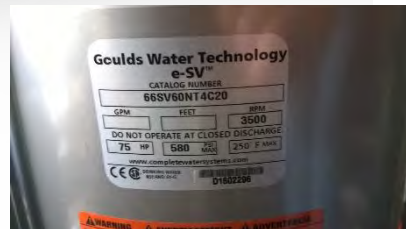


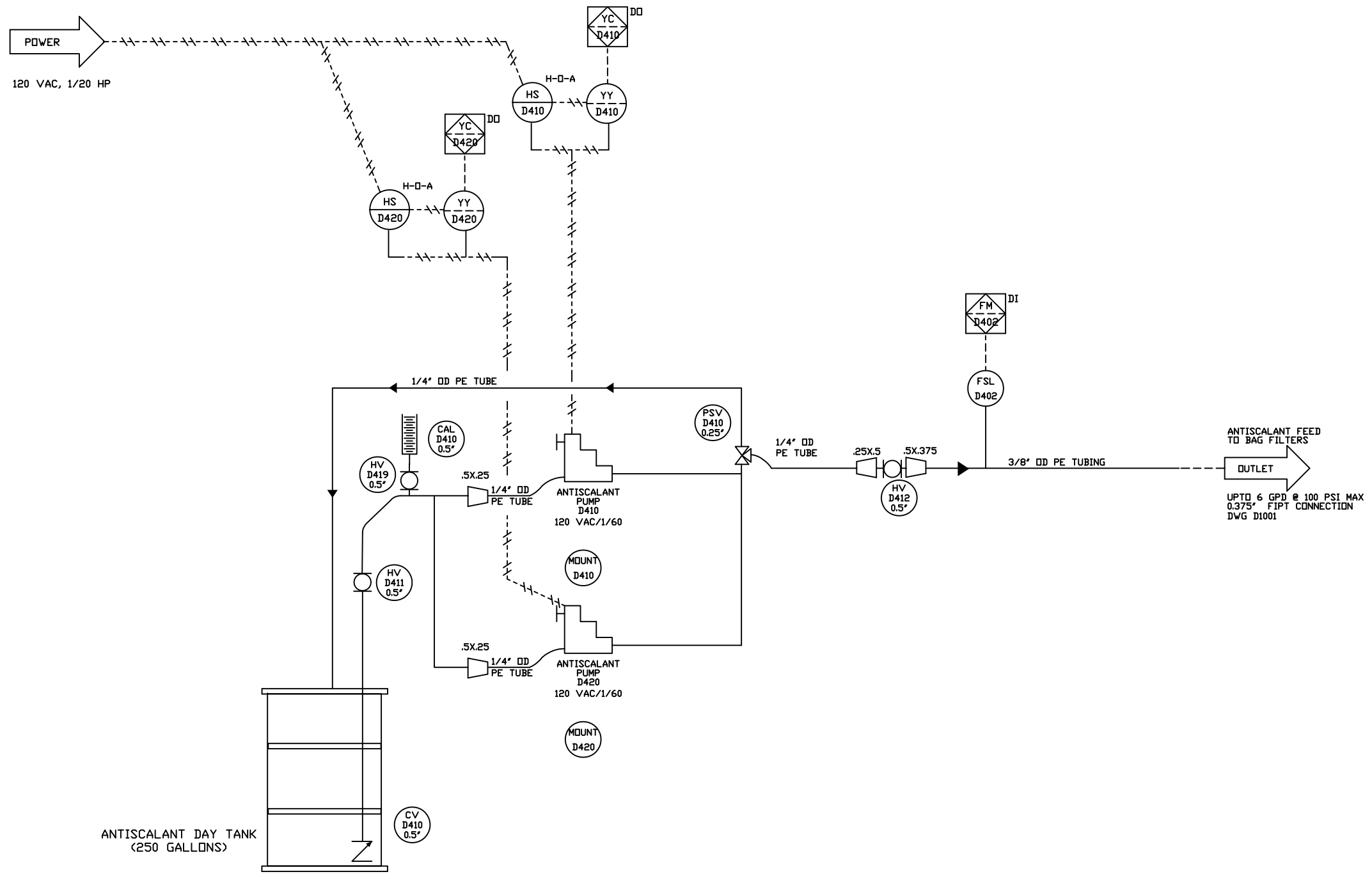
Blending, Chemical Injection, Water Transfer System

AQUEN USA offers a system designed to blend to incoming streams and be able to transfer the blended stream at a high flow or high pressure. The transfer pumps can be operated in parallel or in series. Blending can be automatically operated to blend based upon flow ratio or to maintain a conductivity range. Transfer pumps are operated with VFDs and can be controlled based on either flow or pressure. The system includes two chemical feed systems with room for two 300gal chemical totes.

The system is enclosed in a 45' shipping container. The container has been insulated and modified to include a 36" man door, utility outlets, lights, electric heat and a transformer to convert 480V 3ph to 208V 1ph.



- 2ea Goulds 66SV-6 Pumps 75hp 480VAC Motors
- Rosemount Flow Meters
- Thornton Conductivity Transmitters
- IFM Pressure Transmitters
- Pulsafeeder Chemical Feed Pumps
- Automation Direct Remote I/O panel



ANTISCALANT DAY TANK
(250 GALLONS)

ANTISCALANT FEED
TO BAG FILTERS
OUTLET
UPTO 6 GPD @ 100 PSI MAX
0.375" FIPT CONNECTION
DWG D1001

1	AS-BUILT	JBA	2/26/18	CHM
0	ISSUED FOR CONSTRUCTION	JBA	9/20/17	CHM
C	ISSUED FOR DESIGN	CHM	4/10/17	JBA
B	ISSUED FOR APPROVAL	CHM	3/9/17	JBA
A	ISSUED FOR REVIEW	JBA	2/8/17	CHM
REV	REVISION DESCRIPTION	REV BY	DATE	APP BY
ISSUED FOR INFORMATION				



DISCIPLINE ENGINEER

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES ARE AS FOLLOWS
1/2" ±.015
1/XX ±.01/16
1/XX ±.01
XXX ±.005
ANGLES ±.1

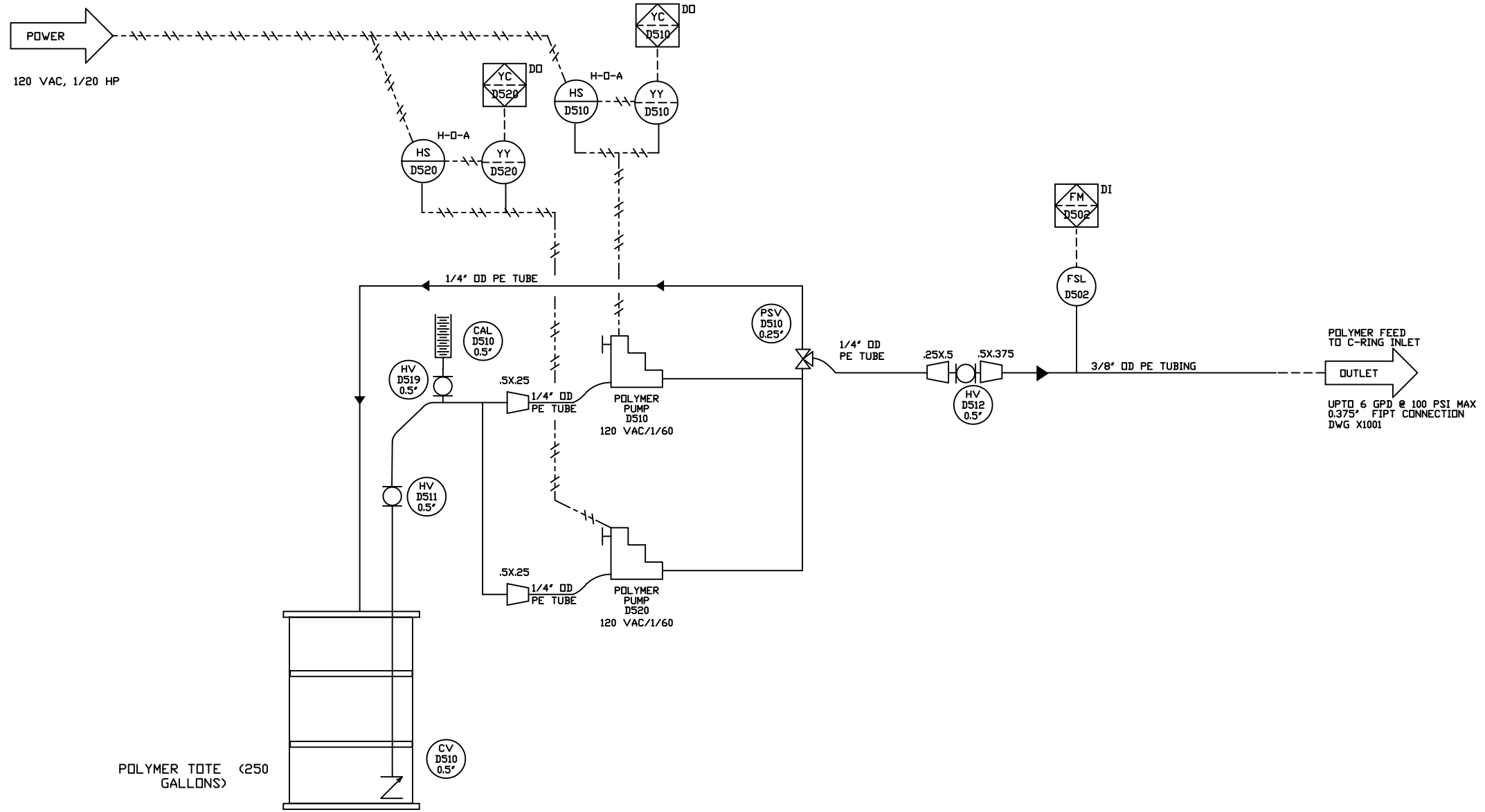
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MODEL FILE NAME: _____
DRAWN BY: CRAIG MILLS
DESIGN BY: JASON ANDERSON
APPROVED BY: _____



PROJECT	ANTI-SCALANT INJECTION		
TITLE			
SIZE	PROJECT NO. 1170	DWG. NO. D1004	REV 1
SHEET SCALE	1:1		SHEET 01 OF 01



1	AS-BUILT	JBA	2/26/18	CHM
0	ISSUED FOR CONSTRUCTION	JBA	9/20/17	CHM
C	ISSUED FOR DESIGN	CHM	4/10/17	JBA
B	ISSUED FOR APPROVAL	CHM	3/9/17	JBA
A	ISSUED FOR REVIEW	JBA	2/8/17	CHM
REV	REVISION DESCRIPTION	REV BY	DATE	APP BY
ISSUED FOR INFORMATION				



DISCIPLINE ENGINEER

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES ARE AS FOLLOWS
1/2X ±.1/16
1/XX ±.1/16
XXX ±.01
XXX ±.005
ANGLES ±.1

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MODEL FILE NAME: DESIGNED BY: JASON ANDERSON
DRAWN BY: CRAIG MILLS APPROVED BY:



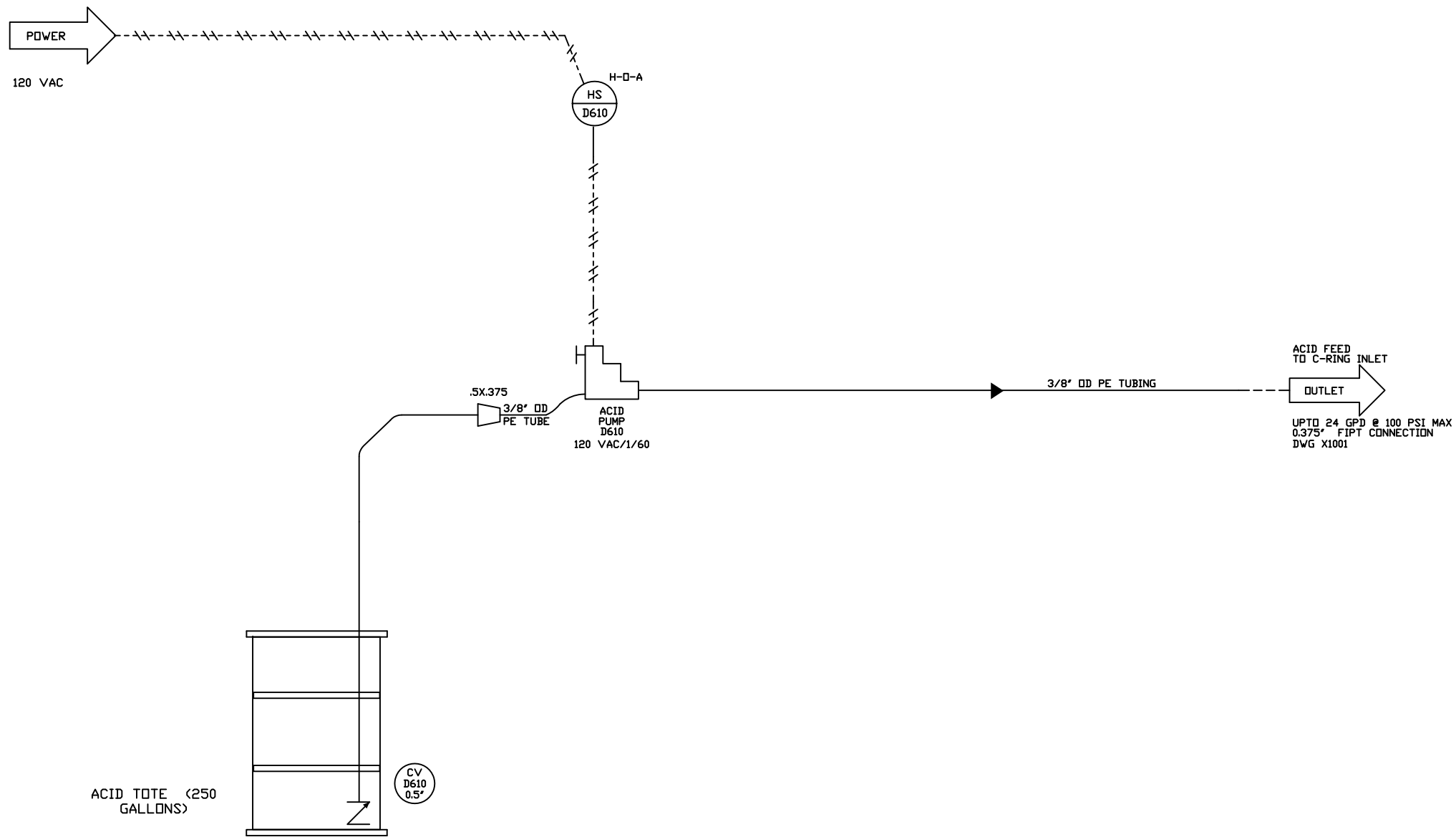
PROJECT TITLE: POLYMER INJECTION

SIZE: D PROJECT NO.: 1170 DWG. NO.: D1005 REV: 1

SHEET SCALE: 1:1

1 3/4 1/2 1/4 0 1/2 1

SHEET 01 OF 01



REV	REVISION DESCRIPTION	REV BY	DATE	APP BY
1	AS-BUILT	JBA	2/26/18	CHM
0	ISSUED FOR CONSTRUCTION	JBA	11/7/17	CHM
ISSUED FOR INFORMATION				



DISCIPLINE ENGINEER

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES ARE AS FOLLOWS
 1/XX ±.1/16
 1/XX ±.1/16
 .00X ±.01
 .00X ±.005
 ANGLES ±.1

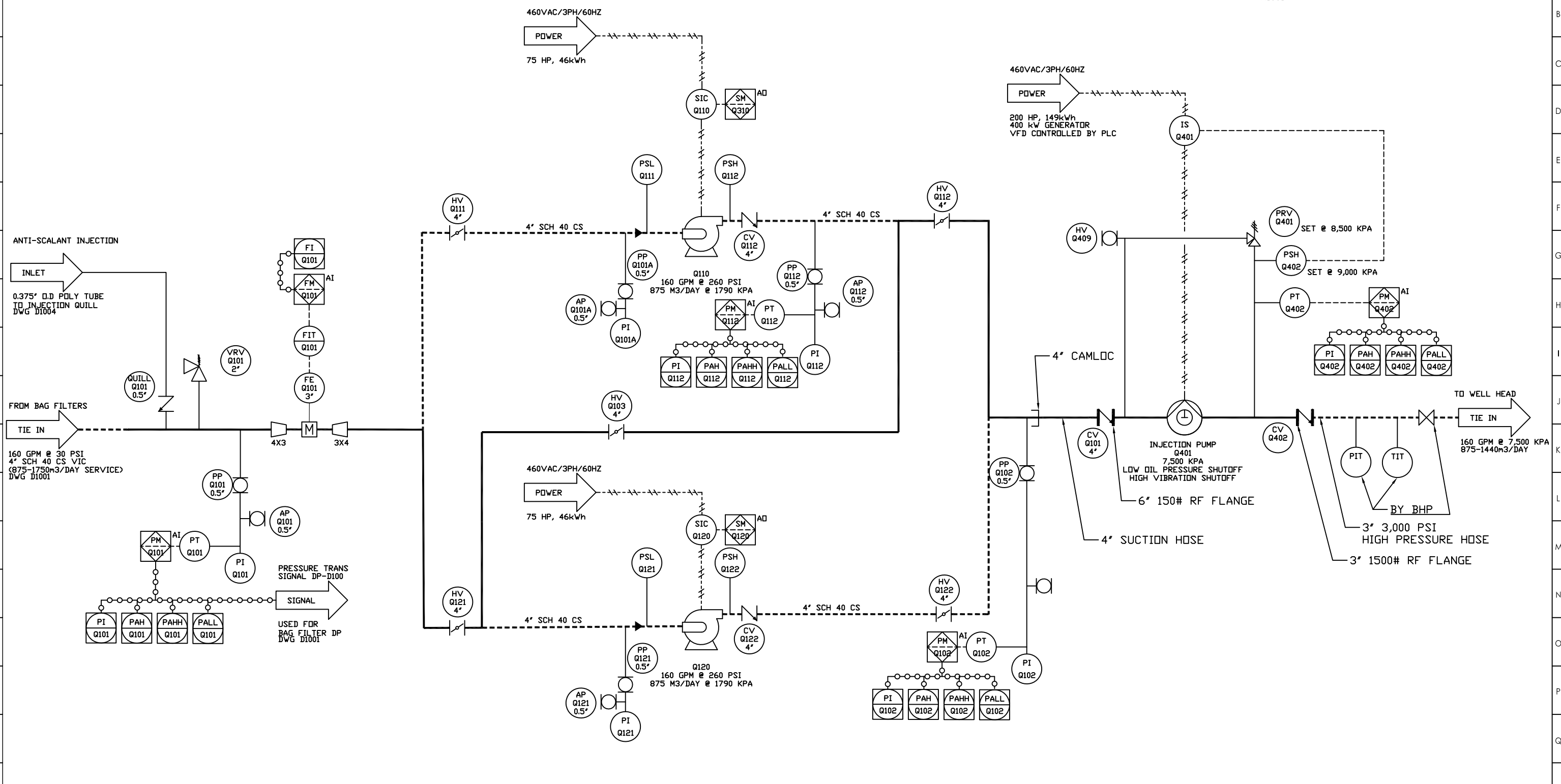
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MODEL FILE NAME: _____
 DRAWN BY: CRAIG MILLS
 DESIGN BY: JASON ANDERSON
 APPROVED BY: _____



PROJECT ACID INJECTION			
SIZE D	PROJECT NO. 1170	DWG. NO. D1006	REV 1
SHEET SCALE 1:1			SHEET 01 OF 01

SYSTEM AREAS INCLUDED IN CONTAINER M9101
 Q1001
 D1004
 D1005
 X1001



POWER DISTRIBUTION M9101
 2EA 1/2HP VENTILATION FANS 110-240/1/60
 2EA 5KW HEATERS 240/1/60
 1EA 300WATTS OF LIGHTING 110-240/1/60
 1EA UTILITY OUTLET CIRCUIT 110/1/60
 1EA REMOTE IO PANEL 110/1/60
 5EA HEAT TRACE GFI CIRCUITS 20AMP 208/1/60
 2EA 1/20HP CHEMICAL FEED PUMPS

5	ADDED CUSTOMER EQUIPMENT	JBA	3/23/18	CHM
4	AS-BUILT	JBA	2/26/18	CHM
3	ADDED VALVE SYMBOL AND MOVED CHECK VALVE	JBA	1/2/18	CHM
2	UPDATED HIGH PRESSURE INJECTION PUMP PIPING	JBA	12/20/17	CHM
1	ADDED HIGH PRESSURE INJECTION PUMP	JBA	12/7/17	CHM
0	ISSUED FOR CONSTRUCTION	JBA	9/20/17	CHM
D	ADDED LINE NUMBERS	JBA	8/15/17	CHM
REV	REVISION DESCRIPTION	REV BY	DATE	APP BY

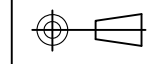
ISSUED FOR INFORMATION



FOSSIL WATER

DISCIPLINE ENGINEER

THIRD ANGLE PROJECTION



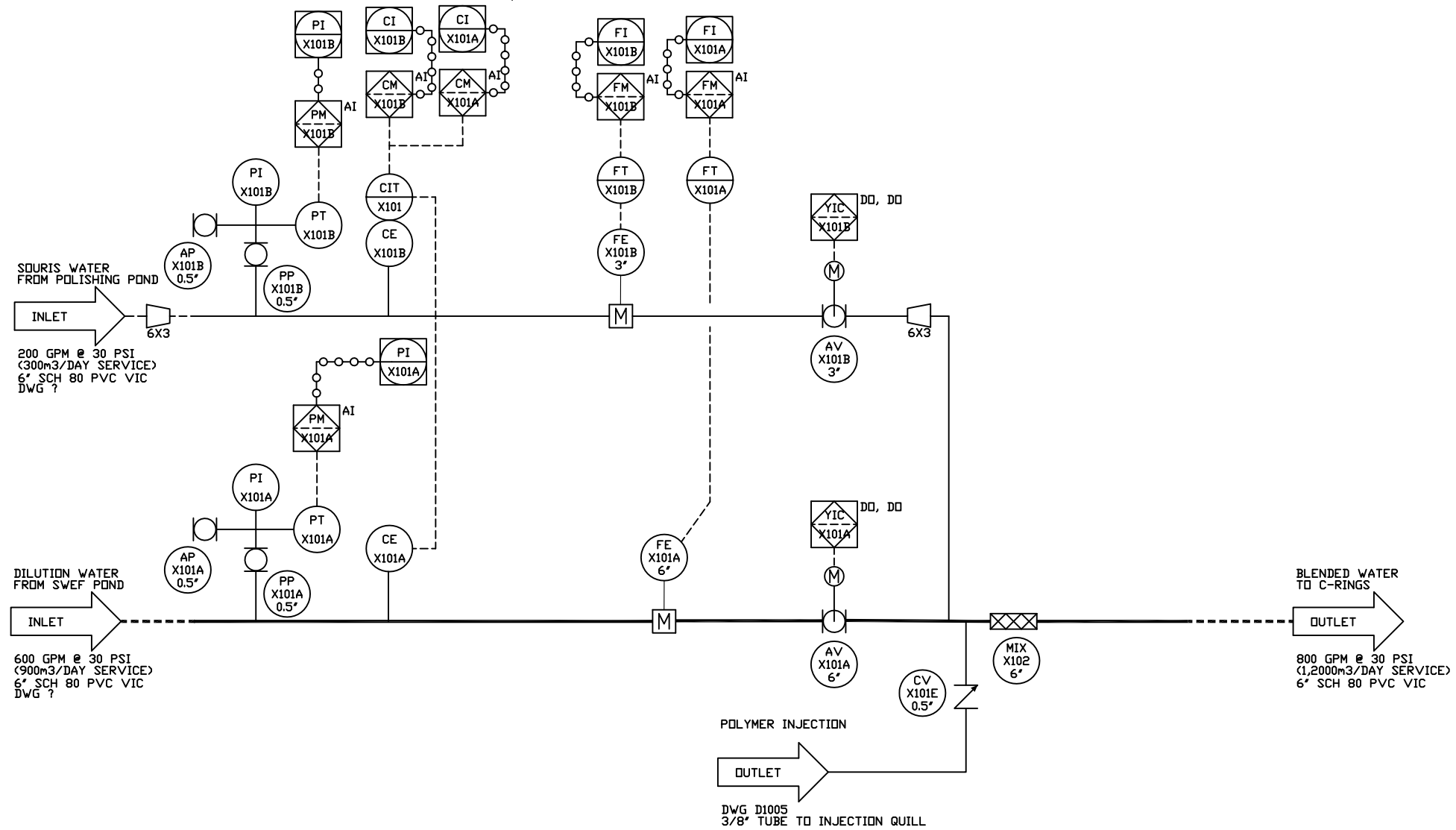
UNLESS OTHERWISE SPECIFIED:
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 1/2X: ±.015
 1/XX: ±.01/16
 .00X: ±.01
 .00X: ±.005
 ANGLES: ±.1

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MODEL FILE NAME: DISIGNED BY: JASON ANDERSON
 DRAWN BY: CRAIG MILLS APPROVED BY:



PROJECT TITLE	WELL DISPOSAL PUMPS		
SIZE	PROJECT NO. 1170	DWG. NO. Q1001	REV 5
SHEET SCALE 1:1	SHEET SCALE 1:1		SHEET 01 OF 01



REV	REVISION DESCRIPTION	REV BY	DATE	APP BY
1	AS-BUILT	JBA	2/26/18	CHM
0	ISSUED FOR CONSTRUCTION	JBA	9/20/17	CHM
C	RELEASE FOR DESIGN	CHM	4/7/17	JBA
B	RELEASE FOR APPROVAL	CHM	3/1/17	JBA
A	ISSUED FOR REVIEW	JBA	2/7/17	CHM
1	ISSUED FOR INFORMATION			



FOSSIL WATER

DISCIPLINE ENGINEER

THIRD ANGLE PROJECTION
 UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES ARE AS FOLLOWS
 1/XX ±.015
 1/XX ±.01/16
 .00X ±.01
 .00X ±.005
 ANGLES ±.1

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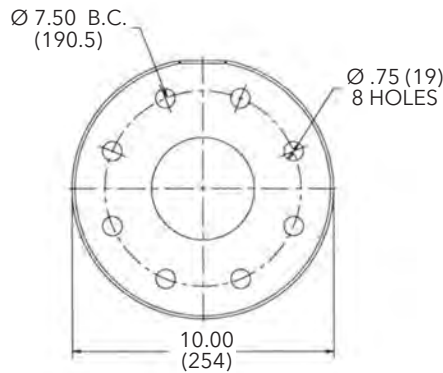
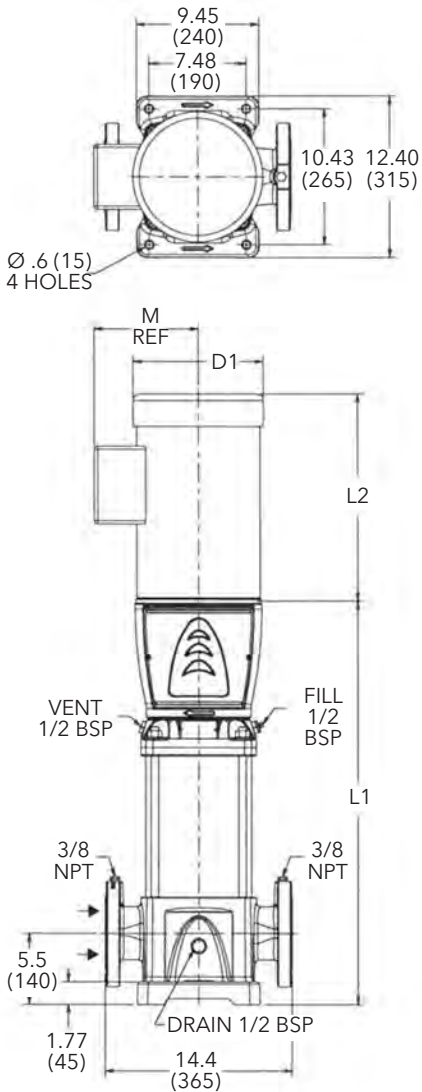


PROJECT TITLE			
BLENDING P&ID			
SIZE	PROJECT NO.	DWG. NO.	REV
D	1170	X1001	1
SHEET SCALE 1:1			SHEET 01 OF 01

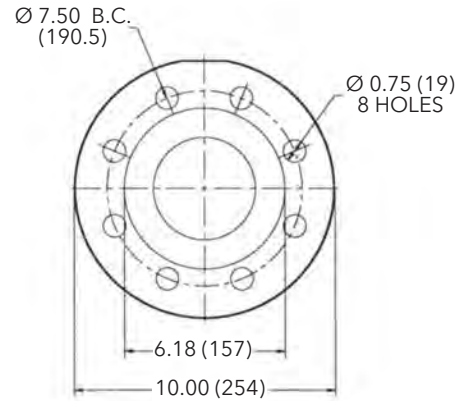
Dimensions and Weights

66SV Series 3500 RPM

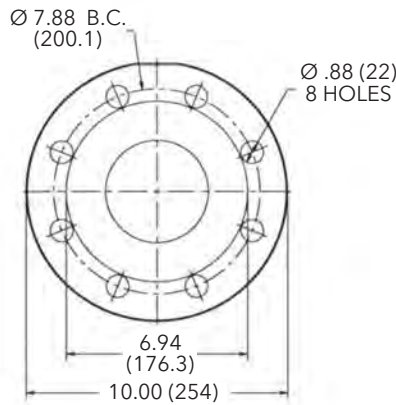
60 Hz



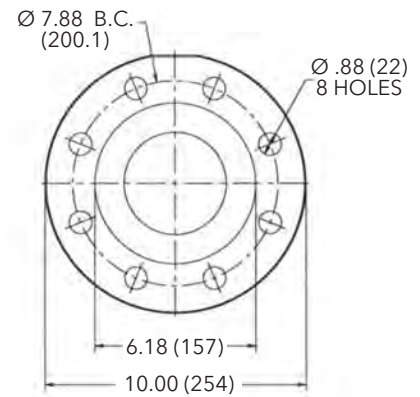
**Cast Iron
4\"/>**



**316SS
4\"/>**



**Cast Iron
4\"/>**

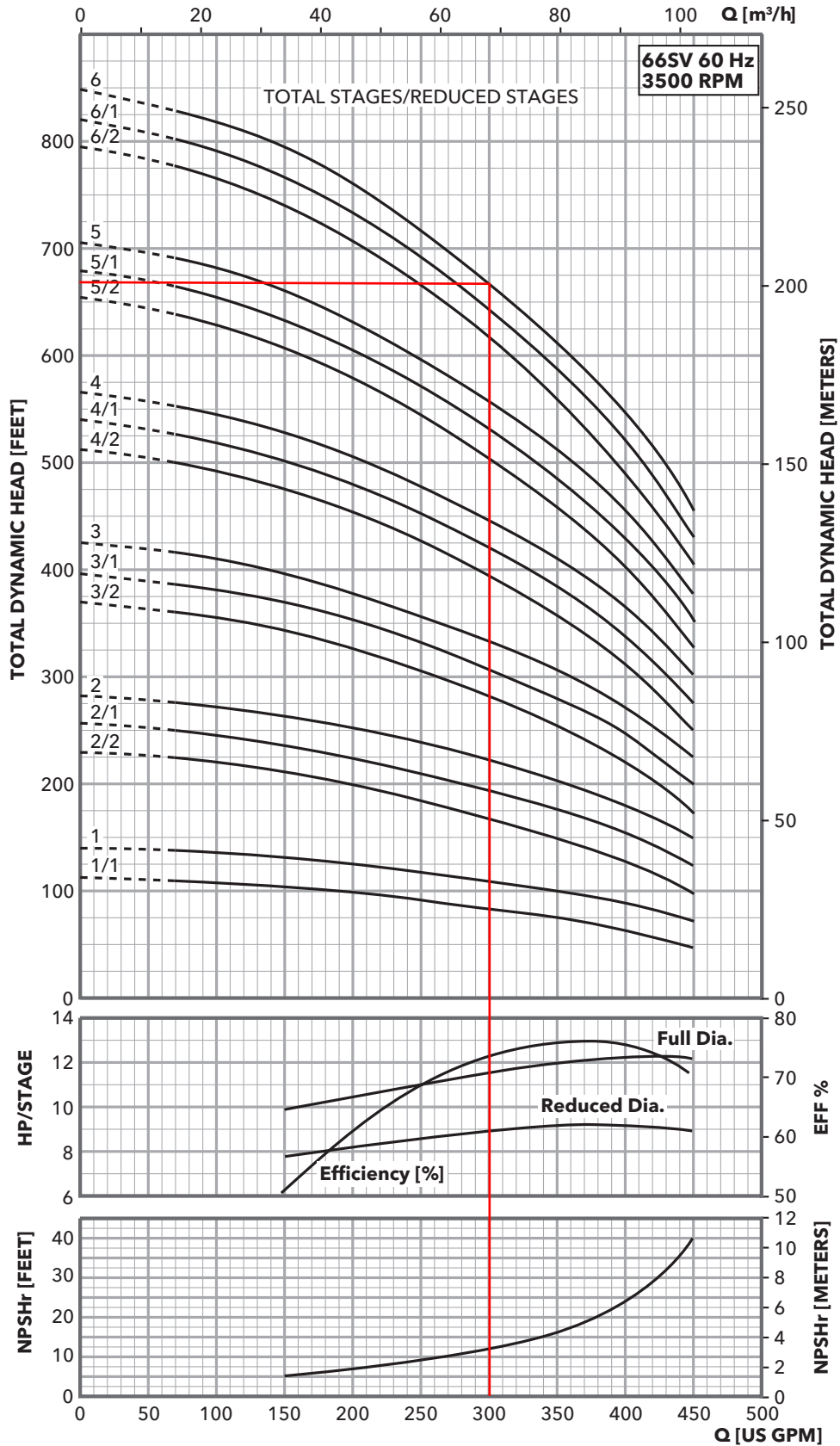


**316SS
4\"/>**

All dimensions are in inches (mm).

66SV SERIES – 60Hz, 3500 RPM ODP/TEFC Enclosures

Pump Type Stages	HP	Motor				Dimensions (in)										Weight (lbs.)									
		NEMA Frame				L1	L2				M (Ref.)	D1 (max.)				D2	Pump Only	Motor				Pump/Motor			
		ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø		ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø		ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø			ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø	ODP 1Ø	TEFC 1Ø	ODP 3Ø	TEFC 3Ø
66SV-1	15	-	-	215TC	254TC	23.19	-	-	15.56	16.56	9.25	-	-	10.19	10.31	5.51	185	-	-	128	250	-	-	313	435
66SV-2/2	20	-	-	254TC	256TC	26.75	-	-	15.56	16.56	9.25	-	-	10.19	10.31	5.51	196	-	-	220	280	-	-	416	476
66SV-2/1		-	-			26.75	-	-	15.56	16.56	9.25	-	-	10.19	10.31	5.51	196	-	-	220	280	-	-	416	476
66SV-2	25	-	-	256TC	284TC	28.31	-	-	18.00	23.38	13.12	-	-	11.63	15.31	5.51	210	-	-	240	420	-	-	450	630
66SV-3/2	30	-	-	284TC	284TC	31.81	-	-	20.12	23.38	13.12	-	-	13.25	15.31	5.51	223	-	-	325	445	-	-	548	668
66SV-3/1		-	-			31.81	-	-	20.12	23.38	13.12	-	-	13.25	15.31	5.51	223	-	-	325	445	-	-	548	668
66SV-3	40	-	-	284TC	284TC	31.81	-	-	20.12	23.38	13.12	-	-	13.25	15.31	5.51	223	-	-	328	448	-	-	551	671
66SV-4/2		-	-			35.38	-	-	20.12	23.38	13.12	-	-	13.25	15.31	5.51	234	-	-	328	448	-	-	562	682
66SV-4/1	50	-	-	326TSC	326TSC	34.88	-	-	22.50	23.38	13.12	-	-	13.25	15.31	5.51	242	-	-	382	592	-	-	624	834
66SV-4		-	-			34.88	-	-	22.50	23.38	13.12	-	-	13.25	15.31	5.51	242	-	-	382	592	-	-	624	834
66SV-5/2	60	-	-	326TSC	364TSC	38.44	-	-	22.50	23.38	13.12	-	-	13.25	15.31	5.51	252	-	-	382	592	-	-	634	844
66SV-5/1		-	-			38.44	-	-	22.50	27.22	14.96	-	-	13.25	19.00	5.51	252	-	-	474	736	-	-	726	988
66SV-5	75	-	-	326TSC	364TSC	38.44	-	-	22.50	27.22	14.96	-	-	13.25	19.00	5.51	252	-	-	474	736	-	-	726	988
66SV-6/2		-	-			41.94	-	-	24.12	27.22	14.96	-	-	15.12	19.00	5.51	266	-	-	500	762	-	-	766	1028
66SV-6/1	75	-	-	365TSC	365TSC	41.94	-	-	24.12	27.22	14.96	-	-	15.12	19.00	5.51	266	-	-	500	762	-	-	766	1028
66SV-6		-	-			41.94	-	-	24.12	27.22	14.96	-	-	15.12	19.00	5.51	266	-	-	500	762	-	-	766	1028



Analytical Transmitters



THORNTON

Leading Pure Water Analytics

M300 ISM Transmitters

Conductivity/Resistivity

pH/ORP

Dissolved Oxygen

ISM



M300 ISM Transmitters

for Innovative Liquid Analysis

METTLER TOLEDO

M300 ISM Analytical Transmitters with plug and measure capability

METTLER TOLEDO THORNTON M300 ISM process analytical instrumentation provides reliable, accurate measurements of conductivity/resistivity, pH/ORP and dissolved oxygen. "Intelligent Sensor Management"™ technology provides the utmost in convenience and control of sensor performance.

Quick and easy installation thanks to "Plug and Measure" capabilities

Operational errors at the transmitter are virtually eliminated since all relevant status and configuration information is automatically transferred from the sensor to the transmitter during startup.

Features

- Compact ¼ DIN panel mounting with NEMA 4X, IP65 panel seal
- Robust ½ DIN wall mounting with NEMA 4X, IP65 back cover
- ISM Sensors are immediately recognized at installation
- Measurements are available within seconds of connection
- ISM capabilities communicate type, model, serial number, full calibration data plus historical data
- Used with UniCond™ conductivity sensors with ISM for exceptionally wide range measurement
- On-line sensor diagnostics assure process surveillance
- Historical calibration and exposure information improves preventive maintenance programs
- Multiple languages: English, French, German, Italian, Spanish, Portuguese, Russian, Japanese
- CE compliant, UL Listed for US and Canadian standards



ISM

Applications

Pure and ultrapure water treatment for semiconductor rinsing, critical power/steam makeup and pharmaceutical waters.

Semiconductor processing in rinsers and wet benches with precise resistivity measurement and temperature compensation.

Power plant cycle chemistry and stator cooling monitoring with exceptionally accurate temperature compensation for specific and cation conductivity and pH and very low maintenance dissolved oxygen measurement.

Pharmaceutical water monitoring to meet USP, EP, and JP conductivity requirements including built-in tables of alarm limits.

Reclaim, recycle and wastewater treatment for the above industry applications for contaminant detection, diversion and neutralization.

M300 ISM Multiparameter Transmitter

- One or two field-configurable plug & measure channels for any available measurement parameters
- ISM for Conductivity/resistivity, pH/ORP, and/or dissolved oxygen
- Reduces number of instruments and amount of panel space



Measurement Specifications

Functional		
Conductivity/Resistivity Ranges		
0.01 Constant Sensor	0.002 to 500 $\mu\text{S}/\text{cm}$ (2000 ohm-cm to 500 Mohm-cm)	
0.1 Constant Sensor	0.02 to 50,000 $\mu\text{S}/\text{cm}$ (20 ohm-cm to 50 Mohm-cm)	
Readout in equivalent S/m ranges is selectable		
TDS Ranges (CaCO ₃ and NaCl)	Cover equivalent conductivity ranges	
RO % Rejection	0-100% (computed from two conductivity measurements)	
Conductivity Resolution	Four significant digits, auto-ranged	
pH, ORP Ranges	-1.00 to 15.00 pH, -1500 to 1500 mV; resolution 0.01 pH, 1 mV	
Dissolved Oxygen Ranges	0-20,000 ppb; 0-20 ppm, 0-200% saturation; resolution 0.1 ppb	
Temperature Measurement Range	-40 to 200 °C (-40 to 392 °F); resolution 0.1 °	
Temperature Sensor Input	Digital from sensor	
Update rate	Display and outputs, once per second	
Temperature Compensation		
Conductivity/Resistivity	Selectable as: Std (standard high purity Thornton/Light), Light 84, Std referenced to 75°C, linear %°C, 50% glycol, 100% glycol, cation, ammonia, isopropyl alcohol, none	
pH	Automatic / manual for electrode output, plus adjustable solution temperature coefficient for solution ionization effects	
Dissolved Oxygen	Automatic, for membrane permeability and oxygen solubility	
Conductivity/Resistivity Calibration	1- or 2-point	
pH Calibration	1- or 2-point, with auto buffer recognition	
pH Diagnostics	Selectable continuous checking of membrane resistance and reference diaphragm/junction resistance (with solution ground sensors)	
Dissolved Oxygen Calibration	Air/comparison, zero	
Sensor maximum distance	91 m (300 ft) conductivity; 20 m (66 ft) pH, ORP, DO	
Performance		
System Accuracy		
Conductivity/Resistivity	Identical to sensor	
pH, ORP	Identical to sensor	
Dissolved Oxygen	Identical to sensor	
Outputs – see p. 4 for ratings	One Channel	Two Channel
Setpoints/Alarms	4 - high, low, outside, between, USP or EP	6 - high, low, outside, between, USP or EP
Relays	2 - SPDT, 2 SPST reed	2 SPDT, 1 SPST NO, 1 SPST NC, 2 SPST reed
Analog Output Signals	2	4
Discrete Inputs	1	2

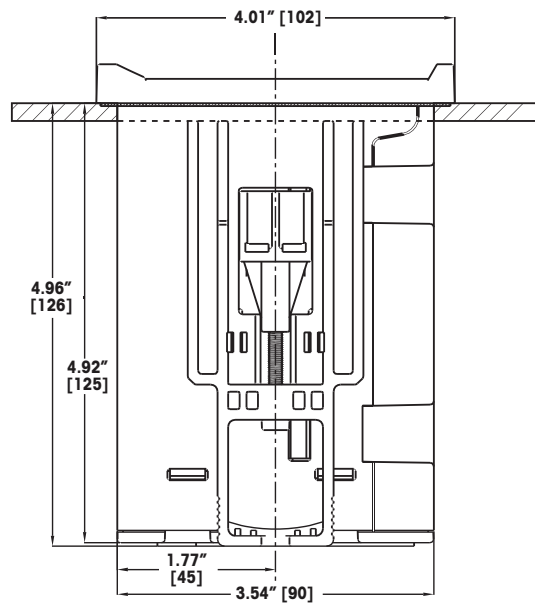
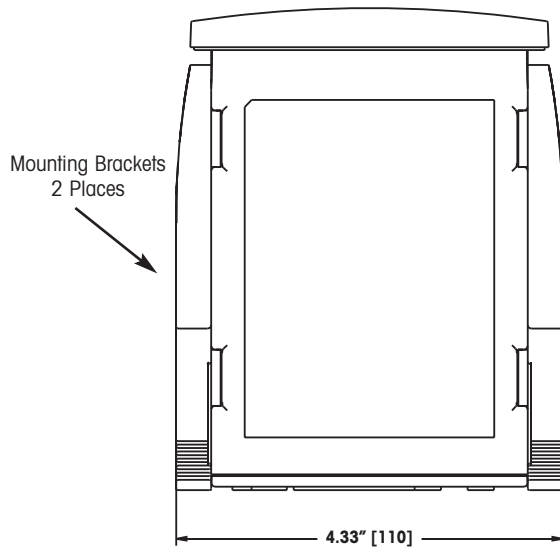
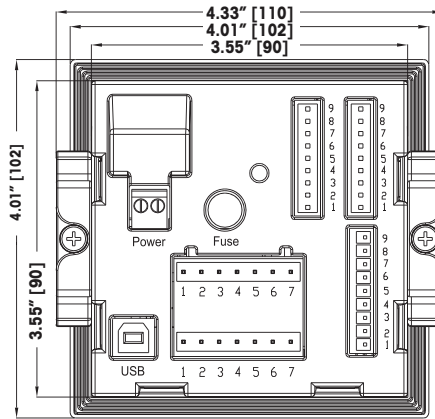
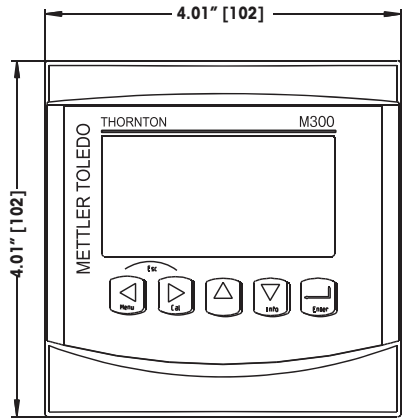
M300 ISM Multiparameter Transmitter

Physical and Electrical Specifications

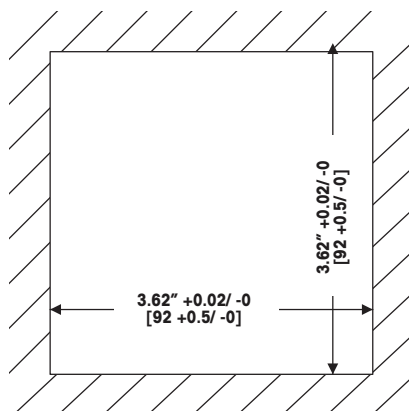
Enclosure/Power	
Operator interface	4 line back-lit LCD; 5-tactile keys
1/4 DIN Model Dimensions (H x W x D)	4.01 x 4.01 x 5.51 in (102 x 102 x 140 mm)
Max. Depth, - panel mounted	4.96 in (126 mm), excluding plug-in connectors
1/2 DIN Model Dimensions (H x W x D)	5.90 x 5.90 x 4.57 in (150 x 150 x 116 mm)
Max. Depth, - panel mounted	3.46 in (88 mm)
Material	Polycarbonate
Weight, 1/4 DIN Models	1.5 lb (0.7 kg)
Weight, 1/2 DIN Models	2 lb (1 kg)
UL Electrical Environment	Installation (overvoltage) Category II
Ratings/Approvals	UL listed, CE compliant; NEMA 4X, IP 65 - 1/2 DIN wall mount and 1/4 DIN panel seal
EMC Emissions	According to EN55011 Class A
Power	Universal 100-240 VAC, 50-60 Hz or 20-30 VDC; 5 W (on power loss, all settings are retained in non-volatile memory without batteries)
Environmental	
Storage temperature	-40 to 70 °C (-40 to 158 °F)
Ambient temperature operating range	-10 to 50 °C (14 to 122 °F)
Relative humidity	0 to 95%
Outputs	
Analog outputs (as specified for individual models)	Powered 0/4-20 mA, 22 mA alarm, 500 ohms maximum load; not for use with externally powered circuits
Analog output accuracy	± 0.05 mA
Analog output scaling	Linear, bi-linear, logarithmic (1,2,3 or 4 decades), auto-ranging
Relays (as specified for individual models)	All contacts are potential free, with adjustable hysteresis and time delay
SPDT, SPST NO, SPST NC	250 VAC/30 VDC, 3 A, resistive
SPST reed	300 VDC, 0.5 A, 10 W
Digital communications	USB, type B connector, for remote configuration and data acquisition
Discrete input (as specified for individual models)	Accepts dry contact closure for remote PID control auto/manual selection
PID Control	
Display	Auto/manual status and % output on bottom line of display
Settings	Auto/manual, setpoint, deadband, non-linear corner points, control limits, proportional gain, integral reset time (min.), derivative rate time (min.)
Manual Station	Controlled by up/down arrow keys in manual mode; remote auto/manual selection by discrete input
Control Output Types	One or two analog signals, relays—pulse frequency, or relays—pulse length

M300 ISM Multiparameter Transmitter

Dimensions for 1/4 DIN panel-mount models

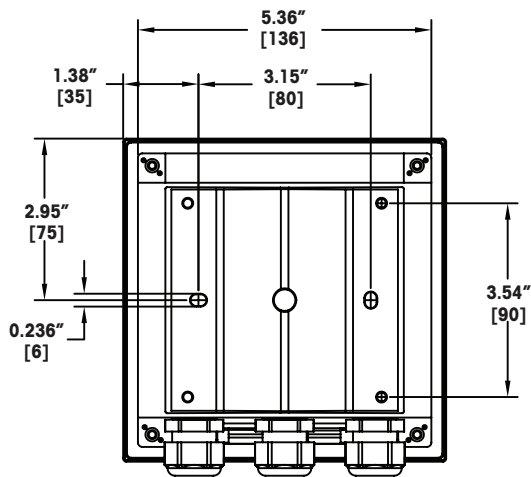
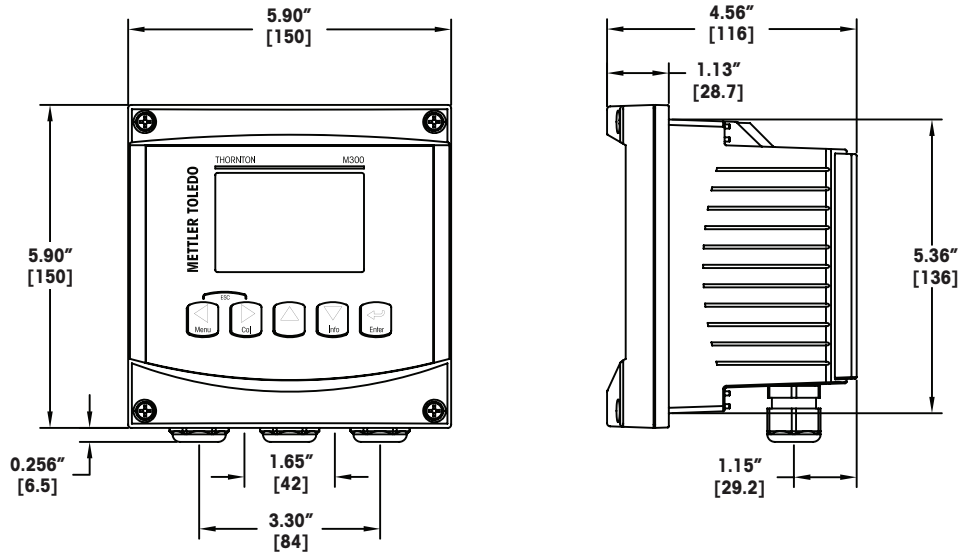


Dimensions for 1/4 DIN panel cutout

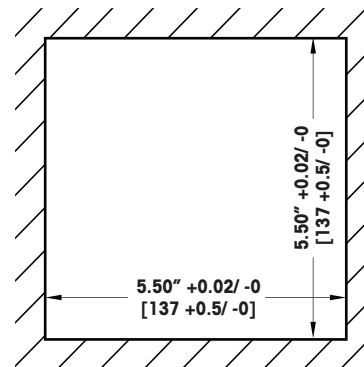


Dimensions in inches [mm]

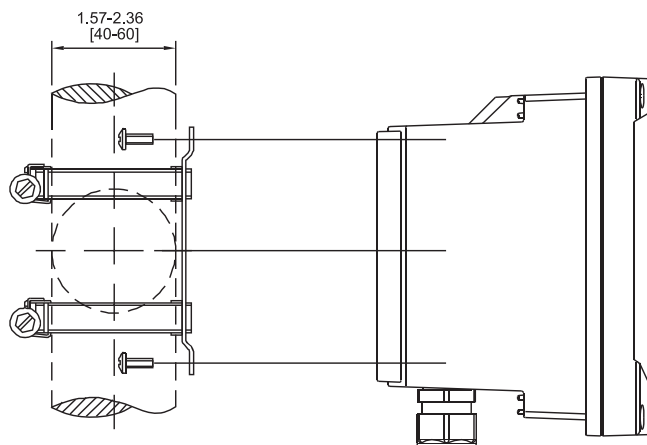
Dimensions for 1/2 DIN wall/panel-mount models



Panel Cutout Dimensions



Dimensions for 1/2 DIN pipe mount kit



Dimensions in inches [mm]

Ordering Information

M300 ISM Transmitters

Description		Part Number
1/4 DIN enclosure – panel mounting kit included		
M300 ISM	1-channel Multiparameter	58 000 301
M300 ISM	2-channel Multiparameter	58 000 302
1/2 DIN enclosure – panel/wall/pipe mount*		
M300 ISM	1-channel Multiparameter	58 000 311
M300 ISM	2-channel Multiparameter	58 000 312

* Panel and pipe mounting require kits, listed below, ordered separately.

Accessories

Description	Part Number
Panel Mount Kit for 1/2 DIN models	52 500 213
Pipe Mount Kit for 1/2 DIN models	52 500 212
ISM Conductivity Calibration Module	58 082 305
Adapter Panel - M300 to 200/2000 cutout	58 083 305

M300 ISM Sensor Cables

Thornton Conductivity	Part Number
1 ft (0.3 m)	58 080 270
5 ft (1.5 m)	58 080 271
10 ft (3.0 m)	58 080 272
15 ft (4.5 m)	58 080 273
25 ft (7.6 m)	58 080 274
50 ft (15.2 m)	58 080 275
100 ft (30.5 m)	58 080 276
150 ft (45.7 m)	58 080 277
200 ft (61.0 m)	58 080 278
300 ft (91.4 m)	58 080 279

pH/ORP/DO	Part Number
3 ft (1 m)	(10 000 0102) 59 902 167
10 ft (3 m)	(10 000 0302) 59 902 193
16 ft (5 m)	(10 000 0502) 59 902 213
33 ft (10 m)	(10 000 1002) 59 902 230

UniCond™ Conductivity Sensor Calibration Module

- Includes resistances for all ranges of conductivity/resistivity and temperature
- Connects between UniCond™ conductivity sensor and M300 ISM transmitter
- With NIST-traceable certificate of calibration
- Enables efficient QA program

Description	Accuracy	Part No.
ISM Conductivity Calibration Module	± 0.08%	58 082 305



www.mt.com/thornton

Visit for more information

Mettler-Toledo Thornton, Inc.

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Bedford, MA 01730 USA
Tel. +1-781-301-8600
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Toll Free +1-800-510-PURE (US and Canada only)
thornton.info@mt.com

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Quality certificate.
Development, production and testing to ISO 9001.



A certified ServiceXXL provider.



CE Compliant

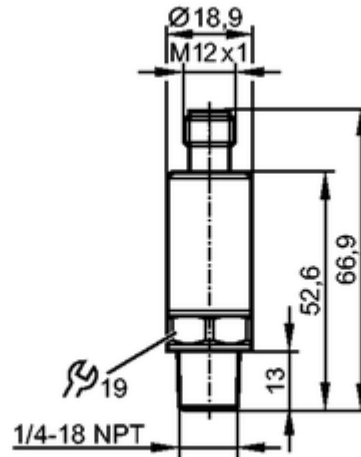


UL listed
Meets Canadian Standards

efectors**PT2443**

PT-050PSEN14-A-ZVG/US/ /W

Pressure sensors

**Product characteristics**

Electronic pressure sensor

for industrial applications

Process connection: 1/4-18 NPT

Analog output

Measuring range: 0...500 psi

Application

Application	Type of pressure: relative pressure Group 2 fluids according to the Pressure Equipment Directive (PED), group 1 fluids on request
Pressure rating [psi]	1450 (static)
Bursting pressure min. [psi]	11600
Vacuum resistance [psi]	-14.5
Medium temperature [°C]	-40...90

Electrical data

Electrical design	DC
Operating voltage [V]	8.5...36 DC
Insulation resistance [MΩ]	> 100 (500 V DC)
Protection class	III
Reverse polarity protection	yes

Outputs

Output	Analog output
Output function	4...20 mA analog
Short-circuit proof	yes

Overload protection	yes
Analog output	4...20 mA
Max. load [Ω]	($U_b - 8.5 \text{ V}$) / 21.5 mA; 720 at $U_b = 24 \text{ V}$

Measuring / setting range

Measuring range [psi]	0...500
-----------------------	---------

Accuracy / deviations**Accuracy / deviations
(in % of the span)**

Characteristics deviation *)	< ± 0.5
Linearity	< ± 0.1 (BFSL) / < ± 0.2 (LS)
Hysteresis	< ± 0.2
Repeatability **)	< ± 0.05
Long-term stability ***)	< ± 0.1

Temperature coefficients (TEMPCO) in the temperature range -40...90° C (in % of the span per 10 K)

Greatest TEMPCO of the zero point + span	< 0.1 (-25...90 °C) / < 0.2 (-40...-25 °C)
--	--

Reaction times

Step response time analogue output [ms]	1
---	---

Environment

Ambient temperature [°C]	-40...90
Storage temperature [°C]	-40...100
Protection	IP 67 / IP 69K

Tests / approvals

Pressure equipment directive	sound engineering practice	
EMC	DIN EN 61000-6-2	
	DIN EN 61000-6-3	
Shock resistance	DIN EN 60068-2-27	50 g (11 ms)
Vibration resistance	DIN EN 60068-2-6	20 g (10...2000 Hz)
MTTF [Years]	784	

Mechanical data

Process connection	1/4-18 NPT
Materials (wetted parts)	1.4542 (17-4 PH / 630) ²
Housing materials	1.4542 (17-4 PH / 630) ² ; stainless steel (316L / 1.4404); PEI
Min. pressure cycles	60 millions in the course of the lifetime (at 1.2 times the nominal pressure)
Tightening torque [Nm]	≤ 50 (recommended tightening torque ¹)
Restrictor element integrated	no (can be retrofitted)
Weight [kg]	0.056

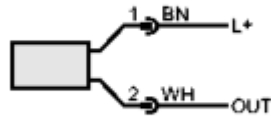
Electrical connection

Connection	M12 connector
------------	---------------

Wiring

Core colors
 BN brown
 WH white





OUT: 4...20 mA
Colours to DIN EN 60947-5-2

Remarks

Remarks

*) incl. drift when overtightened, zero point and span error, non-linearity, hysteresis
 **) with temperature fluctuations < 10 K
 ***) in% of the span / 6 months
 1) Depends on lubrication, seal and pressure rating
 2) Characteristics similar to stainless steel (e.g. 304/1.4301) but higher strength.
 BFSL = Best Fit Straight Line / LS = Limit Value Setting

Pack quantity [piece]

1

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PULSAFEEDER®

The Pulsatron Series A Plus offers manual function controls over stroke length and stroke rate as standard with the option to select external pace for automatic control.

Ten distinct models are available, having pressure capabilities to 250 PSIG (17 BAR) @ 12 GPD (1.9 lph), and flow capacities to 58 GPD (9.1 lph) @ 100 PSIG (7.0 BAR), with a standard turndown ratio of 100:1, and optional ratio of 1000:1. Metering performance is reproducible to within $\pm 3\%$ of maximum capacity.

Features

- Manual Control by on-line adjustable stroke rate and stroke length.
- Highly Reliable timing circuit.
- Circuit Protection against voltage and current upsets.
- Solenoid Protection by thermal overload with auto-reset.
- Water Resistant, for outdoor and indoor applications.
- Internally Dampened To Reduce Noise.
- Guided Ball Check Valve Systems, to reduce back flow and enhance outstanding priming characteristics.
- Few Moving Parts and Wall Mountable.
- Safe & Easy Priming with durable leak-free bleed valve assembly (standard).
- Optional Control: External pace with auto/manual selection.

Controls



Manual Stroke Rate

Manual Stroke Length

External Pacing - Optional

External Pace With Stop - Optional (125 SPM only)

Controls Options		
Feature	Standard Configuration	Optional Configuration ¹
External Pacing	---	Auto / Manual Selection ²
External Pace w/ Stop (125 SPM only)	---	Auto / Manual Selection ²
Manual Stroke Rate	10:1 Ratio	100:1 Ratio
Manual Stroke Length	10:1 Ratio	10:1 Ratio
Total Turndown Ratio	100:1 Ratio	1000:1 Ratio

Note 1: On S2, S3 & S4 sizes only.

Note 2: Not available on 1000:1 turndown pumps.

Operating Benefits

- Reliable metering performance.
- Rated "hot" for continuous duty.
- High viscosity capability.
- Leak-free, sealless, liquid end.



Aftermarket

- KOPkits
- Gauges
- Dampeners
- Pressure Relief Valves
- Tanks
- Pre-Engineered Systems
- Process Controllers (MicroVision)



PULSAtron® Series A Plus
Electronic Metering Pumps

PULSAtron® Series A Plus

Specifications and Model Selection

MODEL		LBC2	LB02	LBC3	LB03	LB04	LB64	LBC4	LBS2	LBS3	LBS4	
Capacity nominal (max.)	GPH	0.25	0.25	0.42	0.50	1.00	1.25	2.00	0.50	1.38	2.42	
	GPD	6	6	10	12	24	30	48	12	33	58	
	LPH	0.9	0.9	1.6	1.9	3.8	4.7	7.6	1.9	5.2	9.14	
Pressure ³ (max.)	GFPP, PVDF, 316SS or PVC (W code) w/TFE Seats	PSIG (Bar)	250 (17)	150 (10)	250 (17)	150 (10)	100 (7)	100 (7)	50 (3.3)	250 (17)	150 (10)	100 (7)
	PVC (V code) Viton or CSPE Seats / Degass Liquid End		150 (10)									
Connections:	Tubing	1/4" ID X 3/8" OD						3/8" ID X 1/2" OD		1/4" ID X 3/8" OD		
	Piping	1/4" FNPT										
Strokes/Minute	SPM	125								250		

Note 3: Pumps with rated pressure above 150 PSI will be de-rated to 150 PSI Max. when selecting certain valve options, see Price Book for details.

Engineering Data

Pump Head Materials Available:	GFPP PVC PVDF 316 SS
Diaphragm:	PTFE-faced CSPE-backed
Check Valves Materials Available:	
Seats/O-Rings:	PTFE CSPE Viton
Balls:	Ceramic PTFE 316 SS Alloy C
Fittings Materials Available:	GFPP PVC PVDF
Bleed Valve:	Same as fitting and check valve selected, except 316SS
Injection Valve & Foot Valve Assy:	Same as fitting and check valve selected
Tubing:	Clear PVC White PE

Important: Material Code - GFPP=Glass-filled Polypropylene, PVC=Polyvinyl Chloride, PE=Polyethylene, PVDF=Polyvinylidene Fluoride, CSPE=Generic formulation of Hypalon, a registered trademark of E.I. DuPont Company. Viton is a registered trademark of E.I. DuPont Company. PVC wetted end recommended for sodium hypochlorite.

Dimensions

Series A PLUS Dimensions (inches)						
Model No.	A	B	C	D	E	Shipping Weight
LB02 / S2	5.0	9.6	9.5	6.5	8.2	10
LBC2	5.0	9.9	9.5	6.5	8.5	10
LBC3	5.0	9.9	9.5	6.5	8.5	10
LB03 / S3	5.0	9.9	9.5	6.5	8.5	10
LB04 / S4	5.0	9.9	9.5	6.5	8.5	10
LB64	5.0	9.9	9.5	6.5	8.5	10
LBC4	5.0	9.9	9.5	6.5	8.5	10

NOTE: Inches X 2.54 = cm

Engineering Data

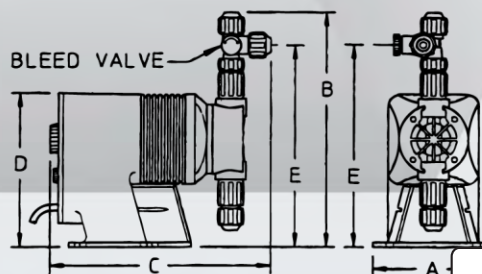
Reproducibility:	+/- 3% at maximum capacity
Viscosity Max CPS:	1000 CPS
Stroke Frequency Max SPM:	125 / 250 by Model
Stroke Frequency Turn-Down Ratio:	10:1 / 100:1 by Model
Stroke Length Turn-Down Ratio:	10:1
Power Input:	115 VAC/50-60 HZ/1 ph 230 VAC/50-60 HZ/1 ph
Average Current Draw:	
@ 115 VAC; Amps:	0.6 Amps
@ 230 VAC; Amps:	0.3 Amps
Peak Input Power:	130 Watts
Average Input Power @ Max SPM:	50 Watts

Custom Engineered Designs – Pre-Engineered Systems



Pre-Engineered Systems

Pulsafeeder's Pre-Engineered Systems are designed to provide complete chemical feed solutions for all electronic metering applications. From stand alone simplex pH control applications to full-featured, redundant sodium hypochlorite disinfection metering, these rugged fabricated assemblies offer turn-key simplicity and industrial-grade durability. The UV-stabilized, high-grade HDPE frame offers maximum chemical compatibility and structural rigidity. Each system is factory assembled and hydrostatically tested prior to shipment.



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Rosemount 8700 Series

Magnetic Flowmeter Sensors







Appendix A Reference Data

Rosemount 8700 Series Product Specifications Overview page A-1
 E-Series Performance Specifications page A-5
 High Signal System Performance Specifications page A-7
 Rosemount Flanged Sensor Specifications page A-9
 Rosemount 8711 Wafer Sensor Specifications page A-13
 Rosemount 8721 Sanitary Sensor Specifications page A-16
 Dimensional Drawings page A-20

ROSEMOUNT 8700 SERIES PRODUCT SPECIFICATIONS OVERVIEW

Listed below are tables that outline some of the basic performance, physical, and functional specifications of the Rosemount 8700 Series Magnetic Flowmeter products.

Table A-1. Rosemount 8700 Series Sensor Specifications

	Model	Style	Base Accuracy ⁽¹⁾	Line Sizes	Coil Drive Power	Design Features	Page for Detailed Specifications	Page for Ordering Information
	8705	Flanged	0.25% Standard 0.15% High Accuracy Option	0.5 to 36 in. (15 to 900 mm)	Pulsed DC	Standard Process Design	page A-9	page A-36
	8707	High-Signal (Flanged)	0.5% Standard 0.25% High Accuracy Option	3 to 36 in. (15 to 900 mm)	High-Signal Pulsed DC	Superior signal stability for Noisy Applications	page A-9	page A-36
	8711	Wafer	0.25% Standard 0.15% High Accuracy Option	0.15 to 8 in. (4 to 200 mm)	Pulsed DC	Compact, Light Weight	page A-13	page A-43
	8721	Hygienic	0.5% Standard 0.25% High Accuracy Option	0.5 to 4 in. (15 to 100 mm)	Pulsed DC	3-A and EHEDG CIP/SIP	page A-16	page A-46

(1) For complete accuracy specifications, please refer to the sensor detailed specifications.

Rosemount 8700 Series

Table A-2. Lining Material Selection




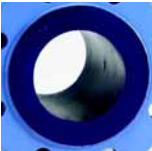


Liner Material	General Characteristics
<p>PFA</p> 	<ul style="list-style-type: none"> • Best chemical resistance • Better abrasion resistance than PTFE • Best high temperature capabilities • -20 to 350 °F (-29 to 177 °C)
<p>PTFE</p> 	<ul style="list-style-type: none"> • Highly chemical resistant • Excellent high temperature capabilities • -20 to 350 °F (-29 to 177 °C)
<p>ETFE</p> 	<ul style="list-style-type: none"> • Excellent chemical resistance • Better abrasion resistance than PTFE • -20 to 300 °F (-29 to 149 °C)
<p>Polyurethane</p> 	<ul style="list-style-type: none"> • Excellent abrasion resistance for slurries with small and medium particles • Limited chemical resistance • 0 to 140 °F (-18 to 60 °C) • Typically applied in clean water
<p>Neoprene</p> 	<ul style="list-style-type: none"> • Very good abrasion resistance for small and medium particles • Better chemical resistance than polyurethane • 0 to 176 °F (-18 to 80 °C) • Typically applied in water with chemicals, and sea water
<p>Linatex Rubber</p> 	<ul style="list-style-type: none"> • Very good abrasion resistance for large particles • Limited chemical resistance especially in acids • Softer material than polyurethane and neoprene • 0 to 158 °F (-18 to 70 °C) • Typically applied in mining slurries

Table A-3. Electrode Selection

Electrode Material	General Characteristics
316L Stainless Steel	• Good corrosion resistance
	• Good abrasion resistance
	• Not recommended for sulfuric or hydrochloric acids
Nickel Alloy 276 (UNS N10276)	• Better corrosion resistance
	• High strength
	• Good in slurry applications
	• Effective in oxidizing fluids
Tantalum	• Excellent corrosion resistance
	• Not recommended for hydrofluoric acid, fluorosilic acid, or sodium hydroxide
80% Platinum 20% Iridium	• Best chemical resistance
	• Expensive material
	• not recommended for aquaregia
Titanium	• Better chemical resistance
	• Better abrasion resistance
	• Good for sea water applications
	• Not recommended for hydrofluoric or sulfuric acid
Electrode Type	General Characteristics
Standard Measurement	• Lowest cost
	• Good for most applications
Standard Measurement + Grounding (Also see Table A-16 and Table A-5 for grounding options and installation)	• Low cost grounding option especially for large line sizes
	• Minimum conductivity of 100 microsiemens/cm
	• Not recommended for electrolysis or galvanic corrosion applications
Bullethead	• Slightly more expensive
	• Best option for coating processes

Rosemount 8700 Series

Table A-4. Grounding Options

Grounding Options	General Characteristics
No Grounding Options (grounding straps)	<ul style="list-style-type: none"> Acceptable for conductive unlined pipe
	<ul style="list-style-type: none"> Grounding straps provided at no cost
Grounding Electrodes	<ul style="list-style-type: none"> Same material as measurement electrodes
	<ul style="list-style-type: none"> Sufficient grounding option when process fluid conductivity is greater than 100 microsiemens/cm
	<ul style="list-style-type: none"> Not recommended in electrolysis applications, galvanic corrosion applications, or applications where the electrodes may coat.
Grounding Rings	<ul style="list-style-type: none"> Low conductivity process fluids
	<ul style="list-style-type: none"> Cathodic or electrolysis applications that may have stray currents in or around the process
	<ul style="list-style-type: none"> Variety of materials for process fluid compatibility
Lining Protectors	<ul style="list-style-type: none"> Protect upstream edge of sensor from abrasive fluids
	<ul style="list-style-type: none"> Permanently installed on sensor
	<ul style="list-style-type: none"> Protect liner material from over torquing of flange bolts
	<ul style="list-style-type: none"> Provide ground path and eliminate need for grounding rings or grounding electrode

Table A-5. Grounding Installation

Type of Pipe	Grounding Options No Grounding Option (Straps Only)	Grounding Rings	Grounding Electrode	Lining Protectors
Conductive Unlined Pipe	Acceptable	Not Required	Not Required	Acceptable (Not Required)
Conductive Lined Pipe	Not Acceptable	Acceptable	Acceptable	Acceptable
Non-Conductive Pipe	Not Acceptable	Acceptable	Acceptable	Acceptable

E-SERIES PERFORMANCE SPECIFICATIONS

(System specifications are given using the frequency output and with the unit at reference conditions.)

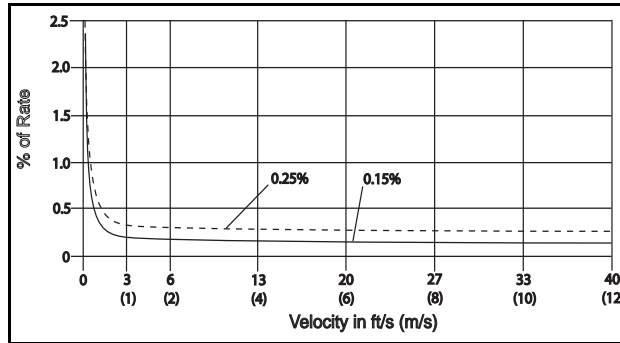
Accuracy

Includes the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.

Rosemount E Series with 8705/8707 Sensor:

Standard system accuracy is $\pm 0.25\%$ of rate ± 1.0 mm/sec from 0.04 to 6 ft./s (0.01 to 2 m/s); above 6 ft./s (2 m/s), the system has an accuracy of $\pm 0.25\%$ of rate ± 1.5 mm/sec.

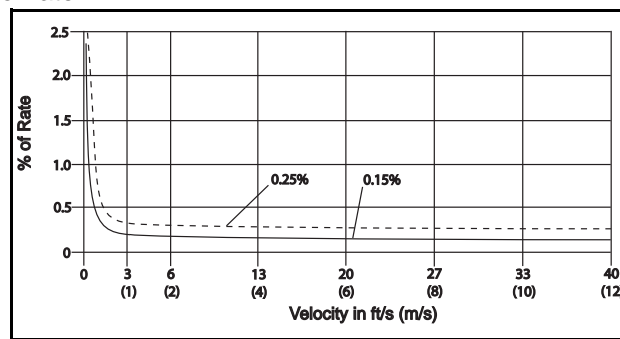
Optional high accuracy is $\pm 0.15\%$ of rate ± 1.0 mm/sec from 0.04 to 13 ft./s (0.01 to 4 m/s); above 13 ft./s (4 m/s), the system has an accuracy of $\pm 0.18\%$ of rate.⁽¹⁾



Rosemount E-Series with 8711 Sensor:

Standard system accuracy is $\pm 0.25\%$ of rate ± 2.0 mm/sec from 0.04 to 39 ft./s (0.01 to 12 m/s).

Optional high accuracy is $\pm 0.15\%$ of rate ± 1.0 mm/sec from 0.04 to 13 ft./s (0.01 to 4 m/s); above 13 ft./s (4 m/s), the system has an accuracy of $\pm 0.18\%$ of rate.

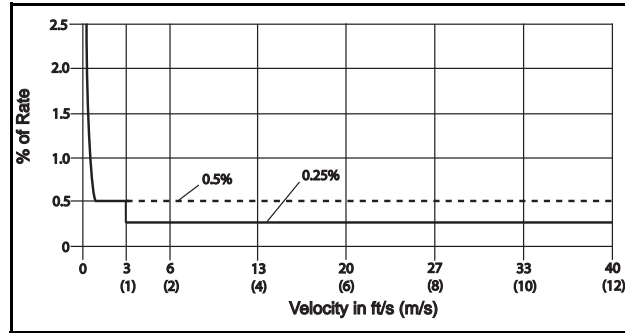


Rosemount E-Series with 8721 Sensor:

Standard system accuracy is $\pm 0.5\%$ of rate from 1 to 39 ft./s (0.3 to 12 m/s); between 0.04 and 1.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ± 0.005 ft./s (0.0015 m/s).

(1) For Sensor sizes greater than 12 in. (300 mm) the high accuracy is $\pm 0.25\%$ of rate from 3 to 39 ft./sec (1 to 12 m/sec).

Optional high accuracy is $\pm 0.25\%$ of rate from 3 to 39 ft./s (1 to 12 m/s).



Rosemount E-Series with Legacy 8705/8707 Sensors:

Standard system accuracy is $\pm 0.5\%$ of rate from 1 to 39 ft./s (0.3 to 12 m/s); between 0.04 and 1.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ± 0.005 ft./s (0.0015 m/s).

Rosemount E-Series with Legacy 8711 Sensors:

Standard system accuracy is $\pm 0.5\%$ of rate from 3 to 39 ft./s (1 to 12 m/s); between 0.04 and 3.0 ft./s (0.01 and 1 m/s), the system has an accuracy of ± 0.015 ft./s (0.005 m/s).

Rosemount E-Series with Other Manufacturers' Sensors:

When calibrated in the Rosemount Flow Facility, system accuracies as good as 0.5% of rate can be attained.

There is no accuracy specification for other manufacturers' sensors calibrated in the process line.

Analog Output Effect

Analog output has the same accuracy as frequency output plus an additional $\pm 4\mu\text{A}$.

Vibration Effect

IEC 60770-1

Repeatability

±0.1% of reading

Response Time (Analog Output)

50 ms maximum response time to step change in input

Stability

±0.1% of rate over six months

Ambient Temperature Effect

±0.25% change over operating temperature range

EMC Compliance

EN61326-1: 2006 (Industrial) electromagnetic compatibility (EMC) for process and laboratory apparatus.

**HIGH SIGNAL SYSTEM
PERFORMANCE
SPECIFICATIONS**

(System specifications are given using the frequency output and with the unit at referenced conditions.)

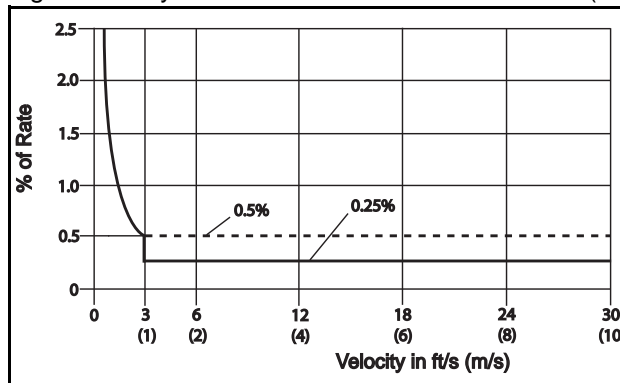
Accuracy

Includes the combined effects of linearity, hysteresis, repeatability, and calibration uncertainty.

Rosemount High Signal Flowmeter System

System accuracy is ±0.5% of rate from 3 to 30 ft./s (1 to 10 m/s); between 0.04 and 3.0 ft./s (0.01 and 0.3 m/s), the system has an accuracy of ±0.015 ft./s (0.005 m/s).

Optional high accuracy is ±0.25% of rate from 3 to 30 ft./s (1 to 10 m/s).



Analog Output Effect

Analog output has the same accuracy as frequency output plus an additional 0.1% of span.

Vibration Effect

±0.1% of span per SAMA PMC 31.1, Level 2

Repeatability

±0.1% of reading

Response Time

0.2 seconds maximum response to step change in input

Stability

±0.1% of rate over six months

Ambient Temperature Effect

±1% per 100 °F (37.8 °C)

EMC Compliance

EN61326-1: 2006 (Industrial) electromagnetic compatibility (EMC) for process and laboratory apparatus.



ROSEMOUNT FLANGED SENSOR SPECIFICATIONS

FLANGED SENSOR FUNCTIONAL SPECIFICATIONS

Service

Conductive liquids and slurries

Line Sizes

1/2–36 in. (15–900 mm) for Rosemount 8705

3–36 in. (80–600 mm) for Rosemount 8707

Interchangeability

Rosemount 8705 Sensors are interchangeable with 8732 and 8712E Transmitters. Rosemount 8707 High-Signal Sensors are interchangeable with 8732, 8712E, and 8712H High-Signal Transmitters. System accuracy is maintained regardless of line size or optional features. Each sensor nameplate has a sixteen-digit calibration number that can be entered into a transmitter through the Local Operator Interface (LOI) or the Field Communicator. In a FOUNDATION fieldbus environment, the 8732E can be configured using the DeltaV™ fieldbus configuration tool or another FOUNDATION fieldbus configuration device. No further calibration is necessary.

Upper Range Limit

39 ft./s (12 m/s)

Process Temperature Limits

PTFE Lining

–20 to 350 °F (–29 to 177 °C)

ETFE Lining

–20 to 300 °F (–29 to 149 °C)

PFA Lining

–20 to 350 °F (–29 to 177 °C)

Polyurethane Lining

0 to 140 °F (–18 to 60 °C)

Neoprene Lining

0 to 176 °F (–18 to 80 °C)

Linatex Lining

0 to 158 °F (–18 to 70 °C)

Ambient Temperature Limits

–30 to 150 °F (–34 to 65 °C)

Rosemount 8700 Series

Pressure Limits

See Table A-6, Table A-7, and Table A-8.

Vacuum Limits

PTFE Lining

Full vacuum to 350 °F (177 °C) through 4-in. (100 mm) line sizes. Consult factory for vacuum applications with line sizes of 6 inches (150 mm) or larger.

All Other Standard Sensor Lining Materials

Full vacuum to maximum material temperature limits for all available line sizes.

Submergence Protection⁽¹⁾

IP68. Continuous submergence to 30 ft. (10 m) requires that conduit entries of the sensor remote junction box be properly sealed to prevent water ingress. This requires the user to install sealed IP68 approved cable glands, conduit connections, or conduit plugs. For more details on proper installation techniques for an IP68 / submersible application, reference Rosemount Technical Document 00840-0100-4750 available on www.Rosemount.com.

Conductivity Limits

Process liquid must have a conductivity of 5 microsiemens/cm (5 micromhos/cm) or greater for 8705. Process liquid must have a conductivity of 50 microsiemens/cm (50 micromhos/cm) for 8707 when used with 8712H, 5 microsiemens/cm when used with other transmitters. Excludes the effect of interconnecting cable length in remote mount transmitter installations.

Table A-6. Temperature vs. Pressure Limits⁽¹⁾

Sensor Temperature vs. Pressure Limits for ASME B16.5 Class Flanges (1/2- to 36-in. line sizes) ⁽²⁾					
Flange Material	Flange Rating	Pressure			
		@ -20 to 100 °F (-29 to 38 °C)	@ 200 °F (93 °C)	@ 300 °F (149 °C)	@ 350 °F (177 °C)
Carbon Steel	Class 150	285 psi	260 psi	230 psi	215 psi
	Class 300	740 psi	675 psi	655 psi	645 psi
	Class 600 ⁽³⁾	1000 psi	800 psi	700 psi	650 psi
	Class 600 ⁽⁴⁾	1480 psi	1350 psi	1315 psi	1292 psi
	Class 900	2220 psi	2025 psi	1970 psi	1935 psi
	Class 1500	3705 psi	3375 psi	3280 psi	3225 psi
	Class 2500	6170 psi	5625 psi	5470 psi	5375 psi
304 Stainless Steel	Class 150	275 psi	235 psi	205 psi	190 psi
	Class 300	720 psi	600 psi	530 psi	500 psi
	Class 600 ⁽⁵⁾	1000 psi	800 psi	700 psi	650 psi
	Class 600 ⁽⁶⁾	1440 psi	1200 psi	1055 psi	997 psi
	Class 900	2160 psi	1800 psi	1585 psi	1497 psi
	Class 1500	3600 psi	3000 psi	2640 psi	2495 psi
	Class 2500	6000 psi	5000 psi	4400 psi	4160 psi

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F (60 °C), 158 °F (70 °C), and 176 °F (80 °C), respectively.

(2) 30- and 36-in. AWWA C207 Table A-7 Class D rated to 150 psi at atmospheric temperature.

(3) Option Code C6

(4) Option Code C7

(5) Option Code S6

(6) Option Code S7

(1) Available for Rosemount 8705 Sensors only.

Table A-7. Temperature vs. Pressure Limits ⁽¹⁾

Sensor Temperature vs. Pressure Limits for AS2129 Table D and E Flanges (4- to 24-in. line sizes)					
Flange Material	Flange Rating	Pressure			
		@ -200 to 50 °C (-320 to 122 °F)	@ 100 °C (212 °F)	@ 150 °C (302 °F)	@ 200 °C (392 °F)
Carbon Steel	D	101.6 psi	101.6 psi	101.6 psi	94.3 psi
	E	203.1 psi	203.1 psi	203.1 psi	188.6 psi

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F (60 °C), 158 °F (70 °C), and 176 °F (80 °C), respectively.

Table A-8. Temperature vs. Pressure Limits ⁽¹⁾

Sensor Temperature vs. Pressure Limits for DIN Flanges (15 to 600 mm line sizes)					
Flange Material	Flange Rating	Pressure			
		@ -196 to 50 °C (-320 to 122 °F)	@ 100 °C (212 °F)	@ 150 °C (302 °F)	@ 175 °C (347 °F)
Carbon Steel	PN 10	10 bar	10 bar	9.7 bar	9.5 bar
	PN 16	16 bar	16 bar	15.6 bar	15.3 bar
	PN 25	25 bar	25 bar	24.4 bar	24.0 bar
	PN 40	40 bar	40 bar	39.1 bar	38.5 bar
304 Stainless Steel	PN 10	9.1 bar	7.5 bar	6.8 bar	6.5 bar
	PN 16	14.7 bar	12.1 bar	11.0 bar	10.6 bar
	PN 25	23 bar	18.9 bar	17.2 bar	16.6 bar
	PN 40	36.8 bar	30.3 bar	27.5 bar	26.5 bar

(1) Liner temperature limits must also be considered. Polyurethane, Linatex, and Neoprene have temperature limits of 140 °F, 158 °F, and 176 °F, respectively.

**FLANGED SENSOR
PHYSICAL
SPECIFICATIONS**

Non-Wetted Materials

Sensor

AISI Type 304 SST or Type 316L SST

Flanges

Carbon steel, AISI Type 304/304L SST, or Type 316/316L SST

Housing

Welded steel

Paint

Polyurethane

Process Wetted Materials

Lining

PFA, PTFE, ETFE, polyurethane, neoprene, Linatex

Electrodes

316L SST, Nickel Alloy 276 (UNS N10276), tantalum, 80% platinum-20% iridium, titanium

Process Connections

ASME B16.5 (ANSI) Class 150, Class 300, Class 600, Class 900, Class 1500, or Class 2500

0.5- to 36-in. (Class 150)

0.5- to 30-in. (Class 300)

0.5- to 24-in. (Class 600)⁽¹⁾

1- to 12-in. (Class 900)⁽²⁾

1.5- to 12-in. (Class 1500)⁽²⁾

2- to 12-in. (Class 2500)⁽²⁾

AWWA C207 Table 3 Class D

30 and 36 in.

EN 1092 (DIN) PN 10, 16, 25, and 40

PN10: Not available for flange sizes from 15 to 150 mm

PN16: Not available for flange sizes from 15 to 80 mm

PN 25: Not available for flange sizes from 15 to 150 mm

PN40: Available for all flange sizes

AS 2129 Table D and E

0.5- to 36-in.

Electrical Connections

Two 1/2–14 NPT connections with number 8 screw terminals are provided in the terminal enclosure for electrical wiring.

Grounding Electrode

An optional grounding electrode can be installed similarly to the measurement electrodes through the sensor lining on 8705 sensors. It is available in all electrode materials.

Grounding Rings

Optional grounding rings can be installed between the flange and the sensor face on both ends of the sensor. Single ground rings can be installed on either end of the sensor. They have an I.D. slightly larger than the sensor I.D. and an external tab to attach ground wiring. Grounding rings are available in 316L SST, Nickel Alloy 276 (UNS N10276), titanium, and tantalum.

Lining Protectors

Optional lining protectors can be installed between the flange and the sensor face on both ends of the sensor. The leading edge of lining material is protected by the lining protector; lining protectors cannot be removed once they are installed. Lining protectors are available in 316L SST, Nickel Alloy 276 (UNS N10276), and titanium.

(1) For PTFE and ETFE, maximum working pressure is derated to 1000 psig.

(2) For Class 900 and higher flange ratings, liner selection is limited to resilient liners.

Rosemount 8700 Series



Rosemount Flanged Sensors

All flanged sensors are fabricated from stainless and carbon steel and welded to provide a hermetic seal that protects against moisture and other contaminants. Sizes range from 1/2 in. (15 mm) to 36 in. (900 mm). The sealed housing ensures maximum sensor reliability by protecting all internal components and wiring from the most hostile environments.



Rosemount High-Signal Magmeter System

The 8707 High-Signal Sensor, used in conjunction with the 8712H High-Signal Transmitter, forms the Rosemount High-Signal Magnetic Flowmeter System. This system provides stable flow measurement in the most difficult high-noise applications while maintaining the benefits of DC technology. The increased signal strength of the high-signal system is made possible through a combination of sensor coil design that incorporates the most advanced materials and an extremely efficient and innovative coil drive circuit. The increased signal strength of the Rosemount high-signal system, coupled with advanced signal processing and superior filtering techniques, provide the solution to demanding flow measurement applications.

Table 2. Rosemount Flanged Sensor Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Code	Product Description ⁽¹⁾	
8705	Magnetic Flowmeter Sensor	
8707	High-Signal Magnetic Flowmeter Sensor	
Lining Material		
Standard		Standard
T	PTFE ⁽²⁾	★
P	Polyurethane ⁽³⁾	★
Expanded		
A	PFA ⁽⁴⁾	
F	ETFE ⁽⁵⁾	
N	Neoprene ⁽³⁾	
L	Linatex ⁽³⁾	
Electrode Material		
Standard		Standard
S	316L Stainless Steel	★
H	Nickel Alloy 276 (UNS N10276)	★
T	Tantalum	★
P	80% Platinum - 20% Iridium	★
Expanded		
N	Titanium	

Table 2. Rosemount Flanged Sensor Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

Electrode Type		Electrode Material (From Above)					Standard
		Code S	Code H	Code T	Code P	Code N	
Standard							
A	2 Electrodes - Standard	•	•	•	•	•	★
E	3rd Grounding Electrode	•	•	•	•	•	★
Expanded							
B	2 Electrodes - Bullet Nose	•	•				
F	3rd Grounding Electrode Bullet Nose	•	•				
Line Size ⁽⁶⁾		Lining Material (From Above)					
		Code A	Code T	Code F	Code P	Code N and L	
005	1/2-in. (15 mm) (8705 only)	•	•	•	NA	NA	
010	1-in. (25 mm) (8705 only)	•	•	•	•	•	
015	1 1/2-in. (40 mm) (8705 only)	•	•	•	•	•	
020	2-in. (50 mm) (8705 only)	•	•	•	•	•	
030	3-in. (80 mm)	•	•	•	•	•	
040	4-in. (100 mm)	•	•	•	•	•	
060	6-in. (150 mm)	•	•	•	•	•	
080	8-in. (200 mm)	•	•	•	•	•	
100	10-in. (250 mm)	•	•	•	•	•	
120	12-in. (300 mm)	•	•	•	•	•	
140	14-in. (350 mm)	•	•	•	•	•	
160	16-in. (400 mm)	NA	•	•	•	•	
180	18-in. (450 mm)	NA	•	NA	•	•	
200	20-in. (500 mm)	NA	•	NA	•	•	
240	24-in. (600 mm)	NA	•	NA	•	•	
300	30-in. (750 mm)	NA	•	NA	•	•	
360	36-in. (900 mm)	NA	•	NA	•	•	
Flange Material and Type ⁽⁶⁾							
C	Carbon Steel Raised Face Slip-On						
S	Stainless Steel (304/304L) Raised Face Slip-On						
P	Stainless Steel (316/316L) Raised Face Slip-On						
J ⁽⁷⁾	Carbon Steel Ring Type Joint (RTJ) Weld Neck						
K ⁽⁷⁾	Stainless Steel (304/304L) Ring Type Joint (RTJ) Weld Neck						
Flange Type and Rating ⁽⁶⁾		Availability					
1	ASME B16.5 ANSI Class 150 (30 and 36 in. AWWA C207 Class D Flat Face)	<p>Refer to Table 3 on page A-41 for carbon steel flange material availability</p> <p>Refer to Table 4 on page A-41 for stainless steel flange material availability</p>					
2	MSS SP44 Class 150 (30 and 36 in. line sizes only)						
3	ASME B16.5 (ANSI) Class 300/MSS-SP44 Class 300 (30-in only)						
6	ASME B16.5 (ANSI) Class 600 (Maximum Pressure: 1000 psig) ⁽⁸⁾						
7	ASME B16.5 (ANSI) Class 600 ⁽⁹⁾						
9	ASME B16.5 (ANSI) Class 900 ⁽⁹⁾⁽¹⁰⁾						
M	ASME B16.5 (ANSI) Class 1500 ⁽¹¹⁾						
N	ASME B16.5 (ANSI) Class 2500 ⁽¹¹⁾						

Rosemount 8700 Series

Table 2. Rosemount Flanged Sensor Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery.
The Expanded offering is subject to additional delivery lead time.

D	EN 1092-1 (DIN) PN 10	Refer to Table 5 on page A-42 for flange material availability	
E	EN 1092-1 (DIN) PN 16		
F	EN 1092-1 (DIN) PN 25		
H	EN 1092-1 (DIN) PN 40		
K	AS2129 Table D ⁽¹²⁾		
L	AS2129 Table E ⁽¹²⁾		
P	JIS B 2220, nominal pressure 10K ⁽¹³⁾	Refer to Table 6 on page A-42 for flange material availability	
R	JIS B 2220, nominal pressure 20K ⁽¹³⁾		
Electrode Housing Configuration			
Standard			Standard
W0	Sealed, Welded Housing ⁽¹⁴⁾		★
Expanded			
W1	Sealed, Welded Housing with Pressure Relief		
W3	Sealed, Welded Housing with Separate Electrode Compartments ⁽¹⁵⁾		
Hazardous Area Approvals		8705	8707
Standard			Standard
NA	CE Marked, No Approvals	•	• ★
FM & CSA			
Standard			Standard
N0	FM Class 1 Div 2 for Non-Flammable fluids; CSA Class 1 Div 2	•	• ★
N5	FM Class 1 Div 2 for Flammable fluids	•	• ★
Expanded			
E5 ⁽¹⁶⁾	FM Class 1 Div 1, Explosion Proof	•	
ATEX			
Standard			Standard
N1	ATEX EEx nA [L] IIC Type n Approval	•	★
KD	ATEX EEx e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•	★
ND	ATEX Dust Approval	•	★
Expanded			
E1	ATEX EEx e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•	
NEPSI			
Expanded			
E3	NEPSI Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•	
EP	NEPSI Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•	
KOSHA		8705	8707
Expanded			
E9	KOSHA Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•	
EK	KOSHA Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•	
INMETRO			
Expanded			
E2	InMetro BR-Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•	
EB	InMetro BR-Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•	
GOST			
E8	GOST Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes), integral mount with 8732E only	•	
EM	GOST Ex e ia IIC T3..T6, Increased Safety Approval (with I.S. electrodes)	•	

Table 2. Rosemount Flanged Sensor Ordering Information

★ The Standard offering represents the most common options. The starred options (★) should be selected for best delivery. The Expanded offering is subject to additional delivery lead time.

Options (Include with selected model number)

Certifications				
Standard				Standard
CR ⁽¹⁷⁾	Canadian Registration Number (CRN) certification	•	•	★
PD	Pressure Equipment Directive Certification (PED, per 97/23/EC)	•	•	★
Expanded				
DW	NSF Drinking Water Certification ⁽¹⁸⁾	•	•	
Optional Grounding Rings⁽¹⁹⁾				
Standard				Standard
G1	(2) 316L SST Ground Rings	•	•	★
G2	(2) Nickel Alloy 276 (UNS N10276) Ground Rings ⁽²⁰⁾	•	•	★
G5	(1) 316L SST Ground Rings	•	•	★
G6	(1) Nickel Alloy 276 (UNS N10276) Ground Rings ⁽²⁰⁾	•	•	★
Expanded				
G3	(2) Titanium Ground Rings ⁽²⁰⁾	•	•	
G4	(2) Tantalum Ground Rings ⁽²¹⁾	•	•	
G7	(1) Titanium Ground Rings ⁽²⁰⁾	•	•	
G8	(1) Tantalum Ground Rings ⁽²¹⁾	•	•	
Optional Lining Protectors⁽¹⁹⁾				
Expanded				
L1	(2) 316L SST Lining Protectors	•	•	
L2	(2) Nickel Alloy 276 (UNS N10276) Lining Protectors ⁽²⁰⁾	•	•	
Expanded				
L3	(2) Titanium Lining Protectors ⁽²⁰⁾	•	•	
H1	Lay-length matching 8701 using spool piece ⁽²⁰⁾	•	•	
H2	Lay-length matching 8701 ⁽²²⁾	•	•	
H5	Lay-length matching Foxboro 2800 using spool piece ⁽²³⁾	•	•	
H7	Lay-length ABB Copax and MagX using spool piece ⁽²⁰⁾	•	•	
Other Options				
Standard				Standard
B3	Integral Mount with 8732	•		★
J1	CM 20 Conduit Adapter	•	•	★
Expanded				
D1	High Accuracy Calibration (0.15% of rate for matched sensor and E-Series transmitter) ⁽²⁴⁾ (0.25% of rate for matched 8707 and 8712H)	•	•	
DT	Heavy Duty Tagging	•	•	
J2	PG 13.5 Conduit Adapter	•	•	
SC	304 SST Junction Box, fully welded to housing	•	•	
		8705	8707	
TA	High Temperature Permeable Fluid Option (Contains vent holes provided for permeable fluids such as nitric acid, hydrofluoric acid, or sodium hydroxide at high temperatures)	•	•	
Q4	Calibration Certificate per ISO 10474 3.1B	•	•	
Q8	Material Traceability 3.1B	•	•	
Q9	Material Traceability Electrode only 3.1B	•	•	
Q66	Welding Procedure Qualification Record Documentation	•	•	
Q67	Welding Performance Qualification Record Documentation	•	•	
Q70	Weld Examination Inspection Certificate, ISO 10474 3.1B	•	•	
Typical Model Number: 8705 T SA 040 C1 W0 N0				

(1) The high-signal magmeter system is not currently available with CE mark.

(2) Available in 1/2-in. to 36-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 1-in. to 10-in. ANSI 600 Derated only.

Rosemount 8700 Series

- (3) Available in 1-in. to 24-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 30- and 36-in. AWWA Class 125 and ANSI 150. Available in 1-in. to 24-in. ANSI 600 full rated. Available in 1- to 12-in. ANSI 900, ANSI 1500, and ANSI 2500.
- (4) Available in 1/2-in. to 12-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 14-in. ANSI 150 only. Not available with electrode housing code W3.
- (5) Available in 1/2-in. to 14-in. line sizes ANSI 150, ANSI 300, and DIN Flanges. Available in 16-in. ANSI 150 only. Available in 1- to 10-in. ANSI 600 Derated only.
- (6) Refer to Table 3, Table 4, and Table 5 on page A-41 and page A-42 for Standard vs. Expanded offering.
- (7) Available in ANSI 1500 and ANSI 2500 only.
- (8) Electrode type options limited to two measurement electrodes or two measurement electrodes + third grounding electrode.
- (9) Electrode type options limited to two measurement electrodes only.
- (10) Lining protectors not available.
- (11) Available with liner options P, N, or L. Line size limited to 1.5-in. to 12-in. for ANSI 1500 and 2-in. to 6-in. for ANSI 2500, available with two measurement electrodes only, not available with ground rings or lining protectors.
- (12) Liner material options limited to T, P, or F; cannot be ordered with ground rings, lining protectors, or H (x) options.
- (13) Available with liner option T only, line size 1/2-in. to 8-in. only, not available with grounding rings or lining protectors.
- (14) Available with ANSI 150, ANSI 300, and DIN flanges.
- (15) Available in 3-in. and larger meters for the 8705. Available in 8-in. and larger meters for 8707.
- (16) Available in sensor line sizes 0.5- through 8-in. (15 through 200 mm).
- (17) CRN Approval covers Alberta and Ontario as a standard. Consult the Factory for availability of other Provinces.
- (18) Only available with PTFE or Polyurethane Liner Material with 316L SST Electrode Material.
- (19) Grounding Rings and Lining Protectors provide the same fluid grounding function. Lining Protectors available for PTFE and ETFE only.
- (20) Available in sensor line sizes 0.5- through 12-in. (15 through 300 mm).
- (21) Available in sensor line sizes 0.5- through 8-in. (15 through 200 mm).
- (22) Available in sensor line sizes 0.5- through 16-in. (15 through 400 mm).
- (23) Available in sensor line sizes 3- through 18-in. (80 through 450 mm).
- (24) D1 Option Code must be ordered with sensor and transmitter.

Table 3. Carbon Steel ASME B16.5 (ANSI) Flange Rating Availability⁽¹⁾

Line Size Code	Line Size Inches (mm)	Class 150 (C1)	MSS-SP44 Class 150 (C2)	Class 300 (C3)	Class 600 (C6)	Class 600 (C7)	Class 900 (C9)	Class 1500 (JM)	Class 2500 (JN)
005	0.5 (15)	★	NA	★	•	NA	NA	NA	NA
010	1 (25)	★	NA	★	•	•	•	NA	NA
015	1.5 (40)	★	NA	★	•	•	•	•	•
020	2 (50)	★	NA	★	•	•	•	•	•
030	3 (80)	★	NA	★	•	•	•	•	•
040	4 (100)	★	NA	★	•	•	•	•	•
060	6 (150)	★	NA	★	•	•	•	•	•
080	8 (200)	★	NA	★	•	•	•	•	•
100	10 (250)	★	NA	★	•	•	•	•	•
120	12 (300)	★	NA	★	CF	•	•	•	•
140	14 (350)	•	NA	•	CF	•	NA	NA	NA
160	16 (400)	•	NA	•	CF	•	NA	NA	NA
180	18 (450)	•	NA	•	CF	•	NA	NA	NA
200	20 (500)	•	NA	•	CF	•	NA	NA	NA
240	24 (600)	•	NA	•	CF	•	NA	NA	NA
300 ⁽²⁾	30 (750)	•	•	•	NA	NA	NA	NA	NA
360 ⁽³⁾	36 (900)	•	•	NA	NA	NA	NA	NA	NA

- (1) Stars (★) represent a Standard offering while dots represent an Expanded offering.
 (2) MSS-SP44 Class 300 Flanges for option C3
 (3) AWWA C207 Class D Flat Face Flange for option C1 only

Table 4. Stainless Steel ASME B16.5 (ANSI) Flange Rating Availability⁽¹⁾

Line Size Code	Line Size Inches (mm)	Class 150 (S1)	MSS-SP44 Class 150 (S2)	Class 300 (S3)	Class 600 (S6)	Class 600 (S7)	Class 900 (S9)	Class 1500 (KM)	Class 2500 (KN)	Class 150 (P1)	MSS-SP44 Class 150 (P2)	Class 300 (P3)
005	0.5 (15)	★	NA	•	•	NA	NA	NA	NA	•	NA	•
010	1 (25)	★	NA	•	•	•	•	NA	NA	•	NA	•
015	1.5 (40)	★	NA	•	•	•	•	•	•	•	NA	•
020	2 (50)	★	NA	•	•	•	•	•	•	•	NA	•
030	3 (80)	★	NA	•	•	•	•	•	•	•	NA	•
040	4 (100)	★	NA	•	•	•	•	•	•	•	NA	•
060	6 (150)	★	NA	•	•	•	•	•	•	•	NA	•
080	8 (200)	★	NA	•	•	•	•	•	•	•	NA	•
100	10 (250)	★	NA	•	•	•	•	•	•	•	NA	•
120	12 (300)	★	NA	•	CF	•	•	•	•	•	NA	•
140	14 (350)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
160	16 (400)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
180	18 (450)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
200	20 (500)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
240	24 (600)	•	NA	•	CF	•	NA	NA	NA	•	NA	•
300 ⁽²⁾	30 (750)	•	•	•	NA	NA	NA	NA	NA	•	•	•
360 ⁽³⁾	36 (900)	•	•	NA	NA	NA	NA	NA	NA	•	•	NA

- (1) Stars (★) represent a Standard offering while dots represent an Expanded offering.
 (2) MSS-SP44 Class 300 Flanges for option S3 or P3
 (3) AWWA C207 Class D Flat Face Flange for option S1 or P1 Only

Rosemount 8700 Series

Table 5. EN 1092-1 (DIN) Flange Rating Availability⁽¹⁾

Line Size Code	Line Size Inches (mm)	Carbon Steel PN 10 (CD)	Carbon Steel PN 16 (CE)	Carbon Steel t PN 25 (CF)	Carbon Steel PN 40 (CH)	Carbon Steel Table D (CK)	Carbon Steel Table E (CL)	Stainless Steel PN 10 (SD)	Stainless Steel PN 16 (SE)	Stainless Steel PN 25 (SF)	Stainless Steel PN 40 (SH)
005	0.5 (15)	NA	NA	NA	★	•	•	NA	NA	NA	★
010	1 (25)	NA	NA	NA	★	•	•	NA	NA	NA	★
015	1.5 (40)	NA	NA	NA	★	•	•	NA	NA	NA	★
020	2 (50)	NA	NA	NA	★	•	•	NA	NA	NA	★
030	3 (80)	NA	NA	NA	★	•	•	NA	NA	NA	★
040	4 (100)	NA	★	NA	★	•	•	NA	★	NA	★
060	6 (150)	NA	★	NA	★	•	•	NA	★	NA	★
080	8 (200)	★	★	•	★	•	•	•	★	•	★
100	10 (250)	★	★	•	•	•	•	•	•	•	•
120	12 (300)	★	★	•	•	•	•	•	•	•	•
140	14 (350)	•	•	•	•	•	•	•	CF	CF	CF
160	16 (400)	•	•	•	•	•	•	•	CF	CF	CF
180	18 (450)	•	•	•	•	•	•	•	CF	CF	CF
200	20 (500)	•	•	•	•	•	•	•	CF	CF	CF
240	24 (600)	•	•	•	•	•	CF	•	CF	CF	CF

(1) Stars (★) represent a Standard offering while dots represent an Expanded offering.

Table 6. JIS 2220 B Flange Rating Availability

Line Size Code	Line Size Inches (mm)	Carbon Steel 10 K (CP)	Carbon Steel 20 K (CR)	304 SST 10 K (SP)	304 SST 20 K (SR)
005	0.5 (15)	•	•	•	•
010	1 (25)	•	•	•	•
015	1.5 (40)	•	•	•	•
020	2 (50)	•	•	•	•
030	3 (80)	•	•	•	•
040	4 (100)	•	•	•	•
060	6 (150)	•	•	•	•
080	8 (200)	•	•	•	•

PRESSURE, VACUUM, DIFFERENTIAL PRESSURE AND TEMPERATURE SWITCHES



FEATURES

- Single Switch Output
- Epoxy Coated and Gasketed Cast Aluminum Enclosure Type 4X
- Tamper-Resistant Set Point "Lock"
- Heat Trace and Freeze Protection Thermostats
- Proof Pressures to 10,000 psi (689,5 bar)
- Adjustable Ranges:

Pressure:
30 "Hg Vac to 5000 psi
(-1 to 344,7 bar)

"wc Ranges:
300 "wc Vacuum to 250 "wc Pressure
(-746,7 to 622,3 mbar)

Differential Pressure:
0.2 "wcd to 500 psid
(0,5 mbar to 34,5 bar)

Temperature:
-180 to 650°F
(-117.8 to 343.3°C)



OVERVIEW

The 100 Series is a cost-effective pressure and temperature switch for process plants and OEM equipment. The rugged, one piece enclosure features a slanted cover for wiring accessibility.

A wide variety of microswitch and process-connection options make this versatile series ideal for applications requiring a rugged weather-proof mechanical switch.

Typical applications that utilize the 100 Series are heat tracing, freeze protection, processing equipment (pumps, compressors), inputs for annunciator panels, and fire suppression systems.

FEATURES

- UL listed and **CUL** certified.
- CE compliant to low voltage directive and pressure equipment directive.
- Optional ATEX or GOST intrinsic safety compliance
- Single switch (SPDT or DPDT) output
- Welded stainless steel diaphragm models
- Ultra low pressure, "wc models
- Optional sensor material for corrosive media
- Polished stainless steel flush-mount connection
- Pump switch models with wide adjustable deadband



"Clam shell" design allows for ease in wiring (pressure model shown)

Differential pressure model

Bulb and capillary temperature model with manual reset option

SPECIFICATIONS

STORAGE TEMPERATURE	-65 to 160°F (-54 to 71 °C)
AMBIENT TEMPERATURE LIMITS	-40 to 160°F (-40 to 71 °C); models 520-525, 540-548, 700-706, 15731-15736: 0 to 160°F (-18 to 71 °C); Set point typically shifts less than 1% of range for a 50°F (28°C) ambient temperature change
SET POINT REPEATABILITY	Temperature models: ± 1% of adjustable range Pressure models 15623, 15731-15737, 171-174, 218, 270-376, 520-535, 540-543, 700-706, 560-564: ± 1% of adjustable range; models 190-194, 183-189, 483-494, 544-548, 565-567, 610-680, 15884: ±1.5% of adjustable range Internal set point lock on all pressure models
SHOCK	Set point repeats after 15 G, 10 millisecond duration
VIBRATION	Set point repeats after 2.5 G, 5-500 Hz
ENCLOSURE	Die cast aluminum, epoxy powder coated, gasketed, captive cover screws
ENCLOSURE CLASSIFICATION	Enclosure type 4X
SWITCH OUTPUT	One SPDT snap action switch; switch may be wired "normally open" or "normally closed"
ELECTRICAL RATING	15A 125/250/480 VAC resistive except for H100-15623, 15731-15737, 15884, 20A 125/250/480 VAC resistive, B100-13546 and E100-13545, 22A/480 VAC. Electrical switches have limited DC capabilities at 24-30 VDC, 2A resistive and 1A inductive. 125 VDC, 0.5A resistive, 0.03A inductive. Consult factory for additional information.
WEIGHT	2-7 lbs; Varies with model
ELECTRICAL CONNECTION	1/2" NPT (female); Two 7/8" diameter knockouts
PRESSURE CONNECTION	Models 15623, 218, 270-376, 610-680, 701-706, 15731-15884: 1/4" NPT (female); Models 171-194, 483-494, 520-535, 15737: 1/2" NPT (female); Models 540-548: 1/8" NPT (female); Models 560-564: 2" Sanitary Fitting; Models 565-567: 1.5" Sanitary Fitting (Sanitary fittings mate with Tri-Clamp® fitting systems)
TEMPERATURE ASSEMBLY	Bulb and capillary: 6 feet 304 stainless steel except for E100-13545, 10 feet 304 stainless steel Immersion stem: nickel-plated brass (standard) except for B100-13546 stainless steel; optional 316L stainless steel
FILL	Models 1BS/BC are solvent filled, models 2-8 non-toxic oil filled
TEMPERATURE DEADBAND	Type F typically 1% and type B, C, and E typically 2% of range under laboratory conditions (70°F ambient circulating bath at rate of 1/2°F per minute change)
HEAT TRACING OR FREEZE PROTECTION	Thermostats designed specifically for heat tracing and freeze protection ambient sensing applications are available with types B100 and E100

APPROVALS

UE declarations and third-party issued Agency certifications are available for download at www.ueonline.com/prod_approval.



UNITED STATES AND CANADA

UL Listed, **cUL** Certified

Temperature: UL 873; CSA C22.2 no. 24, File # E10667

Pressure: UL 508; CSA C22.2 no. 14, File # E42272;

Enclosure Type 4X



EUROPE

ATEX Directive (94/9/EC)



II 1 G EEx ia IIC T6, **(OPTIONAL - code M405)**

Tamb.= -50°C to +60°C

UL International DEMKO A/S (N.B.#0539)

Certificate #DEMKO 03 ATEX 0335063

EN 50014, 50020, 50284

Low Voltage Directive (LVD) (73/23/EC & 93/68/EEC)

UEC compliant to LVD

Products rated lower than 50 VAC and 75 VDC are outside of the scope of the LVD

Pressure Equipment Directive (PED) (97/23/EC)

Compliant to PED

Products rated lower than 7.5 psi are outside the scope of the PED



RUSSIA

Gosgortekhnadzor Permit **(OPTIONAL - code M406)**

0ExiaIIC T6

Tamb = -50°C to +60°C

NANIO CCVE Certification Center

Certificate # ROSS US.GB05.Bo2933

GOST R 51330.0, 51330.1, 51330.10 & 51330.14

PRESSURE MODEL CHART

Model	Adjustable Set Point Range		Deadband		Over Range Pressure*		Proof Pressure**					
	Low end of range on fall; High end of range on rise											
	"wc	mbar	"wc	mbar	psi	bar	psi	bar				
Type H100												
Buna N diaphragm and O-Ring with epoxy coated aluminum 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (other wetted materials available see page 11)												
520	300 Vac to 0	-746,7 to 0	0.2 to 8	0,5 to 19,9	200	13,8	400	27,6				
521	10 Vac to 10	-24,9 to 24,9	0.1 to 0.6	0,2 to 1,5	200	13,8	400	27,6				
522	50 Vac to 50	-124,5 to 124,5	0.1 to 3	0,2 to 7,5	200	13,8	400	27,6				
523	0.5 to 5.0	1,2 to 12,4	0.1 to 0.3	0,2 to 0,7	200	13,8	400	27,6				
524	2.5 to 50	6,2 to 124,5	0.1 to 0.8	0,2 to 2,0	200	13,8	400	27,6				
525	10 to 250	24,9 to 622,3	0.1 to 6	0,2 to 14,9	200	13,8	400	27,6				
Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes												
530	300 Vac to 0	-746,7 to 0	0.2 to 15	0,5 to 37,3	50	3,4	100	6,9				
531	10 Vac to 10	-24,9 to 24,9	0.1 to 0.6	0,2 to 1,5	50	3,4	100	6,9				
532	50 Vac to 50	-124,5 to 124,5	0.1 to 3	0,2 to 7,5	50	3,4	100	6,9				
533	0.5 to 5.0	1,2 to 12,4	0.1 to 0.3	0,2 to 0,7	50	3,4	100	6,9				
534	2.5 to 50	6,2 to 124,5	0.1 to 0.8	0,2 to 2,0	50	3,4	100	6,9				
535	10 to 250	24,9 to 622,3	0.1 to 10	0,2 to 24,9	50	3,4	100	6,9				
Model	Adjustable Set Point Range		Adjustable Deadband			Over Range Pressure*		Proof Pressure**				
	Low End		Mid Range		High Range							
	"wc	mbar	"wc	mbar	"wc	mbar	psi	bar	psi	bar		
Buna N diaphragm and O-Ring with epoxy coated aluminum, 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes; includes adjustable deadband microswitch												
15737	50 Vac to 50	-124,5 to 124,5	0.5 to 7	1,2 to 17,4	1 to 10	2,5 to 24,9	2 to 13	5,0 to 32,4	200	13,8	400	27,6
Deadband												
	psi		bar (unless noted)		psi		bar		psi		bar	
Welded 316L stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant)												
171	1 to 20	68,9 mbar to 1,4	0.1 to 1	6,9 to 68,9	500	34,5	1000	68,9				
172	2 to 50	0,1 to 3,4	0.1 to 1.5	6,9 to 103,4	500	34,5	1000	68,9				
173	4 to 100	0,3 6,9	0.1 to 2.5	6,9 to 172,4	500	34,5	1000	68,9				
174	8 to 200	0,6 to 13,8	0.1 to 3.5	6,9 to 241,3	500	34,5	1000	68,9				
2" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)												
560	0.5 to 15	34,5 mbar to 1.0	0.1 to 1	6,9 to 68,9	200	13,8	300	20,7				
561	1 to 25	68,9 mbar to 1,7	0.1 to 1.5	6,9 to 103,4	200	13,8	300	20,7				
562	2 to 50	0,1 to 3,4	0.1 to 2.5	6,9 to 172,4	200	13,8	300	20,7				
563	4 to 100	0,3 6,9	0.1 to 4	6,9 to 275,8	200	13,8	300	20,7				
564	8 to 200	0,6 to 13,8	0.1 to 5	6,9 to 344,7	200	13,8	300	20,7				

Tri-Clamp® is a registered trademark of Alfa Laval.

Application Note: The use of metallic diaphragms where higher pressure shock or heavy cycling is expected should be avoided. Models 171-174 should not be used where system or start-up vacuum pressure might exceed 26" Hg Vac (-0.9 bar).

* **Over Range Pressure:** The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.

** **Proof Pressure:** The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).



PRESSURE MODEL CHART

Model	Adjustable Set Point Range		Deadband		Over Range Pressure*		Proof Pressure**	
	psi	bar (unless noted)	psi	bar (unless noted)	psi	bar	psi	bar

Type H100

1.5" sanitary welded 316L stainless steel diaphragm and pressure connection. Mates with Tri-Clamp® fitting systems (not UE supplied)

565	5 to 30	0,3 to 2,1	1 to 5	68,9 mbar to 0,3	1000	68,9	1500	103,4
566	10 to 100	0,7 to 6,9	1 to 12	68,9 mbar to 0,8	1000	68,9	1500	103,4
567	15 to 300	1,0 to 20,7	3 to 22	0,2 to 1,5	1000	68,9	1500	103,4

Buna-N diaphragm and O-ring with nickel-plated brass 1/4" NPT (female) pressure connection; Option M540 Viton® diaphragm and O-ring available for models 701-705

701	1.5 to 30	103,4 mbar to 2,1	1 to 2	68,9 mbar to 0,1	500	34,5	600	41,4
702	3 to 100	0,2 to 6,9	1 to 4	68,9 mbar to 0,3	500	34,5	600	41,4
703	9 to 300	0,6 to 20,7	1 to 5	68,0 mbar to 0,3	500	34,5	600	41,4
704	15 to 500	1,0 to 34,5	2 to 8	0,1 to 0,6	1500	103,4	2500	172,4
705	30 to 1000	2,1 to 68,9	3 to 20	0,2 to 1,4	1500	103,4	2500	172,4
706	100 to 1700	6,9 to 117,2	10 to 30	0,7 to 2,1	2000	103,4	2500	172,4

Viton® diaphragm and O-Ring with 316 stainless steel 1/4" NPT (female) pressure connection (includes adjustable deadband switch)

15623	20 to 200	1,4 to 13,8	12 to 26	0,8 to 1,8	500	34,5	1000	68,9
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Model	Adjustable Set Point Range		Adjustable Deadband			Over Range Pressure*		Proof Pressure**	
	psi	bar	Low End psi	Mid Range psi	High End psi	psi	bar	psi	bar

Buna N diaphragm and O-Ring nickel-plated brass 1/4" NPT (female) pressure connection; includes adjustable deadband microswitch

15731	3 to 30	0,2 to 2,1	1.5 to 4	0,1 to 0,3	2 to 4.5	0,1 to 0,3	2.5 to 5	0,2 to 0,3	500	34,5	600	41,4
15732	5 to 100	0,3 to 6,9	3 to 6	0,2 to 0,4	4 to 7.5	0,3 to 0,5	5 to 9	0,3 to 0,6	500	34,5	600	41,4
15733	9 to 300	0,6 to 27,0	4 to 11	0,3 to 0,8	5 to 13	0,3 to 0,9	5 to 16	0,3 to 1,1	500	34,5	600	41,4
15734	15 to 500	1,0 to 34,5	8 to 25	0,6 to 1,7	9 to 28	0,6 to 1,9	10 to 31	0,7 to 2,1	1500	103,4	2500	172,4
15735	30 to 1000	2,1 to 68,9	9 to 30	0,6 to 2,1	10 to 35	0,7 to 2,4	30 to 90	2,1 to 6,2	1500	103,4	2500	172,4
15736	100 to 1700	6,9 to 117,2	25 to 60	1,7 to 4,1	40 to 80	2,8 to 5,5	50 to 100	3,4 to 6,9	2000	137,9	2500	172,4

Model	Adjustable Set Point Range		Deadband		Over Range Pressure*		Proof Pressure**	
	psi	bar	Lower 75% range span psi	Top 25% range span bar	psi	bar	psi	bar

Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, large 0.72" orifice for clean-out purposes (NACE MR-0175 compliant)

190	5 to 30	0,3 to 2,1	1 to 3	0,1 to 0,2	6 max	0,4	1500	103,4	2500	172,4
191	10 to 100	0,7 to 6,9	1 to 8	0,1 to 0,6	15 max	1,0	1500	103,4	2500	172,4
192	15 to 300	1,0 to 20,7	3 to 18	0,2 to 1,2	25 max	1,7	1500	103,4	2500	172,4
193	20 to 500	1,4 to 34,5	4 to 30	0,3 to 2,1	45 max	3,1	1500	103,4	2500	172,4
194	80 to 1700	5,5 to 117,2	5 to 120	0,3 to 8,3	150 max	10,3	2000	137,9	2500	172,4

Application Note: The use of metallic diaphragms where higher pressure shock or heavy cycling is expected should be avoided. Models 171-174 should not be used where system or start-up vacuum pressure might exceed 26" Hg Vac (-0.9 bar).

Model	Adjustable Set Point Range		Deadband		Top 25%		Over Range Pressure*		Proof Pressure**	
	Low end of range on fall; psi	High end of range on rise bar	Lower 75% range span psi	bar	psi	bar	psi	bar	psi	bar
Type H100										
Welded 316 stainless steel diaphragm and 1/2" NPT (female) pressure connection, 0.06" orifice to dampen pulsations										
490	5 to 30	0,3 to 2,1	1 to 3	0,1 to 0,2	6 max	0,4	1500	103,4	2500	172,4
491	10 to 100	0,7 to 6,9	1 to 8	0,1 to 0,6	15 max	1,0	1500	103,4	2500	172,4
492	15 to 300	1,0 to 20,7	3 to 18	0,2 to 1,2	25 max	1,7	1500	103,4	2500	172,4
493	20 to 500	1,4 to 34,5	4 to 30	0,3 to 2,1	45 max	3,1	1500	103,4	2500	172,4
494	80 to 1700	5,5 to 117,2	5 to 120	0,3 to 8,3	150 max	10,3	2000	137,9	2500	172,4
	psi (unless noted)	bar	psi (unless noted)	bar (unless noted)	psi	bar	psi	bar	psi	bar
316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-Ring (optional Kalrez®, Ethylene Propylene, or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), large 0.72" orifice for clean-out purposes. Models 188 and 189 have a 316L stainless steel 1/2" NPT (female) pressure connection (NACE MR-0175 compliant)										
183	1 to 20	0,1 to 1,4	0.3 to 2.5	20,7 to 172,4 mbar	500	34,5	1000	68,9		
184	2 to 50	0,1 to 3,4	0.3 to 3	20,7 to 206,8 mbar	500	34,5	1000	68,9		
185	4 to 100	0,3 to 6,9	0.5 to 6	34,5 to 413,7 mbar	500	34,5	1000	68,9		
186	8 to 200	0,6 to 13,8	1 to 11	0,1 to 0,8	500	34,5	1000	68,9		
188	50 to 1000	3,4 to 68,9	25 to 125	1,7 to 8,6	2000	137,9	7000	482,6		
189	250 to 3500	17,2 to 241,3	50 to 300	3,4 to 20,7	4000	275,8	7000	482,6		
316L stainless steel diaphragm (optional Hastelloy® C or Monel®); Viton® GLT O-Ring (optional Kalrez®, ethylene propylene or Aflas®); 316 stainless steel 1/2" NPT (female) pressure connection (optional Hastelloy® C or Monel®), 0.06" orifice to dampen pulsations. Models 488 and 489 316L stainless steel pressure connection (NACE MR-0175 compliant)										
483	1 to 20	0,1 to 1,4	0.3 to 2.5	20,7 to 172,4 mbar	500	34,5	1000	68,9		
484	2 to 50	0,1 to 3,4	0.3 to 3	20,7 to 206,8 mbar	500	34,5	1000	68,9		
485	4 to 100	0,3 to 6,9	0.5 to 6	34,5 to 413,7 mbar	500	34,5	1000	68,9		
486	8 to 200	0,6 to 13,8	1 to 11	0,1 to 0,8	500	34,5	1000	68,9		
488	50 to 1000	3,4 to 68,9	25 to 125	1,7 to 8,6	2000	137,9	7000	482,6		
489	250 to 3500	17,2 to 241,3	50 to 300	3,4 to 20,7	4000	275,8	7000	482,6		
Phosphor bronze bellows with nickel-plated brass 1/4" NPT (female) pressure connection. Model 218 has 300 series stainless steel spring exposed to media										
218	30 "Hg Vac to 0	-1 to 0	1 to 2 "Hg	33,9 to 67,7 mbar	3	0,2	30	2,1		
270	4 to 200	0,3 to 13,8	1 to 8	0,1 to 0,6	200	13,8	250	17,2		
274	6 to 300	0,4 to 20,7	1 to 10	0,1 to 0,7	300	20,7	350	24,1		
Welded 316L stainless steel bellows and 1/4" NPT (female) pressure connection										
358	15 to 200	1,0 to 13,8	1 to 6	0,1 to 0,2	200	13,8	800	55,2		
361	20 to 300	1,4 to 20,7	1 to 7	0,1 to 0,3	300	20,7	800	55,2		
376	25 to 500	1,7 to 34,5	1.5 to 8	0,1 to 0,3	500	34,5	800	55,2		

Hastelloy® is a registered trademark of Haynes International, Inc. Monel® is a registered trademark of The Special Metals Corporation. Viton® and Kalrez® are registered trademarks of E.I. duPont de Nemours and Company. Aflas® is a registered trademark of Asahi Glass.

* Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.

** Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g., start-up, testing).

Deadband Note: Models 190-194, 490-494 are expressed as the lower 75% and top 25% of the range span because of the operating characteristics of the diaphragm sensor and switch. Use of optional diaphragm materials for models 483-489 may increase deadband.



PRESSURE MODEL CHART

Model	Adjustable Set Point Range		Deadband		Over Range Pressure*		Proof Pressure**	
	Low end of range on fall; High end of range on rise							
	psi	bar	psi	bar	psi	bar	psi	bar
Type H100								
303 stainless steel piston, Buna N O-Ring with 303 stainless steel 1/4" NPT (female) pressure connection								
610	75 to 1000	5,2 to 68,9	30 to 150	2,1 to 10,3	6000	413,7	10,000	689,5
612	125 to 3000	8,6 to 206,8	40 to 250	2,8 to 17,2	6000	413,7	10,000	689,5
616	700 to 5000	48,3 to 344,7	40 to 375	2,8 to 25,9	6000	413,7	10,000	689,5
	psi	bar	psi	bar	psi	bar	psi	bar
303 stainless steel piston, Buna N O-Ring with 303 stainless steel 1/4" NPT (female) pressure connection (includes adjustable deadband switch)								
15884	700 to 5000	48,3 to 344,7	80 to 500	5,5 to 34,5	6000	413,7	10,000	689,5
316 stainless steel bellows and 1/4" NPT (female) pressure connection (Not recommended for rapid or high cycling pressure changes)								
680	100 to 1700	6,9 to 117,2	9 to 40	0,6 to 2,8	1700	117,2	2500	172,4

DIFFERENTIAL PRESSURE MODEL CHART

Model	Adjustable Set Point Range		Deadband		Working Pressure***		Proof Pressure**	
	Low end of range on fall; High end of range on rise							
	psid	bar	psi	bar	psi	bar	psi	bar
Type H100K								
	(unless noted)	(unless noted)	(unless noted)	(unless noted)	(unless noted)			
Buna N diaphragm and sealing diaphragms with epoxy coated aluminum 1/8" NPT (female) pressure connections								
540	0.2 to 7 "wcd	0,5 to 17,4 mbar	0.05 to 0.6 "wc	0,1 to 1,5 mbar	30 "Hg Vac to 200	-1 to 13,8	400	27,6
541	1 to 20 "wcd	2,5 to 49,8 mbar	0.1 to 1.0 "wc	0,2 to 2,5 mbar	30 "Hg Vac to 200	-1 to 13,8	400	27,6
542	5 to 50 "wcd	12,4 to 124,5 mbar	0.2 to 2.5 "wc	0,5 to 6,2 mbar	30 "Hg Vac to 200	-1 to 13,8	400	27,6
543	10 to 200 "wcd	24,9 to 497,8 mbar	0.5 to 8 "wc	1,2 to 19,9 mbar	30 "Hg Vac to 200	-1 to 13,8	400	27,6
544	2 to 20	0,1 to 1,4	0.1 to 1.3	6,9 to 89,6 mbar	30 "Hg Vac to 1200	-1 to 82,7	2500	172,4
545	5 to 50	0,3 to 3,4	0.2 to 2.2	13,8 mbar to 0,1	30 "Hg Vac to 1200	-1 to 82,7	2500	172,4
546	10 to 125	0,7 to 8,6	0.4 to 5.0	27,6 mbar to 0,3	30 "Hg Vac to 1200	-1 to 82,7	2500	172,4
547	50 to 250	3,4 to 17,2	0.8 to 10	0,1 to 0,7	30 "Hg Vac to 1200	-1 to 82,7	2500	172,4
548	100 to 500	6,9 to 34,5	2.0 to 15	0,1 to 1,0	30 "Hg Vac to 1200	-1 to 82,7	2500	172,4

* Over Range Pressure: The maximum pressure that may be applied continuously without causing damage and maintaining set point repeatability.

** Proof Pressure: The maximum pressure to which a pressure sensor may be occasionally subjected, which causes no permanent damage. The unit may require calibration (e.g. start-up, testing).

***Working Pressure Range: The pressure range within which two opposing sensors can be safely operated and still maintain set point adjustability.

TEMPERATURE MODEL CHART

Model	Adjustable Set Point Range		Max. Temp		Scale Division		Stem or Bulb Size†/Finish‡‡
	°F	°C	°F	°C	°F	°C	
Type B100 Internal adjustment via reference dial Type C100 No reference dial; model 13546 not available							
120	0 to 225	-17.8 to 107.2	275	135	10†	5†	9/16" x 1-7/8" below 1/2 "NPT thread (nickel-plated brass)
121	200 to 425	93.3 to 218.3	475	246.1	10†	5†	9/16" x 1-7/8" below 1/2 "NPT thread (nickel-plated brass)
13546†	15 to 140	-9.4 to 60	160	71.1	5†	2†	9/16" x 2-11/16" long stainless steel (Freeze Protection)
Type E100 Stainless steel bulb and capillary; internal adjustment via reference dial							
2BSA	-120 to 100	-84.4 to 37.8	150	65.6	10	5	3/8 x 2-5/8"
2BSB	30 to 250	-1.1 to 121.1	300	148.9	10	5	3/8 x 2-5/8"
3BS	100 to 400	37.8 to 204.4	450	232.2	10	5	3/8 x 2-1/8"
4BS	25 to 100	-3.9 to 37.8	150	65.6	2	1	3/8 x 6-3/4"
5BS	-20 to 80	-28.9 to 26.7	130	54.4	5	2	3/8 x 5"
8BS	350 to 640	176.7 to 337.8	690	365.6	10	5	3/8 x 3-1/4"
13545	25 to 325	-3.9 to 162.8	360	182.2	10	5	1/8 x 11-5/8" (Heat Tracing)
Copper bulb and capillary							
2BCA	-120 to 100	-84.4 to 37.8	150	65.6	10	5	3/8 x 2-5/8"
2BCB	30 to 250	-1.1 to 121.1	300	148.9	10	5	3/8 x 2-5/8"
3BC	100 to 400	37.8 to 204.4	450	232.2	10	5	3/8 x 2-1/8"
4BC	25 to 100	-3.9 to 37.8	150	65.6	2	1	3/8 x 6-3/4"
5BC	-20 to 80	-28.9 to 26.7	130	54.4	5	2	3/8 x 5"
8BC	350 to 640	176.7 to 337.8	690	365.6	10	5	3/8 x 3-1/4"
Type F100 Stainless steel bulb and capillary; no reference dial							
1BS	-180 to 120	-117.8 to 48.9	170	76.7	N/A		3/8 x 3-3/4"
2BS	-125 to 350	-87.2 to 176.7	400	204.4	N/A		3/8 x 2-5/8"
3BS	-125 to 500	-87.2 to 260	550	287.8	N/A		3/8 x 2-1/8"
4BS	-40 to 120	-40 to 48.9	170	76.7	N/A		3/8 x 6-3/4"
5BS	-40 to 180	-40 to 82.2	230	110	N/A		3/8 x 5"
6BS	0 to 250	-17.8 to 121.1	300	148.9	N/A		3/8 x 4-1/2"
7BS	0 to 400	-17.8 to 204.4	450	232.2	N/A		3/8 x 3"
8BS	50 to 650	10 to 343.3	700	371.1	N/A		3/8 x 3-1/4"
Copper bulb and capillary							
1BC	-180 to 120	-117.8 to 48.9	170	76.7	N/A		3/8 x 3-3/4"
2BC	-125 to 350	-87.2 to 176.7	400	204.4	N/A		3/8 x 2-5/8"
3BC	-125 to 500	-87.2 to 260	550	287.8	N/A		3/8 x 2-1/8"
4BC	-40 to 120	-40 to 48.9	170	76.7	N/A		3/8 x 6-3/4"
5BC	-40 to 180	-40 to 82.2	230	110	N/A		3/8 x 5"
6BC	0 to 250	-17.8 to 121.1	300	148.9	N/A		3/8 x 4-1/2"
7BC	0 to 400	-17.8 to 204.4	450	232.2	N/A		3/8 x 3"
8BC	50 to 650	10 to 343.3	700	371.1	N/A		3/8 x 3-1/4"

†Type B100 only

‡Optional immersion stem lengths and capillary lengths are available. Standard capillary length is 6 ft except models 13545 which is 10 ft.

‡‡Optional stainless steel immersion stem, and armored capillary covering available.



HOW TO ORDER

BUILDING A PART NUMBER

Select a **Type**

Refer to the "Type" section below.
 Determine type number based on switch output, enclosure, adjustment and reference.
 Fill in the type portion of your part number with the corresponding number.

Select a **Model**

Refer to the "Model Charts".
 Determine model based on adjustable range, deadband and proof pressure.
 Fill in the model portion of your part number with the corresponding number.

Select an **Option**

Refer to the "Options" section.
 Determine option number based on switch output, optional materials or other product enhancements.
 Fill in the option portion of your part number with the corresponding number.
 Leave "option" portion blank if no options are needed.
 FOR MULTIPLE OPTIONS: Call United Electric Controls.

TYPE

DESCRIPTION

PRESSURE

Type H100 - One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale

DIFFERENTIAL PRESSURE

Type H100K - One SPDT output; epoxy coated enclosure; internal adjustment with "High-Low" reference scale

TEMPERATURE

Type B100 - Immersion stem; one SPDT output; internal adjustment with reference dial
 Type C100 - Immersion stem; one SPDT output; internal adjustment with no reference
 Type E100 - Bulb and capillary; one SPDT output; internal adjustment with reference dial
 Type F100 - Bulb and capillary; one SPDT output; internal adjustment with no reference

SWITCH OPTIONS*

0140	Gold contacts, 1A 125 VAC resistive. NOT AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
0500	Close deadband, 5A 125/250 VAC resistive. NOT AVAILABLE MODELS 520-535, 13545, 13546, 15623, 15731-15884
1010	DPDT switch, 10A 125/250 VAC resistive; deadband and minimum set point will increase. NOT AVAILABLE TEMPERATURE VERSIONS, TYPE H100K OR MODELS 171-194, 483-567, 680, 15623, AND 15731-15884
1070	10 A 125 VDC resistive; deadband and minimum set point will increase. NOT AVAILABLE MODELS 171-194, 483-535, 560-567, 13545, 13546, 15623, 15731-15884
1519	Adjustable deadband, 15 A 125/250/480 VAC resistive; adjustment wheel changes rise setting only. If adjustment on fall setting is required, use primary adjustment. NOT AVAILABLE TYPES B100, E100 OR MODELS 171-194, 483-494, 560-567, 610-616, 51623, 15731-15884
1530	External manual reset, 15 A 125/250/480 VAC resistive; latches on rise, only. NOT AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
1535	High ambient, 15 A 125/250 VAC resistive; temperatures up to 250°F (121.1°C). NOT AVAILABLE MODELS 520-535, 13545, 13546, 15623, 15731-15884
1537	Vapor sealed switch, 15 A 125/250 VAC resistive. NOT AVAILABLE MODELS 523, 533, 13545, 13546, 15623, 15731-15884
2000	20 A 125/250/480 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 520-535, 13545, 13546, 15623, 15731-15884
3000	30 A 125/250/277 VAC resistive. NOT AVAILABLE TYPE H100K OR MODELS 171-194, 483-567, 680, 13545, 13546, 15623, 15731-15884

* All switches have limited DC capabilities. Consult factory for details.

OTHER OPTIONS

M020	Red status light, 115 VAC only. NOT AVAILABLE MODELS 13545, 13546, 15623, 15731-15884
M201	Factory set one switch; specify increasing or decreasing pressure or temperature and setpoint
M277	Range indicated on nameplate in kPa or MPa, factory selected. NOT AVAILABLE ON TEMPERATURE VERSIONS
M278	Range indicated on nameplate in Kg/cm ² . NOT AVAILABLE ON TEMPERATURE VERSIONS
M405	Intrinsic safety compliance for European Union per ATEX standards
M406	Intrinsic Safety compliance for Russia per Gosgortekhnadzor standards.
M444	Paper ID tag
M446	Stainless steel ID tag & wire attachment
M449	Surface mounting hardware kit that is required for models 520-535, 15737, & 540-548 when surface mounting. Use option code only at time of ordering product, otherwise use surface and pipe mounting kit part number 6361-704 as a separate order or for other models.
M504	316L stainless steel immersion stem. AVAILABLE TEMPERATURE MODELS 120, 121 ONLY
M540	Viton® construction (deadband and low end range may increase slightly); wetted parts include Viton® diaphragm and O-ring plus stainless steel pressure connection. AVAILABLE ON MODELS 610-616 (O-ring only), 701-705 (Viton diaphragm & O-ring, stainless steel pressure connection), AND 540-548 (Viton diaphragms and seals, pressure connections remain aluminum)
M550	Oxygen service cleaning; alcohol cleaning to remove residue from the process connection. NOT AVAILABLE ON PRESSURE MODEL 706
M914	1/2" NPT (female) stainless steel pressure connection. AVAILABLE MODELS 358-376, 610-616
M921	Brass pressure connection. AVAILABLE MODELS 610-616
6361-704	Surface and pipe mounting hardware kit for all models. Required for surface mounting models 520-535, 15737 & 540-548 if not previously ordered with option M449.
SD6286-51	Watertight conduit fitting; connects 7/8" hole to 1/2" NPT (female) fitting
ALSO AVAILABLE:	UE Final Inspection Reports, Certified Drawings, and other Certificates are available. Please consult your UE representative for additional information.

OPTIONAL SENSOR MATERIAL FOR "WC RANGES. AVAILABLE MODELS 520-525

XC001	Aluminum pressure connection, Viton® diaphragm, Viton® O-ring
XC002	Aluminum pressure connection, Kapton® diaphragm, Buna N O-ring
XC003	Aluminum pressure connection, Kapton® diaphragm, Viton® O-ring
XC004	316L Stainless steel pressure connection, 316L stainless steel diaphragm, Viton® O-ring. (Over range pressure is limited to 100 psi)
XC005	316L Stainless steel pressure connection, Viton® diaphragm, Viton® O-ring
XC007	316L Stainless steel pressure connection, Teflon® diaphragm, Viton® O-ring

OPTIONAL SENSOR MATERIALS FOR CORROSIVE MEDIA. AVAILABLE MODELS 183-189, 483-489

XD002	Hastelloy C diaphragm (NACE MR-0175 compliant)
XD003	Monel diaphragm (NACE MR-0175 compliant)
XP112	Hastelloy C pressure connection (NACE MR-0175 compliant)
XP113	Monel pressure connection (NACE MR-0175 compliant)
XR211	Kalrez® O-ring
XR213	Ethylene propylene O-ring
XR214	Aflas® O-ring

OPTIONAL FLUSH MOUNT FLANGES. AVAILABLE MODELS 560-567

F196	Flush mounted flange, 150#, 1" lap joint, raised face	AVAILABLE MODELS 565-567 ONLY
F197	Flush mounted flange, 150#, 2" lap joint, raised face	AVAILABLE MODELS 560-564 ONLY
F198	Flush mounted flange, 300#, 1" lap joint, raised face	AVAILABLE MODELS 565-567 ONLY
F199	Flush mounted flange, 300#, 2" lap joint, raised face	AVAILABLE MODELS 560-564 ONLY

Note: No options are available on Heat Trace and Freeze Protection models 13546 and 13545 or pump switch models 15623 & 15731-15737 except M201, M405, M406 M444, M446 and M550. No options are available on model 15884 except M201 & M446.



OPTIONS FOR TEMPERATURE MODELS

UNION CONNECTORS**

Option	Replacement Number	Description
<u>Brass</u>		
W027	SD6213-27	1/2" NPT w/ 3/4" bushing
W045	SD6213-45	3/4" NPT
W051	SD6213-51	1/2" NPT
<u>304 Stainless Steel</u>		
W028	SD6213-28	1/2" NPT w/ 3/4" bushing
W046	SD6213-46	3/4" NPT
W050	SD6213-50	1/2" NPT

THERMOWELLS**

For all bulb & capillary switches, except Model 13545

Option	Replacement Number	Description
<u>Brass</u>		
W075	SD6225-75	1/2" NPT with 3/4" NPT adapter bushing, 4" BT
W191	SD6225-191	1/2" NPT, 4" BT
W118	SD6225-118	1/2" NPT with 3/4" NPT adapter bushing, 7" BT
W192	SD6225-192	1/2" NPT, 7" BT
<u>316 Stainless Steel</u>		
W076	SD6225-76	3/4" NPT, 4.5" BT
W193	SD6225-193	1/2" NPT, 4.5" BT
W119	SD6225-119	3/4" NPT, 7.5" BT
W177	SD6225-177	1/2" NPT, 7.5" BT

For all immersion stem switches; except Model 13546

W139	SD6225-139	3/4" NPT X 1-23/32" BT, BRASS
W140	SD6225-140	3/4" NPT X 1-23/32" BT, 316 ST/ST

W000 IMMERSION STEM AND THERMOWELLS

Note: Option W000 is a special Immersion Stem construction that has no external thread. This option fits inside a special thermowell and is secured with a set-screw.

Option	Description
W000	Immersion stem only, brass
W097	Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1-23/32" BT Brass thermowell
W099	Immersion stem and thermowell. Includes W000 stem and 1/2" NPT x 1-23/32" BT 316 ST/ST thermowell.

OPTIONAL LENGTHS:

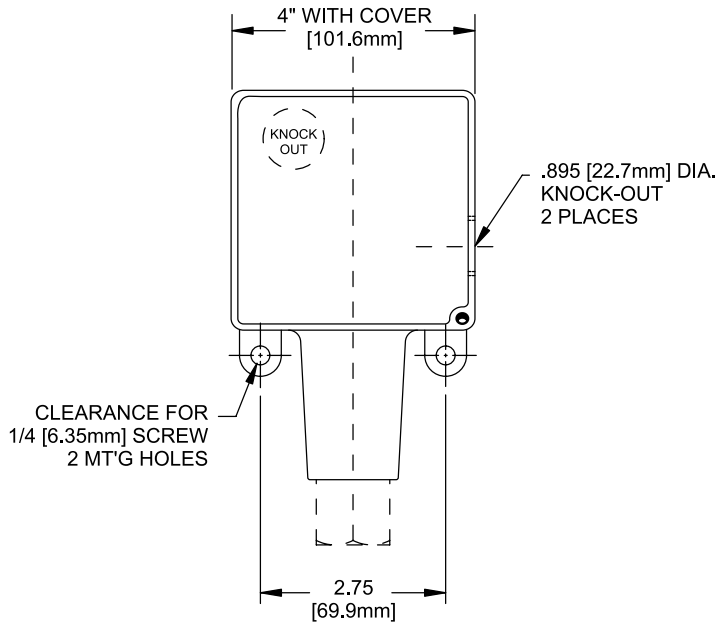
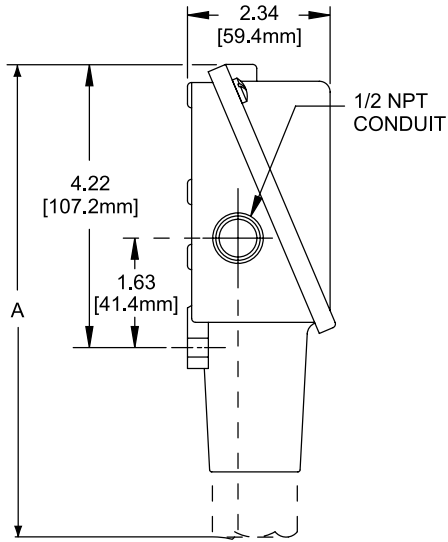
Optional immersion stem lengths to 15" may be available in Brass, with or without 316 ST/ST thermowell. Consult UE for additional information and availability. Optional capillary length to *50' may be available in Copper or 304 ST/ST. Armor or Teflon® capillary protection may be available to lengths less than or equal to capillary length. Consult UE for additional information and availability.

*Consult UE regarding repeatability and ambient effects on capillary lengths over 30'.
** Dimensional drawings for union connectors and thermowells may be found at www.ueonline.com

DIMENSIONAL DRAWINGS

Dimensional drawings for all models may be found at www.ueonline.com

Types B100, C100, E100, F100, H100, H100K



Dimension A			
Models	Inches	mm	NPT
Pressure			
171-174	7.63	193.8	1/2"
183-186, 484-486	7.56	192.0	1/2"
188-189, 488-489	6.63	168.4	1/2"
190-194, 490-494	6.63	168.4	1/2"
218	6.56	166.6	1/4"
270-274	7.00	177.8	1/4"
358-376	7.00	177.8	1/4"
520-525, 15737	8.44	214.4	1/2"
530-535	8.00	203.2	1/2"
560-564	6.63	168.4	2" Sanitary Fitting
565-567	6.63	168.4	1-1/2" Sanitary Fitting
610-616, 680, 15884	7.00	177.8	1/4"
701-706, 15623, 15731-15736	6.63	168.4	1/4"
Differential Pressure			
540-543	8.47	215.1	1/8"
544-548	8.53	216.7	1/8"
Temperature			
120, 121, 13546	9.38	238.3	Immersion stem
1BC-8BC, 1BS-8BS, 13545	8.69	220.7	Bulb & capillary

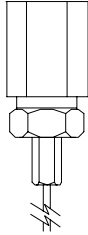
All dimensions stated in inches (millimeters)

DIMENSIONAL DRAWINGS

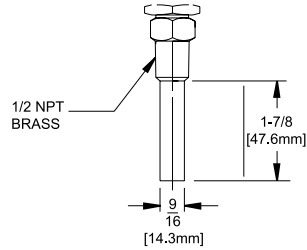
Dimensional drawings for all models may be found at www.ueonline.com

Temperature Sensors

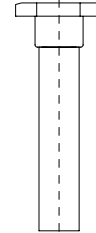
Models 1BC-8BC, 1BS-8BS, 13545



Models 120,121

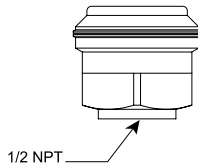


Model 13546

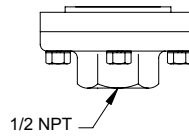


Pressure Sensors

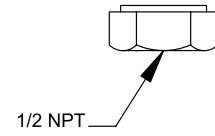
Models 171-174



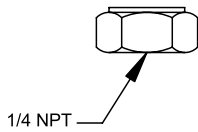
Models 183-186, 483-486



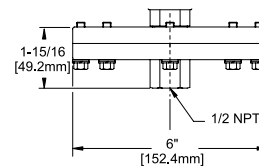
Models 188-194, 488-494



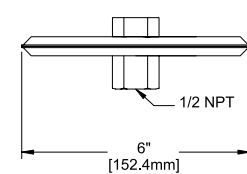
Models 218-376, 610-706,
15623,15731-15736



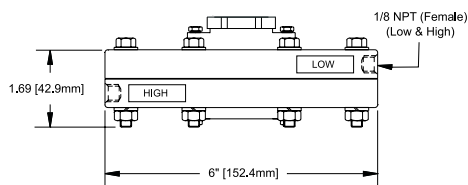
Models 520-525, 15737



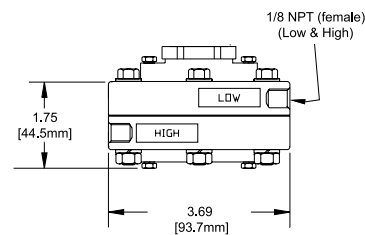
Models 530-535



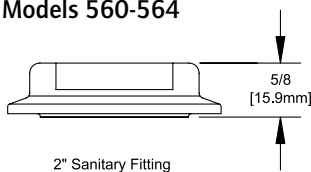
Models 540-543



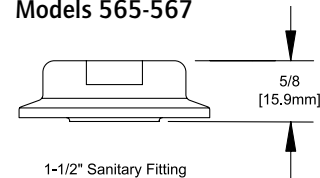
Models 544-548



Models 560-564



Models 565-567

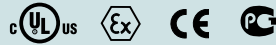


*All dimensions
stated in inches
(millimeters)*

ALTERNATIVE PRODUCTS FROM UE

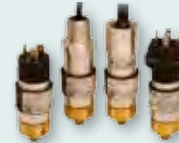
One Series

- Electronic solid-state reliability
- Two-wire operation
- Digital display with keypad set-up
- 100% of range adjustable on-off deadband
- 4-20 mA output models
- Continuous diagnostic health check



10 Series

- Compact, cylindrical enclosure
- Pressure ranges from 4 to 7,500 psi, and proof pressure to 12,000 psi
- Choice of seven electrical terminations
- NPT or SAE threaded pressure connections



117 Series

- Single Switch for Corrosive and Hazardous Division 2 Locations
- Compact pressure, differential pressure and temperature models
- Hermetically-sealed SPDT and DPDT output
- Epoxy-coated weather-tight design houses stainless steel internal construction
- Convenient terminal block wiring



400 Series

- 1, 2, and 3 switch output may be separated up to 100% of range
- Wide selection of pressure, differential pressure, and temperature ranges
- Setting via reference dial or hex screw adjustment
- Weathertight 4X design ideal for ordinary location applications



Temperature Sensors

Rugged RTDs and thermocouples for process and energy applications, available with Nema 4X and explosion-proof heads to match heat-trace, turbine, combustion, and stack-emission applications



RECOMMENDED PRACTICES AND WARNINGS

United Electric Controls Company recommends careful consideration of the following factors when specifying and installing UE pressure and temperature units. Before installing a unit, the Installation and Maintenance instructions provided with unit must be read and understood.

- To avoid damaging unit, proof pressure and maximum temperature limits stated in literature and on nameplates must never be exceeded, even by surges in the system. Operation of the unit up to maximum pressure or temperature is acceptable on a limited basis (e.g., start-up, testing) but continuous operation must be restricted to the designated over range pressure. Excessive cycling at maximum pressure or temperature limits could reduce sensor life.
- A back-up unit is necessary for applications where damage to a primary unit could endanger life, limb or property. A high or low limit switch is necessary for applications where a dangerous runaway condition could result.
- The adjustable range must be selected so that incorrect, inadvertent or malicious setting at any range point cannot result in an unsafe system condition.
- Install unit where shock, vibration and ambient temperature fluctuations will not damage unit or affect operation. When applicable, orient unit so that moisture does not enter the enclosure via the electrical connection. When appropriate, this entry point should be sealed to prevent moisture entry.
- Unit must not be altered or modified after shipment. Consult UE if modification is necessary.
- Monitor operation to observe warning signs of possible damage to unit, such as drift in set point or faulty display. Check unit immediately.
- Preventative maintenance and periodic testing is necessary for critical applications where damage could endanger property or personnel.
- Electrical ratings stated in literature and on nameplate must not be exceeded. Overload on a switch can cause damage, even on the first cycle. Wire unit according to local and national electrical codes, using wire size recommended in installation sheet.
- Do not mount unit in ambient temp. exceeding published limits.

LIMITED WARRANTY

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any such product which is found to be defective in such workmanship or material will be repaired or replaced by Seller (Ex-works, Factory, Watertown, Massachusetts. INCOTERMS); provided, however, that this warranty applies only to equipment found to be so defective within a period of 24 months from the date of manufacture by the Seller. Seller shall not be obligated under this warranty for alleged defects which examination discloses are due to tampering, misuse, neglect, improper storage, and in any case where products are disassembled by anyone other than authorized Seller's representatives. EXCEPT FOR THE LIMITED WARRANTY OF REPAIR AND REPLACEMENT STATED ABOVE, SELLER DISCLAIMS ALL WARRANTIES WHATSOEVER WITH RESPECT TO THE PRODUCT, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

LIMITATION OF SELLER'S LIABILITY

SELLER'S LIABILITY TO BUYER FOR ANY LOSS OR CLAIM, INCLUDING LIABILITY INCURRED IN CONNECTION WITH (I) BREACH OF ANY WARRANTY WHATSOEVER, EXPRESSED OR IMPLIED, (II) A BREACH OF CONTRACT, (III) A NEGLIGENT ACT OR ACTS (OR NEGLIGENT FAILURE TO ACT) COMMITTED BY SELLER, OR (IV) AN ACT FOR WHICH STRICT LIABILITY WILL BE INPUTTED TO SELLER, IS LIMITED TO THE "LIMITED WARRANTY" OF REPAIR AND/OR REPLACEMENT AS SO STATED IN OUR WARRANTY OF PRODUCT. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF A LIKE GENERAL NATURE, INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS OR PRODUCTION, OR LOSS OR EXPENSES OF ANY NATURE INCURRED BY THE BUYER OR ANY THIRD PARTY.

UE specifications subject to change without notice.

Be sure to visit www.ueonline.com for the latest information.

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