ mA}$  closed: $I_{nom} = 4.7 \text{ mA}$
		$U_i = 30 \text{ V}$ $I_i = 130 \text{ mA}$ $P_i = 1 \text{ W}$ $C_i = 10 \text{ nF}$ $L_i = 0 \text{ mH}$

Operating data	Modbus
Passive	$U_{\text{ext}} \leq 32 \text{ VDC}$
	$f_{\text{max}}$ in the operating menu set to $f_{\text{max}} \leq 1 \text{ kHz}$ : $I \leq 100 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{\text{ext}} = 32 \text{ VDC}$ closed: $U_{0, \text{max}} = 0.2 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, \text{max}} = 2 \text{ V}$ at $I \leq 100 \text{ mA}$
<b>Low flow cut off</b>	
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)
<b>Time constant</b>	
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

<b>Status output / limit switch</b>		
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	
<b>Operating data</b>	<b>Basic I/Os + Modbus</b>	<b>Ex i I/Os</b>
Passive	$U_{ext} \leq 32 \text{ VDC}$ $I \leq 100 \text{ mA}$ open: $I \leq 0.05 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ closed: $U_{0, max} = 0.2 \text{ V}$ at $I \leq 10 \text{ mA}$ $U_{0, max} = 2 \text{ V}$ at $I \leq 100 \text{ mA}$	-
NAMUR	-	Passive to EN 60947-5-6 open: $I_{nom} = 0.77 \text{ mA}$ closed: $I_{nom} = 4.7 \text{ mA}$ <hr/> $U_i = 30 \text{ V}$ $I_i = 130 \text{ mA}$ $P_i = 1 \text{ W}$ $C_i = 10 \text{ nF}$ $L_i = 0 \text{ mH}$
<b>Control input</b>		
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.	
<b>Operating data</b>	<b>Basic I/Os</b>	<b>Ex i I/Os + Modbus</b>
Passive	$U_{ext} \leq 32 \text{ VDC}$ $I_{nom} = 6.5 \text{ mA}$ at $U_{ext} = 24 \text{ VDC}$ $I_{nom} = 8.2 \text{ mA}$ at $U_{ext} = 32 \text{ VDC}$ Contact closed (on): $U_0 \geq 8 \text{ V}$ with $I_{nom} = 2.8 \text{ mA}$ Contact open (off): $U_0 \leq 2.5 \text{ V}$ with $I_{nom} = 0.4 \text{ mA}$	-
<b>FOUNDATION Fieldbus</b>		

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
<b>Modbus</b>	
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

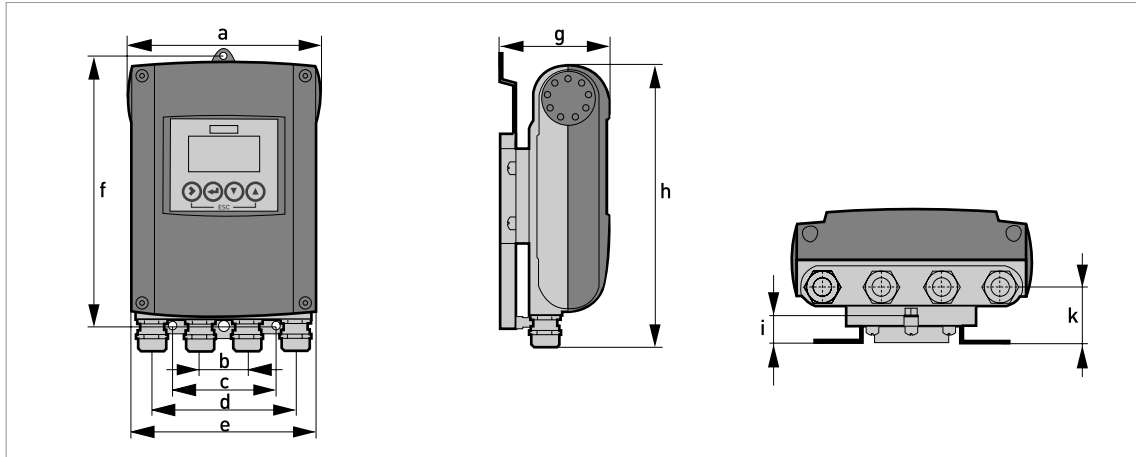
## Approvals and certificates

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
<b>Hazardous areas</b>	
ATEX	<b>Optional (only 9500A)</b>
	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)
	<b>Option (Wall-mounted version only)</b>
	II 2 D Ex tD A21 IP64 T135
IECEX	<b>Optional (only 9500A)</b>
	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)
	<b>Option (Wall-mounted version only)</b>
	Ex e [ia] mb IIC T4
	Ex tD A21 IP64 T135°C
FM/CSA	<b>Optional (only 9500A)</b>
	Class I, Div 2, Group A, B, C and D
	<b>Option (Wall-mounted version only)</b>
	Class I, Div 2, Group A, B, C and D
<b>Other standards and approvals</b>	
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



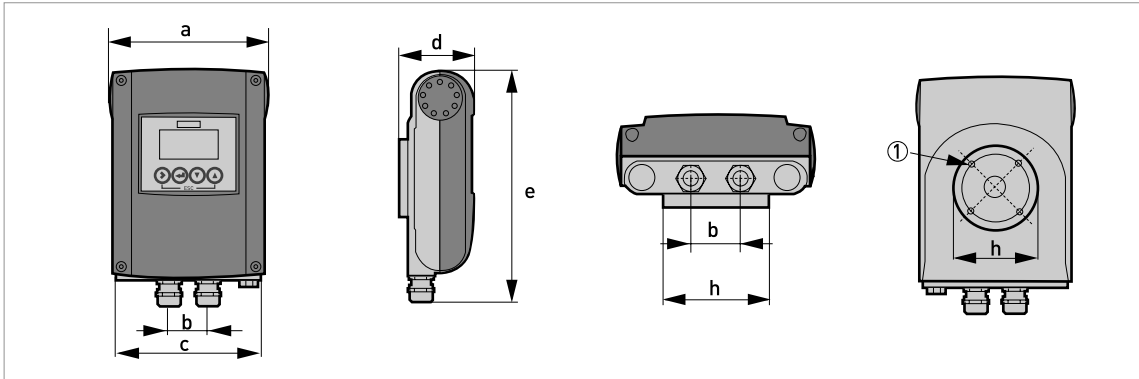
Dimensions and weights in mm and kg

	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

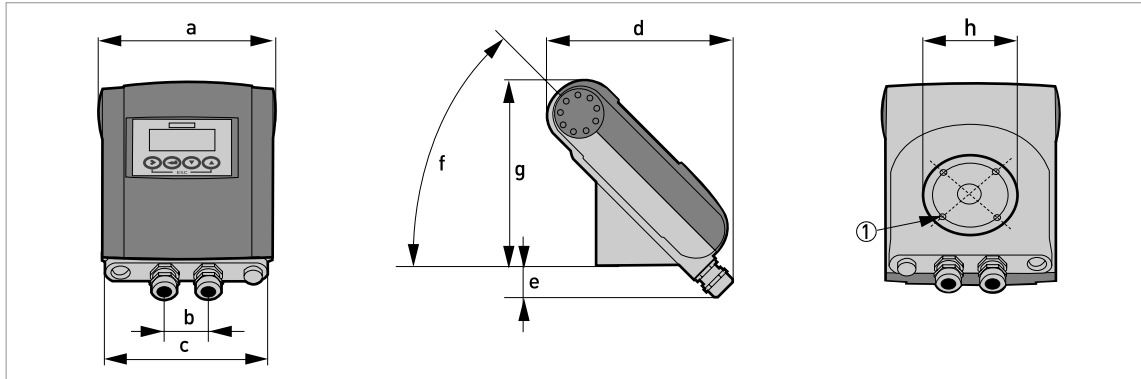
Dimensions and weights in mm and kg

	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

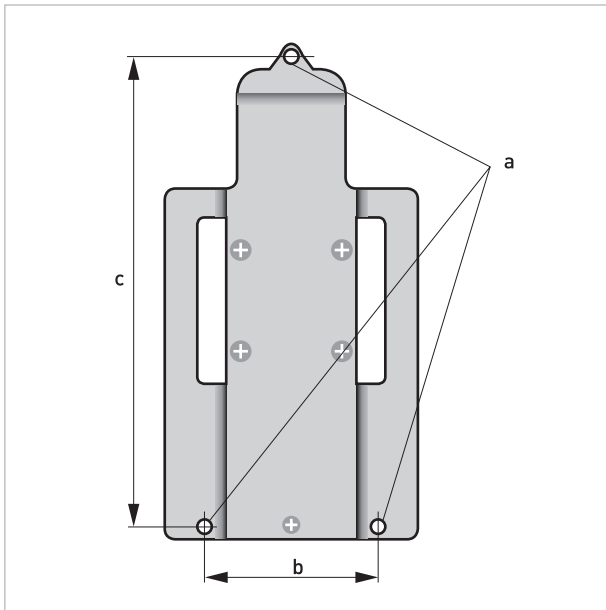
Dimensions and weights in mm and kg

	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<sup>3</sup>/h

v [m/s]	Q <sub>100 %</sub> in m <sup>3</sup> /h			
	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

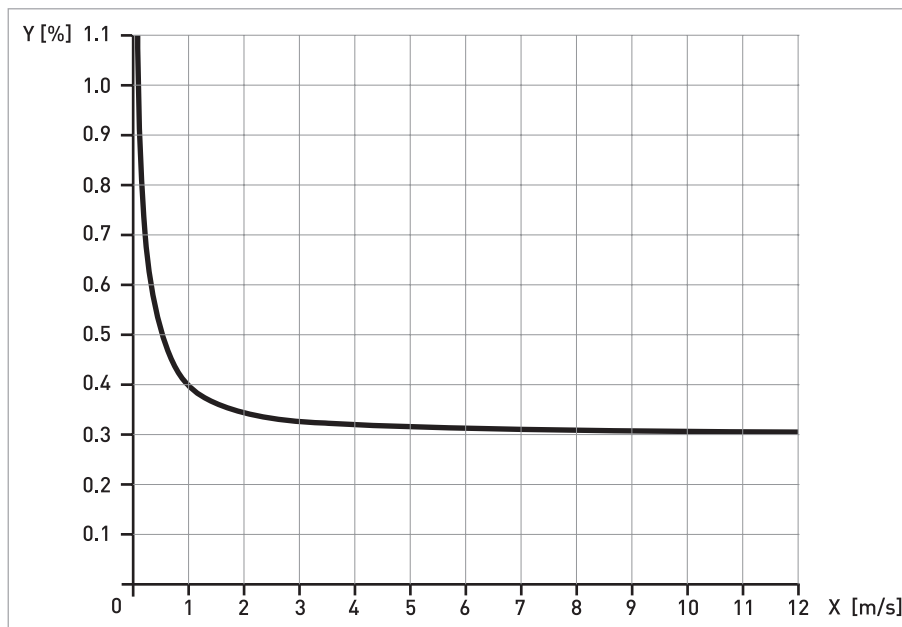
	Q <sub>100 %</sub> in US gallons/min			
v [ft/s]	1	3.3	10	40
DN [inch]	Min. flow	Nominal flow		Max. flow
1/10	0.02	0.09	0.23	0.93
1/8	0.06	0.22	0.60	2.39
1/4	0.13	0.44	1.34	5.38
3/8	0.37	1.23	3.73	14.94
1/2	0.84	2.82	8.40	33.61
3/4	1.49	4.98	14.94	59.76
1	2.33	7.79	23.34	93.36
1.25	3.82	12.77	38.24	152.97
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

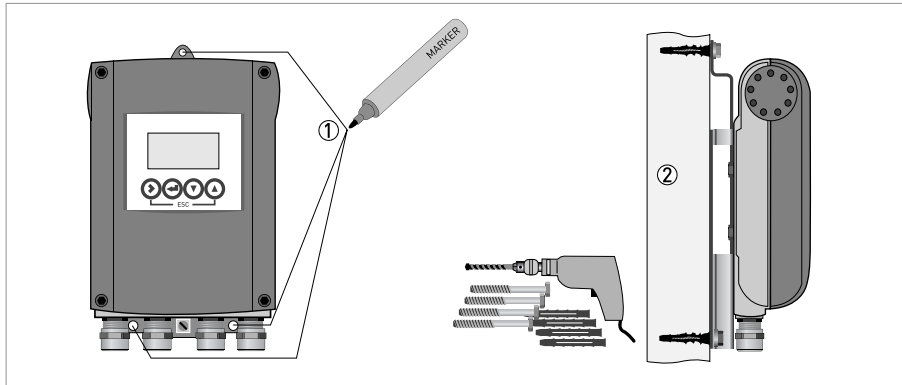
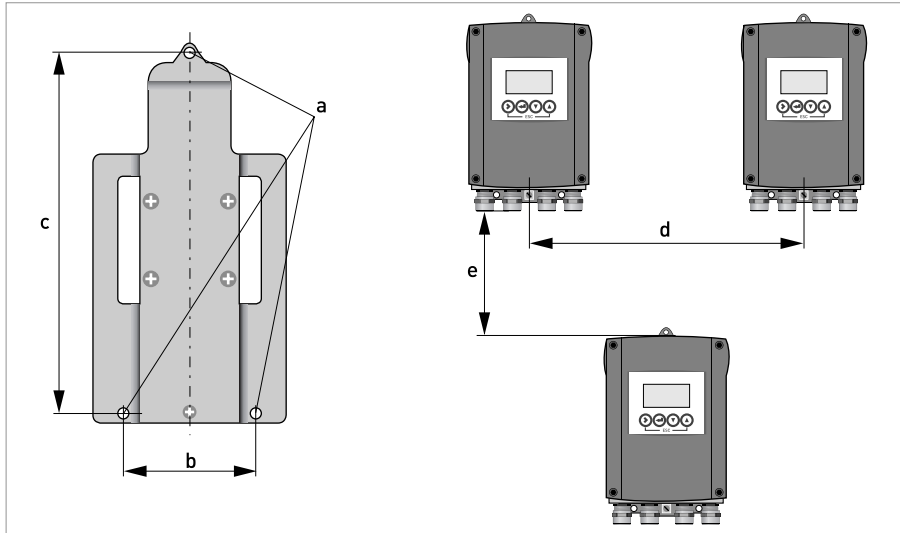


Figure 3-1: Mounting the wall-mounted housing

- 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:  $\geq 50 \text{ mm} / 2''$

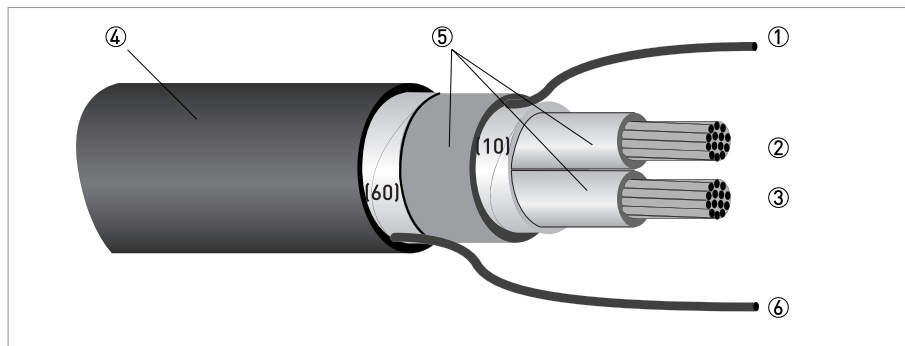


Figure 4-1: Construction of signal cable A

- ① Stranded drain wire (1) for the inner shield (10), 1.0 mm<sup>2</sup> Cu / AWG 17 (not insulated, bare)
- ② Insulated wire (2), 0.5 mm<sup>2</sup> Cu / AWG 20
- ③ Insulated wire (3), 0.5 mm<sup>2</sup> 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

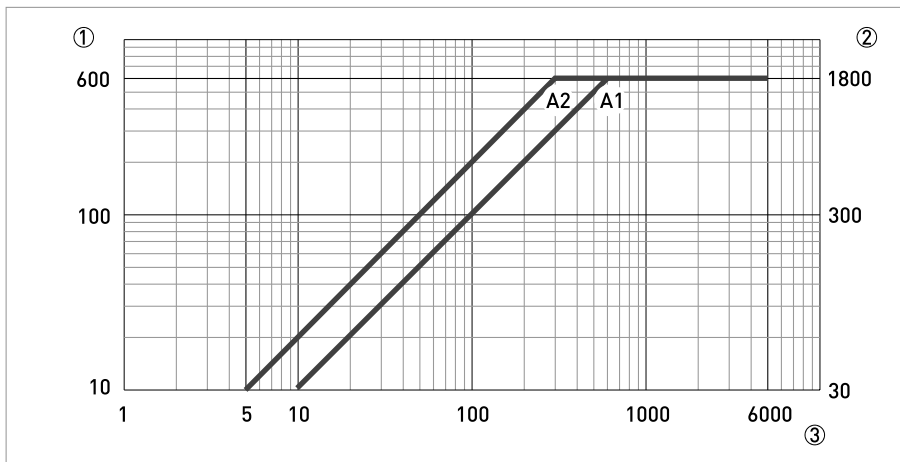


Figure 4-2: Maximum length of signal cable A

- 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:  $\geq 50 \text{ mm} / 2''$
- The following illustration is schematic. The positions of the electrical connection terminals may vary depending on the housing version.

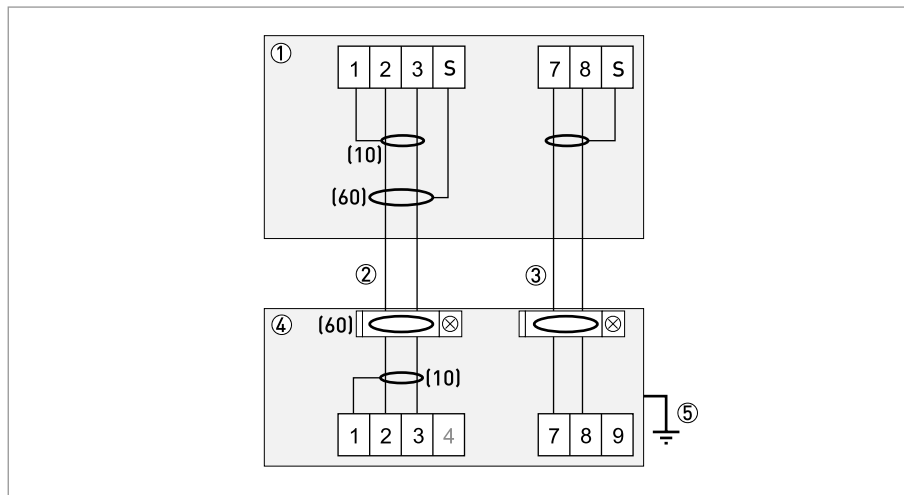


Figure 4-3: Connection diagram for signal and field current cable

- 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 ( $I_N \leq 16 \text{ A}$ ) for the infeed power circuit, and also a separator (switch, circuit breaker) to isolate the signal converter must be provided.

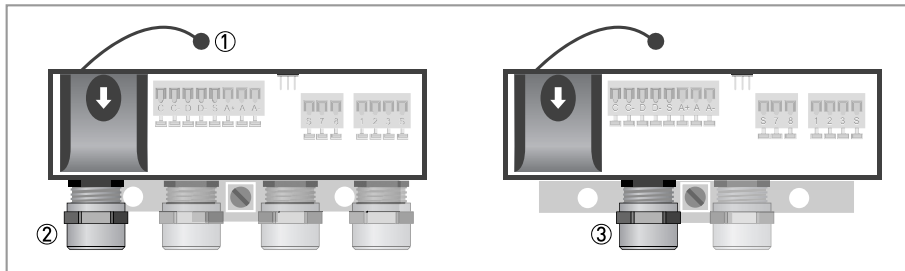


Figure 4-4: Terminal compartment for power supply

- 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.

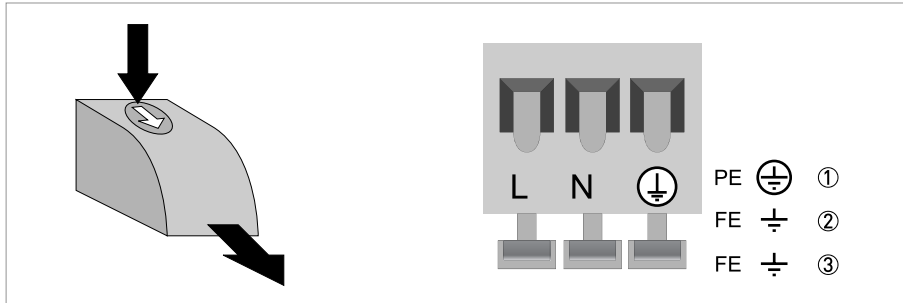


Figure 4-5: Power supply connection

- 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

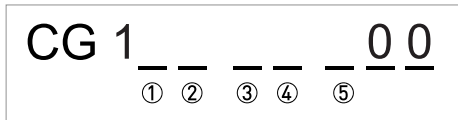


Figure 4-6: Marking (CG number) of the electronics module and output variants

- 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 <sub>p</sub> / C <sub>p</sub> passive ①		P <sub>p</sub> / S <sub>p</sub> passive ①		②		I <sub>p</sub> + HART® passive ③	
						I <sub>a</sub> + HART® active ③		

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

#### Description of the used abbreviations

I <sub>a</sub>	I <sub>p</sub>	Current output active or passive
P <sub>p</sub>		Pulse/frequency output passive
S <sub>p</sub>		Status output / limit switch passive
C <sub>p</sub>		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 <sub>p</sub> / S <sub>p</sub> passive ①	②	I <sub>p</sub> + HART® passive	
-------	---	---	--------------------------------	--

FOUNDATION Fieldbus (Option)

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

G 0 0	P <sub>p</sub> / S <sub>p</sub> passive	②	+3.3 V; 560 Ω	Common	Sign. A (D0-)	Sign. B (D1+)
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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

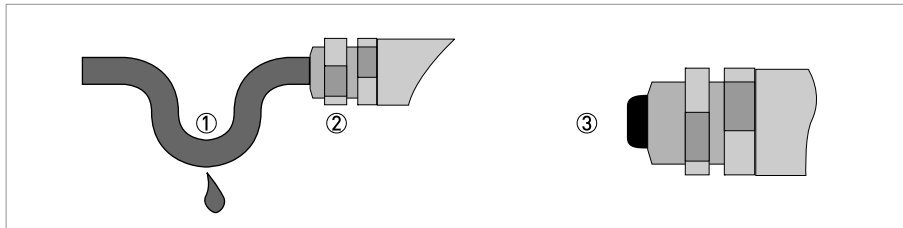


Figure 4-7: Protect housing from dust and water

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

Model	Description
0	<b>Reference method</b> Standard
0 2 3	<b>Tag plate (field &amp; wall only)</b> Standard 316/1.4401 tag plate (120 x 46 mm) 316/1.4401 tag plate (67 x 25 mm)
1 3* 4	<b>Manuals</b> 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](http://www.fielddevices.foxboro.com)

Project Code: WIKSP2GW

Page:3

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

Item	Qty	LEVEL TRANSMITTER
2.00	1	<b>KPSI 750-S14D-015.00-000.000-B1-0050-B Submersible Pressure Transducer</b>
	750	<b>SYSTEM DESIGN</b> Non-Clogging 2.75" PTFE Coated Elastomeric Diaphragm
	S	<b>MATERIAL</b> Stainless Steel
	1	<b>REFERENCE FORMAT</b> Vented Gage
	4	<b>OUTPUT</b> 4-20 ma
	D	<b>PRESSURE CONNECTION</b> Diaphragm Protector
	4	<b>ELECTRICAL CONNECTION</b> 1/2" - 14 NPT male conduit fitting with molded cable seal
	A	<b>LIGHTNING PROTECTION</b> None
	015.000	<b>LEVEL RANGE (AT MAX OUTPUT)</b> 15
	000.000	<b>LEVEL RANGE (AT MIN OUTPUT)</b> 0
	B	<b>MOISTURE PROTECTION</b> Vent Filter
	1	<b>CABLE TYPE</b> Polyurethane
	0050	<b>CABLE LENGTH</b> 50 feet
	B	<b>ENGINEERING UNITS/LABEL</b> ft. H <sub>2</sub> O

**Tag Set**

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

# MEAS KPSI 750



- Non-Fouling Submersible Level Transducer
- Non-Clogging 2.75" PTFE Coated Elastomeric Diaphragm
- $\pm 0.25\%$  FSO Static Accuracy
- Custom Built in Two Days
- Two Year Warranty



## DESCRIPTION

The MEAS KPSI 750 submersible hydrostatic level transducer is specifically designed to meet the rigorous environments encountered in a slurry or highly viscous application. It provides precision depth measurement under most hostile 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. 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 our latest 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 115 ft (35m) H<sub>2</sub>O
- Integral Diaphragm Protector
- Optional Lifetime Lightning Protection

## APPLICATIONS

- Lift Stations
- Wastewater
- Slurry Tanks
- Pump Control

## SPECIFICATIONS

Parameter		Comment
<b>LEVEL RANGES</b>		
Full Scale Level Ranges (intermediate level ranges are available)	10 thru 115 ft H <sub>2</sub> O (3 thru 35 m H <sub>2</sub> O)	Vented Gage Reference
Proof Pressure	1.5 x FS	
Burst Pressure	2.0 x FS	
<b>STATIC PERFORMANCE</b>		
Static Accuracy (combined effects of non-linearity, hysteresis and repeatability, best fit straight line method)	$\pm 0.25\%$ FSO	BFSL method
Resolution	+0.0001% FS	

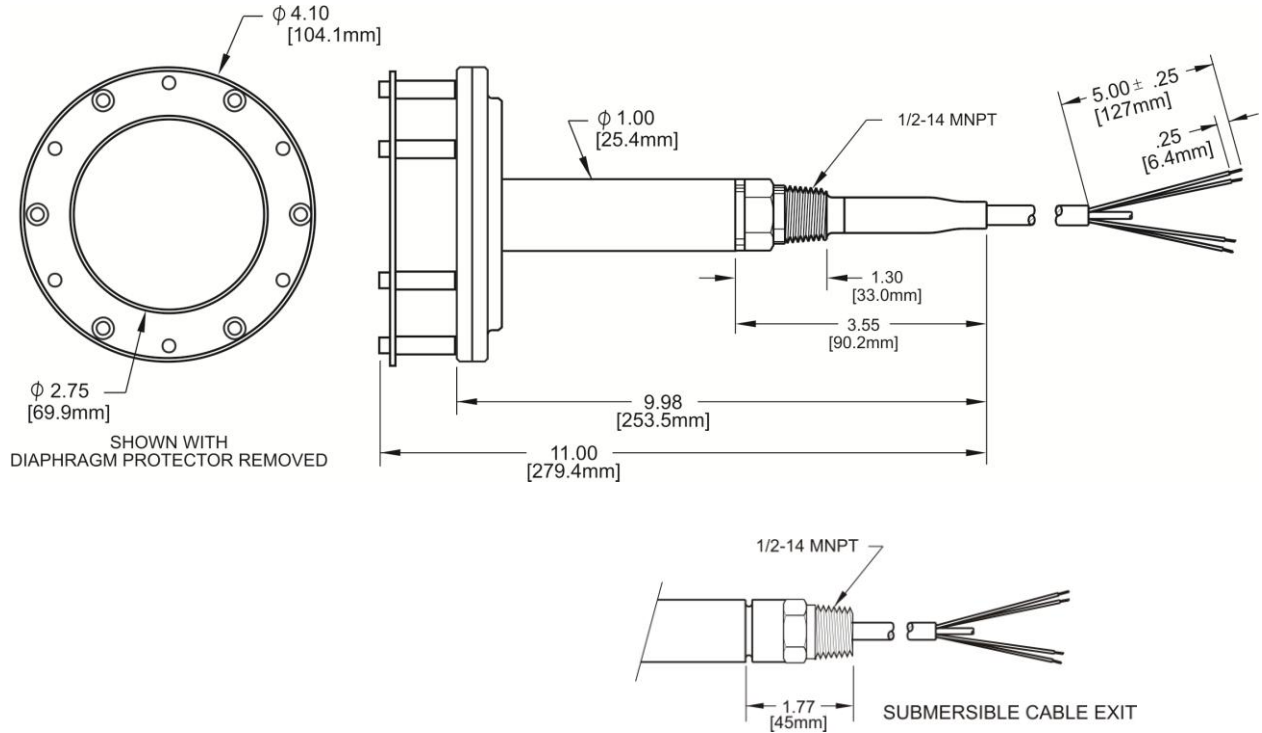
# MEAS KPSI 750

## SPECIFICATIONS

<b>ENVIRONMENTAL</b>		
Wetted Materials	316 SS or Titanium; POM; polyurethane, PTFE or FKM	
Compensated Temp Range	0 to 50°C	
Thermal Error (maximum allowable deviation from the Best Fit Straight Line due to a change in temperature)	±0.10% FSO/°C	worst case for level ranges > 23' (7m) H <sub>2</sub> O prorated for level ranges ≤ 23' (7m) H <sub>2</sub> O
Operating Temp Range	-20 to 60 °C	when attached to polyurethane cable
Protection Rating	IP 68, NEMA 6P	
<b>ELECTRICAL</b>		
Excitation	9-28V – VDC output	0-5V, 0-2.5V, 0-4V
	9-28V – mA output	4-20
	15-28V – VDC output	0-10V
	10-28V – VDC output	1.5-7.5V
Input Current	20 mA max	for mA output
	3.5 mA max	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) H <sub>2</sub> O, 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	
<b>CERTIFICATIONS</b>		
	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)
<b>PHYSICAL</b>		
Approximate Weight	3.5 lbs (1588 g) transducer	
	0.05 lbs/ft (79 g/m) cable	
Cable Jacket Material	Polyurethane (standard) ETFE (optional)	
Cable Pull Strength	200 lbs (90 kg)	
Cable Number of Conductors	4	
Cable Conductor Size	22 AWG	
Cable Seal	Molded Polyurethane	for polyurethane cable
	FKM Gland	for ETFE cable
<b>TEMPERATURE OUTPUT OPTION (not intrinsically safety approved)</b>		
Temperature Range	-20 to 60°C	available for 4-20mA output versions only
Output Signal	4-20mA	
Temperature Measurement Accuracy	±4°C	
<b>LIGHTNING PROTECTION (power supply needs to be limited to 150mA to avoid lock up of the gas tube after a suppression event)</b>		
Life Expectancy	>1,000 Operations	
Peak Clamping Voltage	36 Volts	
Response Time	<10 nsecs	
Shunts	20,000 Amperes	

# MEAS KPSI 750

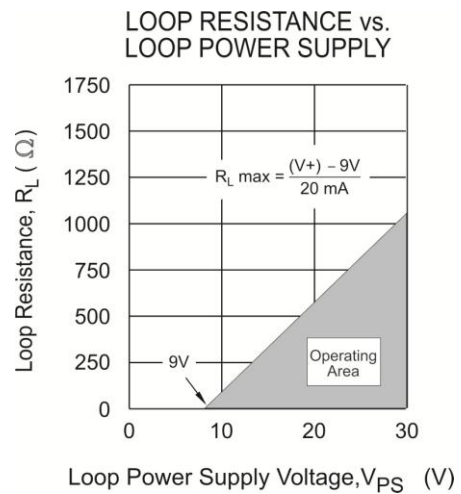
## DIMENSIONS



Molded Cable Seal Configuration for Polyurethane Cable

## ELECTRICAL TERMINATION / LOOP RESISTANCE / CERTIFICATIONS

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



# MEAS KPSI 750

## ORDERING INFORMATION

MODEL		SUBMERSIBLE LEVEL TRANSDUCER	
7	5	0	±0.25% FSO Static Accuracy
<b>MATERIAL</b>			
S	Stainless Steel		
<b>REFERENCE FORMAT</b>			
1	Vented gage		
<b>OUTPUT</b>			
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		
<b>PRESSURE CONNECTION</b>			
D	Diaphragm protector		
<b>ELECTRICAL CONNECTION</b>			
4	1/2" - 14 NPT male conduit fitting with molded cable seal		
B	1/2" - 14 NPT male conduit fitting with gland cable seal		
<b>LIGHTNING PROTECTION</b>			
A	None		
B	Full Lightning Protection		
<b>LEVEL RANGE (at MAX output)<sup>1</sup></b>			
#	#	#	#
↓	↓	↓	↓
<b>LEVEL RANGE (at MIN output)<sup>1</sup></b>			
#	#	#	#
↓	↓	↓	↓
<b>MOISTURE PROTECTION</b>			
B	Vent Filter		
C	Aneroid Bellows		
<b>CABLE TYPE</b>			
1	Polyurethane		
2	ETFE		
<b>CABLE LENGTH</b>			
#	#	#	#
↓	↓	↓	↓
<b>LABEL<sup>2</sup></b>			
A	psi		
B	ft H <sub>2</sub> O		
C	m H <sub>2</sub> O		

**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<sub>2</sub>O / 2.3073 = psi  
m H<sub>2</sub>O / 0.703265 = psi

Examples: 10 ft H<sub>2</sub>O / 2.3073 = 4.334 psi  
10m H<sub>2</sub>O / 0.703265 = 14.219 psi

(enter 004.334 in the part number)  
(enter 014.219 in the part number)

For sealed gage reference add local atmosphere when converting to psi. Contact MEAS for assistance.

Example: 10 ft H<sub>2</sub>O / 2.3073 + 14.7 = 19.034 psi

(enter 019.034 in the part number)

2 Units of measure on standard MEAS label. Contact Measurement Specialties if private labeling is required.

### NORTH AMERICA

Measurement Specialties, Inc.  
1000 Lucas Way  
Hampton, VA 23666  
USA  
Tel: 1-757-766-1500  
Fax: 1-757-766-4297  
Toll Free: 1-800-745-8008  
Sales: [WL\\_sales@meas-spec.com](mailto: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](mailto: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](mailto:pfg.cs.asia@meas-spec.com)

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Project Code: WIKSP2GW

Page:4

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

Item	Qty	DESCRIPTION
3.00	1	<b>PRESSURE TRANSMITTER</b> <b>Foxboro IGP10-T22D1F-L1V3 Gauge Pressure Transmitter</b> <b>Aux Specs: D0197MJ</b>
		<b>IGP10 FUNCTION:</b> Measures Pressure And Transmits A Proportional Electrical Signal.
		<b>T ELECTRONIC VERSION AND OUTPUT SIGNAL:</b> Intelligent; Digital HART & 4 To 20 mA
		<b>22 STRUCTURE CODE MATERIALS AND TYPE:</b> 316L ss Process Connection, 316L ss Diaphragm, Silicone Fill Fluid, 1/2 NPT External & 1/4 NPT Internal Thread Connection Type
		<b>D SPAN LIMITS:</b> 0.07 & 2.1 MPa, 10 & 300 psi, 0.70 & 21 bar or kg/cm <sup>2</sup>
		<b>1 CONDUIT CONNECTION &amp; HOUSING MATERIAL:</b> 1/2 NPT Conduit Connection, Both Sides, Aluminum Housing
		<b>F ELECTRICAL SAFETY:</b> 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.
		<b>L1 OPTIONAL MODEL SUFFIX(ES) INCLUDED:</b> Digital Indicator. Internal Pushbuttons. And Window Cover
		<b>D0197MJ Accessories for IAP10, IGP10, IGP25, IGP10S, IAP10</b> Anderson Greenwood M25 2-Valve Manifold 1/2" FNPT x 1/2" MNPT SS Teflon packing with Body Material SS

**Tag Set**

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

**PSS 2A-1C13 B**

**Models IAP10, IGP10, IAP20, and IGP20 I/A Series<sup>®</sup> Absolute and Gauge Pressure Transmitters with HART<sup>®</sup> 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<sup>®</sup> brand I/A Series<sup>®</sup> 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<sup>®</sup> 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<sup>(1)</sup>; 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<sup>®</sup>. Hastelloy<sup>®</sup> 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<sup>(2)</sup> 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<sup>(3)</sup>, 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.

<sup>3</sup>. Equivalent to Hastelloy®.

## BRACKET-MOUNTED TRANSMITTERS – IAP20 AND IGP20

### SENSOR CORROSION PROTECTION

Choice of 316L ss, Co-Ni-Cr, nickel alloy<sup>(4)</sup>, 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<sub>2</sub>O) 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<sub>2</sub>O) 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

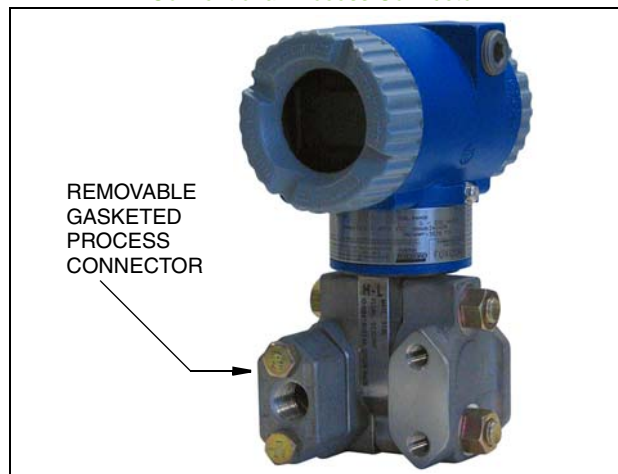
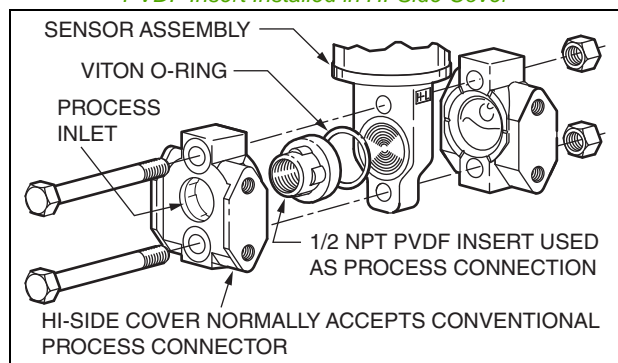


Figure 3. Bracket-Mounted Transmitter Shown with 1/2 NPT PVDF Insert Installed in HI-Side Cover



### 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 <sub>2</sub> O	mbar	kPa	inH <sub>2</sub> O	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<sub>2</sub>O, 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.

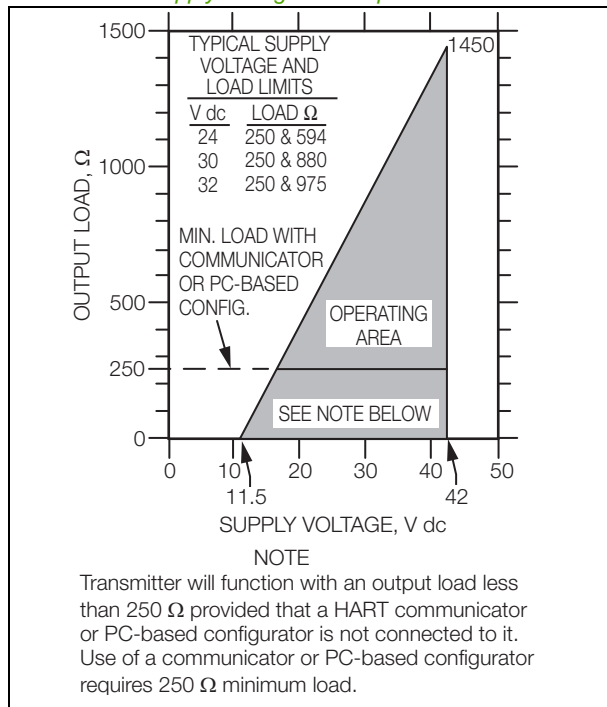
**Write Protect Jumper**

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



### 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

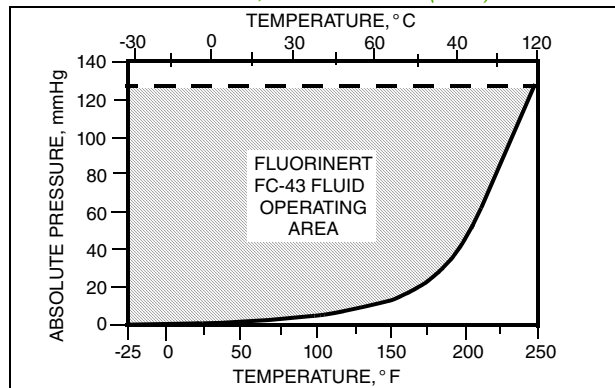
#### With Silicone Fill Fluid

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

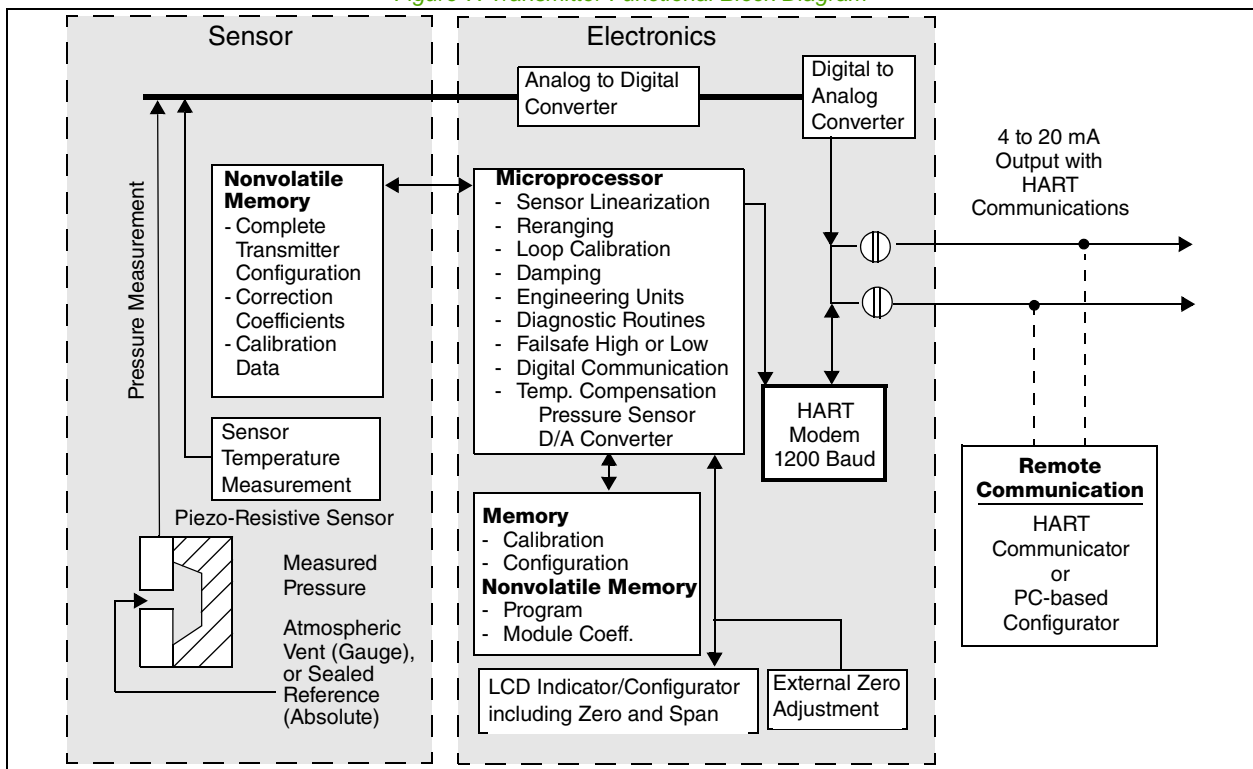
Parameter	Current Outputs
Offline	Configurable between 4 and 20 mA
Sensor Failure	Configurable to Fail LO or Fail HI
Fail LO	3.60 mA
Underrange	3.80 mA
Overrange	20.50 mA
Fail HI	21.00 mA

**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)**

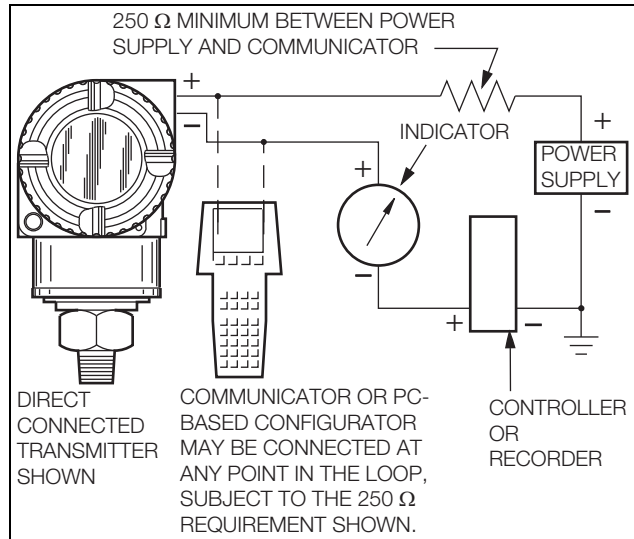
This Mode supports communications with up to 15 transmitters on a single pair of signal/power wires. The output signal is updated 4 times per second and carries not only the pressure measurement, but also the sensor and electronics temperatures (internal recalculation rate for temperature is once per 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)**

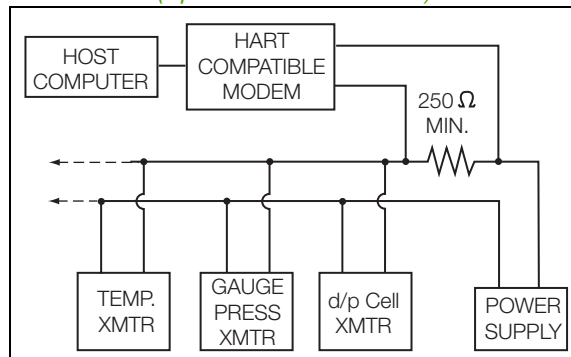
inH <sub>2</sub> O	psi	Pa	atm	g/cm <sup>2</sup>
ftH <sub>2</sub> O	inHg	kPa	bar	torr
mmH <sub>2</sub> O	mmHg	MPa	mbar	-
mH <sub>2</sub> O	-	-	-	-

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 <sub>2</sub> O 0 100
Measurement #1 Pressure EGU Output	per S.O. (d) 4 to 20 mA	inH <sub>2</sub> O 4 to 20 mA (e)
Measurement #2 Pressure EGU	per S.O. (d)	inH <sub>2</sub> O
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

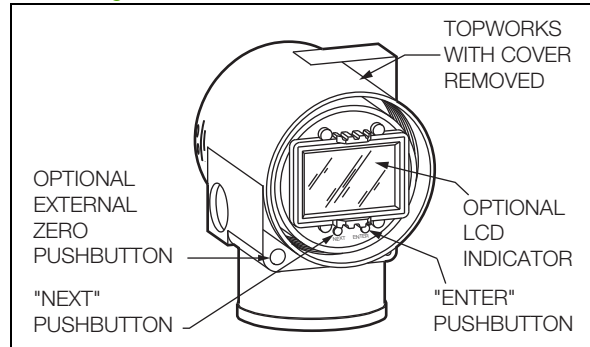
The LCD indicator provides:

- ▶ 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 <sup>2</sup> (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 <sup>2</sup> (0 to 3 "g") from 15 to 500 Hz with Aluminum Housing; and 0 to 10 m/s <sup>2</sup> (0 to 1 "g") from 9 to 500 Hz with 316 ss Housing	11 m/s <sup>2</sup> (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.

**PERFORMANCE 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) <ul style="list-style-type: none"> <li>▶ Process Connection</li> <li>▶ Gaskets</li> <li>▶ Sensor Diaphragm</li> </ul>	316L ss or nickel alloy (a)  Not applicable  316L ss, Co-Ni-Cr, or nickel alloy (a)	Carbon Steel, 316 ss, nickel alloy (a), Monel, or PVDF (Kynar)  Glass Filled pte (Chemloy), Viton  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

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)
<b>Electronics Versions and Output Signal</b>	
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)	-T
<b>Structure Code - Select from one of the following six groups:</b>	
<b>1. Transmitter Only (no seals)</b>	
<b>Process Connection      Sensor      Sensor Fill Fluid      Connection Type</b>	
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
<b>2. Transmitter Prepared for Foxboro Model Coded Seals (c)</b>	
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
<b>3. Transmitters Prepared for non-Foxboro Seals</b>	
Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (f)	SC
Transmitter Prepared for Remote Seal; Inert Fill in Sensor (g)	SD
<b>4. Flameproof Transmitter Only (no seals)</b>	
<b>Process Connection      Sensor      Sensor Fill Fluid      Connection Type</b>	
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
<b>5. Flameproof Transmitter Prepared for Foxboro Model Coded Seals (c)</b>	
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
<b>6. Flameproof Transmitter Prepared for non-Foxboro Seals</b>	
Flameproof Transmitter Prepared for Remote Seal; Silicone Fill in Sensor (f)	SH
Flameproof Transmitter Prepared for Remote Seal; Inert Fill in Sensor (g)	SJ
<b>Span Limits - Absolute or Gauge Pressure Units, as Applicable</b>	
<b>MPa      psi      bar</b>	
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
<b>Conduit Connection and Housing Material</b>	
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
<b>Electrical Safety (Also See Electrical Safety Specifications Section)</b>	
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 <u>user marking</u> )	M
ATEX Multiple Certifications (includes ATEX Codes E, D, and N) (h) (i) (See Electrical Safety Specifications section for <u>user marking</u> )	P
CSA Certifications: (j)	C
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	
CSA zone certified flameproof Ex d IIC; also all certifications of Code C above (h) (i)	B
FM Approvals: (j)	F
Division 1 intrinsically safe, explosionproof, dust-ignitionproof Zone approved AEx ia IIC	
Division 2 nonincendive, Classes I, II, and III	
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
<b>Optional Selections</b>	
<b>Mounting Bracket Set (l)</b>	
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
<b>Digital Indicator with Pushbuttons</b>	
Digital Indicator, Pushbuttons, and Window Cover	-L1
<b>Vent Screw and Block &amp; Bleed Valve</b>	
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
<b>Conduit Thread Adapters</b>	
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
<b>Electronics Housing Features</b>	
External Zero Adjustment	-Z1
Custody Transfer Lock and Seal	-Z2
External Zero Adjustment and Custody Transfer Lock and Seal	-Z3
<b>Custom Factory Configuration</b>	
Full Factory Configuration (Requires Configuration Form to be filled out)	-C2
<b>Cleaning and Preparation</b>	
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
<b>SIL2 Transmitters</b>	
SIL2-Certified HART Transmitter	-S2
<b>Instruction Books (Common MI, Brochure, and Full Documentation Set on DVD is Standard)</b>	
Without Instruction Book and DVD - Only "Getting Started" Brochure is supplied	-K1
<b>Miscellaneous Optional Selections</b>	
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 I/A Series, Electronic, Bracket-Mounted Gauge Pressure Transmitter	IAP20 IGP20																																																																																								
<b>Electronics Versions and Output Signal</b>																																																																																									
Intelligent; Digital HART and 4 to 20 mA dc (Version -T)	-T																																																																																								
<b>Structure Code - Select from one of the following three groups:</b>																																																																																									
<b>1. Transmitter</b>																																																																																									
<table border="0"> <thead> <tr> <th>Hi-Side Cover</th> <th>Sensor</th> <th>Fill Fluid</th> <th></th> </tr> </thead> <tbody> <tr><td>Steel</td><td>Co-Ni-Cr</td><td>Silicone</td><td>10</td></tr> <tr><td>Steel</td><td>Co-Ni-Cr</td><td>Inert</td><td>11</td></tr> <tr><td>Steel</td><td>316L ss</td><td>Silicone</td><td>12</td></tr> <tr><td>Steel</td><td>316L ss</td><td>Inert</td><td>13</td></tr> <tr><td>Steel</td><td>Nickel alloy (a)</td><td>Silicone</td><td>16</td></tr> <tr><td>Steel</td><td>Nickel alloy (a)</td><td>Inert</td><td>17</td></tr> <tr><td>316 ss</td><td>Co-Ni-Cr</td><td>Silicone</td><td>20</td></tr> <tr><td>316 ss</td><td>Co-Ni-Cr</td><td>Inert</td><td>21</td></tr> <tr><td>316 ss</td><td>316L ss</td><td>Silicone</td><td>22</td></tr> <tr><td>316 ss</td><td>316L ss</td><td>Inert</td><td>23</td></tr> <tr><td>316 ss</td><td>316L ss, Gold Plated</td><td>Silicone</td><td>2G</td></tr> <tr><td>316 ss</td><td>Monel</td><td>Silicone</td><td>24</td></tr> <tr><td>316 ss</td><td>Monel</td><td>Inert</td><td>25</td></tr> <tr><td>316 ss</td><td>Nickel alloy (a)</td><td>Silicone</td><td>26</td></tr> <tr><td>316 ss</td><td>Nickel alloy (a)</td><td>Inert</td><td>27</td></tr> <tr><td>Monel</td><td>Monel</td><td>Silicone</td><td>34</td></tr> <tr><td>Monel</td><td>Monel</td><td>Inert</td><td>35</td></tr> <tr><td>Nickel alloy (a)</td><td>Nickel alloy (a)</td><td>Silicone</td><td>46</td></tr> <tr><td>Nickel alloy (a)</td><td>Nickel alloy (a)</td><td>Inert</td><td>47</td></tr> <tr><td>Nickel alloy (a)</td><td>Tantalum</td><td>Silicone</td><td>48</td></tr> <tr><td>Nickel alloy (a)</td><td>Tantalum</td><td>Inert</td><td>49</td></tr> </tbody> </table>	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	
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**MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)**

Description	Model
<b><u>Process Connector Type (Material Same as Process Cover Material)</u></b>	
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
<b><u>Conduit Connection and Housing Material</u></b>	
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
<b><u>Electrical Safety (Also see Electrical Safety Specifications section)</u></b>	
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)	M
(See Electrical Safety Specifications section for <u>user marking</u> )	
CSA Certifications:	C
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	
CSA zone certified flameproof Ex d IIC; also all certifications of Code C above (g)	B
FM Approvals:	F
Division 1 intrinsically safe, explosionproof, dust-ignitionproof	
Zone approved AEx ia IIC	
Division 2 nonincendive, Classes I, II, and III	
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
<b><u>Optional Selections</u></b>	
<b><u>Mounting Bracket Set - Not available with Direct Connect Seals, Structure Codes F1 and F2</u></b>	
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
<b><u>Digital Indicator with Pushbuttons</u></b>	
Digital Indicator, Pushbuttons, and Window Cover	-L1

**MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)**

<u>Description</u>				<u>Model</u>
<b>Process Cover Type</b>	<b>Cover Screw Material</b>	<b>Cover Screw Size</b>	<b>Connector Screw Material</b>	
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
<b><u>Cleaning and Preparation - Not Available with Gold-Plated Sensor, Structure 2G (g)</u></b>				
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
<b><u>Bolting for Process Covers/Connectors (l)</u></b>				
316 ss Bolts and Nuts (Pressure Derated) (i)				-B1
17-4 ss Bolts and Nuts (j)				-B2
B7M Bolts and Nuts (NACE)(Pressure Derated) (i)				-B3
<b><u>Conduit Thread Adapters</u></b>				
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
<b><u>Electronics Housing Features</u></b>				
External Zero Adjustment				-Z1
Custody Transfer Lock and Seal				-Z2
External Zero Adjustment and Custody Transfer Lock and Seal				-Z3
<b><u>Custom Factory Configuration</u></b>				
Full Factory Configuration (Requires Configuration Form to be filled out)				-C2
<b><u>Tube Connectors - Specify Only One (Only 316 ss process covers; no side vents on cover) (g)</u></b>				
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
<b><u>Gaskets</u></b>				
Gasket for Vacuum Service with Pressure Seals (o)				-G1
<b><u>SIL2 Transmitters</u></b>				
SIL2-Certified Transmitter				-S2

MODEL CODE – IAP20 AND IGP20 TRANSMITTERS (CONTINUED)

Description	Model
<b>Instruction Books (Common MI, Brochure, and Full Documentation Set on DVD is Standard)</b>	
Without Instruction Book and DVD - Only "Getting Started" Brochure is supplied	-K1
<b>Miscellaneous Optional Selections</b>	
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
<b>Examples: IGP20-T20B21F-M1Z2; IAP20-TS3C11F-T</b>	

- 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 ptfе 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:

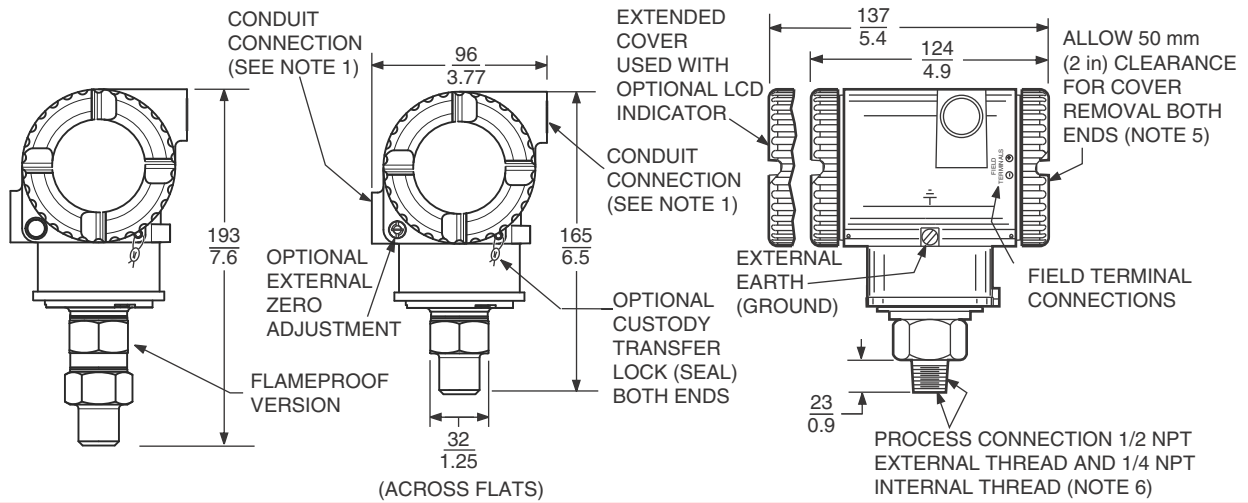
<b>Communication Protocol:</b>	HART, 4 to 20 mA dc, and digital output signal.												
<b>Remote Communications:</b>	Must not interfere with output.												
<b>Accuracy:</b>	Digital Output: $\pm 0.050\%$ of calibrated span. 4 to 20 mA Output: $\pm 0.060\%$ of calibrated span.												
<b>RFI Protection:</b>	0.1% error between 27 and 1000 MHz at 30 V/m field intensity												
<b>Proof Pressure:</b>	120, 1200, 11 500, or 22 000 psi for direct connected transmitters; 27 250 psi for bracket mounted transmitters, as specified.												
<b>Span Limits:</b>	From 1 to 6000 psi for standard direct connected transmitters; and from 0.5 inH <sub>2</sub> O to 5000 psi for standard bracket mounted transmitters, as specified; or SI and Metric equivalents.												
<b>Electronics Housing:</b>	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.												
<b>Modular Electronics:</b>	Easily replaceable modular electronics; optional integral LCD Digital Indicator with on-board configuration pushbuttons.												
<b>Mounting:</b>	Direct to process or bracket mounted to pipe or surface.												
<b>Process Connection:</b>	<b>IAP10/IGP10 Transmitters:</b> 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. <b>IAP20/IGP20 Transmitters:</b> 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.												
<b>Process Cover Materials Available:</b>	Applicable to IAP20/IGP20 transmitters only. Industry Standard 316 ss, Carbon Steel, Monel, and nickel alloy (a).												
<b>Sensor Materials:</b>	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.												
<b>Electrical Classification:</b>	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.												
<b>Approximate Mass:</b>	<table border="0"> <tr> <td>Direct Connected Transmitter:</td> <td>1.5 kg (3.3 lb)</td> </tr> <tr> <td>Bracket-Mounted Transmitter:</td> <td>3.5 kg (7.8 lb) without process connector</td> </tr> <tr> <td></td> <td>4.2 kg (9.2 lb) with process connector</td> </tr> <tr> <td>With 316 ss Electronics Housing:</td> <td>Add 1.1 kg (2.4 lb)</td> </tr> <tr> <td>With Optional LCD Indicator:</td> <td>Add 0.2 kg (0.4 lb)</td> </tr> <tr> <td>With Pressure Seals:</td> <td>See PSS 2A-1Z11 A</td> </tr> </table>	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
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With Optional LCD Indicator:	Add 0.2 kg (0.4 lb)												
With Pressure Seals:	See PSS 2A-1Z11 A												
<b>Model Code:</b>	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®.

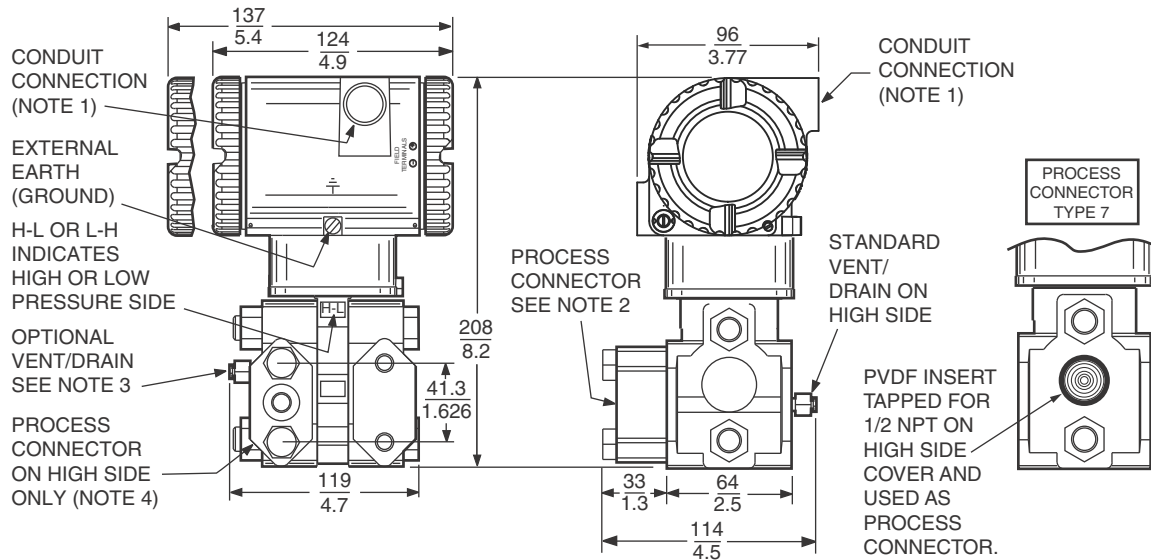
DIMENSIONS – NOMINAL

IAP10 AND IGP10 DIRECT CONNECTED TRANSMITTERS

mm  
in



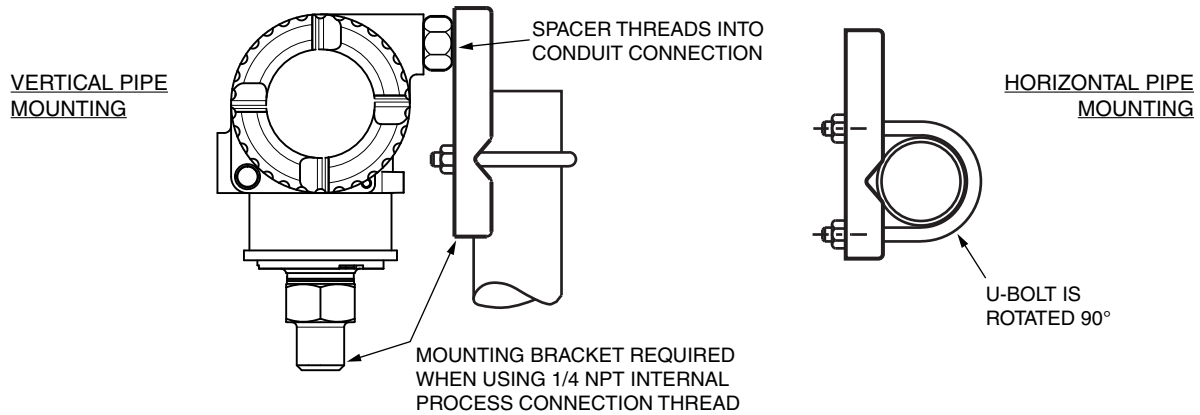
IAP20 AND IGP20 BRACKET MOUNTED TRANSMITTERS



NOTES

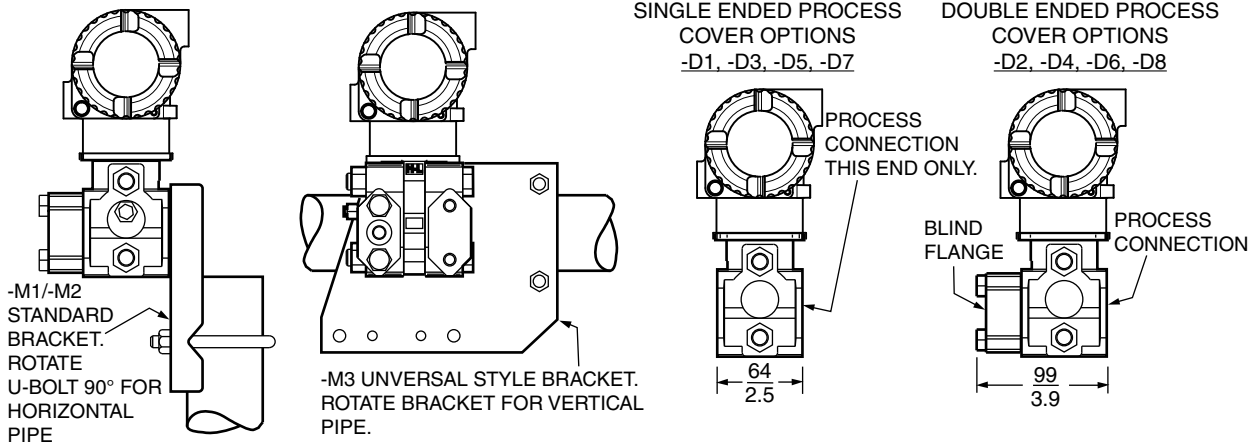
1. CONDUIT CONNECTION 1/2 NPT, PG 13.5, OR M20, BOTH SIDES : PLUG UNUSED CONNECTION WITH METAL PLUG (SUPPLIED).
2. PROCESS CONNECTOR CAN BE REMOVED AND CONNECTION MADE DIRECTLY TO PROCESS COVER USING 1/4 NPT INTERNAL THREAD IN PROCESS COVER. NOTE THAT WITH PROCESS CONNECTION CODE "0", THERE IS NO CONNECTOR.
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

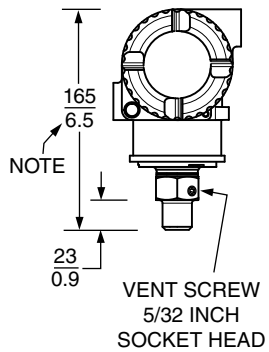


IAP20/IGP20 WITH OPTIONS -M1, -M2, AND -M3

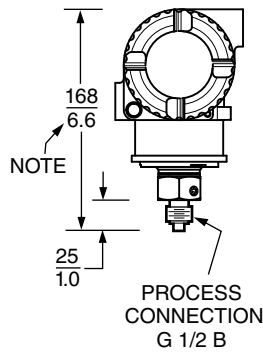
IAP20/IGP20 WITH DIN CONSTRUCTION OPTIONS



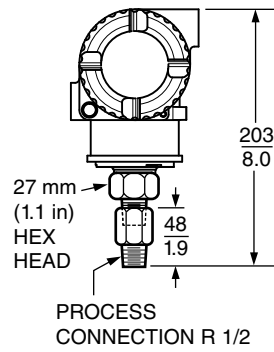
IAP10/IGP10 OPTION -V1



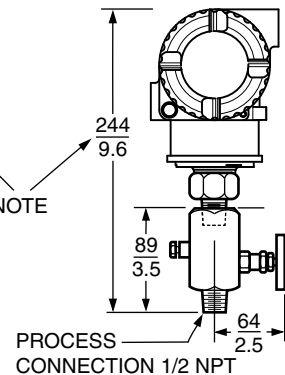
IAP10/IGP10 OPTION -G



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 <sub>2</sub> O	inHg	kPa	mbar	psi
ftH <sub>2</sub> O	mmHg	MPa	bar	atm
mmH <sub>2</sub> O	Pa	torr	g/cm <sup>2</sup>	kg/cm <sup>2</sup>
mH <sub>2</sub> O	–	–	–	–

(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](http://www.fielddevices.foxboro.com)

INSTRUMENTS • CONTROLS • VALVES



Engineering, Inc.  
SINCE 1954  
www.arcoengineering.com

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Louisville, KY 40213

Ph: (502) 966-3134  
Fx: (502) 966-3135

### 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.

## Block and Bleed Gauge Valves – M25 and M251

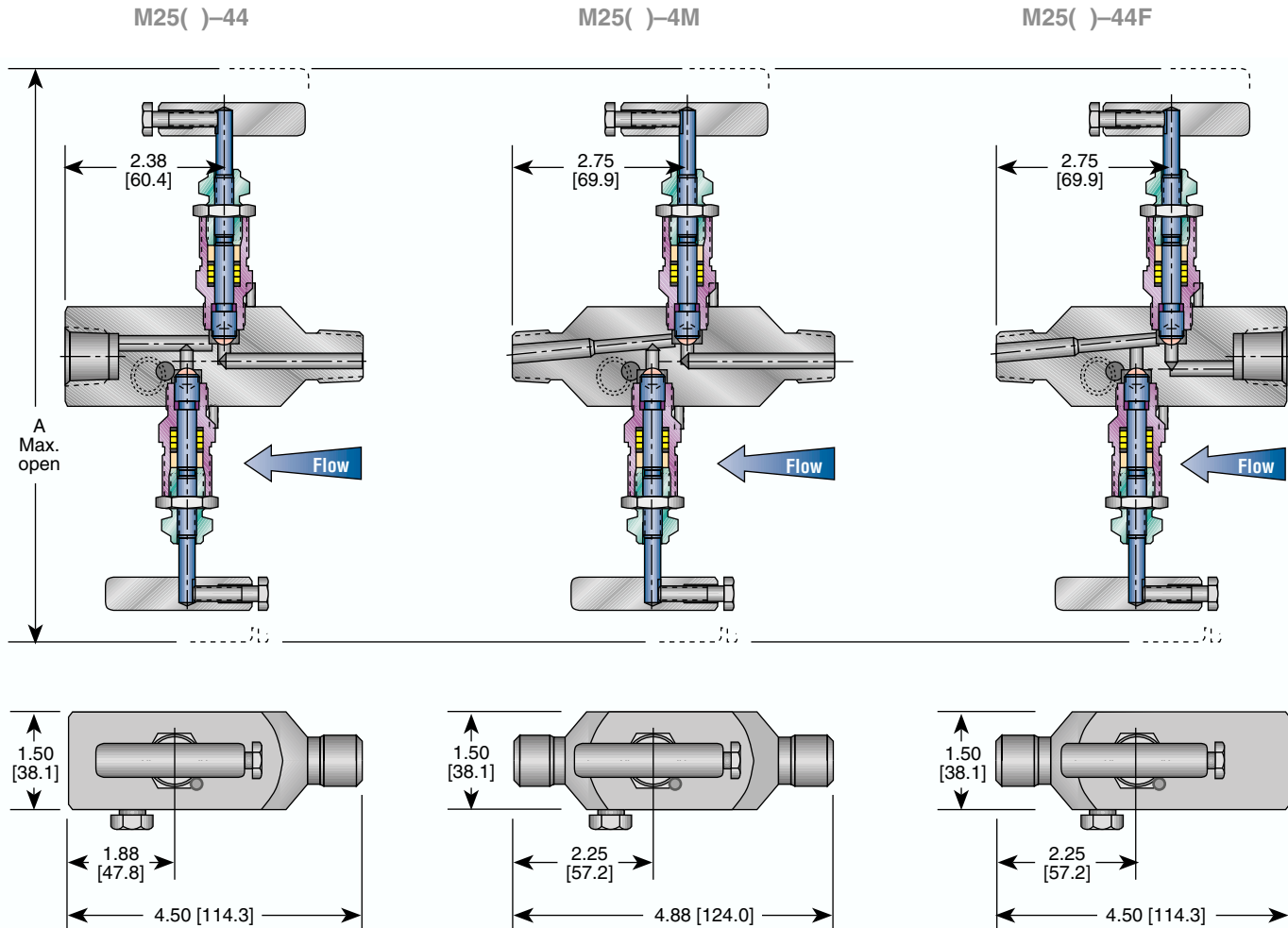


### Features and Benefits

- **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.

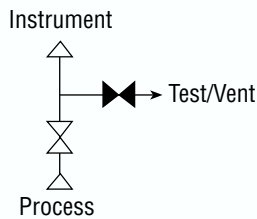
## Block and Bleed Gauge Valves – M25 Specifications

### Dimensions, inches [mm]



### Dimensions, inches [mm]

Packing	A
Low Emissions (E)	8.14
GRAFOIL® (H)	[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,	6000 psig @ 200°F	4000 psig @ 500°F
SS,	[414 barg @ 93°C]	[276 barg @ 260°C]
SG		

#### GRAFOIL® and Low Emissions Graphite Packing

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

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

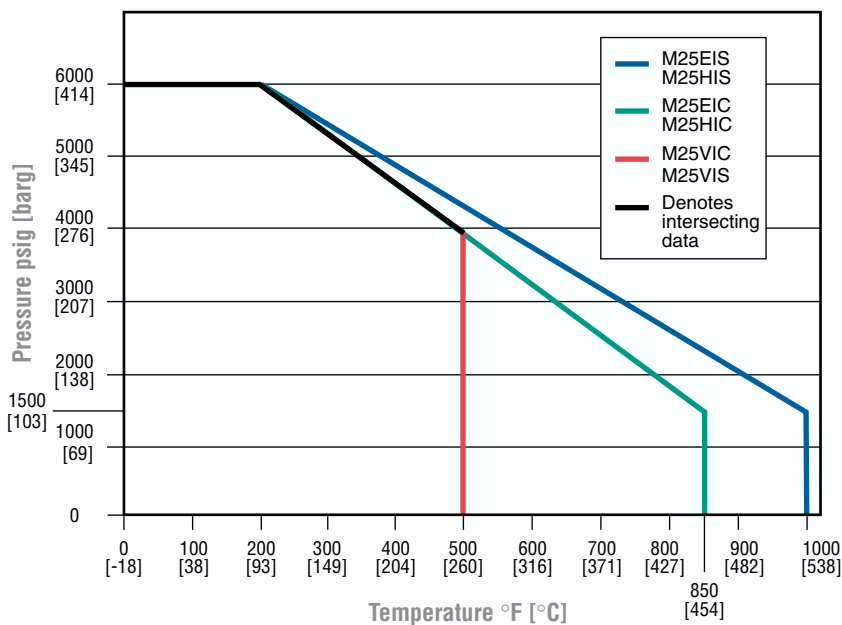
### Standard Materials

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

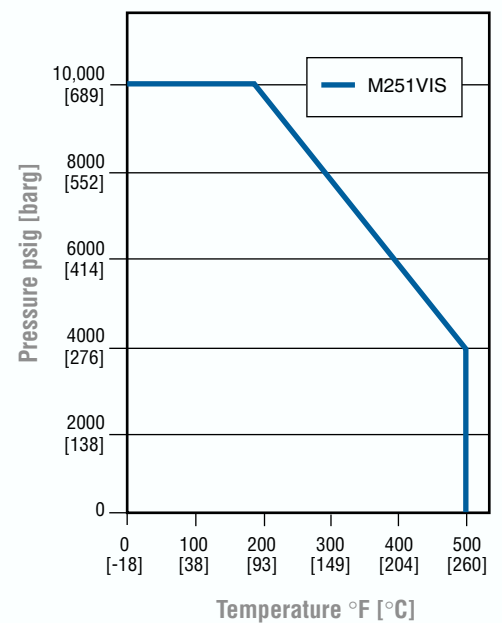
### Notes

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<sup>1</sup>

C – CS  
S – 316 SS  
M – Monel®

#### Connections (Inlet/Outlet)<sup>2</sup>

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.

#### INSTRUMENTS • CONTROLS • VALVES

**ARCO**  
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SINCE 1954  
www.arcoengineering.com

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Ph: (502) 966-3134  
Fx: (502) 966-3135

Project Code: WIKSP2GW

Page:5

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

Item	Qty	LEVEL SWITCH
4.00	2	Anchor Scientific GSI-50-NONC Float Level Switch
		<b>SYSTEM DESIGN</b>
		Mercury-free Eco-Float for controlling liquid levels
		<b>MOUNTING STYLE</b>
		Internally weighted
		<b>CABLE LENGTH</b>
		50 feet
		<b>CIRCUIT CONFIGURATION</b>
		Normally open/ normally closed contacts (7 A @ 115 VAC)
		<b>ACCESSORIES</b>
		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**

<b>Set 1</b>	Customer Tag	LS-103A
	Customer Item	Re-Use Water Basin High Level Switch
<b>Set 2</b>	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

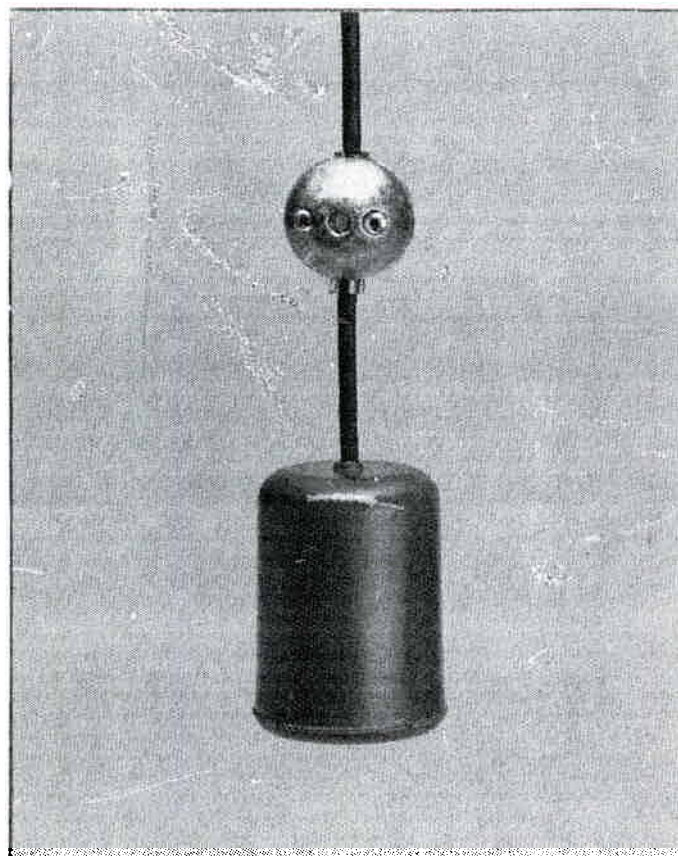
- Mercury Free
- Variety of Mounting Styles
- Variety of Circuit Configurations
- Installation Easy
- Differential In One Float
- Replaces Diaphragm and Mercury Switches

### 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

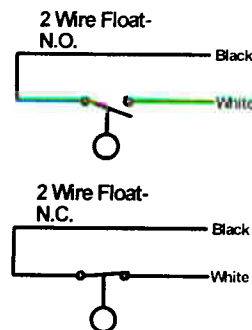
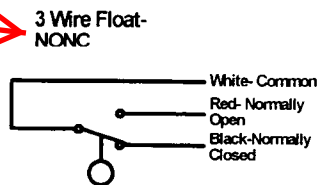


**Model GSE**

### 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.



Project Code: WIKSP2GW

Page:6

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

Item	Qty	RE-USE WATER PLC CONTROL PANEL	
5.00	1	R.E. Pedrotti Co./Kasa Controls	Primary Control Panel Components
		<b>PLC EQUIPMENT</b>	
		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	
		<b>NETWORK SWITCH</b>	
		(1) Moxa EDS-508A-MM-SC, 8-port Ethernet Switch, 6-port Copper/2-port Fiber, Multi-mode Type SC (24 VDC)	
		<b>INDUSTRIAL COMPUTER</b>	
		(1) Phoenix Contact ValueLine 21.5" Industrial Touch Panel PC with Windows 7 Pro SP1, 24 VDC, 8 GB, 80 GB SSHD	
		<b>HMI SOFTWARE LICENSING</b>	
		(1) Wonderware System Platform 2014 License	
		<b>POWER SUPPLY</b>	
		(2) Phoenix Contact 2938581 120 VAC In/24 VDC Out, 5A	
		<b>ENCLOSURE</b>	
		(1) Saginaw SCE-42EL3612LP, Wall Mount Painted Steel (gray) 42" H x 36" W x 12" D, NEMA 12 with SCE-42P36 Sub-panel	
		<b>PATCH PANEL</b>	
		(1) Panduit CBXF12IW-AY 12-port Fiber Optic Patch Panel with (12) CMDEISCEI Type SC multi-mode connectors	
		<b>UNINTERRUPTIBLE POWER SUPPLY (UPS)</b>	
		(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

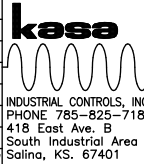
Jul, 05 2016

**REP**

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

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

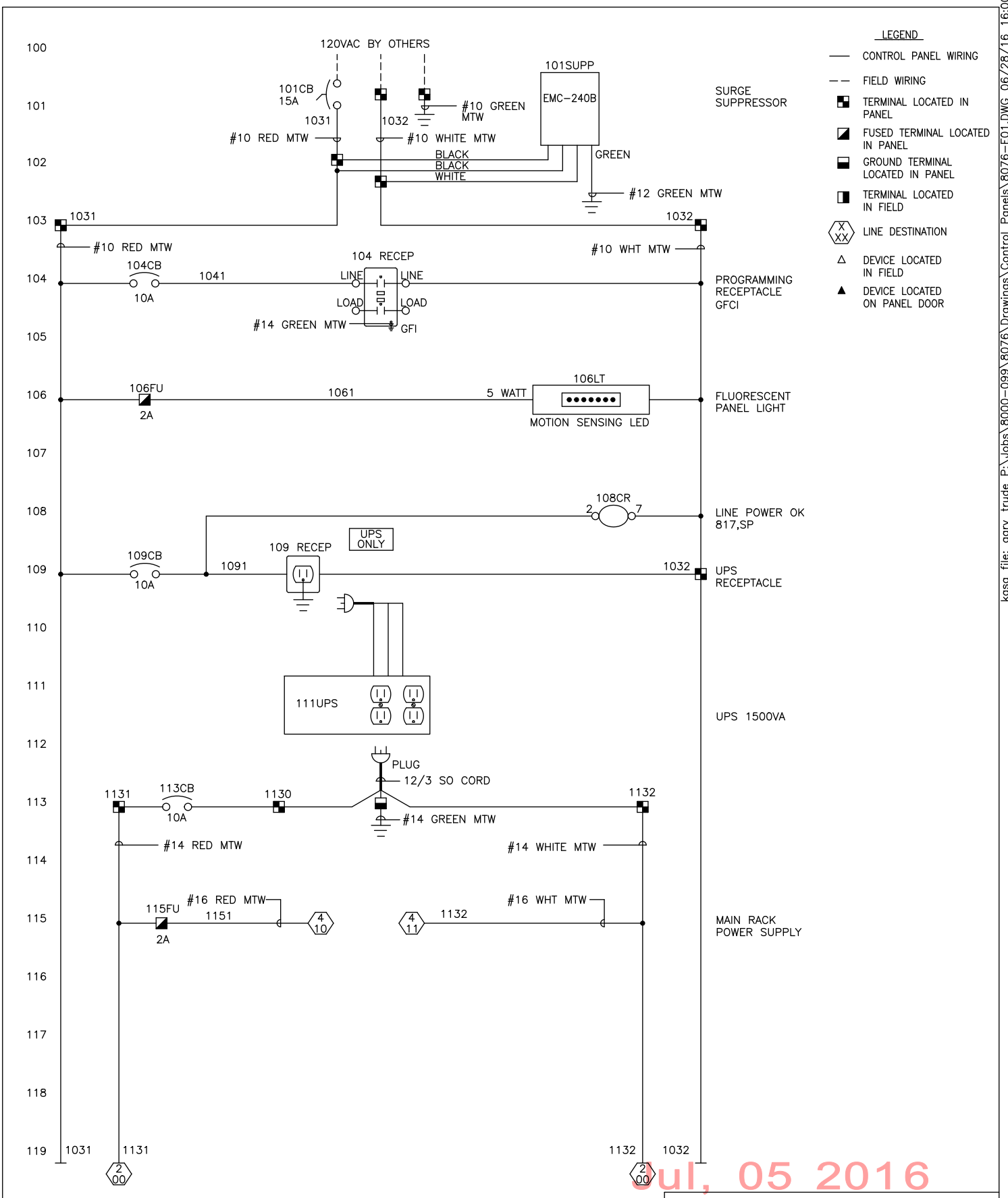
DRAWING INDEX



**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.
		8076	8076-ID



Jul, 05 2016

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

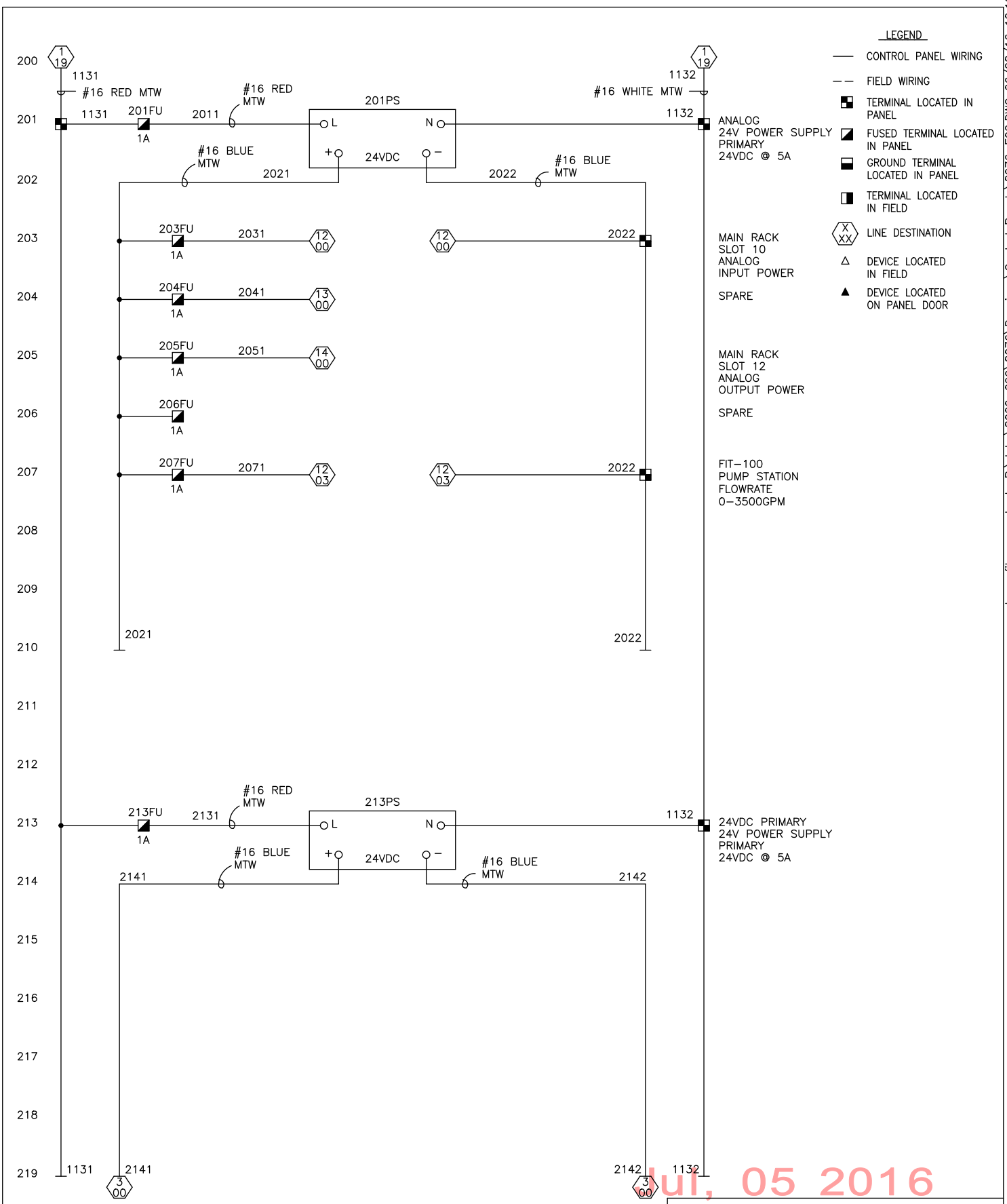
**REP**  
R.E. Pedrotti Co., Inc.  
5855 Beverly, SUITE A  
MISSION, KANSAS 66202  
(913) 677-3366 FAX (913) 677-3460

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

120VAC POWER DISTRIBUTION

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

SHEET OF	1 OF 22	JOB NO. 8076	DWG. NO. 8076-E01
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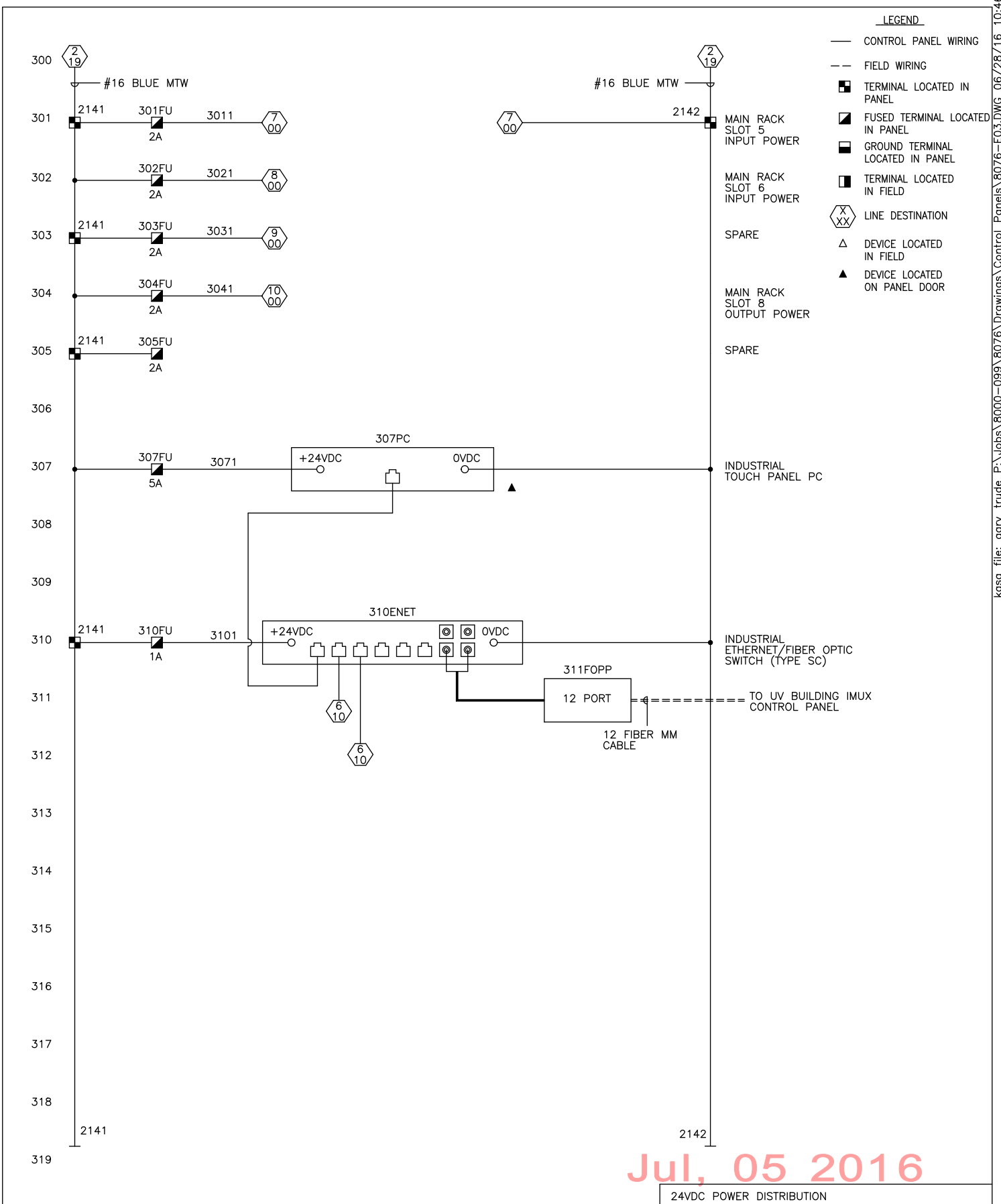


Jul, 05 2016

<p style="font-size: 24px; font-weight: bold; margin: 0;">REP</p> <p style="font-size: 10px; margin: 0;">R.E. Pedrotti Co., Inc. 5855 Beverly, SUITE A MISSION, KANSAS 66202 (913) 677-3366 FAX (913) 677-3460</p>	NO	REVISIONS	DATE	BY	MISC.	<p style="text-align: center; font-weight: bold; font-size: 18px;">kasa</p> <p style="font-size: 8px; margin: 0;">INDUSTRIAL CONTROLS, INC. PHONE 785-825-7181 418 East Ave. B South Industrial Area Salina, KS. 67401</p>
	1	SUBMITTAL	—	BF	DATE 6/27/16	
	—	—	—	—	SCALE —	
	—	—	—	—	DESIGNED BF	
	—	—	—	—	DRAWN GT	
	—	—	—	—	CHECKED —	
	—	—	—	—	APPROVED —	
—	—	—	—	P.O. NO. 49484-WIKSP2GW		

120VAC/24VDC POWER DISTRIBUTION

<p style="font-size: 10px; margin: 0;">R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS</p>	<table style="width: 100%; font-size: 8px;"> <tr> <td style="width: 33%;">SHEET 2</td> <td style="width: 33%;">JOB NO. 8076</td> <td style="width: 33%;">DWG. NO. 8076-E02</td> </tr> <tr> <td>OF 22</td> <td></td> <td></td> </tr> </table>	SHEET 2	JOB NO. 8076	DWG. NO. 8076-E02	OF 22		
SHEET 2	JOB NO. 8076	DWG. NO. 8076-E02					
OF 22							



**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

Jul, 05 2016

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

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

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

**24VDC POWER DISTRIBUTION**

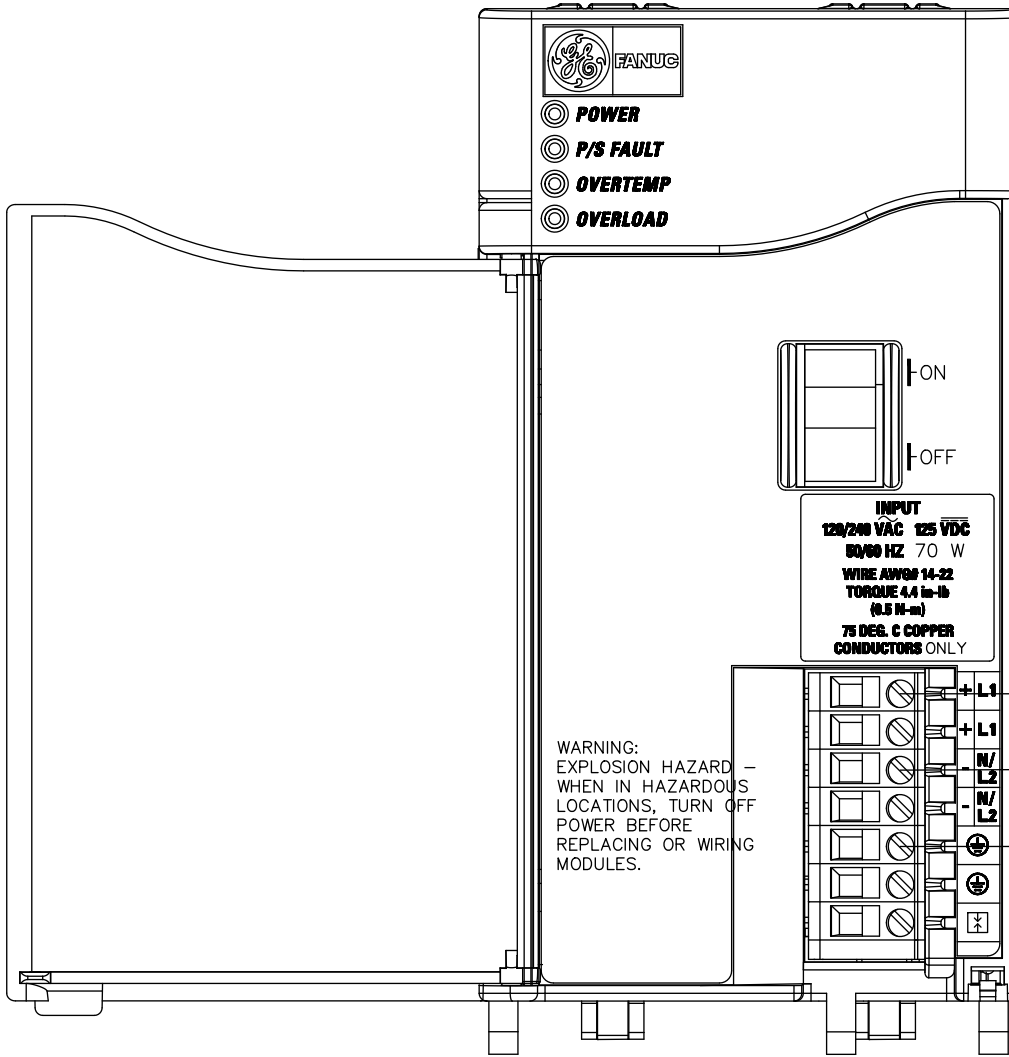
R.E. PEDROTTI CO., INC.  
WICHITA WWTP PLANT 2  
RE-USE WATER PUMP STATION  
CONTROL PANEL  
WICHITA, KANSAS

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

400  
401  
402  
403  
404  
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406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419

MAIN RACK  
SLOT 0 AND 1

**IC695PSA040**



- 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

WARNING:  
EXPLOSION HAZARD -  
WHEN IN HAZARDOUS  
LOCATIONS, TURN OFF  
POWER BEFORE  
REPLACING OR WIRING  
MODULES.


Jul, 05 2016

**REP**

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

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

RACK POWER SUPPLY, SLOT 0 AND 1



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

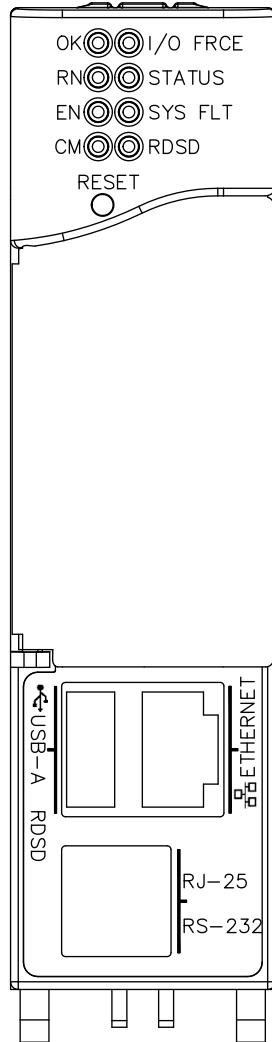
LEGEND

- 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

500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519

MAIN RACK  
SLOT 2

**IC695CPE305**



Jul, 05 2016

**REP**

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

NO	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	-	BF	DATE 6/27/16
-	-	-	-	SCALE -
-	-	-	-	DESIGNED BF
-	-	-	-	DRAWN GT
-	-	-	-	CHECKED -
-	-	-	-	APPROVED -
-	-	-	-	P.O. NO. 49484-WKSP2GW

CPU MODULE - MAIN RACK, SLOT 2, PROCESSOR		
 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 5 OF 22	JOB NO. 8076

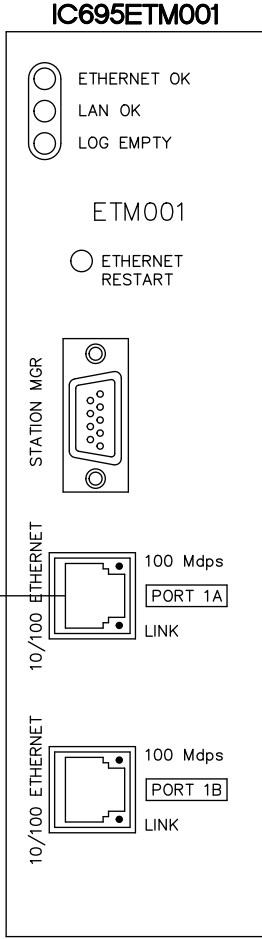
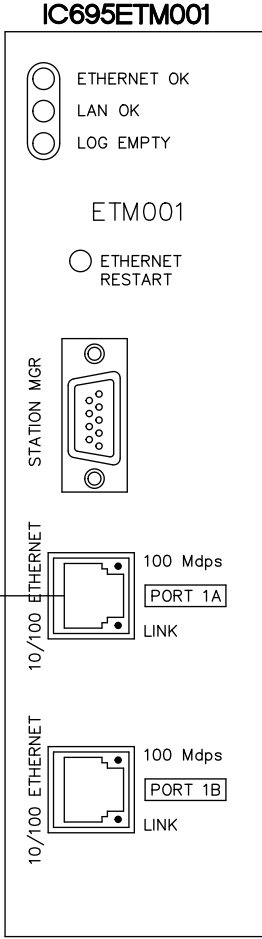
LEGEND

- 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

600  
601  
602  
603  
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605  
606  
607  
608  
609  
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611  
612  
613  
614  
615  
616  
617  
618  
619

MAIN RACK  
SLOT 3

MAIN RACK  
SLOT 4



Jul, 05 2016

**REP**

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

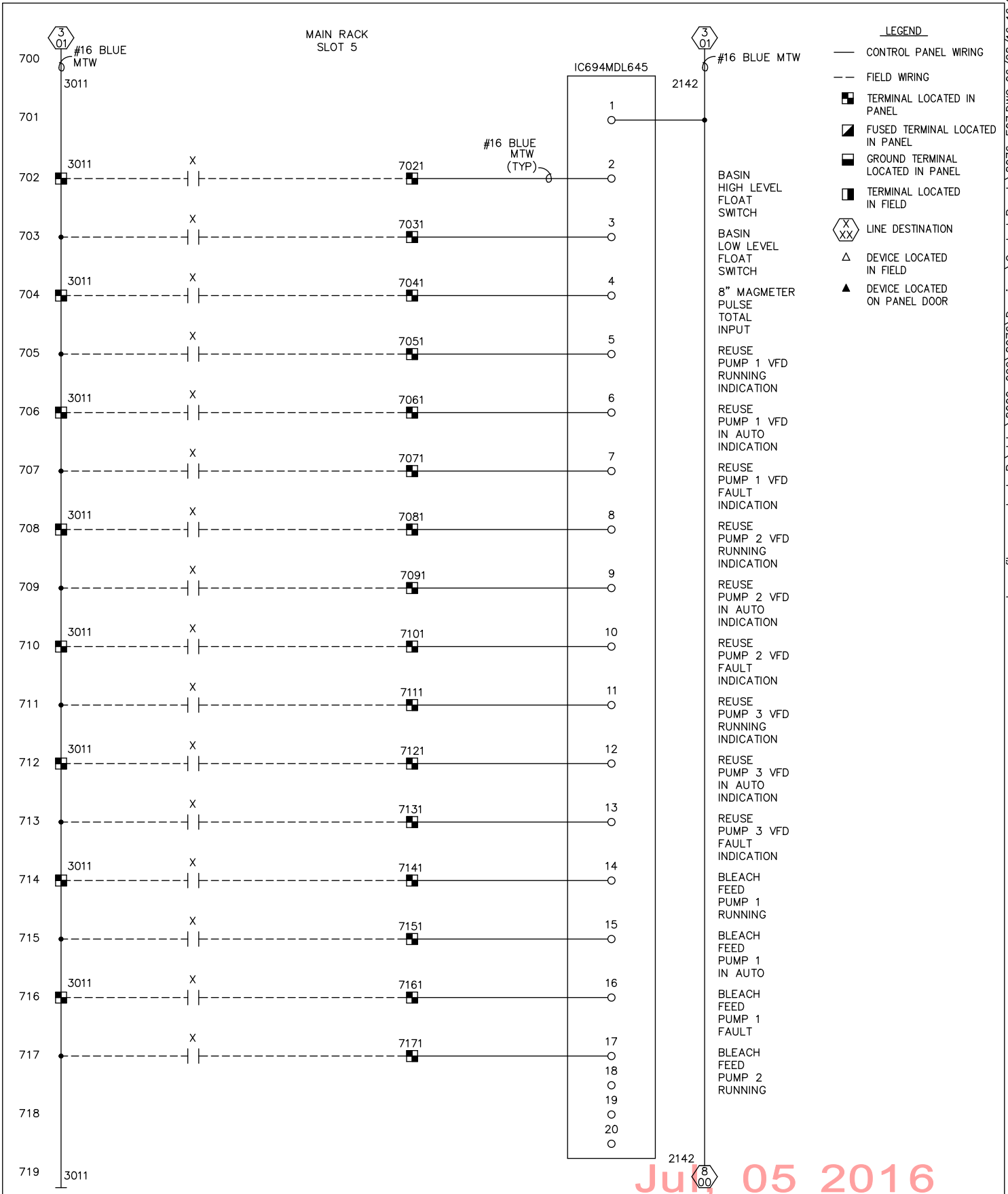
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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

COMMUNICATION - MAIN RACK, SLOT 3 & SLOT 4

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



Jul 05 2016

**DISCRETE INPUTS - MAIN RACK, SLOT 5**

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

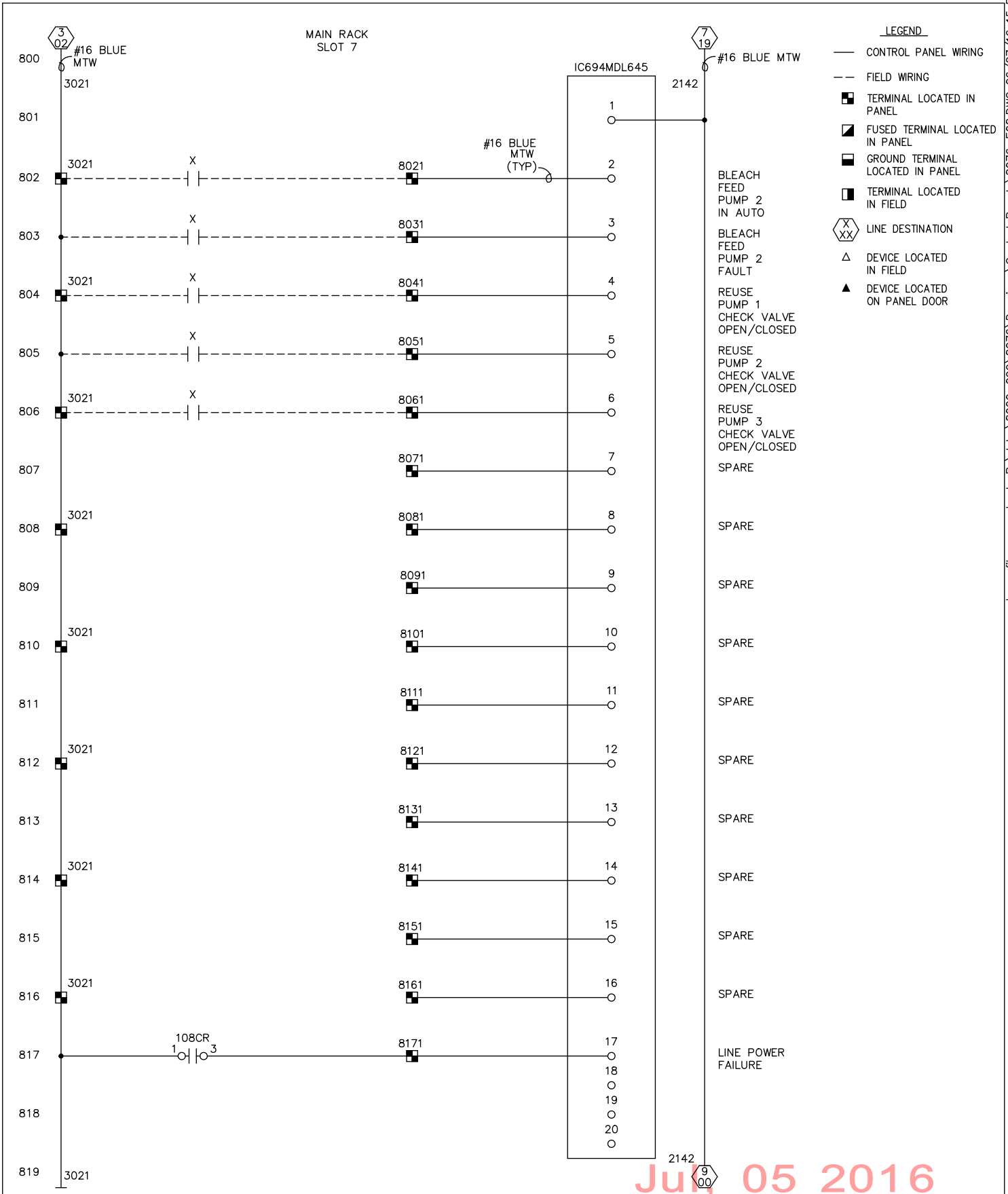
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--	--	--	--	DESIGNED BF
--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

**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 7 OF 22	JOB NO. 8076	DWG. NO. 8076-E07
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Jul 05 2016

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

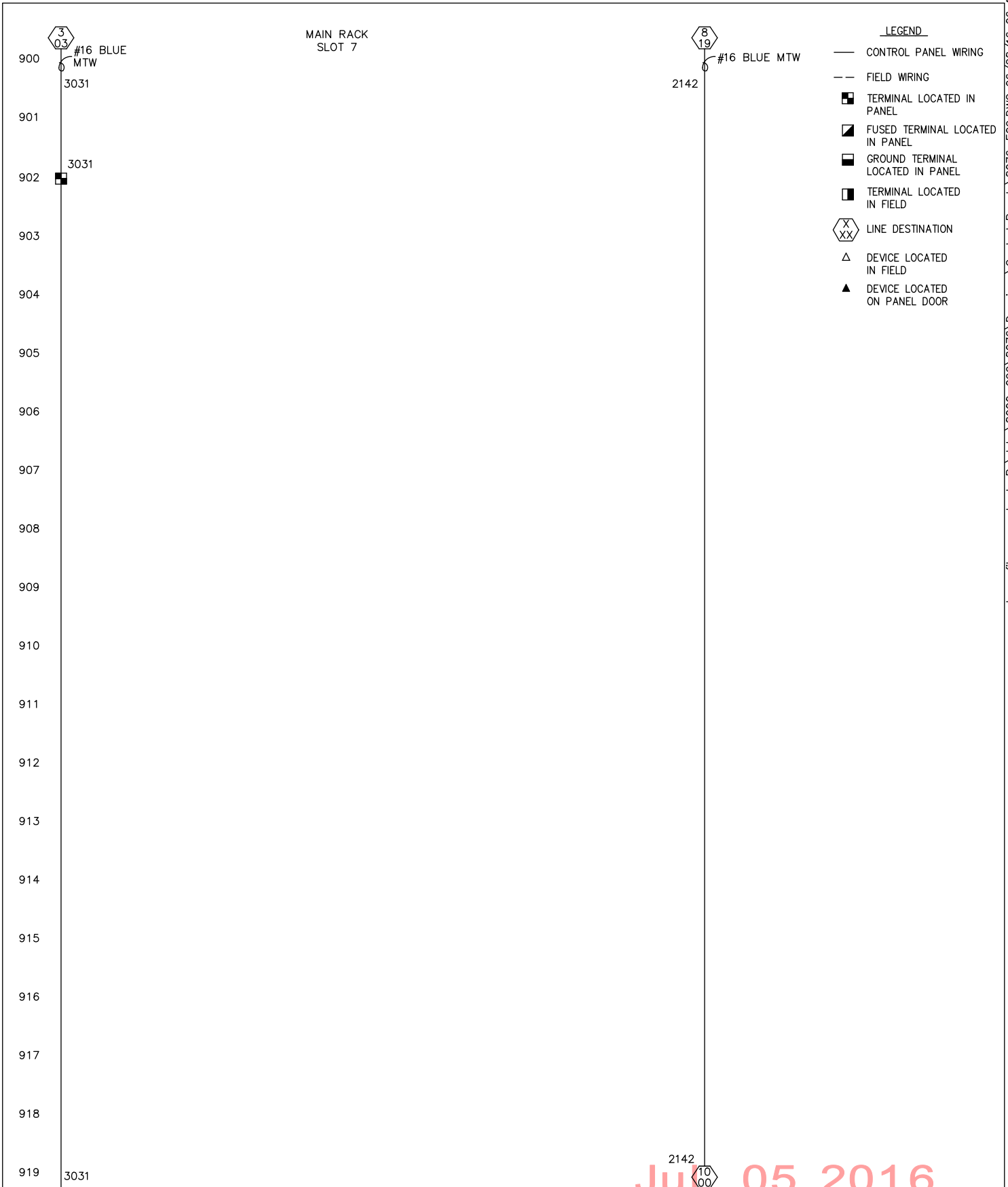
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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

**DISCRETE INPUTS - MAIN RACK, SLOT 8**

**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

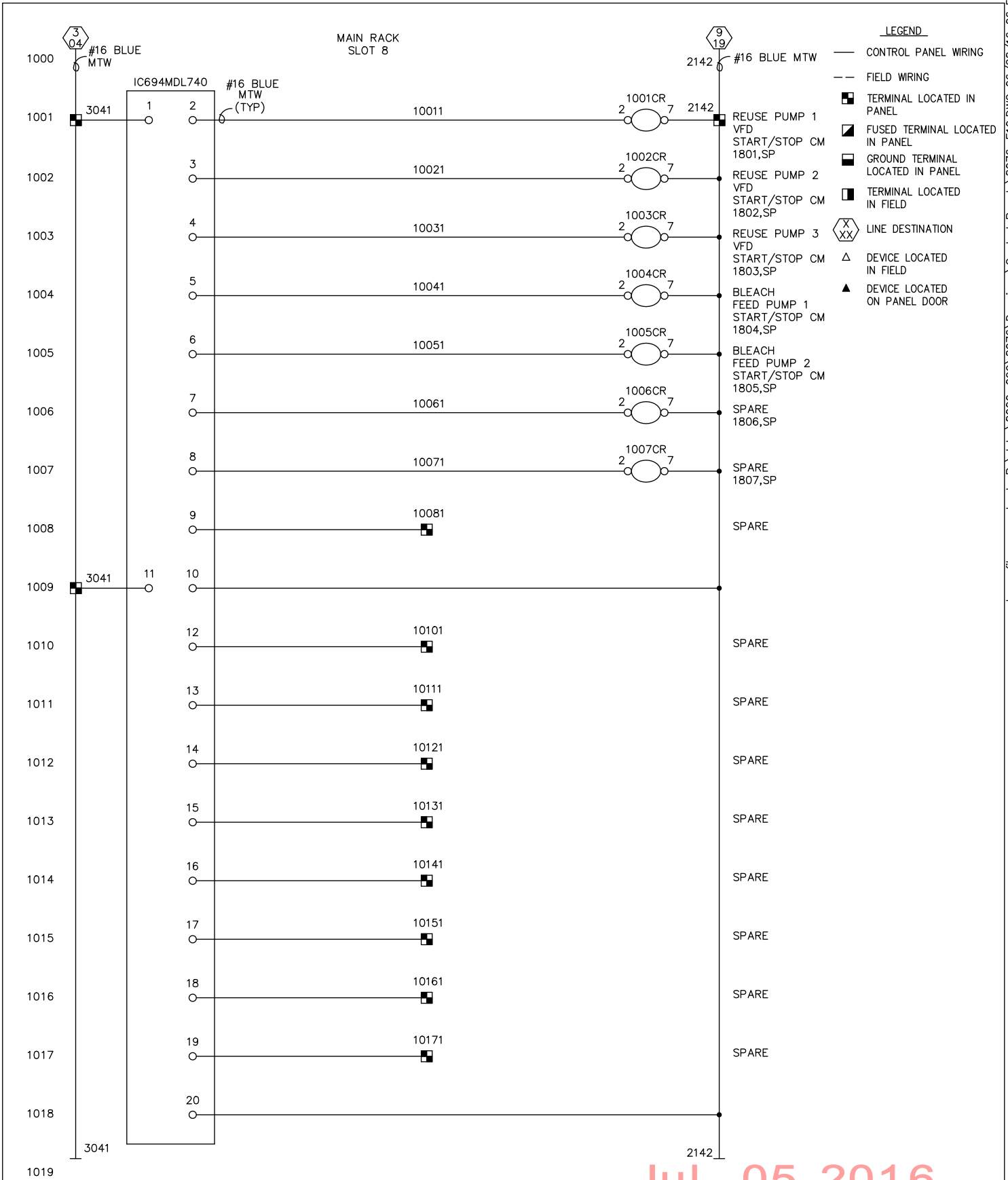
SHEET 8 OF 22	JOB NO. 8076	DWG. NO. 8076-E08
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Jul 05 2016

<p style="font-size: 24px; font-weight: bold; margin: 0;"><i>REP</i></p> <p style="margin: 0; font-size: 8px;">R.E. Pedrotti Co., Inc. 5855 Beverly, SUITE A MISSION, KANSAS 66202 (913) 677-3366 FAX (913) 677-3460</p>	NO	REVISIONS	DATE	BY	MISC.	<p style="text-align: center; font-weight: bold; font-size: 18px; margin: 0;">kasa</p> <p style="font-size: 8px; margin: 0;">INDUSTRIAL CONTROLS, INC. PHONE 785-825-7181 418 East Ave. B South Industrial Area Salina, KS. 67401</p>	<p style="font-size: 8px; margin: 0;">R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS</p>
	1	SUBMITTAL	--	BF	DATE 6/27/16		
	--	--	--	--	SCALE --		
	--	--	--	--	DESIGNED BF		
	--	--	--	--	DRAWN GT		
	--	--	--	--	CHECKED --		
	--	--	--	--	APPROVED --		
--	--	--	--	P.O. NO. 49484-WKSP2GW			

SPARE SLOT - MAIN RACK, SLOT 7		
SHEET 9 OF 22	JOB NO. 8076	DWG. NO. 8076-E09



Jul, 05 2016

**DISCRETE OUTPUTS - MAIN RACK, SLOT 8**

<p style="font-size: 24pt; font-weight: bold; margin: 0;"><b>REP</b></p> <p style="font-size: 8pt; margin: 0;">R.E. Pedrotti Co., Inc. 5855 Beverly, SUITE A MISSION, KANSAS 66202 (913) 677-3366 FAX (913) 677-3460</p>	NO	REVISIONS	DATE	BY	MISC.	<p style="font-size: 18pt; font-weight: bold; margin: 0;"><b>kasa</b></p> <p style="font-size: 8pt; margin: 0;">INDUSTRIAL CONTROLS, INC. PHONE 785-825-7181 418 East Ave. B South Industrial Area Salina, KS. 67401</p>	<p style="font-size: 8pt; margin: 0;">R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS</p>
	1	SUBMITTAL	—	BF	DATE 6/27/16		
	—	—	—	—	SCALE —		
	—	—	—	—	DESIGNED BF		
	—	—	—	—	DRAWN GT		
	—	—	—	—	CHECKED —		
	—	—	—	—	APPROVED —		
—	—	—	—	P.O. NO. 49484-WKSP2GW			
SHEET 10 OF 22	JOB NO. 8076	DWG. NO. 8076-E10					

**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 9  
SPARE SLOT

1100  
1101  
1102  
1103  
1104  
1105  
1106  
1107  
1108  
1109  
1110  
1111  
1112  
1113  
1114  
1115  
1116  
1117  
1118  
1119

Jul, 05 2016

SPARE SLOT - MAIN RACK, SLOT 9



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

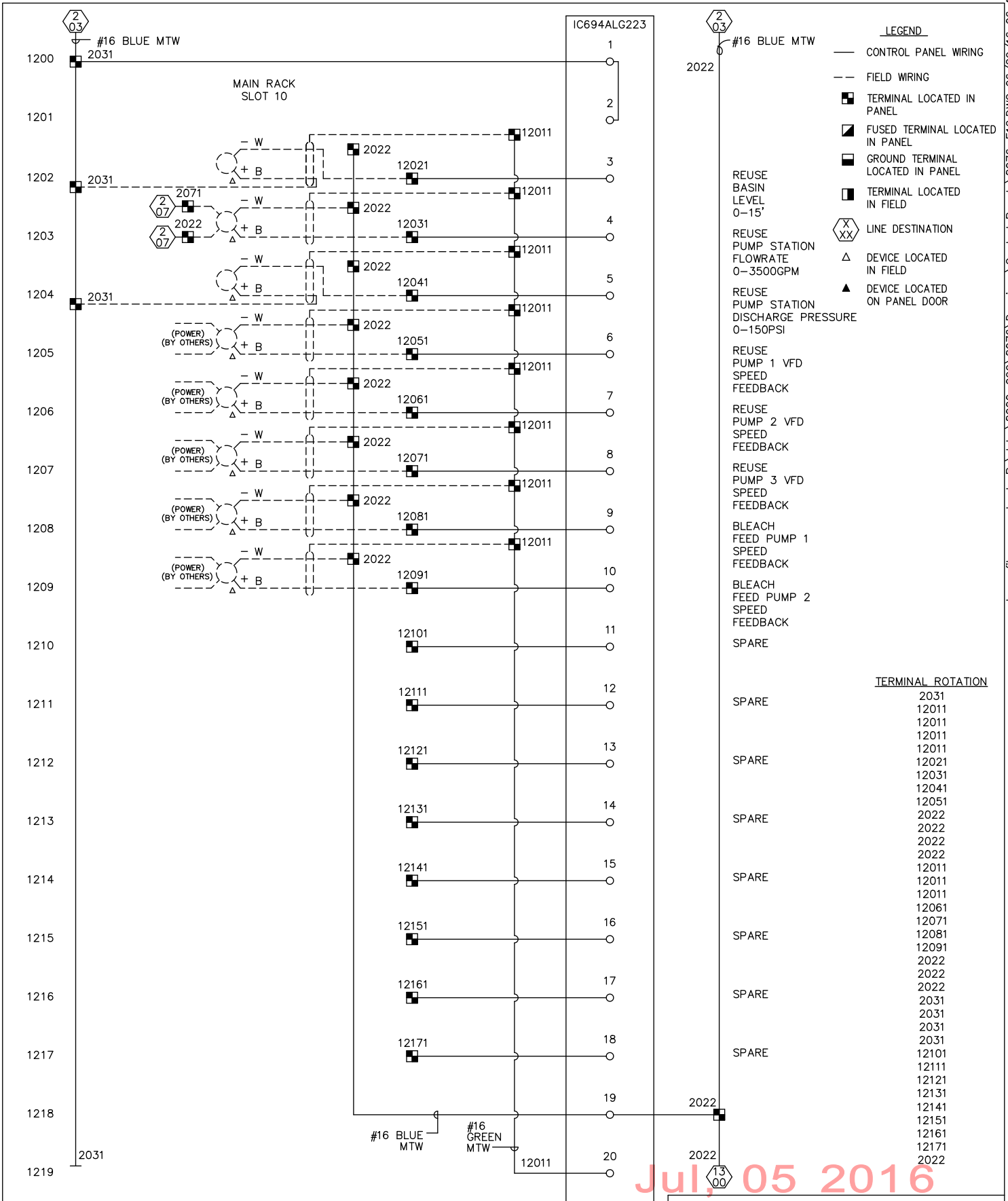
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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

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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 11 OF 22	JOB NO. 8076	DWG. NO. 8076-E11
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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
- REUSE BASIN LEVEL 0-15'
- REUSE PUMP STATION FLOWRATE 0-3500GPM
- REUSE PUMP STATION DISCHARGE PRESSURE 0-150PSI
- REUSE PUMP 1 VFD SPEED FEEDBACK
- REUSE PUMP 2 VFD SPEED FEEDBACK
- REUSE PUMP 3 VFD SPEED FEEDBACK
- BLEACH FEED PUMP 1 SPEED FEEDBACK
- BLEACH FEED PUMP 2 SPEED FEEDBACK
- SPARE

**TERMINAL ROTATION**

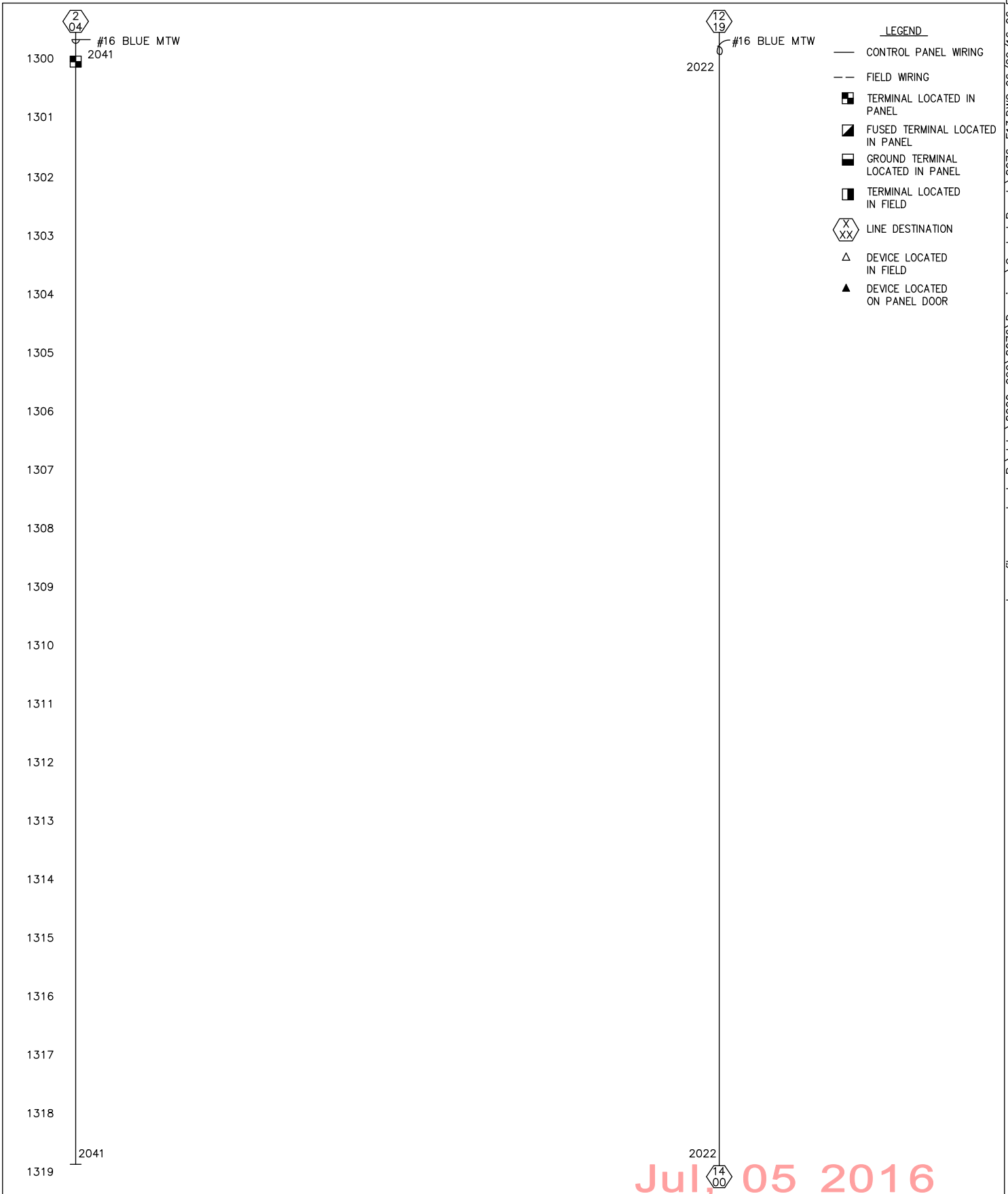
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	12011
	12011
	12011
SPARE	12021
	12031
	12041
	12051
SPARE	2022
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	2022
	2022
SPARE	12011
	12011
	12061
	12071
SPARE	12081
	12091
	2022
	2022
SPARE	2022
	2022
	2031
	2031
	2031
	2031
SPARE	12101
	12111
	12121
	12131
	12141
	12151
	12161
	12171
	2022

ANALOG INPUTS - MAIN RACK, SLOT 10

	R.E. PEDROTTI CO., INC.		
	WICHITA WWTP PLANT 2		
	RE-USE WATER PUMP STATION		
	CONTROL PANEL		
WICHITA, KANSAS			
SHEET 12 OF 22	JOB NO. 8076	DWG. NO. 8076-E12	

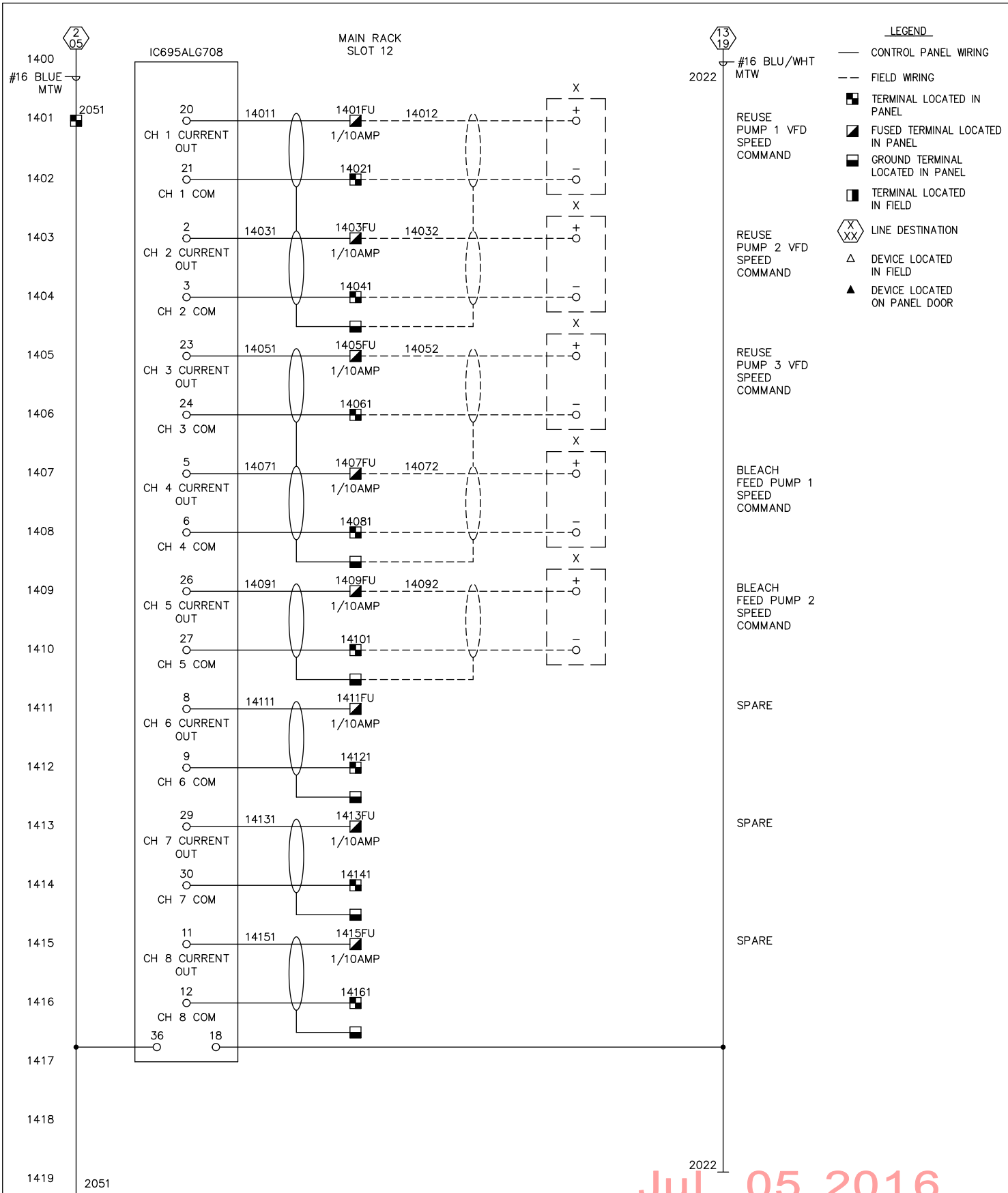
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-	-	-	-	SCALE -
-	-	-	-	DESIGNED BF
-	-	-	-	DRAWN GT
-	-	-	-	CHECKED -
-	-	-	-	APPROVED -
-	-	-	-	P.O. NO. 49484-WKSP2GW

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



Jul 05 2016

<p style="font-size: 24px; font-weight: bold; margin: 0;"><i>REP</i></p> <p style="font-size: 8px; margin: 0;">R.E. Pedrotti Co., Inc. 5855 Beverly, SUITE A MISSION, KANSAS 66202 (913) 677-3366 FAX (913) 677-3460</p>	NO	REVISIONS	DATE	BY	MISC.	<p style="text-align: center; font-weight: bold; font-size: 18px; margin: 0;">kasa</p> <p style="font-size: 8px; margin: 0;">INDUSTRIAL CONTROLS, INC. PHONE 785-825-7181 418 East Ave. B South Industrial Area Salina, KS. 67401</p>	<p style="font-size: 8px; margin: 0;">R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS</p>
	1	SUBMITTAL	--	BF	DATE 6/27/16		
	--	--	--	--	SCALE --		
	--	--	--	--	DESIGNED BF		
	--	--	--	--	DRAWN GT		
	--	--	--	--	CHECKED --		
	--	--	--	--	APPROVED --		
	--	--	--	--	P.O. NO. 49484-WKSP2GW		
SPARE SLOT - MAIN RACK, SLOT 11							
SHEET 13	JOB NO.	DWG. NO.					
OF 22	8076	8076-E13					



Jul, 05 2016

NO.	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	--	BF	DATE 6/27/16
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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
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--	--	--	--	P.O. NO. 49484-WKSP2GW

**REP**  
R.E. Pedrotti Co., Inc.  
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MISSION, KANSAS 66202  
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**kasa**

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

ANALOG OUTPUTS - MAIN RACK, SLOT 12

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

SHEET 14 OF 22	JOB NO. 8076	DWG. NO. 8076-E14
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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
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

MAIN RACK  
SLOT 13  
SPARE SLOT

1500  
1501  
1502  
1503  
1504  
1505  
1506  
1507  
1508  
1509  
1510  
1511  
1512  
1513  
1514  
1515  
1516  
1517  
1518  
1519

Jul, 05 2016

SPARE SLOT - MAIN RACK, SLOT 13

**REP**

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

NO	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	--	BF	DATE 6/27/16
--	--	--	--	SCALE --
--	--	--	--	DESIGNED BF
--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

**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 15 OF 22	JOB NO. 8076	DWG. NO. 8076-E15
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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
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

MAIN RACK  
SLOT 14  
SPARE SLOT

1600  
1601  
1602  
1603  
1604  
1605  
1606  
1607  
1608  
1609  
1610  
1611  
1612  
1613  
1614  
1615  
1616  
1617  
1618  
1619

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SPARE SLOT - MAIN RACK, SLOT 14



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

NO	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	—	BF	DATE 6/27/16
—	—	—	—	SCALE —
—	—	—	—	DESIGNED BF
—	—	—	—	DRAWN GT
—	—	—	—	CHECKED —
—	—	—	—	APPROVED —
—	—	—	—	P.O. NO. 49484-WKSP2GW

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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 16 OF 22	JOB NO. 8076	DWG. NO. 8076-E16
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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
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR

MAIN RACK  
SLOT 15  
SPARE SLOT

1700  
1701  
1702  
1703  
1704  
1705  
1706  
1707  
1708  
1709  
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1711  
1712  
1713  
1714  
1715  
1716  
1717  
1718  
1719

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SPARE SLOT - MAIN RACK, SLOT 15



**R.E. Pedrotti Co., Inc.**  
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—	—	—	—	DESIGNED BF
—	—	—	—	DRAWN GT
—	—	—	—	CHECKED —
—	—	—	—	APPROVED —
—	—	—	—	P.O. NO. 49484-WKSP2GW

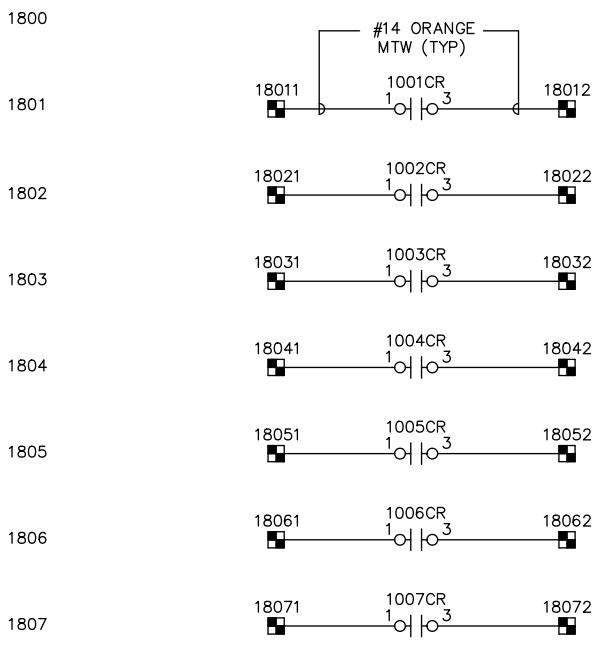
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INDUSTRIAL CONTROLS, INC.  
PHONE 785-825-7181  
418 East Ave. B  
South Industrial Area  
Salina, KS. 67401

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

SHEET 17 OF 22	JOB NO. 8076	DWG. NO. 8076-E17
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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
- △ DEVICE LOCATED IN FIELD
- ▲ DEVICE LOCATED ON PANEL DOOR



REUSE  
PUMP 1 VFD  
START/STOP  
COMMAND

REUSE  
PUMP 2 VFD  
START/STOP  
COMMAND

REUSE  
PUMP 3 VFD  
START/STOP  
COMMAND

BLEACH  
FEED PUMP 1  
START/STOP  
COMMAND

BLEACH  
FEED PUMP 2  
START/STOP  
COMMAND

SPARE

SPARE

1800  
1801  
1802  
1803  
1804  
1805  
1806  
1807  
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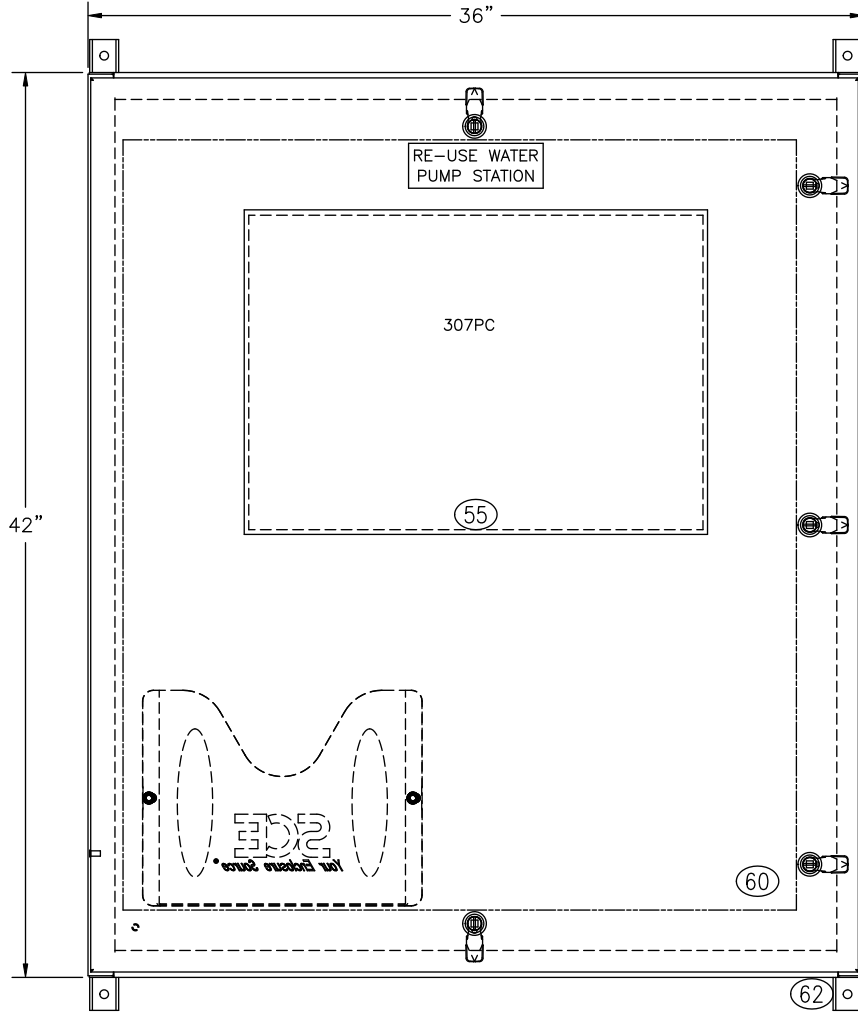
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**R.E. Pedrotti Co., Inc.**  
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MISSION, KANSAS 66202  
(913) 677-3366 FAX (913) 677-3460

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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WKSP2GW

INTERPOSING RELAY SCHEMATICS		
 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 18 OF 22	JOB NO. 8076



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

**REP**

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

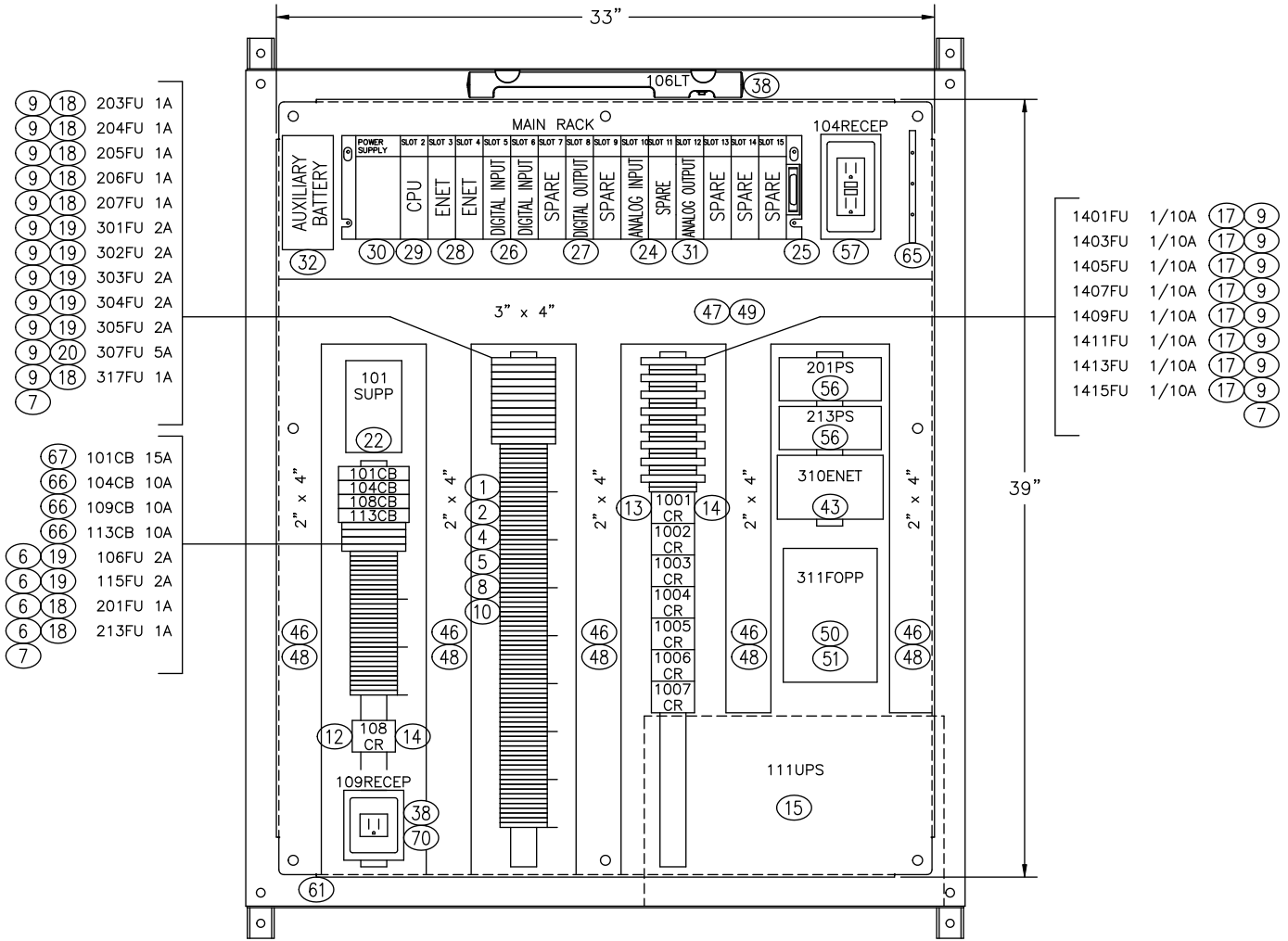
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--	--	--	--	DRAWN GT
--	--	--	--	CHECKED --
--	--	--	--	APPROVED --
--	--	--	--	P.O. NO. 49484-WIKSP2GW

EXTERIOR LAYOUT

**kosa**  
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 19 OF 22	JOB NO. 8076	DWG. NO. 8076-L01
----------------	--------------	-------------------



- (9) 18 203FU 1A
- (9) 18 204FU 1A
- (9) 18 205FU 1A
- (9) 18 206FU 1A
- (9) 18 207FU 1A
- (9) 19 301FU 2A
- (9) 19 302FU 2A
- (9) 19 303FU 2A
- (9) 19 304FU 2A
- (9) 19 305FU 2A
- (9) 20 307FU 5A
- (9) 18 317FU 1A
- (7)
- (6) 19 106FU 2A
- (6) 19 115FU 2A
- (6) 18 201FU 1A
- (6) 18 213FU 1A
- (7)
- (6) 19 101CB 15A
- (6) 6 104CB 10A
- (6) 6 109CB 10A
- (6) 6 113CB 10A

- 1401FU 1/10A (17) (9)
- 1403FU 1/10A (17) (9)
- 1405FU 1/10A (17) (9)
- 1407FU 1/10A (17) (9)
- 1409FU 1/10A (17) (9)
- 1411FU 1/10A (17) (9)
- 1413FU 1/10A (17) (9)
- 1415FU 1/10A (17) (9)
- (7)

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.

Jul 05 2016

**REP**  
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 MISSION, KANSAS 66202  
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NO.	REVISIONS	DATE	BY	MISC.
1	SUBMITTAL	-	BF	DATE 6/27/16
-	-	-	-	SCALE -
-	-	-	-	DESIGNED BF
-	-	-	-	DRAWN GT
-	-	-	-	CHECKED -
-	-	-	-	APPROVED -
-	-	-	-	P.O. NO. 49484-WIKSP2GW

**INTERIOR LAYOUT**

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

### MAIN RACK

AUXILIARY BATTERY

①	POWER SUPPLY	SLOT 2	SLOT 3	SLOT 4	SLOT 5	SLOT 6	SLOT 7	SLOT 8	SLOT 9	SLOT 10	SLOT 11	SLOT 12	SLOT 13	SLOT 14	SLOT 15	②
		CPU	ENET	ENET	DIGITAL INPUT	DIGITAL INPUT	SPARE	DIGITAL OUTPUT	SPARE	ANALOG INPUT	SPARE	ANALOG OUTPUT	SPARE	SPARE	SPARE	

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**REP**  
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-	-	-	-	DESIGNED BF
-	-	-	-	DRAWN GT
-	-	-	-	CHECKED -
-	-	-	-	APPROVED -
-	-	-	-	P.O. NO. 49484-WKSP2GW

PLC RACK LAYOUT		
<p style="font-size: 8px;">INDUSTRIAL CONTROLS, INC.                  PHONE 785-825-7181                  418 East Ave. B                  South Industrial Area                  Salina, KS. 67401</p>	R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS	
SHEET 21 OF 22	JOB NO. 8076	DWG. NO. 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-CJ6-10	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	-	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	-	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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BILL OF MATERIALS		
		
R.E. PEDROTTI CO., INC. WICHITA WWTP PLANT 2 RE-USE WATER PUMP STATION CONTROL PANEL WICHITA, KANSAS		
INDUSTRIAL CONTROLS, INC. PHONE 785-825-7181 418 East Ave. B South Industrial Area Salina, KS. 67401	SHEET 22 OF 22	JOB NO. 8076
	DWG. NO. 8076-BOM	

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## 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](#)

### 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

**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](#)

**$\alpha$  and  $\beta$  Series Servo Amplifiers** [page 1.61](#)

**VersaMotion** [pages 1.62-1.70](#)





**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
<b>Product Name</b>	<b>RX3i CPU with built-in USB Master port, Ethernet port and serial port</b>	<b>RX3i CPU with built-in USB Master port, Ethernet port and 2 serial ports</b>	<b>RX3i CPU with two built-in serial ports</b>	<b>RX3i CPU with two built-in serial ports</b>
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Controller	Controller	Controller	Controller
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Boolean Execution Speed (ms/K)</b>	.072	.072	0.047	0.047
<b>User Logic Memory</b>	5Meg bytes	10Meg bytes	64Mega bytes	20Meg bytes
<b>Battery Backed Real Time Clock</b>	Yes	Yes	Yes	Yes
<b>Dynamic Data Back-up</b>	Energy Pack Support (Battery-less Backup)	Energy Pack Support (Battery-less Backup)	Battery Backup only	Battery Backup only
<b>I/O Discrete Points</b>	32K	32K	32K	32K
<b>I/O Analog Points</b>	32K	32K	32K	32K
<b>Type of Memory Storage</b>	SRAM, Flash	SRAM, Flash	SRAM, Flash	SRAM, Flash
<b>Processor Speed (MHz)</b>	1.1GHz	1.1GHz	1GHz	1GHz
<b>USB -A 2.0 Master Port</b>	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
<b>Built-in Ethernet Ports</b>	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only	One RJ-45 port, 10/100Mbaud. SRTP support for programmer only		
<b>Built-in Serial Ports</b>	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)
<b>Total Number of Local Racks</b>	8	8	8	8
<b>Communications Options</b>		Serial, Genius, CMX (Reflective Memory), Ethernet		
<b>Field Busses/Device Networks</b>	Ethernet (PROFINET, EtherNet Global Data, Channels, Modbus TCP Server and Client), Genius, PROFIBUS DP, DeviceNet			
<b>Software Programming Support</b>	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
<b>Program Languages Supported</b>	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
<b>Internal Power Used</b>	+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 &#64; 3.3VDC; 1200 mA &#64; 5VDC (Check Data sheet)
<b>Number of Slots Module Occupies on Backplane</b>	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
<b>Product Name</b>	<b>RX3i Bumpless Redundant High Availability CPU with two built-in serial ports. (Requires IC695RMX128 Data Sync Module)</b>	<b>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)</b>
<b>Lifecycle Status</b>	Active	Active
<b>Module Type</b>	Redundant Controller	Quad System Redundant Controller
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Boolean Execution Speed (ms/K)</b>	0.047	0.047
<b>User Logic Memory</b>	64Meg bytes	64Meg bytes
<b>Battery Backed Real Time Clock</b>	Yes	Yes
<b>I/O Discrete Points</b>	32K	32K
<b>I/O Analog Points</b>	32K	32K
<b>Type of Memory Storage</b>	SRAM, Flash	SRAM, Flash
<b>Dynamic Data Back-up</b>	Battery Backup only	Battery Backup only
<b>Processor Speed</b>	1GHz	1GHz
<b>Built-in Communication Ports</b>	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)
<b>Total Number of Racks</b>	8	8
<b>Communications Options</b>	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet	Serial, Genius, CMX, Ethernet, PROFINET, PROFIBUS, and DeviceNet
<b>Field Busses/Device Networks</b>	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
<b>Software Programming Support</b>	Proficy Machine Edition Logic Developer Professional edition 5.7 or above	Proficy Machine Edition Logic Developer Professional edition 7.0 SIM 8 or above
<b>Program Languages Supported</b>	Ladder Logic, Structured Text, C, Function Block Diagram	Ladder Logic, Structured Text, C, Function Block Diagram
<b>Redundancy Maximum amount of data in for Synchronization</b>	Up to 2 Mbytes beginning and end of scan	Up to 2 Mbytes beginning and end of scan
<b>Redundancy Typical Base Sweep Time (Reference Data Transfer List Impact)</b>	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
<b>Redundancy Switchover Time</b>	Maximum 1 logic scan, minimum 3.133 msec.	Maximum 1 logic scan, minimum 3.133 msec.
<b>CPU Scan Synchronization</b>	Automatic Each Scan	Automatic Each Scan
<b>Redundant Synch LAN</b>	Yes	Yes
<b>Redundant I/O LAN</b>	Yes	Yes
<b>Internal Power Used</b>	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC	1750 mA @ 3.3 VDC; 1200 mA @ 5 VDC
<b>Number of Slots Module Occupies on Backplane</b>	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**

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

**Baseplates**



RX3i baseplates are available in 7, 12 and 16 slot configurations to 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
<b>Product Name</b>	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)
<b>Lifecycle Status</b>	Active	Active	Active	Active	Active	Active	Active
<b>Module Type</b>	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
<b>Backplane Support</b>	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.
<b>Module Hot Swap Support</b>	Yes	Yes	Yes	No	No	No	No
<b>Baseplate Option</b>	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
<b>Distance</b>	N/A	N/A	N/A	Up to 50 feet	Up to 700 feet	Up to 50 feet	Up to 700 feet
<b>Number of Slots</b>	7	12	16	5	5	10	10
<b>Dimension (W x H x D) in. (mm)</b>	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)
<b>Internal Power Used</b>	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
<b>Product Name</b>	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 multipurpose power supplies.	Multipurpose Power Supply, 24 VDC. Supports multiple multipurpose power supplies.
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply	Universal Base Power Supply
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	2	1	2	1
<b>Power Source</b>	100-240 VAC or 125 VDC	24 VDC	100-240 VAC or 125 VDC	24 VDC
<b>Redundant and Added Capacity Support</b>	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
<b>Output Source</b>	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.
<b>Number of Redundant Power Supplies Supported</b>	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
<b>Product Name</b>	<b>Power Supply, 120/240 VAC, 125 VDC</b>	<b>Power Supply, 120/240 VAC, 125 VDC</b>	<b>Power Supply, 24 VDC</b>	<b>Power Supply, 12 VDC</b>
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply	Expansion Power Supply
<b>Backplane Support</b>	Remote Bases Only	Remote Bases Only	Remote Bases Only	Remote Bases Only
<b>Power Source</b>	100-240 VAC or 125 VDC	100-240 VAC or 125 VDC	24 VDC	12 VDC
<b>High Capacity</b>	No	Yes	Yes	Yes
<b>Output Source</b>	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
<b>Cable Length to Redundant Power Supply Adapter</b>	N/A	N/A	N/A	N/A
<b>Redundant Power Supply Adapter Rack Compatibility</b>	N/A	N/A	N/A	N/A
<b>24 VDC Output Current Capacity</b>	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**

<b>Product Name</b>	<b>Power Supply, 48 VDC</b>
<b>Lifecycle Status</b>	Active
<b>Module Type</b>	Expansion Power Supply
<b>Backplane Support</b>	Remote Bases Only
<b>Power Source</b>	48 VDC
<b>High Capacity</b>	No
<b>Output Source</b>	30 watts total; 15 watts 5 V; 15 watts 24 V relay; 20 watts 24 V isolated
<b>Cable Length to Redundant Power Supply Adapter</b>	N/A
<b>Redundant Power Supply Adapter Rack Compatibility</b>	N/A
<b>24 VDC Output Current Capacity</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active	Active
<b>Module Type</b>	Input Simulator	Discrete Input	Discrete Input	Discrete Input	Discrete Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1	1
<b>Input Voltage Range</b>	N/A	0-132 VAC	0-132 VAC	0-264 VAC	0-132 VAC
<b>Input Current (mA)</b>	N/A	14.5	14.5	15	12
<b>Number of Points</b>	16	8	16	8	16
<b>Response Time (ms)</b>	20 on/30 off	30 on/45 off	30 on/45 off	30 on/45 off	30 on/45 off
<b>Trigger Voltage</b>	N/A	74-132	74-132	148-264	74-132
<b>Points per Common</b>	16	1	1	1	16
<b>Diagnostic Supported</b>	N/A	N/A	N/A	N/A	N/A
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active	Active
<b>Module Type</b>	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1	1
<b>Input Voltage Range</b>	0-132 VAC	0-30 VDC	0-150 VDC	0-30 VDC	0-30 VDC
<b>Input Current (mA)</b>	12	7	4.5	7	7
<b>Number of Points</b>	32	16	8	8	16
<b>Response Time (ms)</b>	30 on/45 off	12 on/28 off	7 on/7 off	7 on/7 off	7 on/7 off
<b>Trigger Voltage</b>	74-132	11.5-30	90-150	11.5-30	11.5-30
<b>Points per Common</b>	16	16	4	8	16
<b>Diagnostic Supported</b>	N/A	N/A	N/A	N/A	N/A
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active	Active
<b>Module Type</b>	Discrete Input	Discrete Input	Discrete Input	Discrete Input	Discrete Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	Universal PCI Slot Only
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1	1
<b>Input Voltage Range</b>	0-30 VDC	0-15 VDC	0-30 VDC	0-30 VDC	0-30 VDC
<b>Input Current (mA)</b>	7	3.0 @ 5 V, 8.5 @ 12 V	7	7	12.2
<b>Number of Points</b>	16	32	32	32	16
<b>Response Time (ms)</b>	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.
<b>Trigger Voltage</b>	11.5-30	4.2-15	11.5-30	11.5-30	0.5 × VIN VDC
<b>Points per Common</b>	16	8	8	8	8
<b>Diagnostic Supported</b>	N/A	N/A	N/A	N/A	Open Wire, Short to DC Negative Input Pulse Test Short to DC Plus
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBB032 or IC694TBS032
<b>Internal Power Used</b>	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 configura- tions (IC695ACC600 contains 2 CJC's)
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 25°C (77°F)	0.25% at 25°C (77°F)	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
<b>Product Name</b>	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).
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Analog Input	Analog Input	Analog Input with HART Communications
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Range</b>	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
<b>HART Support</b>	N/A	N/A	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)
<b>Channel-to-Channel Isolation</b>	One Group of Eight	One Group of Sixteen	One Group of Eight
<b>Number of Channels</b>	8	16	8
<b>Update Rate</b>	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.
<b>Resolution</b>	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
<b>Accuracy</b>	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
<b>Input Impedance</b>	Current 249 ohms ±1%	Current 249 ohms ±1%	Current 249 ohms ±1%
<b>Input Filter Response</b>	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 500Hz
<b>Notch Filter</b>	Yes	Yes	Yes
<b>Diagnostics</b>	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
<b>Internal Power Used</b>	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
<b>External Power Requirement</b>	N/A	N/A	N/A
<b>Connector Type</b>	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
<b>Product Name</b>	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).
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Analog Input with HART Communications	Analog Input with Channel to Channel Isolation	Analog Input with Channel to Channel Isolation
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Range</b>	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
<b>HART Support</b>	Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) Enterprise HART Pass-Thru Command (Function 3)	N/A	N/A
<b>Channel-to-Channel Isolation</b>	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)
<b>Number of Channels</b>	16	6	12
<b>Update Rate</b>	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
<b>Resolution</b>	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
<b>Accuracy</b>	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, ±0.25% of span over operating temperature range
<b>Input Impedance</b>	Current 249 ohms ±1%	Current = 250 ohms ±1%, Voltage >= 500k Ohms	Current = 250 ohms ±1%, Voltage >= 500k Ohms
<b>Input Filter Response</b>	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
<b>Notch Filter</b>	Yes	N/A	N/A
<b>Diagnostics</b>	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
<b>Internal Power Used</b>	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
<b>External Power Requirement</b>	N/A	19.2 V to 30 VDC, Current required: 500 mA	19.2 V to 30 VDC, Current required: 500 mA
<b>Connector Type</b>	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
<b>Product Name</b>	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)
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Analog Input	Analog Input	Analog Input	Analog Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Range</b>	-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
<b>HART Support</b>	N/A	N/A	N/A	N/A
<b>Channel-to-Channel Isolation</b>	N/A	N/A	N/A	N/A
<b>Number of Channels</b>	4	4	1	16
<b>Update Rate</b>	4 ms all channels	2 ms all channels	13 ms all channels	13 ms all Channels
<b>Resolution</b>	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
<b>Accuracy</b>	±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)
<b>Input Impedance</b>	>9 Megohms	250 ohms	250 ohms	250 ohms
<b>Input Filter Response</b>	17 Hz	325 Hz	200 Hz	200 Hz
<b>Notch Filter</b>	N/A	N/A	N/A	N/A
<b>Diagnostics</b>	N/A	N/A	N/A	N/A
<b>Internal Power Used</b>	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
<b>External Power Requirement</b>	N/A	N/A	N/A	N/A
<b>Connector Type</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Discrete Output	Discrete Output	Discrete Output	Discrete Output
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Output Voltage Range</b>	85-132 VAC	85-264 VAC	85-132 VAC	85-264 VAC
<b>Number of Points</b>	12	8	16	5
<b>Isolation</b>	N/A	N/A	N/A	Yes
<b>Diagnostics</b>	N/A	N/A	N/A	N/A
<b>Load Current per Point</b>	0.5 A	1 A	0.5 A	2 A
<b>Response Time (ms)</b>	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off	1 on 1/2 cy off
<b>Output Type</b>	Triac	Triac	Triac	Triac
<b>Polarity</b>	N/A	N/A	N/A	N/A
<b>Points per Common</b>	6	4	4	1
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Discrete Output	Discrete Output	Discrete Output	Discrete Output
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Output Voltage Range</b>	74-264 VAC	12-24 VDC	11-150 VDC	12-24 VDC
<b>Number of Points</b>	16	8	6	16
<b>Isolation</b>	Yes	N/A	N/A	N/A
<b>Diagnostics</b>	N/A	N/A	N/A	N/A
<b>Load Current per Point</b>	Per Point 2A max. @ 30°C & 1A max. @ 60°C (Linear derating)	0.5 A	1 A	0.5 A
<b>Response Time (ms)</b>	1 on/1/2 cy off	2 on/2 off	7 on/5 off	2 on/2 off
<b>Output Type</b>	Triac	Transistor	Transistor	Transistor
<b>Polarity</b>	N/A	Positive	Positive/Negative	Positive
<b>Points per Common</b>	1	8	1	8
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Discrete Output	Discrete Output	Discrete Output	Discrete Output
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Output Voltage Range</b>	12-24 VDC	12-24 VDC	5, 12-24 VDC	12-24 VDC
<b>Number of Points</b>	16	16	32	32
<b>Isolation</b>	N/A	N/A	N/A	N/A
<b>Diagnostics</b>	N/A	N/A	N/A	N/A
<b>Load Current per Point</b>	0.5 A	1 A	0.5 A	0.5 A
<b>Response Time (ms)</b>	2 on/2 off	2 on/2 off	0.5 on/0.5 off	0.5 on/0.5 off
<b>Output Type</b>	Transistor	Transistor	Transistor	Transistor
<b>Polarity</b>	Negative	Positive	Negative	Positive
<b>Points per Common</b>	8	8	8	8
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Fujitsu Connector	Fujitsu Connector
<b>Internal Power Used</b>	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	<ul style="list-style-type: none"> <li>• Output Pulse Test</li> <li>• Over temperature</li> <li>• Failed Switch Detection</li> <li>• Overload Detection and Shutdown</li> <li>• No-load Detection</li> </ul>	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
<b>Product Name</b>	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)
<b>Lifecycle Status</b>	Active	Active	Active	Active	Active
<b>Module Type</b>	Discrete Output	Discrete Output	Discrete Output	Discrete Output	Discrete Output
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1	1
<b>Output Voltage Range</b>	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
<b>Number of Points</b>	16	8	16	8	8
<b>Isolation</b>	Yes	Yes	N/A	N/A	Yes
	N/A	N/A	N/A	N/A	N/A
<b>Diagnostics</b>					
<b>Load Current per Point</b>	4 A	8 A	2 A	8 A	8 A
<b>Response Time (ms)</b>	10ms maximum (At nominal voltage excluding contact bounce)	15 on/15 off	15 on/15 off	11 on/11 off	11 on/11 off
<b>Output Type</b>	Relay	Relay	Relay	Relay	Relay
<b>Polarity</b>	N/A	N/A	N/A	N/A	N/A
<b>Points per Common</b>	1	1	4	N/A	1
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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 25°C (77°F); 0-10 V, -10V + 10 V ±0.25 at 25°C (77°F)	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
<b>Product Name</b>	<b>PACSystems RX3i Analog Output, Current/Voltage, 8 Channel</b>	<b>PACSystems RX3i Analog Output with HART Communications, Current/Voltage, 8 Channel</b>
<b>Lifecycle Status</b>	Active	Active
<b>Module Type</b>	Analog Output	Analog Output with HART Communications
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1
<b>Diagnostics</b>	High and Low Alarm, Ramp Rate Control Clamping, Overrange and Underrange	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange
<b>Protection</b>	N/A	N/A
<b>Range</b>	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
<b>HART Support</b>	N/A	-Get HART Device Information (Function 1) Simplified HART Pass-Thru Command (Function 2) -Enterprise HART Pass-Thru Command (Function 3)
<b>Number of Channels</b>	8	8
<b>Channel-to-Channel Isolation</b>	N/A	N/A
<b>Update Rate</b>	8 ms all channels	8 ms all channels and HART enabled channels could add 6 to 8 seconds.
<b>Resolution</b>	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
<b>Accuracy</b>	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
<b>Maximum Output Load</b>	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)
<b>Output Load Capacitance</b>	Current: 10uH max.; Voltage: 1uF max.	Current: 10uH max.; Voltage: 1uF max.
<b>External Power Requirement</b>	Voltage Range: 19.2 V to 30 V Current required: 315 mA	Voltage Range: 19.2 V to 30 V Current required: 315 mA
<b>Connector Type</b>	IC694TBB032 or IC694TBS032. Sold Separately	IC694TBB032 or IC694TBS032. Sold Separately.
<b>Internal Power Used</b>	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
<b>Product Name</b>	PACSystems RX3i Isolated Analog Output, Current/Voltage, 8 Isolated Channels	PACSystems RX3i Analog Output, Voltage, 2 Channel	PACSystems RX3i Analog Output, Current, 2 Channel
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Analog Output with Channel to Channel Isolation	Analog Output	Analog Output
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Diagnostics</b>	High and Low Alarm, Ramp Rate Control, Clamping, Overrange and Underrange	N/A	N/A
<b>Protection</b>	N/A	N/A	N/A
<b>Range</b>	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
<b>HART Support</b>	N/A	N/A	N/A
<b>Number of Channels</b>	8	2	2
<b>Channel-to-Channel Isolation</b>	Yes (250 VAC continuous, 1500 VAC for 1 minute per channel)	N/A	N/A
<b>Update Rate</b>	8 ms all channels (1 msec per channel)	5 ms all channels	5 ms all channels
<b>Resolution</b>	±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
<b>Accuracy</b>	Accurate to within ±0.1% of span at 25C, ± 0.25% of span over operating temperature range	±5 mV at 25°C (77°F)	0-20 mA, ±8 µA at 25°C (77°F); 0-20 mA, 4-20 mA ±0.1% at 25°C (77°F)
<b>Maximum Output Load</b>	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)
<b>Output Load Capacitance</b>	Current: 10uH max.; Voltage: 1uF max.	2000 pF	2000 pF, Inductance 1H
<b>External Power Requirement</b>	500 mA @ 24 VDC	N/A	N/A
<b>Connector Type</b>	IC694TBBx32 or IC694TBSx32 Sold Separately.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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
<b>Product Name</b>	<b>Isolated Analog Output Module, Voltage</b>	<b>Isolated Analog Output Module, Current</b>
<b>Lifecycle Status</b>	Active	Active
<b>Module Type</b>	Analog Output	Analog Output
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1
<b>Diagnostics</b>	N/A	N/A
<b>Protection</b>	N/A	N/A
<b>Range</b>	±10 V	4-20 mA or 0-20 mA
<b>HART Support</b>	N/A	N/A
<b>Number of Channels</b>	4	4
<b>Channel-to-Channel Isolation</b>	1500 VAC (RMS), ±2000 VDC	1500 VAC (RMS), ±2000 VDC
<b>Update Rate</b>	N/A	N/A
<b>Resolution</b>	1.2 5 mV	2.0 µA (4-20 mA); 2.5 µA (±20 mA)
<b>Accuracy</b>	N/A	N/A
<b>Maximum Output Load</b>	N/A	N/A
<b>Output Load Capacitance</b>	N/A	N/A
<b>External Power Requirement</b>	N/A	2-32 VDC
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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 $\mu$ A 4-20 mA 0.5 $\mu$ A/bit (Output) 16 bit; 0 to 20 mA: 0.625 $\mu$ A; 4 to 20 mA: 0.5 $\mu$ A; -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 $\mu$ A/bit (Output) 16 bit; 0.312 mV/bit; 4-20 mA 0.5 $\mu$ A/bit; 0-20 mA 0.625 $\mu$ A/bit
Accuracy	Current Input 0 to 20 mA $\pm$ 0.25% of full scale @ 25°C (77°F); $\pm$ 0.5% of full scale over specified operating temperature range Current Input 4 to 20 mA $\pm$ 0.25% of full scale @ 25°C (77°F); $\pm$ 0.5% of full scale over specified operating temperature range 4 to 20 mA Enhanced Mode $\pm$ 0.25% of full scale @ 25°C (77°F); $\pm$ 0.5% of full scale over specified operating temperature range Current Output $\pm$ 0.1% of full scale @ 25°C (77°F), typical $\pm$ 0.25% of full scale @ 25°C (77°F), maximum $\pm$ 0.5% of full scale over operating temperature range (maximum) Voltage Output $\pm$ 0.25% of full scale @ 25°C (77°F), typical $\pm$ 0.5% of full scale @ 25°C (77°F), maximum $\pm$ 1.0% of full scale over operating temperature range (maximum)	(Input) 0.25 $\mu$ A; at 25°C (77°F) (Output) 0-20 mA, 4-20 mA $\pm$ 0.1% at 25°C (77°F) (77°F)
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 $\mu$ F (maximum) Current: 2000 pF (maximum)	Voltage:1 $\mu$ F (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 $\pm$ 64; 5 VDC; 150 mA external 24 VDC Isolated	95 mA $\pm$ 64; 5 VDC; 150 mA external 24 VDC Isolated
External Power Requirement	24VDC: Current: 5 $\mu$ A/V (typical), 10 $\mu$ A/V (maximum) Voltage: 25 mV/V (typical), 50 mV/V (maximum)	24VDC: Current: 5 $\mu$ A/V (typical), 10 $\mu$ A/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 CJs)	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .
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	$\pm 150\text{mV}$ or $\pm 50\text{mV}$	$\pm 150\text{mV}$ or $\pm 50\text{mV}$
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.	$\pm 0.1\%$ of voltage span at 25°C. $\pm 0.25\%$ of span over temperature range.
Input Impedance	$>1\text{M}$ ohm	Voltage: $\geq 500\text{k}$ 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	$\pm 14.5$ 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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .	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	$\pm 150\text{mV}$ or $\pm 50\text{mV}$	$\pm 25\text{ mV}$ , $\pm 50\text{ mV}$ and $\pm 100\text{ mV}$
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 $\mu\text{V}$ , 6 $\mu\text{V}$ , 9 $\mu\text{V}$ (respectively)
Accuracy	$\pm 0.1\%$ of voltage span at 25°C $\pm 0.25\%$ of span over temperature range.	$\pm 0.5\%$
Input Impedance	Voltage: $\geq 500\text{k ohm}$	$> 20\text{ Mohms}$
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	$\pm 35\text{ V}$
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
<b>Product Name</b>	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 CJs)	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
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	RTD Input	RTD (and Resistive) Input Channel to Channel Isolation	RTD Input
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Number of Channels</b>	8	8	6
<b>RTD Types Supported</b>	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)
<b>Diagnostics</b>	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
<b>Channel-to-Channel Isolation</b>	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second	N/A
<b>Notch Filter</b>	Yes	N/A	N/A
<b>Resolution</b>	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	0.5°C or 0.5°F
<b>Accuracy</b>	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%	±0.5°C, typical
<b>Input Impedance</b>	>1M ohm	N/A	>1000 Megohms
<b>I/O Required</b>	N/A	N/A	6 %AI
<b>Fault Protection</b>	N/A	N/A	Zener Diode Clamp
<b>Update Time</b>	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
<b>A/D Conversion Type</b>	Sigma Delta	Sigma Delta	18 bit, integrating
<b>Connector Type</b>	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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
<b>Product Name</b>	RTD Input Module, High Resolution	RTD Input Module, Isolated
<b>Lifecycle Status</b>	Active	Active
<b>Module Type</b>	RTD Input	RTD Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1
<b>Number of Channels</b>	6	6
<b>RTD Types Supported</b>	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
<b>Diagnostics</b>	N/A	N/A
<b>Channel-to-Channel Isolation</b>	N/A	5 VAC
<b>Notch Filter</b>	N/A	None
<b>Resolution</b>	0.125°C, 0.1°C, or 0.1°F	0.05°C, 0.05°F, 0.1°C, 0.1°F, 0.5°C or 0.5°F
<b>Accuracy</b>	±0.5°C, typical	±0.3°C
<b>Input Impedance</b>	>1000 Megohms	>1000 Megohms
<b>I/O Required</b>	6 %AI	6% AI, 6% AQ, 16% I
<b>Fault Protection</b>	Zener Diode Clamp	Suppression Diode
<b>Update Time</b>	50 Channels/second	50 Channels/second
<b>A/D Conversion Type</b>	18 bit, integrating	18 bit, integrating
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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
<b>Product Name</b>	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 CJC's)	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Strain Gage Input	Strain Gage Input	Strain Gage Input
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Range</b>	$\pm 150\text{mV}$ or $\pm 50\text{mV}$	$\pm 150\text{mV}$ or $\pm 50\text{mV}$	$\pm 150\text{mV}$ or $\pm 50\text{mV}$
<b>Diagnostics</b>	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
<b>Channel-to-Channel Isolation</b>	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
<b>Number of Channels</b>	8	6	12
<b>Resolution</b>	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
<b>Accuracy</b>	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	$\pm 0.1\%$ of voltage span at 25°C. $\pm 0.25\%$ of span over temperature range.	$\pm 0.1\%$ of voltage span at 25°C. $\pm 0.25\%$ of span over temperature range.
<b>Input Impedance</b>	>1M ohm	Voltage: $\geq 500\text{k ohm}$	Voltage: $\geq 500\text{k ohm}$
<b>I/O Required</b>	N/A	N/A	N/A
<b>A/D Conversion Type</b>	Sigma Delta	Sigma Delta	Sigma Delta
<b>A/D Conversion Time</b>	(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
<b>Strain Gages Supported</b>	Yes	Yes	Yes
<b>Maximum Normal Voltage Input</b>	N/A	N/A	N/A
<b>Maximum Voltage Input</b>	$\pm 14.5$ VDC continuous	N/A	N/A
<b>Connector Type</b>	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
<b>Internal Power Used</b>	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ . 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	$\pm 50\text{mV}$	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 $\mu\text{V}$ , 0.8 $\mu\text{V}$ , 0.9 $\mu\text{V}$ (respectively)	0.8 $\mu\text{V}$ , 1.6 $\mu\text{V}$ , 3.2 $\mu\text{V}$ (respectively)
Accuracy	$\pm 0.1\%$ of voltage sp+GC+GB59GD1+GC59163an at 25 °C. $\pm 0.25\%$ of span over temperature range.	$\pm 0.3\%$	$\pm 0.3\%$
Input Impedance	Voltage: $\geq 500\text{k ohm}$	$>1000$ 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		$\pm 35$ V	$\pm 35$ 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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Mature	Mature
<b>Module Type</b>	Temperature Control	Temperature Control
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1
<b>Number of Channels</b>	8 T/C In/ 8 DC Out	8 T/C In/ 8 DC Out
<b>Range</b>	J=0-600°C K=0-1050°C L=0-600°C	J=0-450°C K=0-600°C L=0-450°C
<b>Output Voltage Range</b>	18 to 30 volts DC	18 to 30 volts DC
<b>Load Current per Point</b>	100 mA maximum sourcing	100 mA maximum sourcing
<b>Diagnostics</b>	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
<b>Connector Type</b>	Two 20 pin connectors (screw type)	Two 20 pin connectors (screw type)
<b>Internal Power Used</b>	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
<b>Product Name</b>	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 CJs)	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .	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: $\pm 150\text{mV}$ or $\pm 50\text{mV}$ .	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: $\pm 50\text{mV}$ . The ALG412 offers a 10dB improvement in noise rejection compared to the ALG312 thermocouple input module.
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Range</b>	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
<b>Diagnostics</b>	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
<b>Number of Channels</b>	8	6	12	12
<b>Channel-to-Channel Isolation</b>	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
<b>Common Mode Rejection</b>	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
<b>Channel to Channel Crosstalk</b>		70 dB minimum	70 dB minimum	70 dB minimum
<b>Notch Filter</b>	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
<b>Resolution</b>	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
<b>Accuracy</b>	Calibrated Accuracy at 25°C. Better than 0.1% of range. Accuracy depends on A/D filter, data format, input noise, and ambient temperature.	$\pm 0.1\%$ of voltage span at 25°C. $\pm 0.25\%$ of span over temperature range.	$\pm 0.1\%$ of voltage span at 25°C $\pm 0.25\%$ of span over temperature range.	$\pm 0.1\%$ of voltage span at 25°C $\pm 0.25\%$ of span over temperature range.
<b>Update Rate</b>	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.
<b>I/O Required</b>	N/A	N/A	N/A	N/A
<b>A/D Conversion Type</b>	Sigma Delta	Sigma Delta	Sigma Delta	Sigma Delta
<b>A/D Conversion Time</b>	(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
<b>Connector Type</b>	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TB3x32, IC694TBSx32 or IC694TBC032. Sold Separately.
<b>Internal Power Used</b>	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
	Analog I/O Thermocouple Input Module	Analog I/O Thermocouple Input Module	Analog I/O Thermocouple Input Module
<b>Product Name</b>			
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Thermocouple Input	Thermocouple Input	Thermocouple Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1
<b>Range</b>	J, K, N, T, E, R, S, B, C, X	J, K, N, T, E, R, S,	J, K, N, T, E, R, S,
<b>Diagnostics</b>	Yes	No	Yes
<b>Number of Channels</b>	16	4	4
<b>Channel-to-Channel Isolation</b>	N/A	N/A	N/A
<b>Common Mode Rejection</b>	N/A	N/A	N/A
<b>Channel to Channel Crosstalk</b>	N/A	N/A	N/A
<b>Notch Filter</b>	N/A	N/A	N/A
<b>Resolution</b>	0.5°C or 0.5°F	0.5°C or 0.5°F	0.5°C or 0.5°F
<b>Accuracy</b>	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)	±0.5°C, typical (J, K, N, T)
<b>Update Rate</b>	N/A	N/A	N/A
<b>I/O Required</b>	16% AI, 16% I	4% AI	4% AI, 16% I
<b>A/D Conversion Type</b>	Integrating	Integrating	Integrating
	40 Channels/second	40 Channels/second	40 Channels/second
<b>A/D Conversion Time</b>			
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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
	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
<b>Product Name</b>				
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Thermocouple Input	Thermocouple Input	Thermocouple Input	Thermocouple Input
<b>Backplane Support</b>	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Range</b>	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
<b>Diagnostics</b>	No	Yes	Yes	Yes
<b>Number of Channels</b>	8	8	8	8
<b>Channel-to-Channel Isolation</b>	N/A	N/A	N/A	N/A
<b>Common Mode Rejection</b>	N/A	N/A	N/A	N/A
<b>Channel to Channel Crosstalk</b>	N/A	N/A	N/A	N/A
<b>Notch Filter</b>	N/A	None	60 Hz	N/A
<b>Resolution</b>	0.5°C or 0.5°F	N/A	N/A	0.5°C or 0.5°F
<b>Accuracy</b>	±0.5°C, typical (J,K,N,T)	N/A	N/A	±0.5°C, typical (J,K,N,T)
<b>Update Rate</b>	N/A	N/A	N/A	N/A
<b>I/O Required</b>	8% AI	8% AI, 8% AQ, 16% I	8% AI, 8% AQ, 16% I	8% AI, 16% I
<b>A/D Conversion Type</b>	Integrating	Integrating	Integrating	Integrating
	40 Channels/second	N/A	N/A	40 Channels/second
<b>A/D Conversion Time</b>				
<b>Connector Type</b>	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.
<b>Internal Power Used</b>	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
<b>Product Name</b>	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 CJs)	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.
<b>Lifecycle Status</b>	Active	Active
<b>Module Type</b>	Resistive Input	Resistive (and RTD) Input Channel to Channel Isolation
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1
<b>Range</b>	0 to 250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms	250 / 500 / 1000 / 2000 / 3000 / 4000 Ohms
<b>Diagnostics</b>	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
<b>Number of Channels</b>	8	8
<b>Channel-to-Channel Isolation</b>	Two Groups of Four	250 VAC Continuous 1500 VAC 1 minute 2550 VDC 1 second
<b>Notch Filter</b>	Yes	N/A
<b>Resolution</b>	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
<b>Accuracy</b>	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%
<b>Input Impedance</b>	>1M ohm	N/A
<b>Input Filter Response</b>	Configurable: 8Hz, 12Hz, 16Hz, 40Hz, 200Hz, 1000Hz	Configurable: 2.3Hz, 4Hz, 4.7Hz, 24Hz, 28Hz
<b>A/D Conversion Type</b>	Sigma Delta	Sigma Delta
<b>A/D Conversion Time</b>	(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
<b>Maximum Voltage Input</b>	±14.5 VDC continuous	N/A
<b>Connector Type</b>	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.	IC694TBBx32, IC694TBSx32 or IC694TBC032. Sold Separately.
<b>Internal Power Used</b>	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
<b>Product Name</b>	PACSystems RX3i Ethernet TCP/IP 10/100Mbps, 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.
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Ethernet	PROFINET Controller	PROFINET Scanner	Reflective Memory
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Protocol Support</b>	SRT, Ethernet Global Data (EGD), Channels (Client and Server), Modbus TCP (Client and Server)	PROFINET	PROFINET	None Required
<b>Entity Type</b>	Client/Server	Master	I/O Device (Scanner)	Deterministic Peer to Peer. Programmable Interrupt support.
<b>Communication Ports</b>	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.	
<b>Bus Speed</b>	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)
<b>I/O Device Update Rate</b>	N/A	Configurable: 1 ms to 512 ms	Configurable: 1 ms to 512 ms	
<b>Maximum I/O Memory</b>	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	
<b>System Maximum Limits</b>	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	
<b>Network Distance</b>	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
<b>Bus Diagnostics</b>	Yes	Yes	Yes	Network error detection.
<b>Number of Drops Supported</b>	Network Dependent	64 Drops 256 Subslots	Supports number of modules allowed per rack Does not support LRE for Series 90-30 expansion racks	256
<b>Message Size</b>	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
<b>Connector Type</b>	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
<b>Internal Power Used</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	PROFIBUS Master	PROFIBUS Slave	Genius Bus Controller	DeviceNet Master
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions	CPU Rack Only
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Protocol Support</b>	PROFIBUS DPV1	PROFIBUS DPV1	Genius	DeviceNet
<b>Entity Type</b>	Master	Slave	Master	Master
<b>Communication Ports</b>	PROFIBUS DB-9 connector	PROFIBUS DB-9 connector	Screw Terminal	Screw Terminal
<b>Bus Speed</b>	12Mbaud	12Mbaud	153.6Kbaud	500Kbaud
<b>I/O Device Update Rate</b>				
<b>Maximum I/O Memory</b>				
<b>System Maximum Limits</b>				
<b>Network Distance</b>	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.
<b>Bus Diagnostics</b>	Yes, Slave Status Bit Array Table, Network Diagnostic Counters, DP Master Diagnostic Counters, Firmware Module Revision, Slave Diagnostic Address	Yes, Alarms	Yes	Yes
<b>Number of Drops Supported</b>	Up To 125 (Requires repeater every 25 nodes)	N/A	32	64
<b>Message Size</b>	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
<b>Connector Type</b>	PROFIBUS Connector	PROFIBUS Connector	Screw Terminal	Screw Terminal
<b>Internal Power Used</b>	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
<b>Product Name</b>	Two Port Serial Module	Four Port Serial Module	Pressure Transducer Module supporting Honeywell LG1237 Smart Sensors	Horner ASCII Basic Module
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	Serial Communications 2 Isolated Serial Ports	Serial Communications 4 Isolated Serial Ports	Serial Communications	Serial Communications 4 Isolated Serial Ports ASCII Basic Co-Processor
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Protocols Supported</b>	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
<b>Programming Languages</b>	None required. Communications set up in Proficy Machine Edition	None required. Communication set up in Proficy Machine Edition		BASIC
<b>Program Storage</b>	FLASH	FLASH	FLASH	EEPROM
<b>Communication Ports</b>	(2) Isolated RS-232 or RS-485/422	(4) Isolated RS-232 or RS-485/422	(1) RS-485	RS-232, RS-232/485
<b>Network Data Rate</b>	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
<b>Internal Power Used</b>	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
<b>Product Name</b>	PACSystems RX3i High Speed Counter	PACSystems RX3i High Speed Counter	PACSystems RX3i High Speed Counter	PACSystems RX3i I/O Processor Module
<b>Lifecycle Status</b>	Active	Active	Active	Active
<b>Module Type</b>	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
<b>Backplane Support</b>	No Backplane Restrictions	Universal Backplane Only. Uses PCI Bus.	Universal Backplane Only. Uses PCI Bus.	No Backplane Restrictions
<b>Number of Slots Module Occupies on Backplane</b>	1	1	1	1
<b>Input/Output Type</b>	Positive Logic	Positive Logic	Positive Logic	N/A
<b>Off State Leakage Current</b>	10 µA per point	200 µA	200 µA	10 µA per point
<b>Output Protection</b>	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
<b>Counter Operation</b>	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
<b>CPU Interrupt Support</b>	No	Yes	Yes	N/A
<b>PLS and Camming Support</b>	No	Yes	Yes	N/A
<b>Input Filters (Selectable)</b>	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
<b>Count Rate</b>	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)
<b>Counter Range</b>	-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
<b>Selectable On/Off Output Presets</b>	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
<b>Counters per Timebase</b>	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
<b>Strobe Register</b>	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
<b>Local Fast Inputs</b>	(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)
<b>Local Fast Outputs</b>	(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)
<b>Connector Type</b>	Terminal Block (20 screws), included with module.	IC694TBBx32 or IC694TBSx32. Sold Separately.	IC694TBBx32 or IC694TBSx32. Sold Separately.	Terminal Block (20 screws), included with module.
<b>Internal Power Used</b>	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

<b>Product Name</b>	<b>PACMotion Module</b>
<b>Lifecycle Status</b>	Active
<b>Module Type</b>	Servo Motion
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.
<b>Number of Slots Module Occupies on Backplane</b>	1
<b>Motion Path Planning</b>	1 ms, Consistent update regardless of the number of axes in the system
<b>Position Loop Update Rate</b>	500 $\mu$ s, All axes in the RX3i rack are updated simultaneously
<b>Velocity Loop Update Rate</b>	125 $\mu$ s, All axes in the RX3i rack are updated simultaneously
<b>Torque Loop Update Rate</b>	62.5 $\mu$ s, All axes in the RX3i rack are updated simultaneously
<b>Controlled Axes/Module</b>	4 $\beta$ i, $\beta$ HVi or aHVi series servos are supported via a fiber optic interface
<b>Master Axes/Module</b>	1, Can be a virtual time-based or incremental encoder master
<b>Servo Command Interface</b>	Fiber Optic 50 Mb/s FANUC Serial Servo Bus (FSSB)
<b>Fiber Terminal Block Cable Length</b>	Max. 100 meters between nodes 400 meters maximum for a 4 axis system
<b>Maximum Axes per RX3i</b>	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)
<b>Position Resolution</b>	aHVi Series 1,048,576 counts/rev, $\beta$ i and $\beta$ HVi Series 65,536 or 131,072 counts/rev. $\beta$ 2i and larger motors support the higher resolution.
<b>Feedback Type</b>	Incremental/Absolute Serial Encoder. Optional battery backup required for absolute feedback mode.
<b>Faceplate I/O</b>	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
<b>Floating Point Support</b>	Yes, Double precision IEEE 754.
<b>Module Hot Insertion/Removal</b>	Yes
<b>Cam Profiles per Module</b>	256 at one time. Up to 2048 profiles can be stored in the RX3i file system for use by any module.
<b>Synch/Delayed Start</b>	Up to 8 axes Axes can be on any module and are synchronized over the backplane.
<b>High Speed Position Capture</b>	$\pm$ 2 Inputs per axis: $\pm$ 1 count = 10 $\mu$ s jitter
<b>Connector Type</b>	Plug-on Screw Terminal and Fiber
<b>Internal Power Used</b>	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**

<b>Product Name</b>	<b>PACMotion I/O Fiber Terminal Block</b>
<b>Lifecycle Status</b>	Active
<b>Module Type</b>	I/O Terminal Block for PACMotion
<b>Mounting/Dimensions</b>	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)
<b>Interface to PACMotion Module</b>	Fiber Optic Cable. Maximum cable length is 100 meters; Interface uses a unique ID for each PMM/FTB pair to prevent cross-connection.
<b>Power Requirements</b>	19.2 VDC —28.8 VDC; 0.45 Amps @ 24 V
<b>24 V Outputs (differential)</b>	Eight optically isolated; source; open load & short detection. 2 groups of 4; 0.5 A max. per point; 4 A max. per group
<b>24 V General Purpose Inputs</b>	Sixteen optically isolated; source/sink 4 groups of 4
<b>5 V Outputs (differential)</b>	Four RS422 Line Driver with short circuit protection; 48 mA max.
<b>5 V Inputs (differential/single-ended)</b>	Six RS422 / RS485 Line Receiver with fault detection
<b>5 V Inputs (differential)</b>	Six RS422 / RS485 Line Receiver with fault detection
<b>Analog Inputs</b>	Two, ±10V differential 14 bit resolution
<b>Analog Outputs</b>	Two, ±10V differential 14 bit resolution
<b>24 V Power Output</b>	Reverse polarity protected by replaceable fuse
<b>5 V Power Output</b>	0.5 amp max. electronic overload protected
<b>Quad Encoder Open Circuit Detection</b>	Yes
<b>I/O Function Assignment</b>	Configurable I/O functions are assigned during module hardware configuration
<b>Terminal Header Options</b>	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 Digital Mode 8 - In Analog Mode
Analog Outputs	2	4 - In Digital 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														
<b>Product Name</b>	<b>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.</b>	<b>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.</b>														
<b>Lifecycle Status</b>	Mature	Active														
<b>Module Type</b>	Power Transducer Modules	Power Synch and Measurement Module														
<b>Input Voltage Range</b>	10-120 VAC (nominal)	20-600 VAC (nominal)														
<b>Power Measurement Configurations</b>	<table border="1"> <tr> <td>Grids</td> <td>Circuits</td> </tr> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>up to 4</td> </tr> </table>	Grids	Circuits	1	0	0	up to 4	<table border="1"> <tr> <td>Grids</td> <td>Circuits</td> </tr> <tr> <td>2</td> <td>0</td> </tr> <tr> <td>1</td> <td>up to 3</td> </tr> <tr> <td>0</td> <td>up to 6</td> </tr> </table>	Grids	Circuits	2	0	1	up to 3	0	up to 6
Grids	Circuits															
1	0															
0	up to 4															
Grids	Circuits															
2	0															
1	up to 3															
0	up to 6															
<b>Current Input Range</b>	0 to 7.5 Amps RMS (5 A RMS nominal)	0 to 7.5 Amps RMS (5 A RMS nominal)														
<b>Frequency Range</b>	35Hz to 70Hz	40Hz to 70Hz														
<b>Output Rating</b>	N/A	150 VAC/VDC, 1 A														
<b>Number of Outputs</b>	0	1 (provided as redundant, isolated, solid-state contacts)														
<b>Data</b>	<p>Data availability</p> <ul style="list-style-type: none"> <li>Data calculation rate: 20ms @ 50Hz, 16.67ms @ 60Hz</li> <li>Data latency: 15ms @ 50Hz, 16.67ms @ 60Hz</li> </ul> <p>Measured Data</p> <ul style="list-style-type: none"> <li>RMS voltage of phase A, B, and C (in Volts x 10)</li> <li>RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid</li> <li>DC component of measured RMS voltages (in Volts x 10)</li> <li>Frequency of phase A grid 1 (in Hz x 100)</li> <li>Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10)</li> </ul> <p>Power and Energy Data</p> <ul style="list-style-type: none"> <li>Active and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR)</li> <li>Active and reactive total energy consumption in Watt-Seconds and Volt-Amperes-Reactive-Seconds (updated once per second), re-settable by the user</li> <li>Total power factor</li> <li>Average real and reactive power consumption (sliding 15 minute window updated once per second)</li> </ul>	<p>Data availability</p> <ul style="list-style-type: none"> <li>Data measurement rate: 20ms @ 50Hz, 16.67ms @ 60Hz.</li> <li>Data latency: 8ms</li> </ul> <p>Measured Data</p> <ul style="list-style-type: none"> <li>RMS voltage of phase A, B, and C (in Volts x 10)</li> <li>RMS currents of phase A, B, C, and Neutral (in Amperes x 1000) for each grid</li> <li>DC component of measured RMS voltages (in Volts x 10)</li> <li>Frequency of phase A grid 1 and phase A grid 2 (in Hz x 100)</li> <li>Phase angle between phase A grid 1 and phase A grid 2 (in degrees x 10)</li> </ul> <p>Calculated Data</p> <ul style="list-style-type: none"> <li>Real and reactive power reported per phase and total in Watts, Volt-Amperes-Reactive (VAR)</li> <li>Real and reactive total energy consumption, integrated over the past 1-second, in Kilo Watt-Hours (kWh) and Kilo Volt-Amperes-Reactive-Hours (kVARh)</li> <li>Total power factor</li> <li>Average real and reactive power consumption (sliding 15 minute window updated once per second)</li> </ul>														
<b>Status and Diagnostics</b>	<ul style="list-style-type: none"> <li>Module Heartbeat (indicates module health)</li> <li>Utility Phase A voltage present</li> <li>Phase polarity valid</li> <li>Voltage measurements valid</li> <li>Current measurements valid</li> </ul>	<ul style="list-style-type: none"> <li>Module Heartbeat (indicates module health)</li> <li>Field connection OK</li> <li>Any grid alarm (single bit indication of power grid health)</li> <li>Grid Voltage fault</li> <li>Grid Current fault</li> <li>Mixed Polarity fault</li> <li>ANSI Protection Relay Calculations</li> <li>Grid Synchronization (ANSI 25)                             <ul style="list-style-type: none"> <li>Phase Shift OK</li> <li>Voltage Difference OK</li> <li>Frequency Difference OK</li> <li>Close Relay OK</li> </ul> </li> <li>Under Voltage alarm (ANSI 27)</li> <li>Reverse Power alarm (ANSI 32)</li> <li>Negative Sequence alarm (ANSI 46)</li> <li>Over Current alarm (ANSI 50)</li> <li>Over Voltage alarm (ANSI 59)</li> <li>VA Imbalance alarm (ANSI 60)</li> <li>Under Frequency alarm (ANSI 81U)</li> <li>Over Frequency alarm (ANSI 81O)</li> </ul>														
<b>Internal Power Used</b>	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**

<b>Product Name</b>	<b>RX3i Solenoid Module</b>
<b>Lifecycle Status</b>	Active
<b>Number of Points</b>	(11) Pneumatic Outputs (5) 24 VDC Outputs
<b>Pneumatic Outputs</b>	11
<b>Supply Pressure</b>	100 PSI
<b>Pressure Drop</b>	25 psi max.@ 0.25scfm
<b>External Solenoid Power</b>	21.6-26.4 VDC, 24 VDC nominal
<b>ON Response Time/Off Response Time</b>	12ms max. ON 12ms max. OFF
<b>Solenoid Inrush Current</b>	33 mA/valve @ 24 VDC
<b>Solenoid Holding Current</b>	13 mA/valve @ 24 VDC
<b>Output Fitting</b>	Threaded for 10-32 adapter, 1/16" hose barb provided
<b>Supply Fitting</b>	Threaded for 10-32 adapter, 1/8" hose barb provided
<b>Load Current per Point</b>	0.5A @ 30 VDC per point, 2.0A total for all five points
<b>Response Time (ms)</b>	0.5 on/0.5 off
<b>Output Type</b>	Transistor
<b>Polarity</b>	Positive
<b>Internal Power Used</b>	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
<b>Product Name</b>	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
<b>Lifecycle Status</b>	Active	Active	Active
<b>Module Type</b>	Ethernet Communications (Supports redundant Ethernet modules)	Ethernet Communications	High Speed Serial Expansion Module
<b>Backplane Support</b>	Universal Backplane Only. Uses PCI Bus.	Compatible with Series 90-30 bases only	Universal Backplane Only
<b>Number of Slots Module Occupies on Backplane</b>	3 (2 for NIU and 1 for Ethernet module)	N/A	No I/O slot used
<b>Built-in Communication Ports</b>	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
<b>I/O Discrete Points</b>	2048 Inputs/2048 Outputs maximum	2048 Inputs/2048 Outputs maximum	N/A
<b>I/O Analog Points</b>	1264 Inputs and 512 Outputs maximum	1264 Inputs and 512 Outputs maximum	N/A
<b>User Logic Memory</b>	5Kbytes of local logic	No local logic	N/A
<b>Network Data Rate</b>	10/100Mbit ports (RJ-45)	10/100Mbit ports (RJ-45)	1 Mbaud
<b>Entity Type</b>	Slave	Slave	Master
<b>Network Distance</b>	Network Dependent	Network Dependent	Up to 700 feet (213 meters)
<b>Bus Diagnostics</b>	Supported	Supported	Yes
<b>Number of Drops Supported</b>	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
<b>Internal Power Used</b>	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 CJs) 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
IC690RBT001	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
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**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 interposing 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
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**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
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**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.

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

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

**Reflective Memory Interface Modules for PCs**

PMC 5565 Reflective Memory PMC Module

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

PCI 5565 Reflective Memory PCI Module

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

PCI Express 5565 Reflective Memory PCIE Module

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

<b>HUB-5595-308</b>	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Multimode Pluggable transceivers	Active
<b>HUB-5595-380</b>	DIN-rail Mount Reflective Memory Hub. 21 -32 VDC Power supply, 1x 10BaseT Ethernet, 1x RS232, 8x Single mode Pluggable transceivers	Active
<b>ACC-5595-208</b>	Rack Mount or Desktop Reflective Memory Hub. Universal power supply, 1x 10BaseT Ethernet, 1x RS232, 8x multimode pluggable transceivers	Active
<b>ACC-5595-280</b>	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)**

<b>IC695STK001</b>	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
<b>IC695STK002</b>	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
<b>IC695STK003</b>	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
<b>IC695STK004</b>	RX3i Power PACKage 4 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSA040, IC695ETM001, IC646MPP101)	Active
<b>IC695STK005</b>	RX3i Power PACKage 5 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSA040, IC646MPP101)	Active
<b>IC695STK006</b>	RX3i Power PACKage 6 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSD040, IC695ETM001, IC646MPP101)	Active
<b>IC695STK007</b>	RX3i Power PACKage 7 Starter Kit includes (one each IC695CPU305, IC695CHS012, IC695PSD040, IC646MPP101)	Active
<b>IC695STK010</b>	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, Active Ethernet, analog simulator, 6" TFT QuickPanel View/Control. Proficy Machine Edition Professional Edition included.	
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/O Base 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 10/100Mbps
		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, SNMP, 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 <sup>a</sup> 4 km <sup>b</sup>	40 km <sup>c</sup>	80 km <sup>d</sup>
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

**Vibration:** 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**

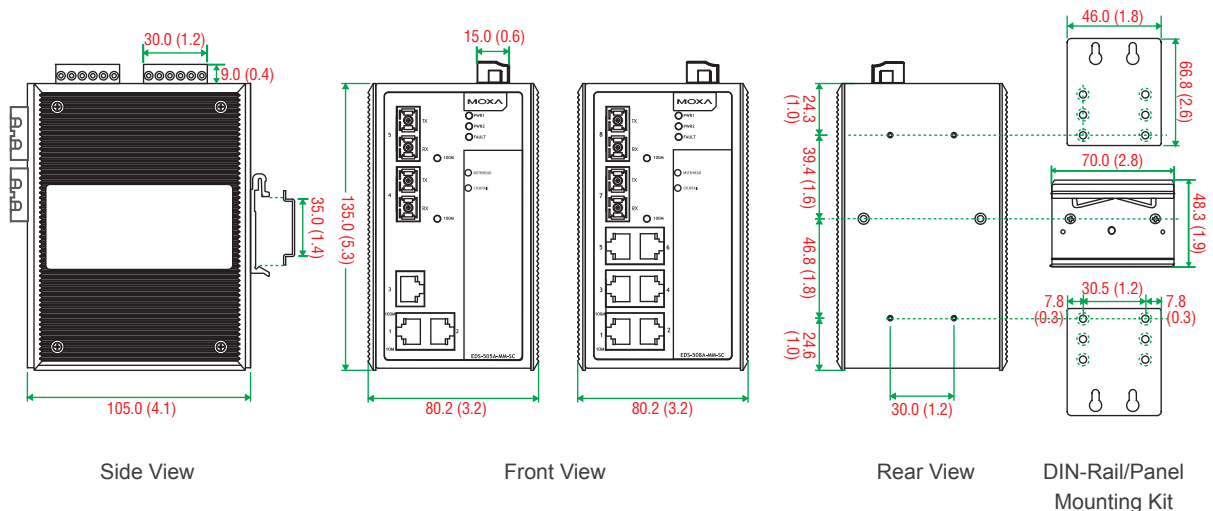
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

**Dimensions**

**EDS-505A/508A Series**

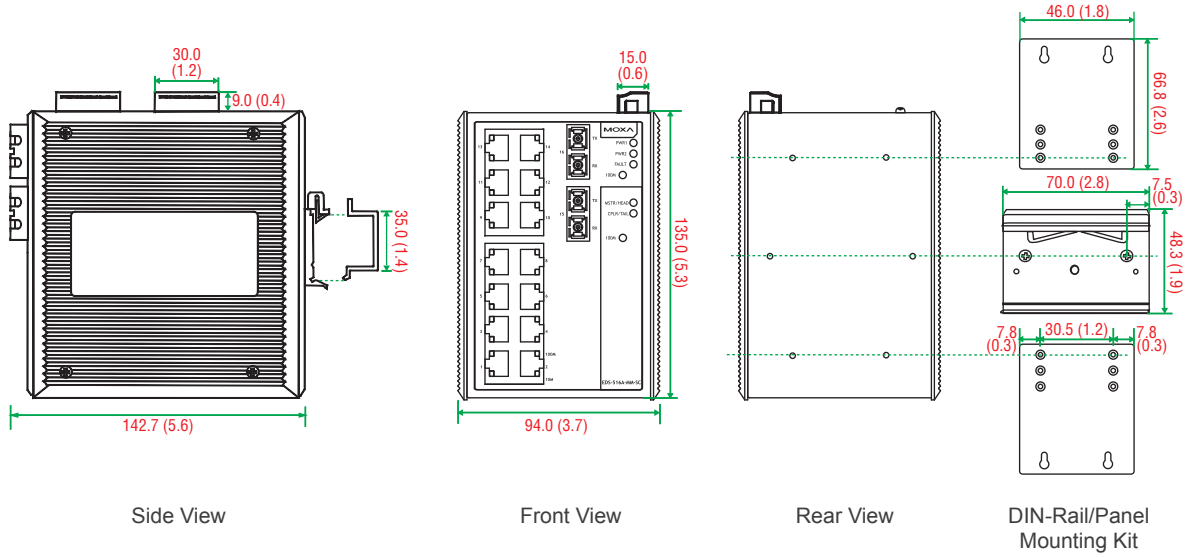
Unit: mm (inch)



**Dimensions**

**EDS-516A Series**

Unit: mm (inch)



**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
<b>EDS-505A/508A Series</b>						
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
<b>EDS-516A Series</b>						
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
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#### 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 $\pm$ 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 HMI and Supervisory Solutions Features

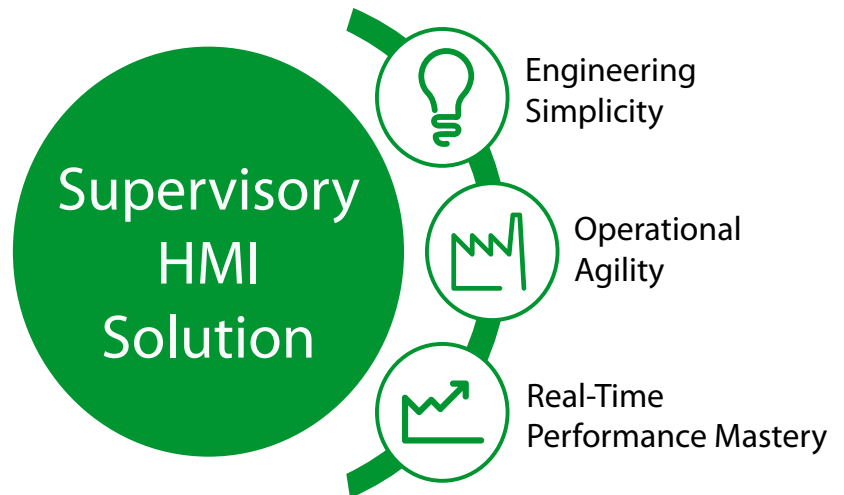


## RELEASE AT A GLANCE

- 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 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.

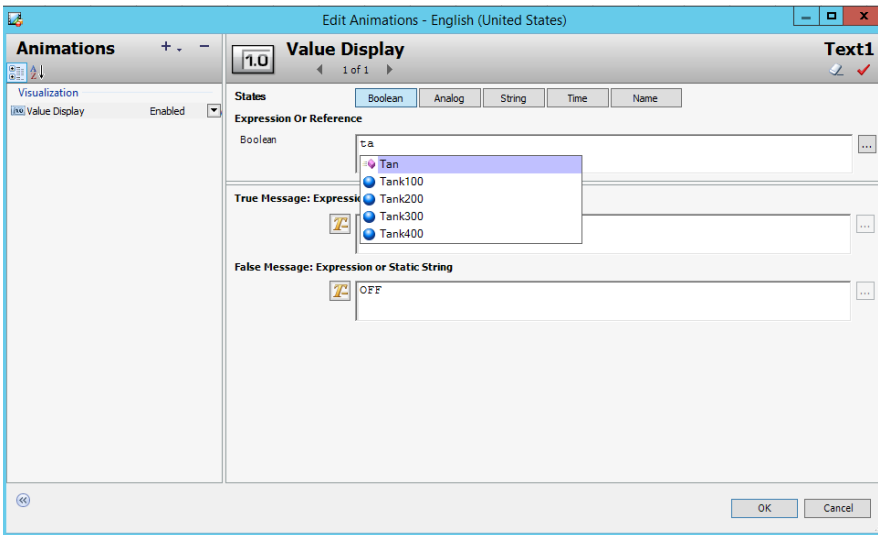
2014 R2 also includes an integrated Galaxy Scrubber which compresses and validates the entire Galaxy to ensure a complete migration process. The Galaxy Scrubber reduces database size by more than half and eliminates failures due to 'out of disk' issues during migration.

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)

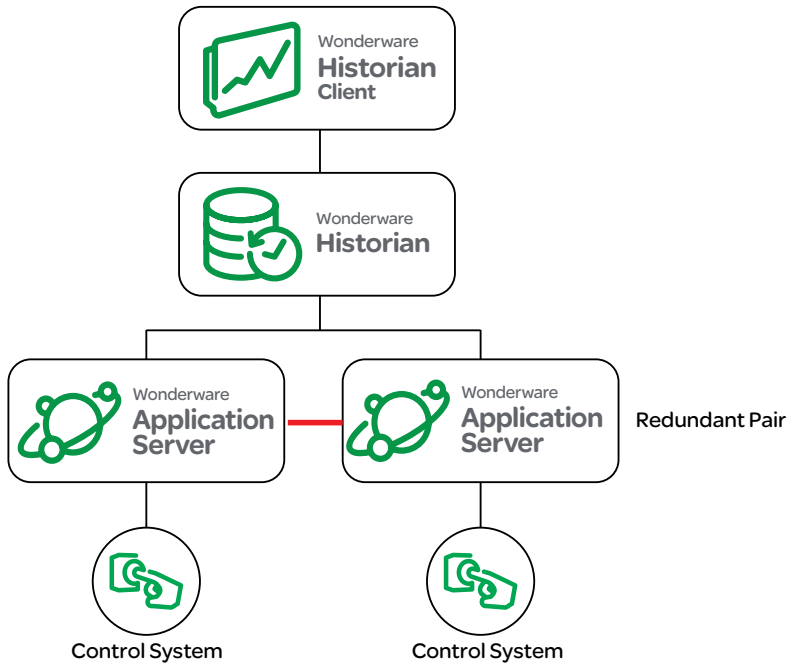
## Faster More Accurate Scripting, Less Troubleshooting

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

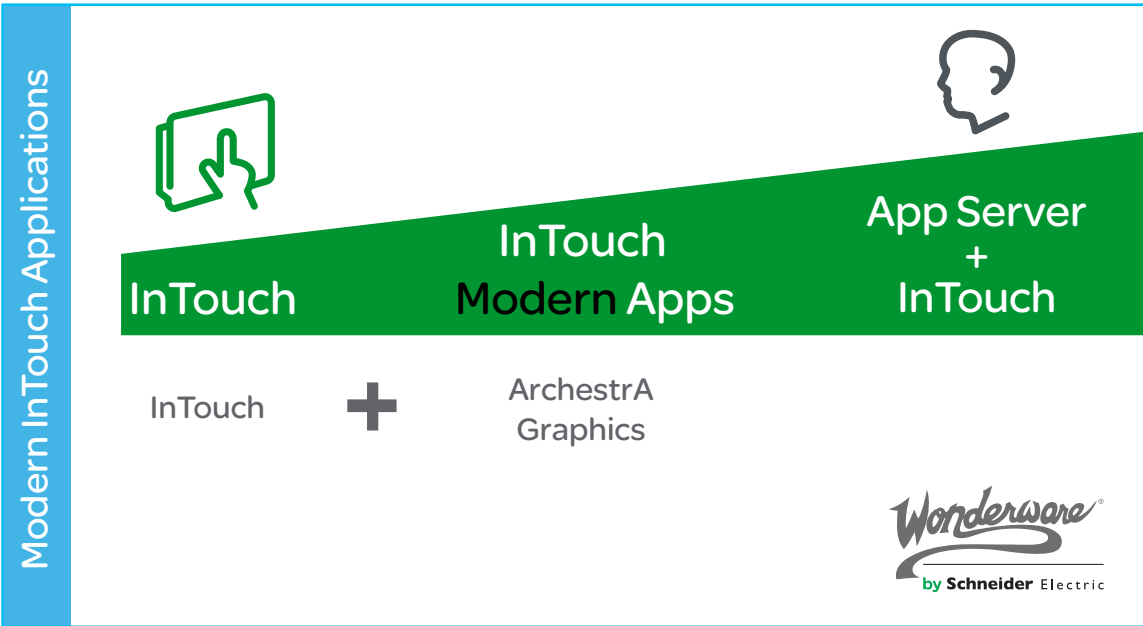
## Features (continued)

**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 ArchestraA 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

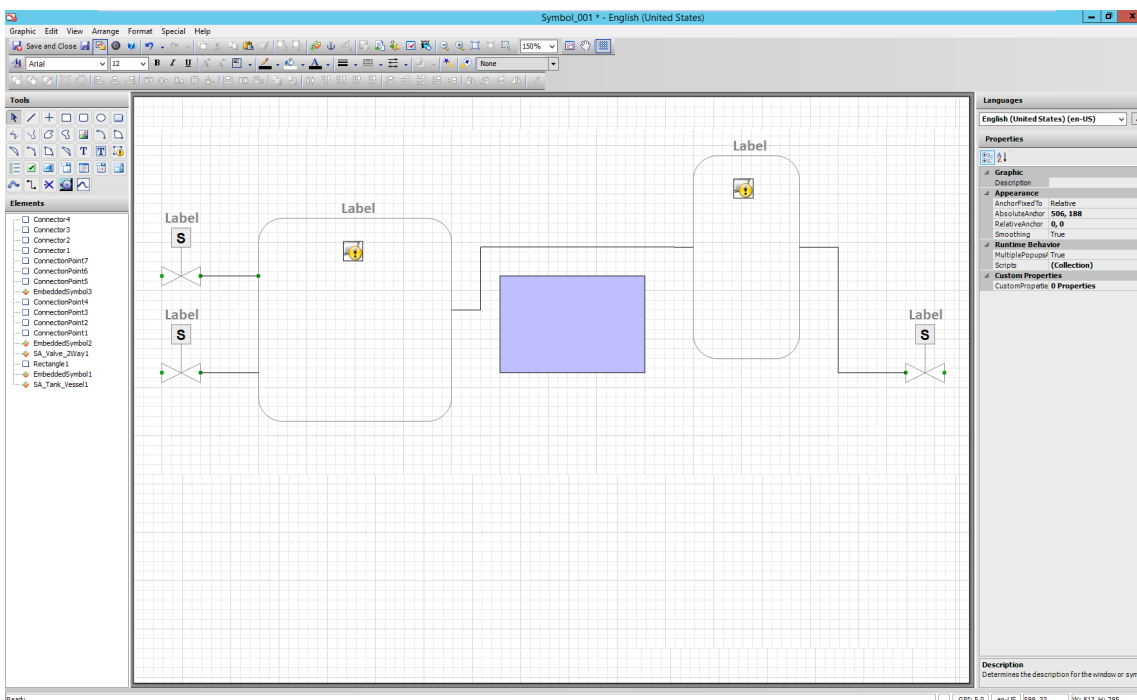
Continuing the Wonderware reputation of unrivaled uninterrupted migration path and preserving previous engineering investment, two new features take the work, worry, and guesswork out of transitioning your legacy existing InTouch application to the most current technology.

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.

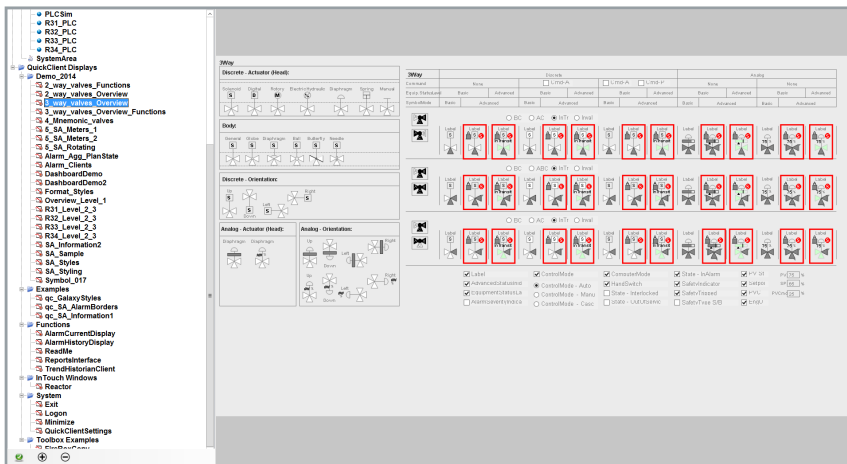
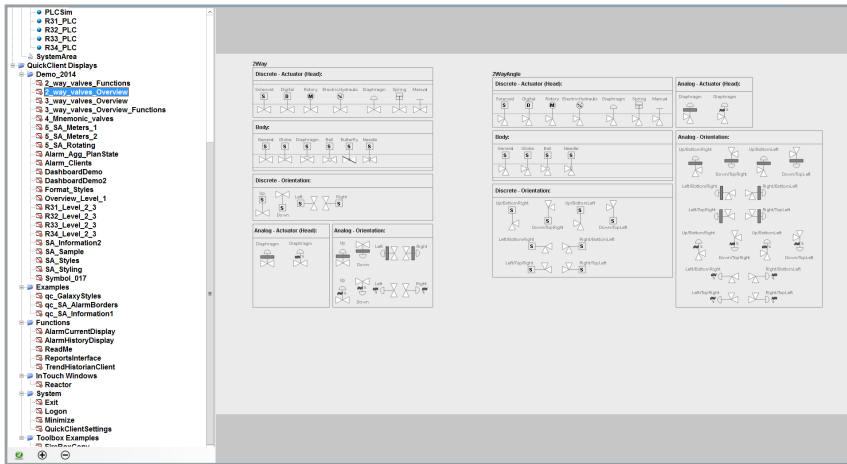


# Wonderware HMI and Supervisory Solutions Features (continued)

## New Situational Awareness Symbols

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

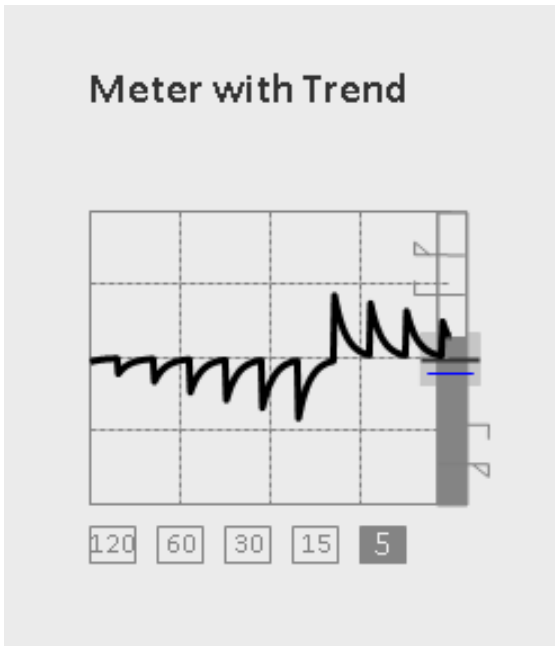
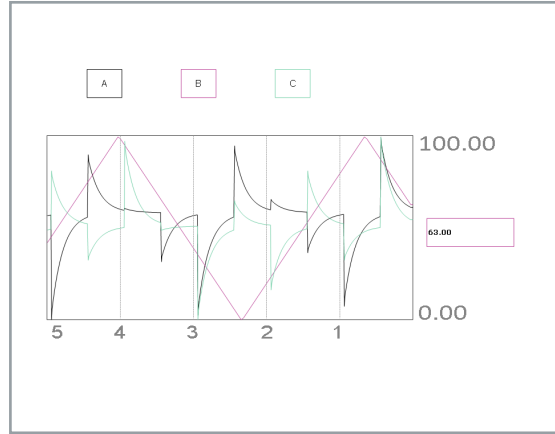
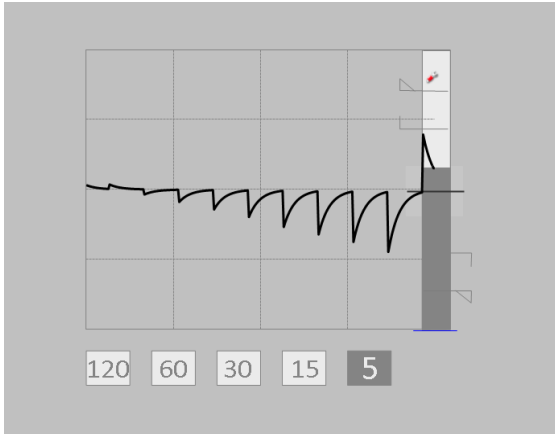
Valve Situational Awareness Symbols – The new set of Symbol Wizards for Valves greatly expand the possibilities to over one million combinations and orientations.



# 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

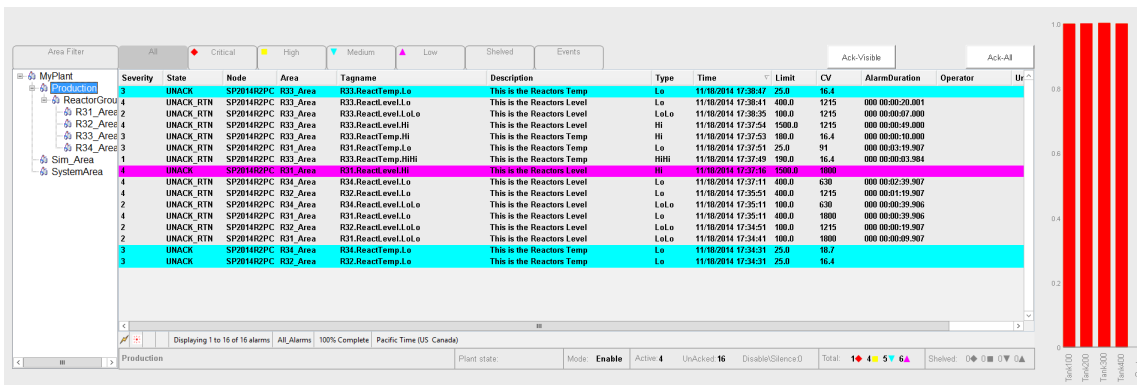


## Easily Visualize Summarized Historical Data

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.

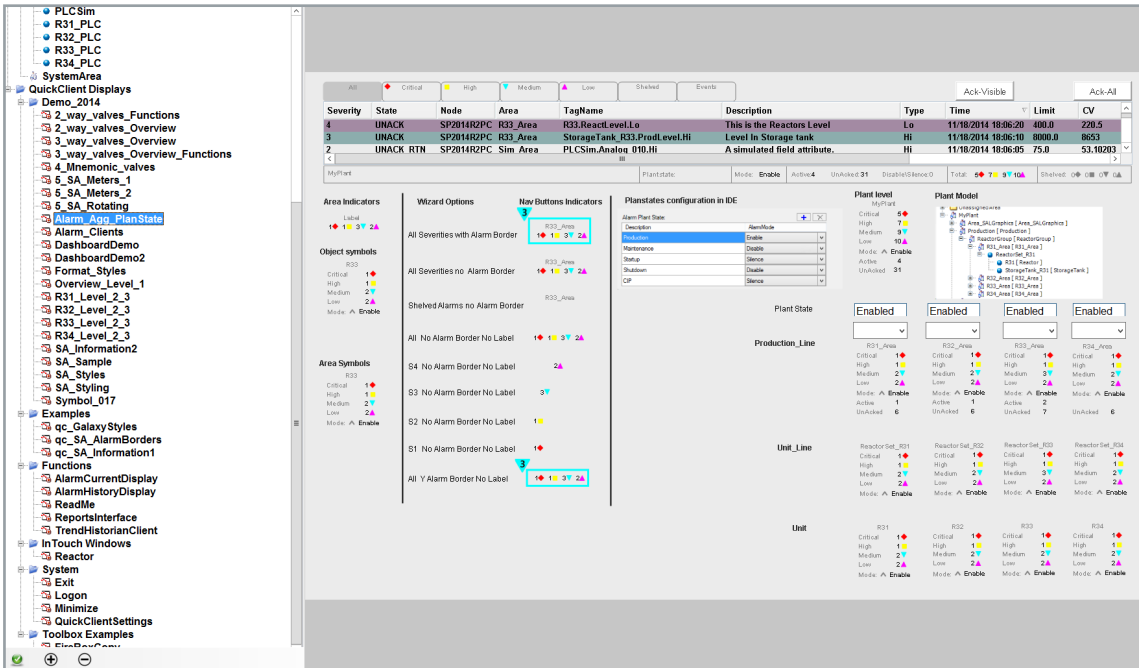
## New Situational Awareness Symbols

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.**

# 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
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# 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 $\pm$ 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 $\pm$ 10 %)
Residual ripple	< 10 mV <sub>PP</sub> (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 <sub>PP</sub> (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 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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	$U_{OUT} > 0.9 \times U_N$ : High signal
Maximum switching voltage	$\leq 24$ V
Output voltage	+ 24 V DC (Signal)
Maximum inrush current	$\leq 40$ mA
Continuous load current	$\leq 40$ mA
Status display	"DC OK" LED green
Note on status display	$U_{OUT} < 0.9 \times U_N$ : LED flashing
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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, $U_{OUT} > 0.9 \times U_N$ : Contact closed
Maximum switching voltage	$\leq 30$ V AC/DC
Maximum inrush current	$\leq 1$ A
Continuous load current	$\leq 1$ 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 / IEC60947 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 

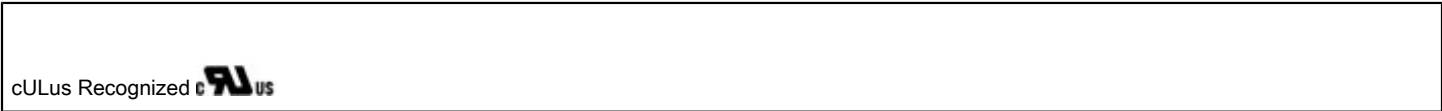
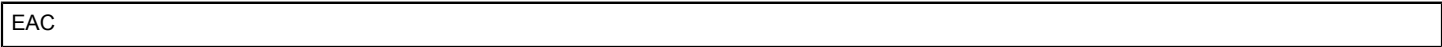
cUL Listed 

GL

DNV

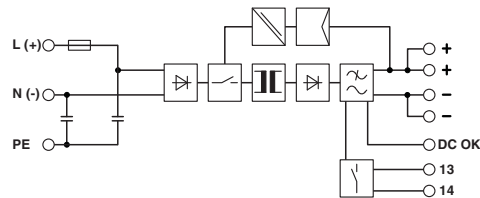
# Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

## Approvals

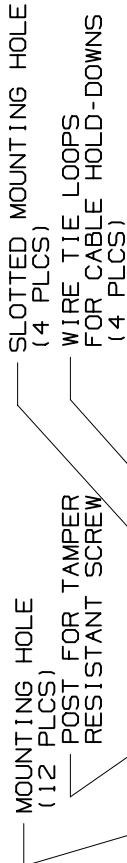


## Drawings

Block diagram



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PANDUIT PART NO.	WEIGHT
CBXF12**-A	3.3 LB/10 PCS (1480 G/10 PCS)

**NOTES:**

- SEE CURRENT CATALOG FOR ADDITIONAL PART NUMBER SUFFIXES TO INDICATE COLOR AND OR PACKAGE QUANTITY.
- SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
- SURFACE MOUNT BOX HOLDS UP TO 12 MINI-COM CONNECTOR MODULES.
- ALSO INCLUDED WITH BOX:
  - PLT1.51-C PAN-TY
  - STRIPS OF 3.00" X .75" FOAM TAPE
  - STRIPS OF 1.50" X .75" FOAM TAPE
  - #6-32 MOUNTING SCREW
  - TAMPER RESISTANT SCREW (TO SECURE COVER TO BASE)
  - LABEL
  - LABEL COVER
- THE BUILT IN FIBER SPOOL MAINTAINS THE RECOMMENDED MINIMUM BEND RADIUS FOR FIBER OPTIC AND CATEGORY 5 CABLES.
- CAN BE USED WITH PAN-WAY LD3, CD3, LDS, CDS, LD10, CD10 RACEWAYS.
- DIMENSIONS IN PARENTHESES ARE IN METRIC.

NO WARRANTY, EXPRESSED OR IMPLIED, IS MADE BY PANDUIT WITH RESPECT TO THE EXISTENCE OF DEFECTS, PERFORMANCE, OR ANY OTHER THINGS THE CONDITIONS WHICH THEY MAY BE APPLIED ARE BEYOND PANDUIT'S CONTROL.

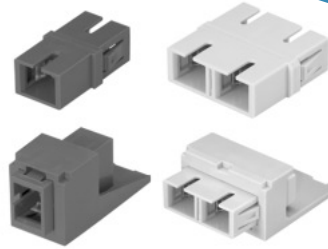
CAD FILENAME=LAYERS D35544BZ\_DC\_CBXF12\_00B.PRT

<p><b>PANDUIT</b> CORP. TINLEY PARK, ILLINOIS</p> <p>12 MODULE SPACE MULTI-MEDIA FIBER OUTLET (CBXF12**-A) CUSTOMER DRAWING</p>		<p>UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: (.X) ± (.XXX) ± .010(.3) (.XX) ± .03(.8) ANGLES ±</p>		<p>UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.</p>				
		<p>DRAWN BY: RCA</p> <p>DATE: 12-4-96</p> <p>CHK'D: CEF</p>	<p>MAT'L:</p> <p>ABS</p>	<p>SCALE: NONE</p>	<p>DRAWING NO. 35544-24</p> <p>SHT 1 OF 2</p>	<p>DWG A</p> <p>SIZE</p>		
1	1-8-02	Jsp	A. REVISED NOTE #4.	35544-24	ECN - R	CUST	SUP	
R	12-4-96	RCA	RELEASED TO PRODUCTION.	35544-24				
REV	DATE	BY	CHK	DESCRIPTION	ECN	R	CUST	SUP

# SC Fiber Optic Adapters

## 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

<b>Standards requirements:</b>	TIA/EIA-604 FOCIS-3 compliant; exceeds TIA/EIA-568-B.3 requirements
<b>Split sleeve material:</b>	Phosphor bronze or zirconia ceramic (required for singlemode applications)
<b>Insertion loss:</b>	.1dB average (multimode), .15dB average (singlemode); supports the performance of FOCIS-3 compliant connectors/patch cords
<b>Return loss:</b>	Supports singlemode (>40dB for SPC and >55dB for UPC) and multimode (>20dB) connector polish performance

\*PANDUIT LC Connector/Adapter connection

## key features and benefits

<b>Integrated panel retention clips</b>	No metal clips to become bent, damaged or lost; clips automatically adjust for FOCIS-3 compliant panel thickness variations for improved mounting
<b>High glass transition temperature latch material (Tg&gt;100°C)</b>	Meets Telcordia GR-326-CORE, Issue 3; maintains latch integrity/geometry in high temperature environments for improved reliability
<b>Improved adapter protective cap design</b>	Maximum protection from contamination; protective cap fully surrounds split sleeve opening
<b>Short flange design</b>	Improved modularity and higher density usage
<b>Choice of phosphor bronze or zirconia ceramic split sleeves</b>	Provides an adapter split sleeve material option to fit specific network requirements
<b>Q.C. number and split sleeve material laser marked on every adapter</b>	Assures 100% traceability; quick and easy identification of split sleeve material: SC-P = Phosphor Bronze and SC-Z = Zirconia Ceramic
<b>Adapters available in MINI-COM® Modules</b>	System flexibility; adapter modules can be used in all MINI-COM® closet products and work area outlets
<b>Adapters available in patch panels, fiber adapter panels (FAPs) and OPTICOM® QUICKNET™ Pre-Terminated MTP* Cassettes</b>	Provides a complete SC system solution
<b>Adapters and modules available in multiple colors</b>	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](http://www.panduit.com)

### SC Fiber Optic Adapters

<b>Simplex MM:</b>	FASSCEI-L
<b>Duplex MM:</b>	FADSCEI-L
<b>Simplex 10Gig™:</b>	FASSCAQ-L
<b>Duplex 10Gig™:</b>	FADSCAQ-L
<b>Simplex 10Gig™ (zirc.):</b>	FASSCZAQ-L
<b>Duplex 10Gig™ (zirc.):</b>	FADSCZAQ-L
<b>Simplex SM (zirc.):</b>	FASSCZBU-L
<b>Duplex SM (zirc.):</b>	FADSCZBU-L
<b>Simplex APC (zirc.):</b>	FASSCZAG-L
<b>Duplex APC (zirc.):</b>	FADSCZAG-L

L = Bag of 50 adapters; 100 per carton.

### MINI-COM® SC Adapter Modules

<b>Simplex MM:</b>	CMSEISCEI
<b>Duplex MM:</b>	CMDEISCEI
<b>Simplex 10Gig™:</b>	CMSAQSCBL
<b>Duplex 10Gig™:</b>	CMDAQSCBL
<b>Simplex 10Gig™ (zirc.):</b>	CMSAQSCZBL
<b>Duplex 10Gig™ (zirc.):</b>	CMDAQSCZBL
<b>Simplex SM (zirc.):</b>	CMSBUSCZBU
<b>Duplex SM (zirc.):</b>	CMDBUSCZBU
<b>Simplex APC (zirc.):</b>	CMSAGSCZBL
<b>Duplex APC (zirc.):</b>	CMDAGSCZBL

### OPTICOM® SC Fiber Adapter Panels

<b>6 duplex MM:</b>	FAP6WEIDSC
<b>6 duplex 10Gig™:</b>	FAP6WAQDSCZ
<b>6 duplex SM (zirc.):</b>	FAP6WBUDSCZ
<b>12 simplex SM (zirc.):</b>	FAP12WBUSCZ

### OPTICOM® QUICKNET™ Pre-Terminated MTP\* Cassettes

<b>12 SC to MTP* (12f):</b>	FC^12-3S
<b>6 SC to MTP* (12f):</b>	FC^12-3

### SC Simplex Fiber Optic Connectors

<b>MM (900µm/3mm, black):</b>	FSCMBL
<b>MM (900µm/3mm, red):</b>	FSCMRD
<b>SM (900µm/3mm, blue):</b>	FSCSBU
<b>MM (900µm/2mm, black):</b>	FSCM2.0BL
<b>MM (900µm/2mm, red):</b>	FSCM2.0RD
<b>SM (900µm/2mm, blue):</b>	FSCS2.0BU

### SC Duplex Fiber Optic Connectors

<b>Multimode (3mm only):</b>	FSCDM
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### OPTI-CORE® Fiber Optic Patch Cords

<b>Duplex SC to SC:</b>	F^AD3-3M‡
<b>Simplex SC to SC:</b>	F^AS3-3M‡
<b>Simplex SC to pigtail:</b>	F^AB3-NM‡

### HD Connector Removal Tool

<b>For LC and SC:</b>	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.

# SC Fiber Optic Adapters

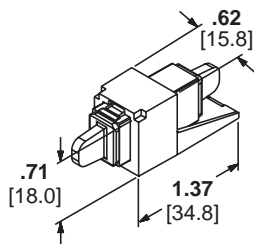
## selection information

Part Number	Adapter Type	Split Sleeve Material	Adapter Color	Module Color	Average Insertion Loss <sup>^</sup>	Return Loss <sup>^</sup>		
<b>SC Adapters</b>								
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				
<b>SC Adapter Modules</b>								
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				

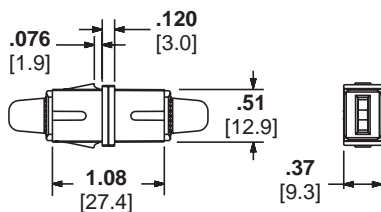
<sup>^</sup>PANDUIT SC Connector/Adapter connection

\*\*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).

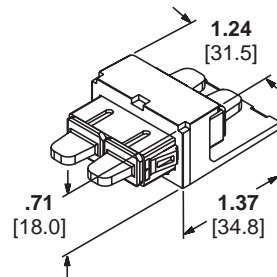
### MINI-Com® SC Simplex Adapter Module



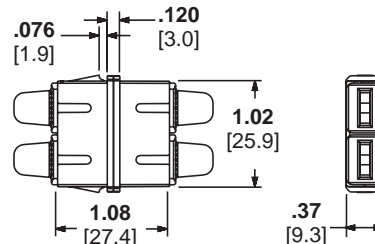
### SC Simplex Adapter



### MINI-Com® SC Duplex Adapter Module



### SC Duplex Adapter



Dimensions are in inches [Dimensions in brackets are in millimeters]

### WORLDWIDE SUBSIDIARIES AND SALES OFFICES

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or by phone: 800-777-3300 and reference FBSP16

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WW-FBSP16  
Replaces SA-NC10SP01E  
10/2005

# APC Back-UPS® Pro ~~1300/1500~~

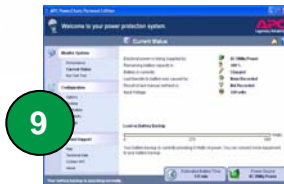
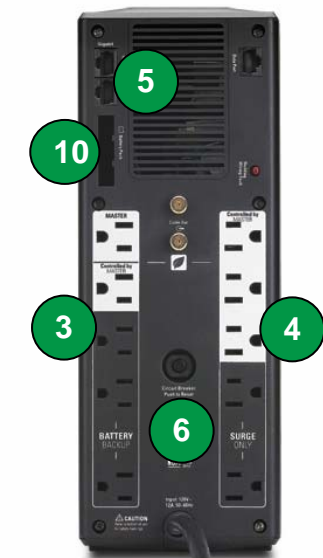
## Power-Saving, high performance power protection for office computers

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)

## Back-UPS RS 1300 & 1500 Specifications

Model Number	BR1300G	BR1500G
<b>Output</b>		
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 <i>Master</i> & 1 <i>Controlled</i> ) 5 surge protection only (incl. 3 <i>Controlled</i> outlets)	10 total NEMA 5-15R outlets: 5 battery & surge (incl. 1 <i>Master</i> & 1 <i>Controlled</i> ) 5 surge protection only (incl. 3 <i>Controlled</i> outlets)
Waveform Type	Stepped Approximation to Sine Wave	Stepped Approximation to Sine Wave
<b>Input</b>		
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
<b>Surge Protection</b>		
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)
<b>Physical</b>		
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
<b>Battery</b>		
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)
<b>Management</b>		
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)
<b>Safety</b>		
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



# IEC Terminal Block Accessories

Screw Type Center Jumpers, Jumper Links, and Jumper Covers




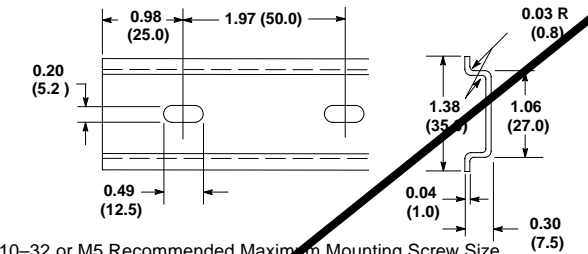

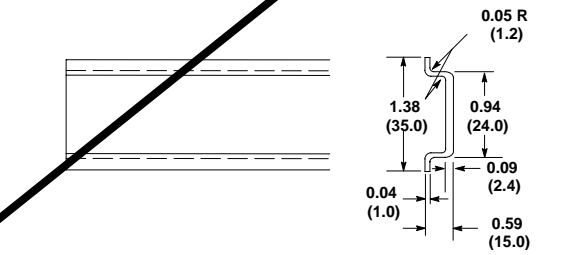

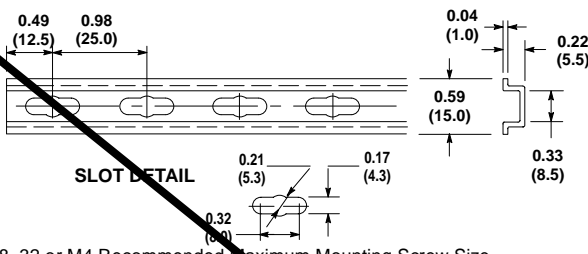
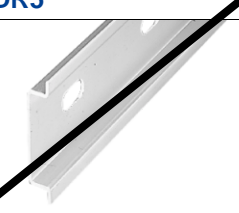
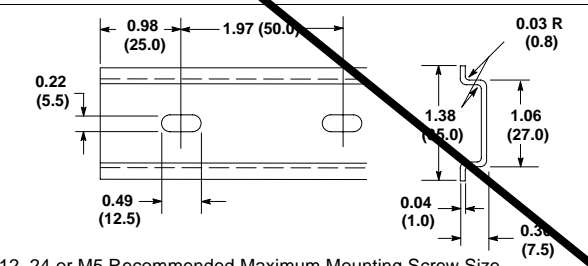

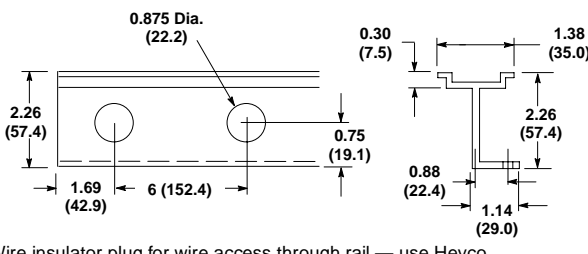

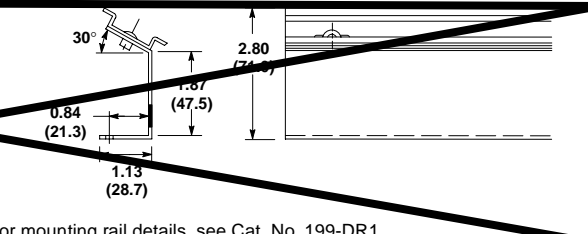
Used On	Cat. No.	Pcs/Pkg
1492-J3, JD3..., JDG3..., J2Q, J3TW, J3F, JD3F	1492-CJJ5-2	50
	1492-CJJ5-3	50
	1492-CJJ5-4	50
	1492-CJJ5-10	20
1492-J4, J4M	1492-CJJ6-2	50
	1492-CJJ6-3	50
	1492-CJJ6-4	50
	1492-CJJ6-10	20
1492-J6	1492-CJJ8-2	50
	1492-CJJ8-3	50
	1492-CJJ8-4	50
	1492-CJJ8-10	20
1492-J10	1492-CJJ10-2	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-CJJ20-2	5
1492-J70	1492-CJJ20-3	5
	1492-CJJ20-4	5
	1492-CJM5-2	10
	1492-CJM5-3	10
1492-WM3	1492-CJM5-4	10
	1492-CJM5-5	10
	1492-CJM5-10	10
	1492-W3, WM3, WR3, WTF3..., WTS3...	1492-CJL5 (Link)
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-WM4, W4TW	1492-CJD6-10	10	
	1492-CJLD5 (Link)	10	
1492-W3	1492-CJ5-2	10	
	1492-CJ5-3	10	
	1492-CJ5-10	10	
	1492-CJCW5 (CJ Cover)*	20	
1492-WTF3..., WTS3...	1492-CJT5-50	5	
	1492-CJT5-2	10	
	1492-CJT5-3	10	
	1492-CJT5-4	10	
	1492-CJT5-5	10	
1492-W4, W4TW	1492-CJT5-10	10	
	1492-CJ6-50	5	
	1492-CJ6-2	10	
	1492-CJ6-3	10	
	1492-CJ6-4	10	
1492-W4	1492-CJ6-5	10	
	1492-CJ6-10	10	
	1492-W4	1492-CJL6 (Link)	10
	1492-W4, W6, W10	1492-CJCW6 (CJ Cover)*	20
		1492-CJ7-40	5
1492-CJ7-2		10	
1492-W6	1492-CJ7-3	10	
	1492-CJ7-4	10	
	1492-CJ7-5	10	
	1492-CJ7-10	10	
1492-W6	1492-CJL7 (Link)	10	
	1492-CJ8-40	5	
1492-W10	1492-CJ8-2	10	
	1492-CJ8-3	10	
	1492-CJ8-4	10	
	1492-CJ8-5	10	
1492-W10	1492-CJ8-10	10	
	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.

**DIN Mounting Rails**

Item	Description	Pcs./Pkg.	Dimensions ❶
<p><b>199-DR1</b></p> 	<p>Symmetrical Rail                      35 mm x 7.5 mm                      3.28' (1 m) long                      Zinc-Plated, Yellow                      Chromated Steel                      EN50022</p> <p><b>DIN #3</b></p>	<p>10</p>	 <p>#10-32 or M5 Recommended Maximum Mounting Screw Size</p>
<p><b>199-DR4</b></p> 	<p>Heavy Duty                      Symmetrical Rail                      35 mm x 15 mm                      3.28' (1 m) long                      Zinc-Plated, Yellow                      Chromated Steel                      EN50022</p> <p><b>DIN #3</b></p>	<p>5</p>	
<p><b>1492-DR3</b></p> 	<p>Mini 15 mm x 5.5 mm                      Rail 3.28' (1 m) long                      Zinc-Plated, Yellow                      Chromated Steel                      EN50042</p> <p><b>DIN #2</b></p>	<p>5</p>	 <p>SLOT DETAIL</p> <p>#8-32 or M4 Recommended Maximum Mounting Screw Size</p>
<p><b>1492-DR5</b></p> 	<p>Symmetrical Rail                      35 mm x 7.5 mm                      3.28' (1 m) long                      Copper-Free                      Aluminum EN50022</p> <p>For 1492 Terminal                      Blocks Only</p> <p><b>DIN #3</b></p>	<p>10</p>	 <p>#12-24 or M5 Recommended Maximum Mounting Screw Size</p>
<p><b>1492-DR6 ❷</b></p> 	<p>Symmetrical Rail                      35 mm x 7.5 mm                      2.26" (57.4 mm) high                      3.28' (1 m) long                      Copper-Free                      Aluminum</p> <p>For 1492 Terminal                      Blocks Only</p> <p><b>DIN #3</b></p>	<p>2</p>	 <p>Wire insulator plug for wire access through rail — use Heyco</p>
<p><b>1492-DR7 ❷</b></p> 	<p>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</p> <p><b>DIN #3</b></p>	<p>5</p>	 <p>For mounting rail details, see Cat. No. 199-DR1</p>

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

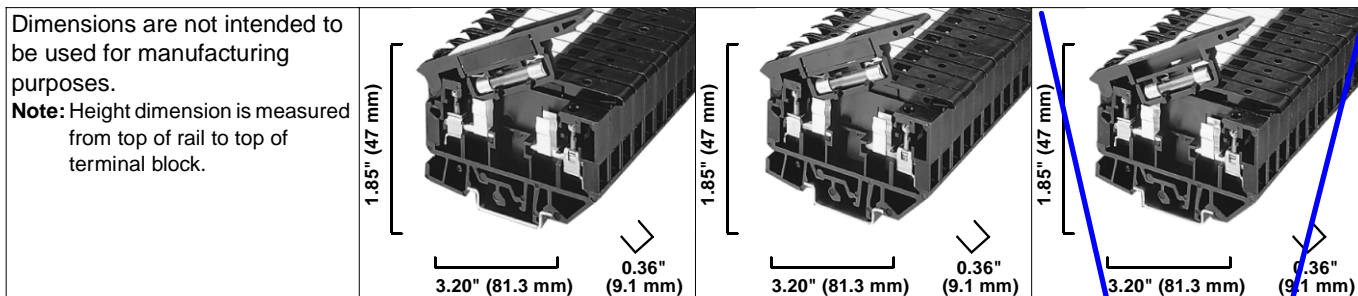


Dimensions Width x Length x Height	Used With	Color	Cat. No.	Pcs/Pkg
0.06 x 1.31 x 2.36 in (1.5 x 33.35 x 60 mm)	1492-J3, J4, J6, J10, J2Q, J3TW, J4M, J3F, JG2Q, JG3, JG3TW, JKD3, JKD3TP, J3P, J3PTP, JTC3...	Gray	1492-EBJ3	50
		Blue	1492-EBJ3-B	50
		Yellow	1492-EBJ3-Y	50
0.06 x 1.93 x 2.36 in (1.5 x 49 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, JD3PSSSTP, JDG3P, JDG3PTP, JDG3PSS, JDG3PSSSTP	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



Specifications	1492-H4			1492-H5			1492-H6		
	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 mm <sup>2</sup>	#30... #12 AWG	#30... #12 AWG	0.05... 4 mm <sup>2</sup>	#30... #12 AWG	#30... #12 AWG	0.05... 4 mm <sup>2</sup>
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)		
<b>Terminal Blocks</b>	<b>Cat. No.</b>	<b>Pcs./Pkg.</b>		<b>Cat. No.</b>	<b>Pcs./Pkg.</b>		<b>Cat. No.</b>	<b>Pcs./Pkg.</b>	
Terminal Block	1492-H4	25		1492-H5	25		1492-H6	25	
<b>Accessories</b> (page 12-172)	<b>Cat. No.</b>	<b>Pcs./Pkg.</b>		<b>Cat. No.</b>	<b>Pcs./Pkg.</b>		<b>Cat. No.</b>	<b>Pcs./Pkg.</b>	
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	

# Screw Connection Terminal Blocks

## Standard Feed-Through Blocks




	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.												
<b>Specifications</b>	Feed-Through Terminal Block				Feed-Through Terminal Block				Feed-Through Terminal Block			
<b>Certifications</b>		<b>CSA</b>	<b>IEC</b>	<b>EEx e II</b>		<b>CSA</b>	<b>IEC</b>	<b>EEx e II</b>		<b>CSA</b>	<b>IEC</b>	<b>EEx e II</b>
<b>Voltage Rating</b>	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
<b>Maximum Current</b>	25 A	20 A	24 A	21 A	35 A	32 A	28 A	28 A	50 A	41 A	36 A	36 A
<b>Wire Range (Rated Cross Section)</b>	30... 12 AWG	26... 12 AWG	2.5 mm <sup>2</sup>	2.5 mm <sup>2</sup> (20... 14 AWG)	22... 10 AWG	4 mm <sup>2</sup>	4 mm <sup>2</sup> (20... 12 AWG)	4 mm <sup>2</sup> (20... 12 AWG)	20... 8 AWG	6 mm <sup>2</sup>	6 mm <sup>2</sup> (20... 10 AWG)	6 mm <sup>2</sup> (20... 10 AWG)
<b>Wire Strip Length</b>	0.39 in (10 mm)				0.39 in (10 mm)				0.47 in (12 mm)			
<b>Recommended Tightening Torque</b>	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)			
<b>Density (Blocks per ft/meter)</b>	59 per ft/196 per meter				49 per ft/163 per meter				37 per ft/123 per meter			
<b>Housing Temperature Range</b>	-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)				-58...+248 °F (-50...+120 °C)			
<b>Terminal Blocks</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>
<b>Color:</b>	Gray	1492-J3		100	1492-J4		100	1492-J6		1492-J6		100
	Red	1492-J3-RE		100	1492-J4-RE		100	1492-J6-RE		1492-J6-RE		100
	Blue	1492-J3-B		100	1492-J4-B		100	1492-J6-B		1492-J6-B		100
	Black	1492-J3-BL		100	1492-J4-BL		100	1492-J6-BL		1492-J6-BL		100
	Green	1492-J3-G		100	1492-J4-G		100	1492-J6-G		1492-J6-G		100
	Yellow	1492-J3-Y		100	1492-J4-Y		100	1492-J6-Y		1492-J6-Y		100
	Orange	1492-J3-OR		100	1492-J4-OR		100	1492-J6-OR		1492-J6-OR		100
	Brown	1492-J3-BR		100	1492-J4-BR		100	1492-J6-BR		1492-J6-BR		100
	White	1492-J3-W		100	1492-J4-W		100	1492-J6-W		1492-J6-W		100
<b>Accessories</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>		<b>Cat. No.</b>		<b>Pcs/Pkg</b>
<b>Mounting Rails:</b>												
1 m Symmetrical DIN (Steel)		199-DR1		10	199-DR1		10	199-DR1		199-DR1		10
1 m Symmetrical DIN (Aluminum)		1492-DR5		10	1492-DR5		10	1492-DR5		1492-DR5		10
1 m Hi-Rise Sym. DIN (Aluminum)		1492-DR6		2	1492-DR6		2	1492-DR6		1492-DR6		2
1 m Angled Hi-Rise Sym. DIN (Steel)		1492-DR7		2	1492-DR7		2	1492-DR7		1492-DR7		2
<b>End Barriers</b>	Gray	1492-EBJ3		50	1492-EBJ3		50	1492-EBJ3		1492-EBJ3		50
	Blue	1492-EBJ3-B		50	1492-EBJ3-B		50	1492-EBJ3-B		1492-EBJ3-B		50
	Yellow	1492-EBJ3-Y		50	1492-EBJ3-Y		50	1492-EBJ3-Y		1492-EBJ3-Y		50
<b>End Anchors and Retainers:</b>												
Screwless End Retainer		1492-ERL35		20	1492-ERL35		20	1492-ERL35		1492-ERL35		20
DIN Rail — Normal Duty		1492-EAJ35		100	1492-EAJ35		100	1492-EAJ35		1492-EAJ35		100
DIN Rail — Heavy Duty		1492-EAHJ35		50	1492-EAHJ35		50	1492-EAHJ35		1492-EAHJ35		50
<b>Jumpers:</b> *												
Screw Center Jumper — 10 pole		1492-CJJ5-10		20	1492-CJJ6-10		20	1492-CJJ8-10		1492-CJJ8-10		20
Screw Center Jumper — 4 pole		1492-CJJ5-4		50	1492-CJJ6-4		50	1492-CJJ8-4		1492-CJJ8-4		50
Screw Center Jumper — 3 pole		1492-CJJ5-3		50	1492-CJJ6-3		50	1492-CJJ8-3		1492-CJJ8-3		50
Screw Center Jumper — 2 pole		1492-CJJ5-2		50	1492-CJJ6-2		50	1492-CJJ8-2		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		1492-T1		1
<b>Other Accessories:</b>												
Partition Plate		1492-EBJ16		20	1492-EBJ16		20	1492-EBJ16		1492-EBJ16		20
Test Plug Socket		1492-TPS23		20	1492-TPS23L		50	1492-TPS23L		1492-TPS23L		50
Test Plug		1492-TP23		20	1492-TP23		20	1492-TP23		1492-TP23		20
Test Plug (Stackable)		1492-TPJ5		25	1492-TPJ6		25	—		—		—
Electrical Warning Plate		1492-EWPJ5		25	1492-EWPJ5		25	1492-EWPJ8		1492-EWPJ8		50
Group Marking Carrier		1492-GM35		25	1492-GM35		25	1492-GM35		1492-GM35		25
<b>Marking Systems:</b>												
Snap-in Marker Cards		1492-M5X12 (144/card)		5	1492-M6X12 (120/card)		5	1492-M7X12 (108/card)		1492-M8X5 (160/card)		5
		1492-M5X5 (200/card)		5	1492-M6X5 (200/card)		5	1492-M8X5 (160/card)		1492-M8X5 (160/card)		5

\* Use of Center Jumpers may affect spacings, requiring derating of terminal blocks. See page 77 for details.

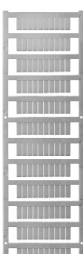
# IEC Terminal Block Accessories

## 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	120	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
	1492-W, 700-HA Relays	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, Entelec, Telemecanique, Legrand Products*	120	White	1492-MC5X5	5
	Phoenix, Wago, Wieland, Entelec, 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, Entelec, Telemecanique, and Legrand Products§	120	White	1492-MC6X10	5

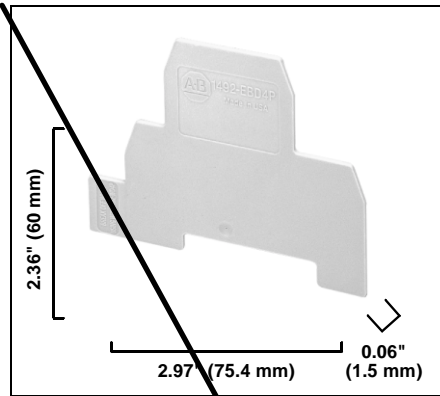
- \* May have some mounting limitations with Telemecanique Earthing Terminals.
- † May have some mounting limitations with Telemecanique Initiator/Actuator Terminals.
- ‡ May have some mounting limitations with Legrand Standard Terminals.
- § May have some mounting limitations with Telemecanique Initiator/Actuator Terminals, and Legrand Standard Terminals.

### Wire Markers

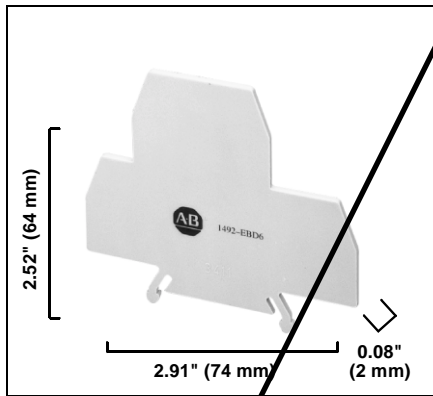
Wire Size	Insulation Dia.	Markers per Card	Color	Cat. No.	Pcs/Pkg
#20... #18 AWG (0.5... 1.0 mm <sup>2</sup> )	0.059... 0.098 in (1.5... 2.5 mm <sup>2</sup> )	40	White	1492-MWC1-12	5
#18... #14 AWG (0.75... 2.5 mm <sup>2</sup> )	0.078... 0.138 in (2.0... 3.5 mm <sup>2</sup> )	40	White	1492-MWC3-12	5
#12 AWG (2.5... 4.0 mm <sup>2</sup> )	0.098... 0.197" in (2.5... 5.0 mm <sup>2</sup> )	24	White	1492-MWC4-12	5

**IEC, Continued**

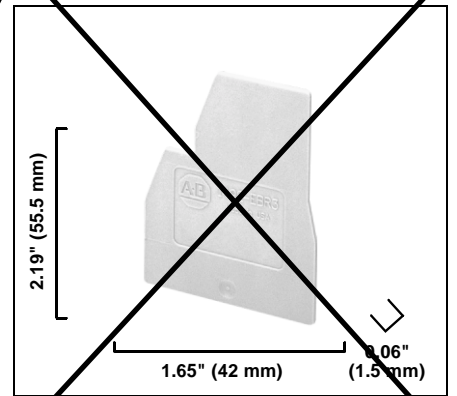
**1492-EBD4P**



**1492-EBD6**

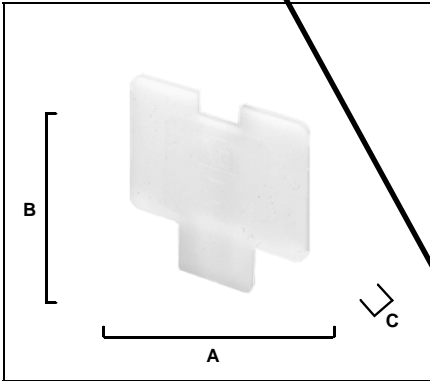


**1492-EBR3**

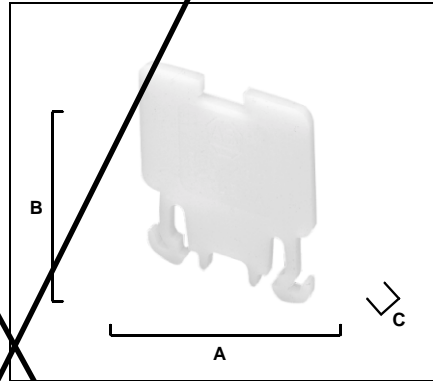


**NEMA/EEMAC**

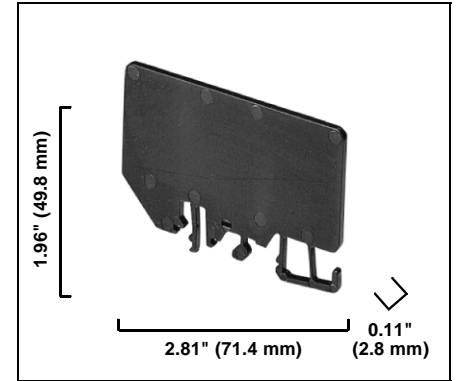
**1492-NM16, 1492-NM16BL,  
 1492-NM16GL, 1492-NM36**



**1492-N16, 1492-N17,  
 1492-N18, 1492-N36**



**1492-N37**

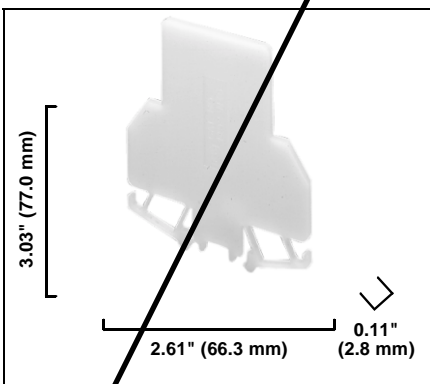


Cat. No.	A	B	C
1492-NM16	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM16BL	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM16GL	1.50" (38.1 mm)	1.39" (35.3 mm)	0.07" (1.78 mm)
1492-NM36	1.56" (39.6 mm)	1.45" (36.8 mm)	0.07" (1.78 mm)

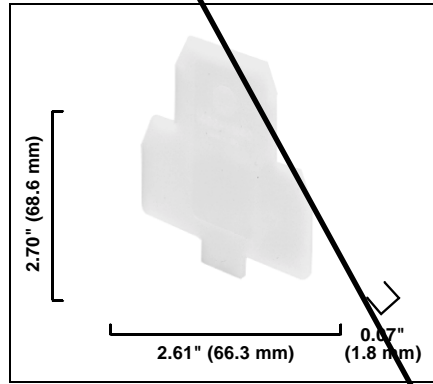
Cat. No.	A	B	C
1492-N16	1.50" (38.1 mm)	1.78" (45.2 mm)	0.11" (2.8 mm)
1492-N17	1.75" (44.5 mm)	2" (50.8 mm)	0.14" (3.6 mm)
1492-N18	1.25" (31.8 mm)	1.13" (28.7 mm)	0.11" (2.8 mm)
1492-N36	1.56" (39.6 mm)	1.68" (42.5 mm)	0.11" (2.8 mm)



**1492-N40**


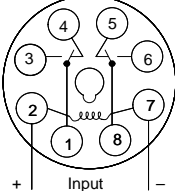
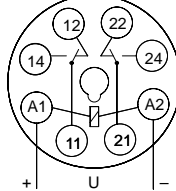

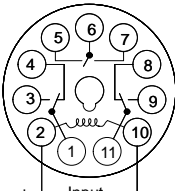
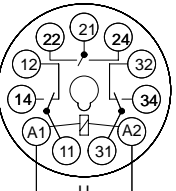


**1492-NM40**

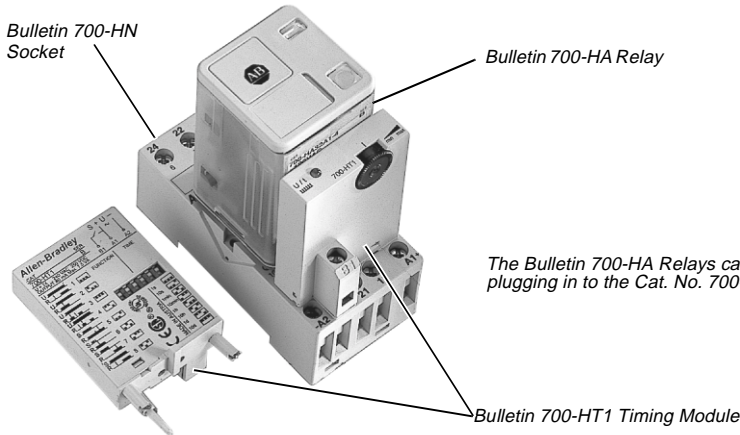


**Bulletin 700-HA**  
**General Purpose Relays and Timing Relays**  
**Product Selection**

**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	 + Input -	 + U -	6V AC	<del>700-HA32A06</del>
					12V AC	<del>700-HA32A12</del>
					24V AC	<del>700-HA32A24 ❹</del>
					120V AC	700-HA32A1 ❹ ←
					240V AC	<del>700-HA32A2 ❹</del>
					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-HA32Z11
					125V DC	700-HA32Z01
					140V DC	700-HA32Z3
	3PDT 3-Pole 3 Form C Single AgNi Contact	10 A B300	 + Input -	 + U -	6V AC	<del>700-HA33A06</del>
					12V AC	<del>700-HA33A12</del>
					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-HA33Z11
					125V DC	700-HA33Z01
					140V DC	<del>700-HA33Z3</del>

- 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.

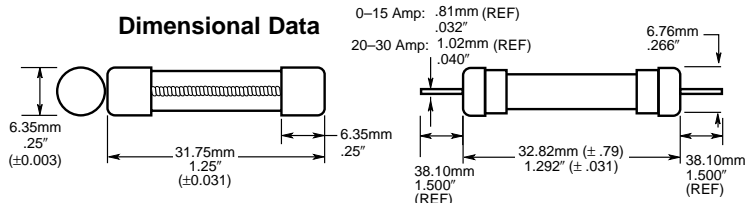


The Bulletin 700-HA Relays can be used together with Timing or Surge Suppressor Modules by plugging in to the Cat. No. 700-HN202 8-Pin Socket, or the Cat. No. 700-HN203 11-Pin Socket.

# Time-Delay Glass Fuses

## For 1/4" x 1-1/4" (6.3mm x 32mm)

**MDL**  
**MDL-V**



**Catalog Symbol:** MDL

1/4" x 1-1/4" (3AG)

**Characteristics:** Time-Delay

**Agency Approvals\*:** UL/CSA 248-4

**Construction:** Glass Tube,  
Albalyo Plated Brass Endcaps

**Packaging & Ordering Information:**

<b>Package Code</b> Blank 5 in BK/ 100 in	<b>MDL</b> — <b>V</b>	<b>(See Table)</b> <b>Rated Current</b>
	<b>Product Symbol</b>	<b>Lead</b> Blank -no lead V-Axial lead

Weight = .93 lbs/100

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.

**Time-Current Characteristics:**

Rated Current	Percent of Rating		
	110%	135%	200%
0-30	4 hrs. (min)	60 min. (max)	120 sec. (max)

**Electrical Characteristics**

Rated Current <sup>5</sup>	Rated Voltage		Interrupting Rating <sup>1</sup>		Pre-arcing I <sup>2</sup> t (A <sup>2</sup> sec)		Typical Total Clearing <sup>3</sup> I <sup>2</sup> t (A <sup>2</sup> sec)		Typical Voltage Drop <sup>2</sup> Volts at 100% Rated Current	Agency* Approvals
	AC (Max.)	DC <sup>6</sup> (Max.)	AC	DC <sup>6</sup>	AC	DC <sup>6</sup>	AC	DC <sup>6</sup>		
1/16	250V	250V	35A	35A	.21	.02	.51	3.59	5.56	UL, CSA, CE
1/10	250V	250V	35A	35A	.04	.60	.11	1.31	2.02	UL, CSA, CE
1/8	250V	250V	35A	35A	.05	.06	.06	.06	1.68	UL, CSA, CE
3/16	250V	250V	35A	35A	.08		.52		1.12	UL, CSA, CE
2/10	250V	250V	35A	35A	.08		.68		1.00	UL, CSA, CE
1/4	250V	250V	35A	35A	.43	.44	.96	.45	1.02	UL, CSA, CE
3/10	250V	250V	35A	35A	.41	.43	1.13	.66	1.48	UL, CSA, CE
3/8	250V	250V	35A	35A	.72	.83	1.86	2.00	.85	UL, CSA, CE
1/2	250V	250V	35A	35A	1.48	2.02	2.52	2.14	1.26	UL, CSA, CE
3/4	250V	250V	35A	35A	3.75	4.25	5.11	4.62	1.01	UL, CSA, CE
1	250V	250V	35A	35A	10.24	9.80	12.65	10.25	.98	UL, CSA, CE
1-1/4	250V	250V	100A	100A	10.70		21.40		.77	UL, CSA, CE
1-1/2	250V	250V	100A	100A	19.10		30.90		.74	UL, CSA, CE
2	250V	250V	100A	100A	68.60		79.70		.59	UL, CSA, CE
2-1/4	250V	250V	100A	100A	55.40		78.20		.27	UL, CSA, CE
2-1/2	250V	250V	100A	100A	63.50		77.10		.42	UL, CSA, CE
3	250V	250V	100A	100A	43.10	30.27	68.60	76.09	.35	UL, CSA, CE
4	250V	32V	200A	1000A	181.90		203.50		.20	UL, CSA, CE
5	250V	32V	200A	1000A	311.30		374.00		.19	UL, CSA, CE
6	250V	32V	200A	1000A	368.30		427.50		.17	UL, CSA, CE
7	250V	32V	200A	1000A	457.50		507.60		.15	UL, CSA, CE
8	250V	250V	200A	200A	280.90	422.00	455.20	531.00	.12	UL, CSA, CE
9	32V	32V	1000A	1000A	568.00		685.00		.14	UL, CSA, CE
10	32V	32V	1000A	1000A	671.00		874.00		.12	UL, CSA, CE
15	32V	32V	1000A	1000A	1931.00		2296.00		.14	UL, CSA, CE
20	32V	32V	1000A	1000A	5652.00		5992.00		.05	UL, CSA, CE
25	32V	32V	1000A	1000A	15356.00		15789.00		.07	UL, CSA, CE
30	32V	32V	1000A	1000A	28033.00		28499.00		.07	UL, CSA, CE

\*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<sup>2</sup>t 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.

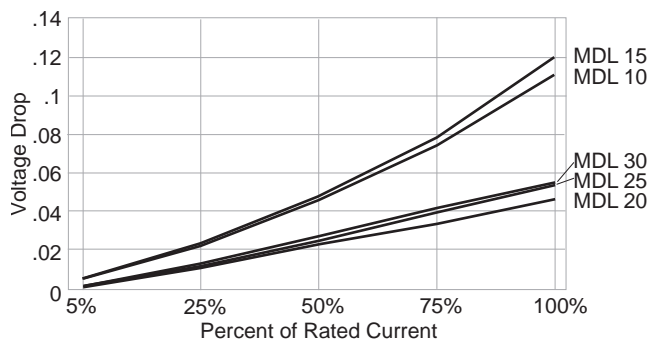
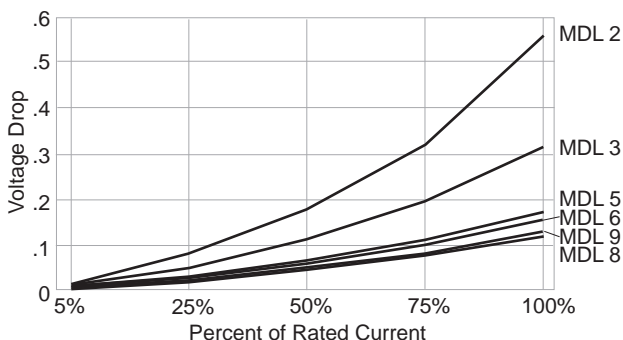
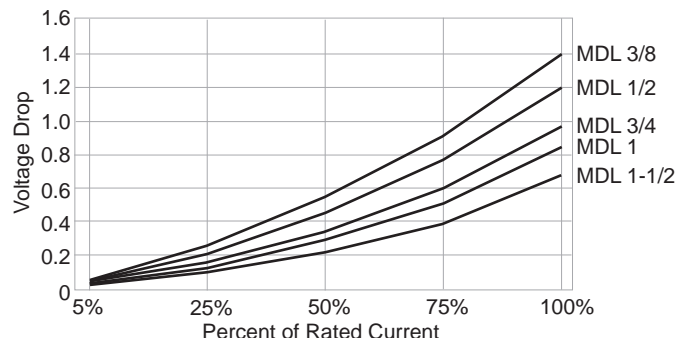
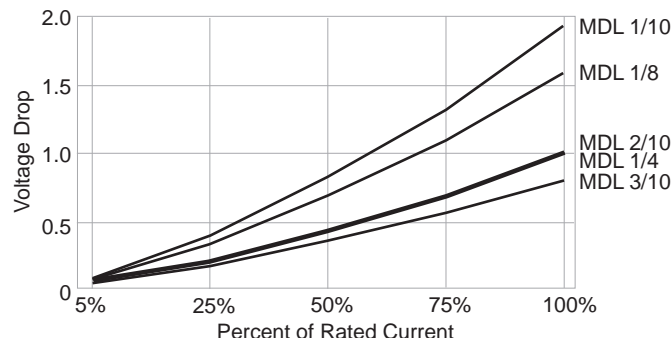
# Time-Delay Glass Fuses

## For 1/4" x 1-1/4" (6.3mm x 32mm)

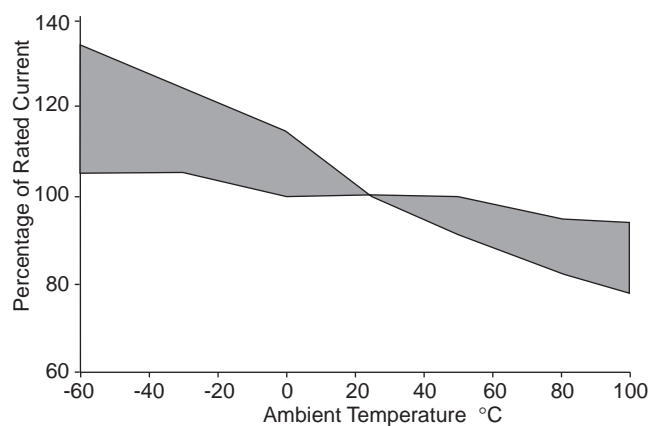
# MDL

# MDL-V

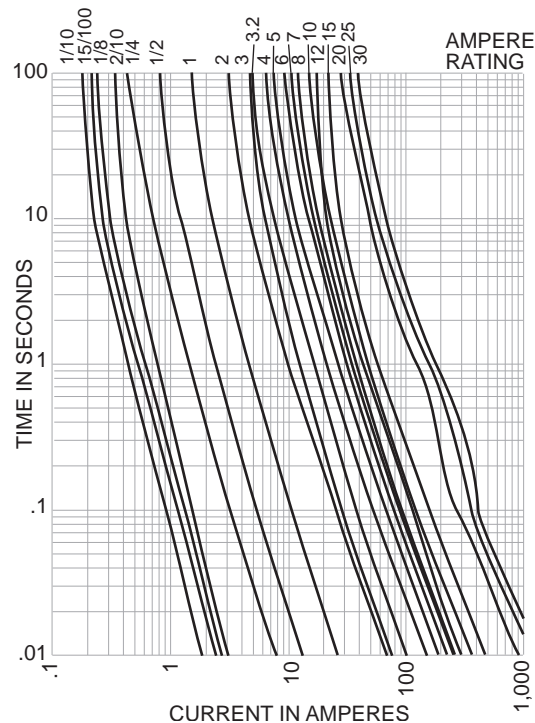
### 1.0 Typical Voltage Drop (At 25° C Ambient Temperature)



### 2.0 Ambient Temperature Effect Chart (Derating Curve)



### Time-Current Characteristic Curves—Average Melt (Full Size Curves Available)



This bulletin is intended to clearly present comprehensive product data and provide technical information that will help the end user with design applications. Bussmann reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Bussmann also reserves the right to change or update, without notice, any technical information contained in this bulletin. Once a product has been selected, it should be tested by the user in all possible applications.

# 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.



## 15 AMP TYPE (125V):

Part Number		Dia.	Eagle Length	P/N	Each
91-1168-00 <a href="#">Buy</a>	Armored Plug Male	1-1/2"	2"	2867	<a href="#">View Price</a>
<del>91-1169-00 <a href="#">Buy</a></del>	<del>Armored Connector Female</del>	<del>1-1/4"</del>	<del>2-19/32"</del>	<del>2887</del>	<del><a href="#">View Price</a></del>



# PowerSure™ EMC-240B

120/240 VAC Surge Protection

■ Surge Protection  
For Business-Critical Continuity™

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 $\mu$ s)
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

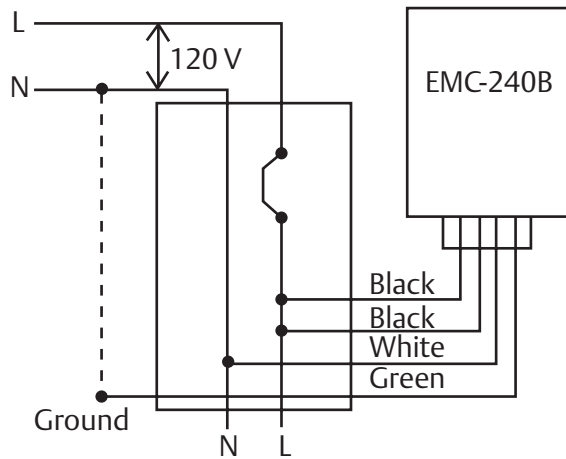
## Features

- Fast response time
- 40,000 Amps per phase capacity
- Failsafe and fused
- Operational status indicators
- ANSI/UL 1449 Third Edition
- 5 year warranty

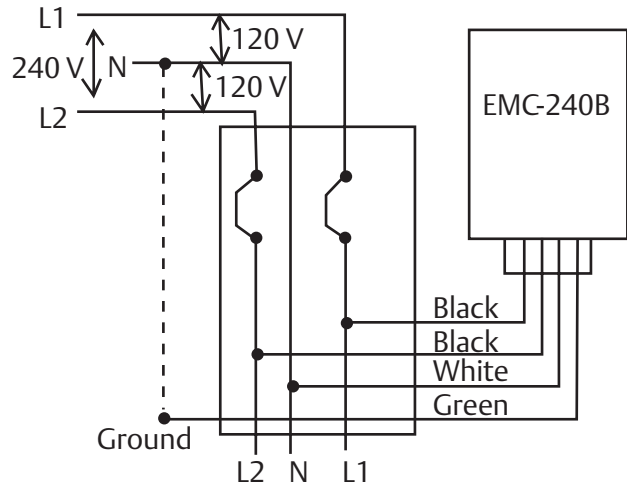
## Models

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

## Installation

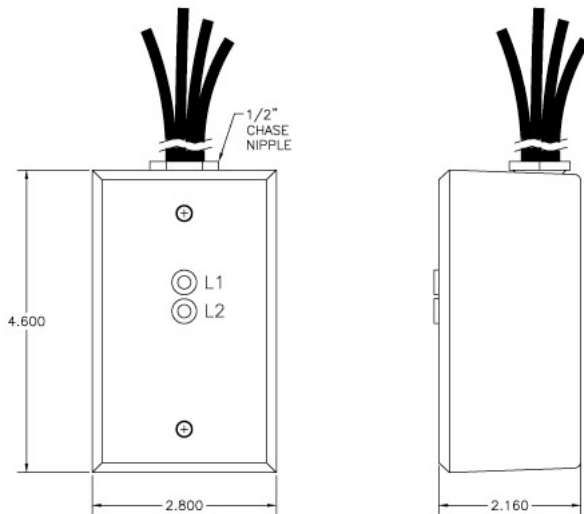


120V applications use a single pole 30Amp breaker



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

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■ Surge Protection

### Emerson Network Power Contact information

#### Headquarters

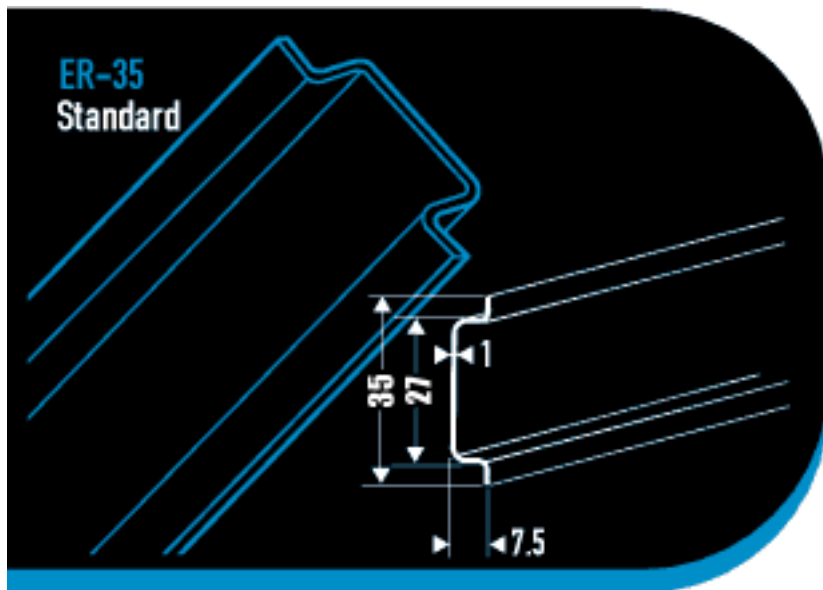
Surge Protection  
100 Emerson Parkway  
Binghamton, New York 13905  
T: (607) 721-8840  
T: (800) 288-6169  
F: (607) 722-8713  
E: [contactsurge@emerson.com](mailto:contactsurge@emerson.com)

[www.emersonnetworkpower.com](http://www.emersonnetworkpower.com)

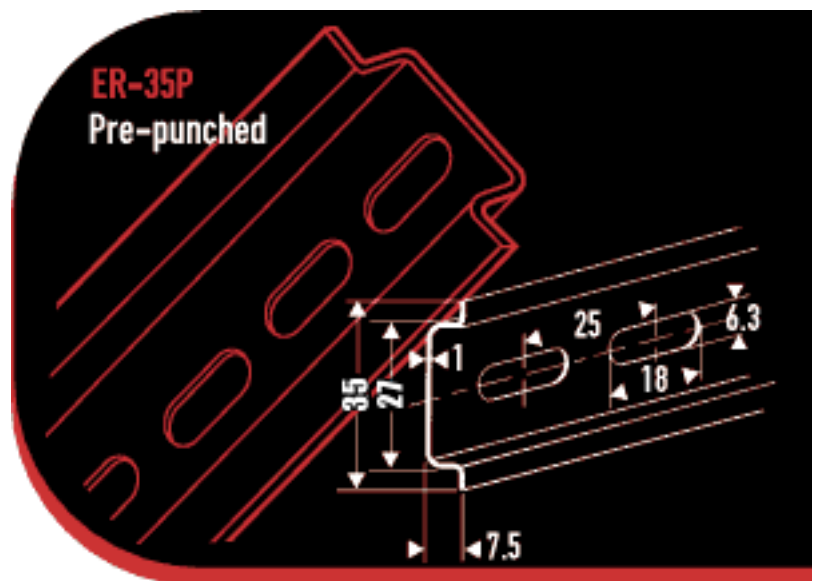


# E-Rails

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 electrolytically plated steel per DIN EN 50022. 2 meters in length~~



→ #111.013 Zinc-bichromate Cold rolled electrolytically 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.

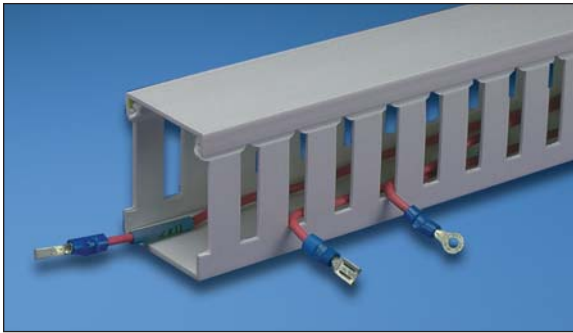
**Dimensions: Accessories, continued**

**Dimensions: DIN Rail Stops and Stand-Offs**

Part No.	Dimensions
<p><b>BNL-5</b></p> <p><del>BNL-8</del></p>	<p>0.374" (9.5mm) Width</p> <p>1.77" (45mm) Length</p>
<b>BNL-8</b>	<p>1.794" (46mm)</p> <p>0.52" (14.1mm)</p>
<b>BNDL2</b>	<p>1.17" (30mm)</p> <p>1.014" (26mm)</p> <p>0.51" (13mm)</p> <p>1.482" (38mm)</p>
<b>BNS3</b>	<p>1.17" (30mm)</p> <p>2 - Ø 0.21" (5.2mm)</p> <p>0.101" (2.6mm)</p> <p>0.59" (15mm)</p> <p>1.014" (26mm)</p> <p>25°</p> <p>1.443" (37mm) <b>BNS3</b></p> <p>3.003" (77mm) <b>BNS4</b></p> <p>1.09" (28mm)</p> <p>0.59" (15mm)</p>
<b>BNS4</b>	

# Wiring Duct **Control Panel**

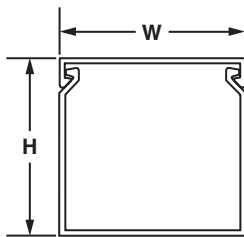
## PANDUCT® Type G — Wide Slot Wiring Duct



- 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



Part Number	Duct Size W x H		Cover Part Number	Duct Std. Ctn. Qty.	Cover Std. Ctn. Qty.	Length (ft)
	In.	mm				
<del>G.5X.5LG6</del>	<del>.69 x .60</del>	<del>17.5 x 15.2</del>	<del>C.5LG6</del>	120	120	6
<del>G.5X1LG6</del>	<del>.69 x 1.06</del>	<del>17.5 x 26.9</del>		120		
<del>G.5X2LG6</del>	<del>.69 x 2.03</del>	<del>17.5 x 51.6</del>		120		
<del>G.5X4LG6</del>	<del>.69 x 4.10</del>	<del>17.5 x 104.1</del>		60		
<del>G.75X.75LG6</del>	<del>.93 x .82</del>	<del>23.6 x 20.8</del>	<del>C.75LG6</del>	120	120	6
<del>G.75X1LG6</del>	<del>.93 x 1.06</del>	<del>23.6 x 26.9</del>		120		
<del>G.75X1.5LG6</del>	<del>.93 x 1.57</del>	<del>23.6 x 39.9</del>		120		
<del>G.75X2LG6</del>	<del>.93 x 2.03</del>	<del>23.6 x 51.6</del>		120		
<del>G1X1LG6</del>	<del>1.26 x 1.12</del>	<del>32.0 x 28.4</del>	<del>C1LG6</del>	120	120	6
<del>G1X1.5LG6</del>	<del>1.26 x 1.62</del>	<del>32.0 x 41.1</del>		120		
<del>G1X2LG6</del>	<del>1.26 x 2.12</del>	<del>32.0 x 53.8</del>		120		
<del>G1X3LG6</del>	<del>1.26 x 3.12</del>	<del>32.0 x 79.2</del>		120		
<del>G1X4LG6</del>	<del>1.26 x 4.10</del>	<del>32.0 x 104.1</del>		60		
<del>G1.5X1LG6</del>	<del>1.75 x 1.12</del>	<del>44.5 x 28.4</del>	<del>C1.5LG6</del>	120	120	6
<del>G1.5X1.5LG6</del>	<del>1.75 x 1.62</del>	<del>44.5 x 41.1</del>		120		
<del>G1.5X2LG6</del>	<del>1.75 x 2.12</del>	<del>44.5 x 53.8</del>		120		
<del>G1.5X3LG6</del>	<del>1.75 x 3.12</del>	<del>44.5 x 79.2</del>		120		
<del>G1.5X4LG6</del>	<del>1.75 x 4.10</del>	<del>44.5 x 104.1</del>		60		
<del>G2X1LG6</del>	<del>2.25 x 1.12</del>	<del>57.2 x 28.4</del>	<del>C2LG6</del>	120	120	6
<del>G2X1.5LG6</del>	<del>2.25 x 1.62</del>	<del>57.2 x 41.1</del>		120		
<del>G2X2LG6</del>	<del>2.25 x 2.12</del>	<del>57.2 x 53.8</del>		120		
<del>G2X3LG6</del>	<del>2.25 x 3.12</del>	<del>57.2 x 79.2</del>		60		
<del>G2X4LG6</del>	<del>2.25 x 4.10</del>	<del>57.2 x 104.1</del>		60		
<del>G2X5LG6</del>	<del>2.25 x 5.10</del>	<del>57.2 x 129.5</del>	60			
<del>G2.5X3LG6</del>	<del>2.75 x 3.12</del>	<del>69.9 x 79.2</del>	<del>C2.5LG6</del>	120	120	6
<del>G3X1LG6</del>	<del>3.25 x 1.12</del>	<del>82.6 x 28.4</del>	<del>C3LG6</del>	120	120	6
<del>G3X2LG6</del>	<del>3.25 x 2.12</del>	<del>82.6 x 53.8</del>		120		
<del>G3X3LG6</del>	<del>3.25 x 3.12</del>	<del>82.6 x 79.2</del>		60		
<del>G3X4LG6</del>	<del>3.25 x 4.10</del>	<del>82.6 x 104.1</del>		60		
<del>G3X5LG6</del>	<del>3.25 x 5.10</del>	<del>82.6 x 129.5</del>		60		
<del>G4X1.5LG6</del>	<del>4.25 x 1.62</del>	<del>108.0 x 41.1</del>	<del>C4LG6</del>	120	120	6
<del>G4X2LG6</del>	<del>4.25 x 2.12</del>	<del>108.0 x 53.8</del>		60		
<del>G4X3LG6</del>	<del>4.25 x 3.12</del>	<del>108.0 x 79.2</del>		60		
<del>G4X4LG6</del>	<del>4.25 x 4.10</del>	<del>108.0 x 104.1</del>		60		
<del>G4X5LG6</del>	<del>4.25 x 5.10</del>	<del>108.0 x 129.5</del>		60		
<del>G6X4LG6</del>	<del>6.25 x 4.15</del>	<del>158.8 x 105.4</del>	<del>C6LG6</del>	60	120	6

Reference	Page(s)
Color Availability	<a href="#">F14</a>
Adhesive Tape	<a href="#">E12</a> , <a href="#">E13</a>
Dimensions	<a href="#">F2</a>
Wirefill Guide	<a href="#">F8</a>
Material Specifications	<a href="#">F13</a>
Tools & Accessories	<a href="#">D11</a> , <a href="#">D12</a> , <a href="#">Section E</a>
Installation Tips	<a href="#">F15</a>

Part Number shown for LG (Light Gray). For other color availability see Color Selection Guide, [page F14](#).

Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation at <http://www.download.phoenixcontact.com>. The General Terms and Conditions of Use apply to Internet downloads.

## ► 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**

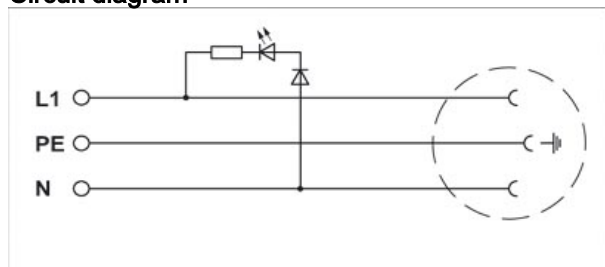
Nominal voltage $U_N$	125 V AC
Nominal current $I_N$	15 A AC
Status display	Glow lamp or LED with preresistor
Material contact	CuZn37
For country-specific use in	USA
Color	gray
Insulating material	PA
Ambient temperature (operation)	-20 °C ... 60 °C
Standards/regulations	IEC 83
Standards/regulations	DIN 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  
Flachsmarktstr. 8  
32825 Blomberg  
Germany  
Phone +49 5235 3 00  
Fax +49 5235 3 41200  
<http://www.phoenixcontact.com>  
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# 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	
<b>Technical Data</b>	
Rated voltage .....	120 V ac
Rated current .....	15 amps
Maximum wire size .....	#10 AWG
GFI response time .....	25 ms @ 4-6 mA
<b>Housing Data</b>	
Color .....	Ivory
Material .....	PVC 94 V-0
Minimum temperature .....	-35°C
Maximum temperature .....	66°C
<b>Dimensions</b>	
Length .....	5.33 in. (135 mm)
Width .....	3.25 in. (82 mm)
Depth .....	2.45 in. (62 mm)

1090A003

# EM-DUO/120/15/GFI

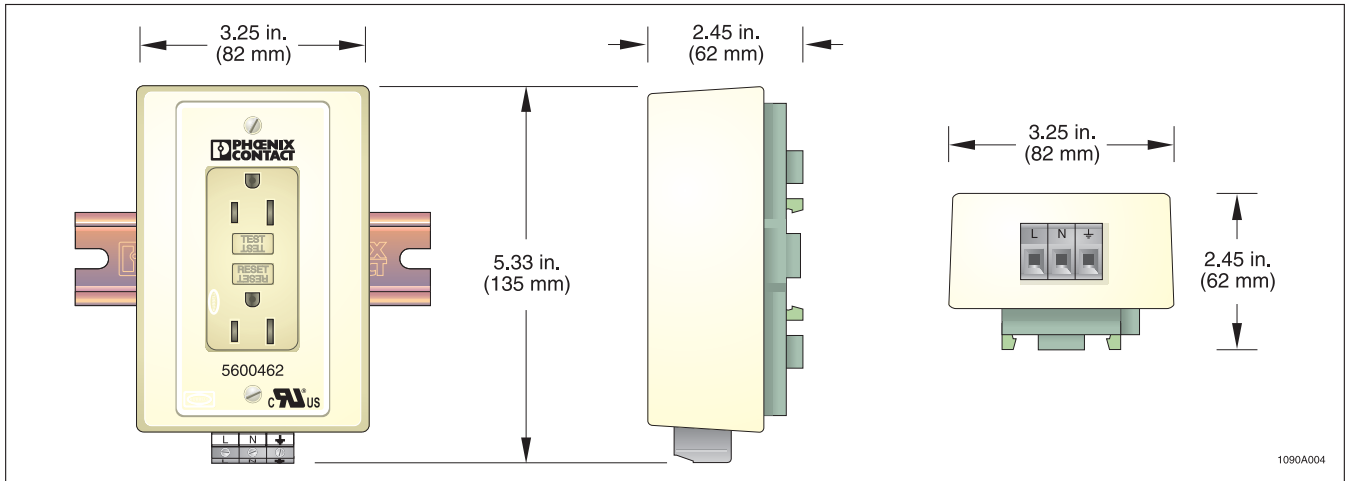


Figure 8. EM-DUO/120/15/GFI Dimensions

## 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.

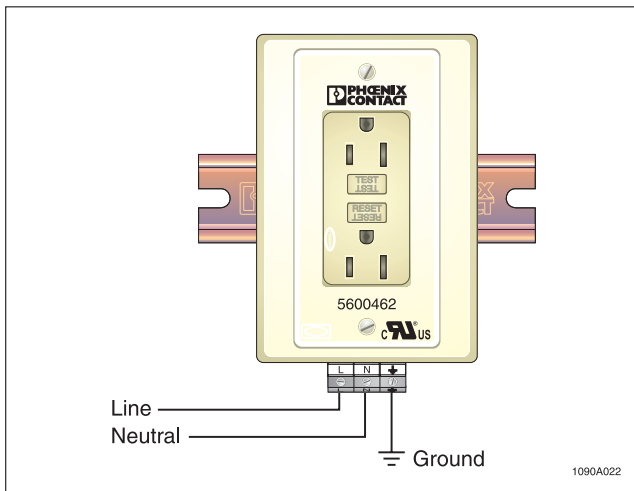


Figure 9. EM-DUO/120/15/GFI Wiring Diagram

**Visit us at our website  
www.em-duo.com**

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Phoenix Contact Inc.  
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Web Site: <http://www.phoenixcontact.com>

### Headquarters, Canada

Phoenix Contact Ltd.  
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Fax: (905) 890-0180

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 95 Midland Road  
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 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



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[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-ELMPK4](#) - 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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## 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 -

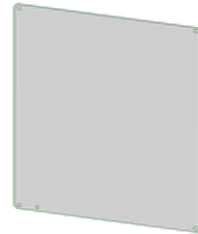
Powder Coated White.

#### 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



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#### 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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## 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



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#### 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](#)

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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 connector 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](mailto:SCE@SaginawControl.com)

# PK18GTA

## LOAD CENTER EQUIPMENT GROUND BAR ASSY



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.

# QOU110

Miniature Circuit Breaker (QOU) Standard, 10A,  
1-Pole, 120/240VAC, HACR Rated



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.

**QOU115**

Miniature Circuit Breaker (QOU) Standard, 15A,  
1-Pole, 120/240VAC, HACR Rated



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.

Project Code: WIKSP2GW

Page:7

Date:7/5/2016

Contractor: Wildcat Construction Co., Inc.

Project: Wichita, KS – Re-Use Water Pump Station

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Item	Qty	UV PLC CONTROL PANEL MODIFICATIONS
6.00	1	R.E. Pedrotti Co. Primary Control Panel Components
		<b>NETWORK SWITCH</b>
		(1) Moxa EDS-508A-MM-SC, 8-port Ethernet Switch, 6-port Copper/2-port Fiber, Multi-mode Type SC (24 VDC)
		<b>POWER SUPPLY</b>
		(1) Phoenix Contact 2938581 120 VAC In/24 VDC Out, 5A
		<b>PATCH PANEL</b>
		(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, SNMP, 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 <sup>a</sup> 4 km <sup>b</sup>	40 km <sup>c</sup>	80 km <sup>d</sup>
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

**Vibration:** 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**

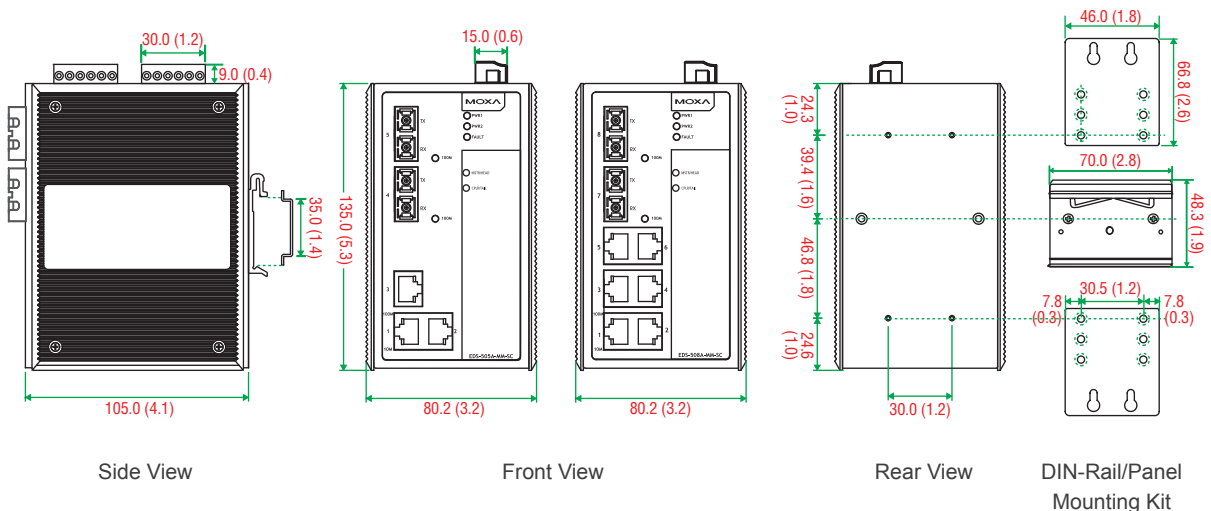
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

**Dimensions**

**EDS-505A/508A Series**

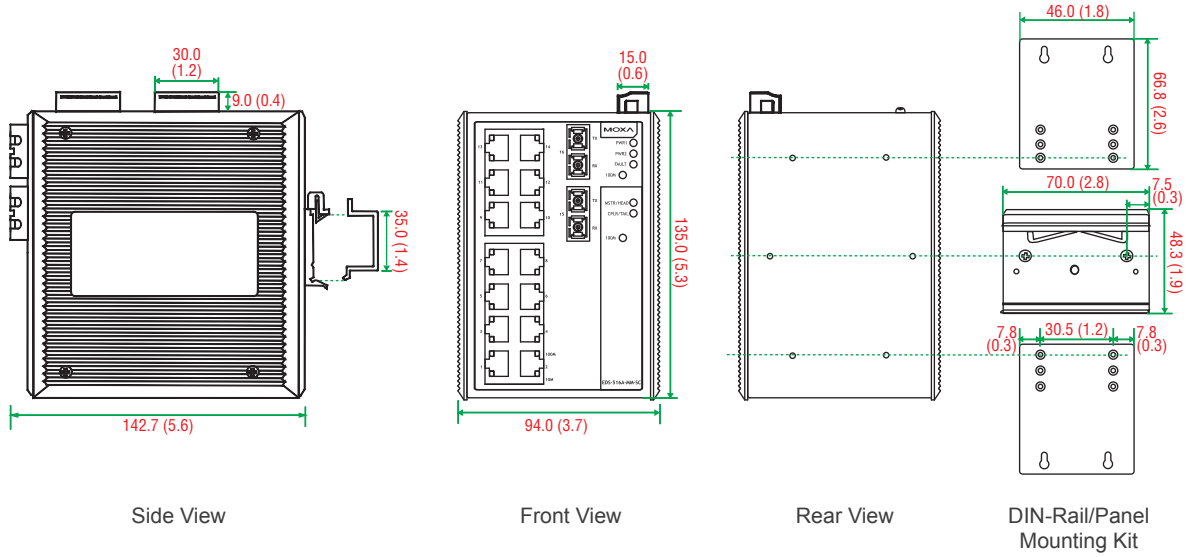
Unit: mm (inch)



**Dimensions**

**EDS-516A Series**

Unit: mm (inch)



**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
<b>EDS-505A/508A Series</b>						
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
<b>EDS-516A Series</b>						
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

Please be informed that the data shown in this PDF Document is generated from our Online Catalog. Please find the complete data in the user's documentation. Our General Terms of Use for Downloads are valid (<http://phoenixcontact.com/download>)



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 $\pm$ 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 $\pm$ 10 %)
Residual ripple	< 10 mV <sub>PP</sub> (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 <sub>PP</sub> (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 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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	$U_{OUT} > 0.9 \times U_N$ : High signal
Maximum switching voltage	$\leq 24$ V
Output voltage	+ 24 V DC (Signal)
Maximum inrush current	$\leq 40$ mA
Continuous load current	$\leq 40$ mA
Status display	"DC OK" LED green
Note on status display	$U_{OUT} < 0.9 \times U_N$ : LED flashing
Conductor cross section solid min.	0.2 mm <sup>2</sup>
Conductor cross section solid max.	2.5 mm <sup>2</sup>
Conductor cross section flexible min.	0.2 mm <sup>2</sup>
Conductor cross section flexible max.	2.5 mm <sup>2</sup>
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, $U_{OUT} > 0.9 \times U_N$ : Contact closed
Maximum switching voltage	$\leq 30$ V AC/DC
Maximum inrush current	$\leq 1$ A
Continuous load current	$\leq 1$ 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 / IECCEB Scheme / EAC / cULus Recognized / cULus Listed


#### Ex Approvals

UL Listed / cUL Listed / cULus Listed


#### Approvals submitted

## Approval details

UL Recognized 

UL Listed 

cUL Recognized 

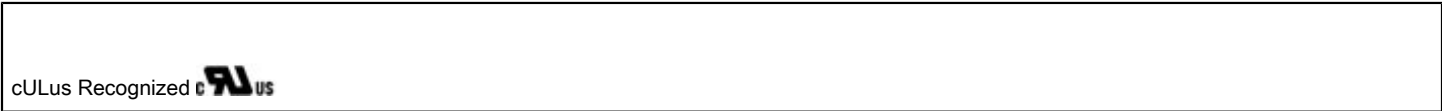
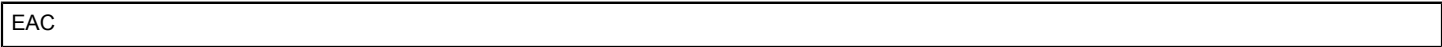
cUL Listed 

GL

DNV

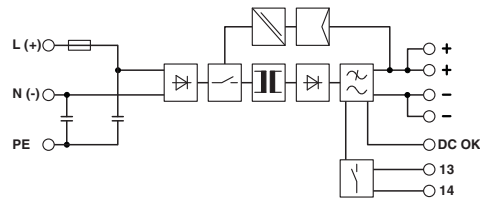
# Power supply unit - QUINT-PS-100-240AC/24DC/ 5 - 2938581

## Approvals



## Drawings

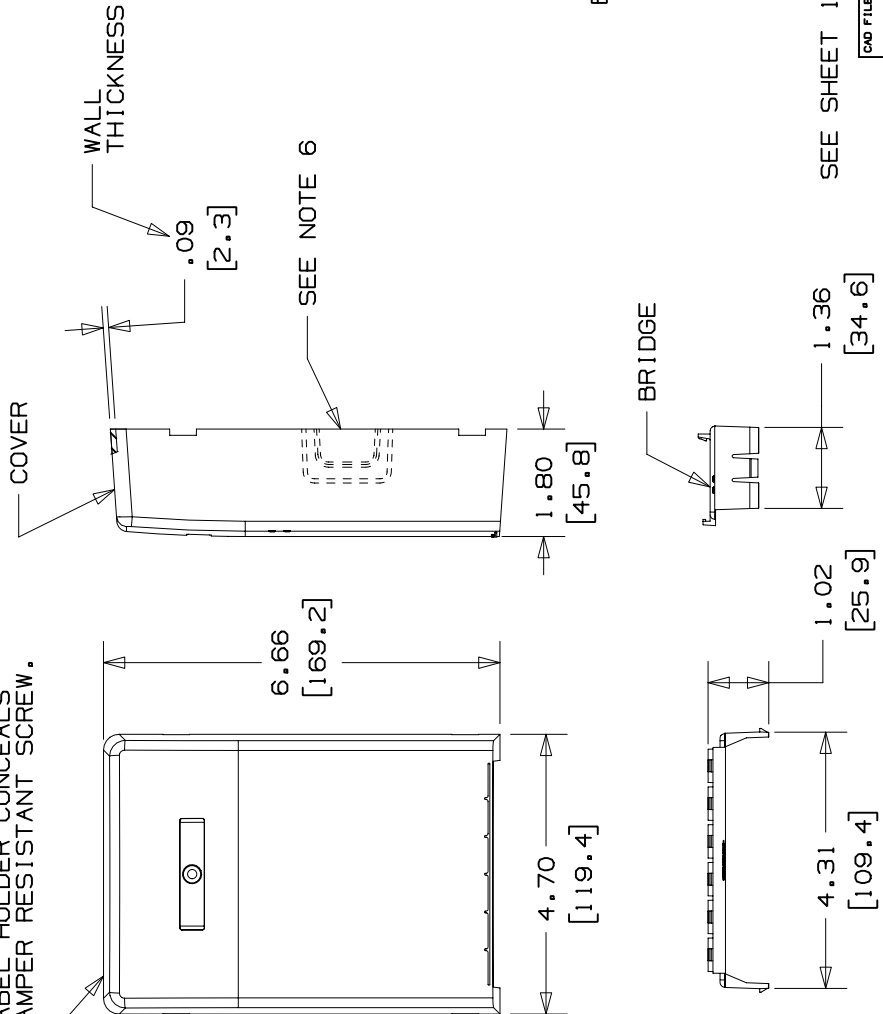
Block diagram





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LABEL HOLDER CONCEALS TAMPER RESISTANT SCREW.



SEE NOTE 6

SEE SHEET 1 OF 2

CAD FILENAME/LAYERS D35544BZ\_DC\_CBXF12\_00B.PRT

PANDUIT		PANDUIT CORP. TINLEY PARK, ILLINOIS	
12 MODULE SPACE MULTI-MEDIA FIBER OUTLET (CBXF12**-A)		CUSTOMER DRAWING	
UNLESS OTHERWISE SPECIFIED, DIMENSIONAL TOLERANCES ARE: (.X) ± .03 (.8) ANGLES ±		UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE GIVEN IN INCHES, THIRD ANGLE PROJECTION.	
1	1-8-02	JsP	REFER TO SHEET 1 OF 2
R	12-4-96	RCA	REFER TO SHEET 1 OF 2
REV	DATE	BY	CHK
			DESCRIPTION
			ECN - R
			CUST SUP
			MAT'L
			ABS
			SCALE NONE
			DRAWING NO. 35544-24
			SHT 2 OF 2
			DWG SIZE A

DRAWN BY RCA

DATE 12-4-96

CHK'D CEF

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REFER TO SHEET 1 OF 2

REFER TO SHEET 1 OF 2

1-8-02

12-4-96

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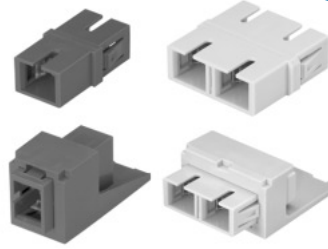
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REV

# SC Fiber Optic Adapters

## 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

<b>Standards requirements:</b>	TIA/EIA-604 FOCIS-3 compliant; exceeds TIA/EIA-568-B.3 requirements
<b>Split sleeve material:</b>	Phosphor bronze or zirconia ceramic (required for singlemode applications)
<b>Insertion loss:</b>	.1dB average (multimode), .15dB average (singlemode); supports the performance of FOCIS-3 compliant connectors/patch cords
<b>Return loss:</b>	Supports singlemode (>40dB for SPC and >55dB for UPC) and multimode (>20dB) connector polish performance

\*PANDUIT LC Connector/Adapter connection

## key features and benefits

<b>Integrated panel retention clips</b>	No metal clips to become bent, damaged or lost; clips automatically adjust for FOCIS-3 compliant panel thickness variations for improved mounting
<b>High glass transition temperature latch material (Tg&gt;100°C)</b>	Meets Telcordia GR-326-CORE, Issue 3; maintains latch integrity/geometry in high temperature environments for improved reliability
<b>Improved adapter protective cap design</b>	Maximum protection from contamination; protective cap fully surrounds split sleeve opening
<b>Short flange design</b>	Improved modularity and higher density usage
<b>Choice of phosphor bronze or zirconia ceramic split sleeves</b>	Provides an adapter split sleeve material option to fit specific network requirements
<b>Q.C. number and split sleeve material laser marked on every adapter</b>	Assures 100% traceability; quick and easy identification of split sleeve material: SC-P = Phosphor Bronze and SC-Z = Zirconia Ceramic
<b>Adapters available in MINI-COM® Modules</b>	System flexibility; adapter modules can be used in all MINI-COM® closet products and work area outlets
<b>Adapters available in patch panels, fiber adapter panels (FAPs) and OPTICOM® QUICKNET™ Pre-Terminated MTP* Cassettes</b>	Provides a complete SC system solution
<b>Adapters and modules available in multiple colors</b>	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](http://www.panduit.com)

### SC Fiber Optic Adapters

<b>Simplex MM:</b>	FASSCEI-L
<b>Duplex MM:</b>	FADSCEI-L
<b>Simplex 10Gig™:</b>	FASSCAQ-L
<b>Duplex 10Gig™:</b>	FADSCAQ-L
<b>Simplex 10Gig™ (zirc.):</b>	FASSCZAQ-L
<b>Duplex 10Gig™ (zirc.):</b>	FADSCZAQ-L
<b>Simplex SM (zirc.):</b>	FASSCZBU-L
<b>Duplex SM (zirc.):</b>	FADSCZBU-L
<b>Simplex APC (zirc.):</b>	FASSCZAG-L
<b>Duplex APC (zirc.):</b>	FADSCZAG-L

L = Bag of 50 adapters; 100 per carton.

### MINI-COM® SC Adapter Modules

<b>Simplex MM:</b>	CMSEISCEI
<b>Duplex MM:</b>	CMDEISCEI
<b>Simplex 10Gig™:</b>	CMSAQSCBL
<b>Duplex 10Gig™:</b>	CMDAQSCBL
<b>Simplex 10Gig™ (zirc.):</b>	CMSAQSCZBL
<b>Duplex 10Gig™ (zirc.):</b>	CMDAQSCZBL
<b>Simplex SM (zirc.):</b>	CMSBUSCZBU
<b>Duplex SM (zirc.):</b>	CMDBUSCZBU
<b>Simplex APC (zirc.):</b>	CMSAGSCZBL
<b>Duplex APC (zirc.):</b>	CMDAGSCZBL

### OPTICOM® SC Fiber Adapter Panels

<b>6 duplex MM:</b>	FAP6WEIDSC
<b>6 duplex 10Gig™:</b>	FAP6WAQDSCZ
<b>6 duplex SM (zirc.):</b>	FAP6WBUDSCZ
<b>12 simplex SM (zirc.):</b>	FAP12WBUSCZ

### OPTICOM® QUICKNET™ Pre-Terminated MTP\* Cassettes

<b>12 SC to MTP* (12f):</b>	FC^12-3S
<b>6 SC to MTP* (12f):</b>	FC^12-3

### SC Simplex Fiber Optic Connectors

<b>MM (900µm/3mm, black):</b>	FSCMBL
<b>MM (900µm/3mm, red):</b>	FSCMRD
<b>SM (900µm/3mm, blue):</b>	FSCSBU
<b>MM (900µm/2mm, black):</b>	FSCM2.0BL
<b>MM (900µm/2mm, red):</b>	FSCM2.0RD
<b>SM (900µm/2mm, blue):</b>	FSCS2.0BU

### SC Duplex Fiber Optic Connectors

<b>Multimode (3mm only):</b>	FSCDM
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### OPTI-CORE® Fiber Optic Patch Cords

<b>Duplex SC to SC:</b>	F^AD3-3M‡
<b>Simplex SC to SC:</b>	F^AS3-3M‡
<b>Simplex SC to pigtail:</b>	F^AB3-NM‡

### HD Connector Removal Tool

<b>For LC and SC:</b>	HDCRT
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\*\*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.

# SC Fiber Optic Adapters

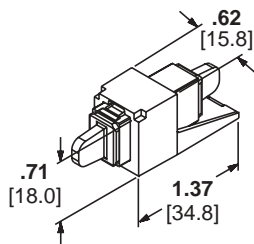
## selection information

Part Number	Adapter Type	Split Sleeve Material	Adapter Color	Module Color	Average Insertion Loss <sup>^</sup>	Return Loss <sup>^</sup>
<b>SC Adapters</b>						
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		
FADSCZAG-L	APC Singlemode Duplex	Zirconia Ceramic	Green	N/A		
<b>SC Adapter Modules</b>						
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		
CMDAGSCZBL	APC Singlemode Duplex	Zirconia Ceramic	Green	Black		

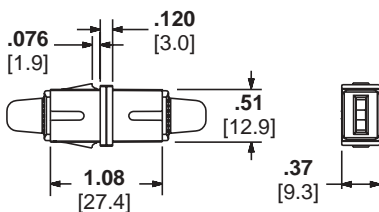
<sup>^</sup>PANDUIT SC Connector/Adapter connection

\*\*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).

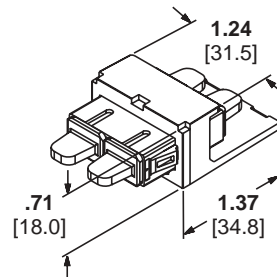
### MINI-Com® SC Simplex Adapter Module



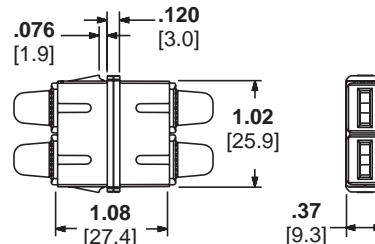
### SC Simplex Adapter



### MINI-Com® SC Duplex Adapter Module



### SC Duplex Adapter



Dimensions are in inches [Dimensions in brackets are in millimeters]

### WORLDWIDE SUBSIDIARIES AND SALES OFFICES

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