Dwyer®

Manufacturing Excellence Since 1931

pressure • temperature • test & data • air quality

flow • level • process control • valves

2021

dwyer-inst.com

KEY MARKETS

HVAC

- Building Automation
- Test Equipment
- Critical Environments
- Original Equipment
  (Chillers, Boilers, Air Handlers, Cooling Towers)
- Valve Automation

PROCESS AUTOMATION

- Water and Wastewater
- Pharmaceutical
- Agriculture and Livestock
- Powder and Bulk
- Industrial Process
- Mining and Heavy Earth Moving
- Oil, Gas and Petrochemical
- Power
- Valve Automation

INNOVATION AWARDS

AHR EXPO
INNOVATION AWARDS
2019
WINNER

Wireless Hydronic Balancing Kit
Series 490W

The ACHR News is the leading trade magazine in the heating, ventilating, air conditioning, and refrigeration industries.

GOLD

- HVAC Mobile Meter® Software Test Instrument App
- PredictAir™ Application Software
- Air Velocity Transmitter | Series AVUL

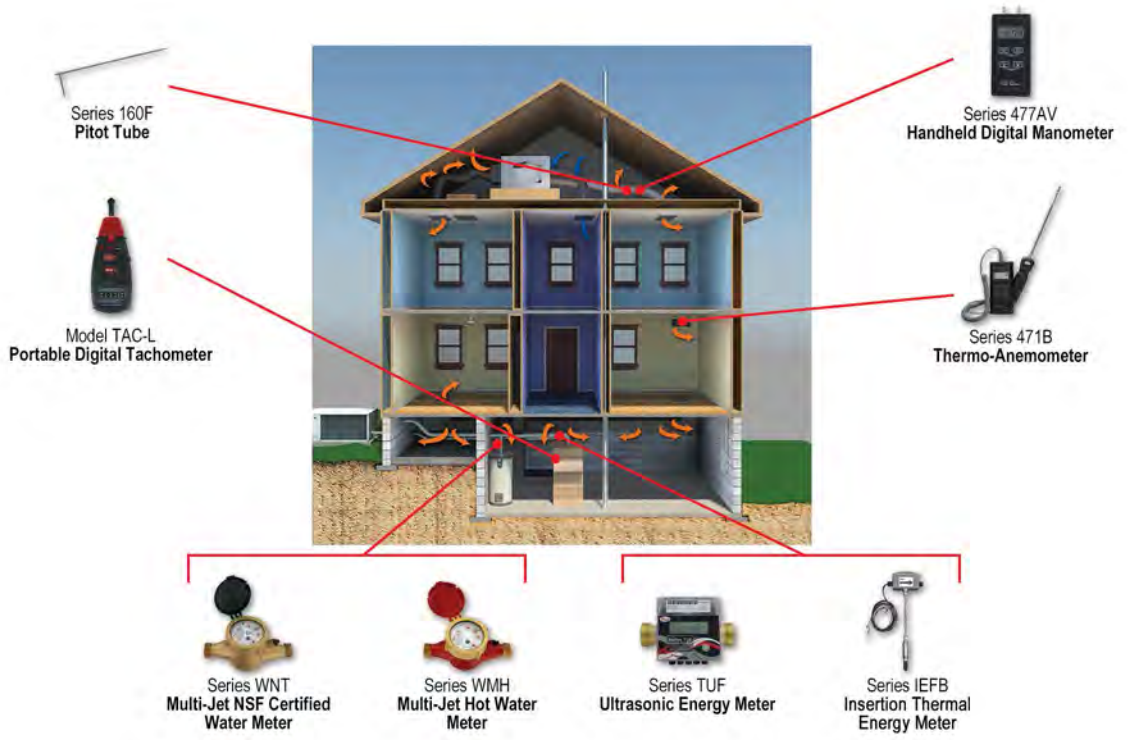
SILVER

- Universal Handheld Test Instrument | Model UHH2
- Wireless Hydronic Balancing Kit | Series 490W
- Hydronic Application Software

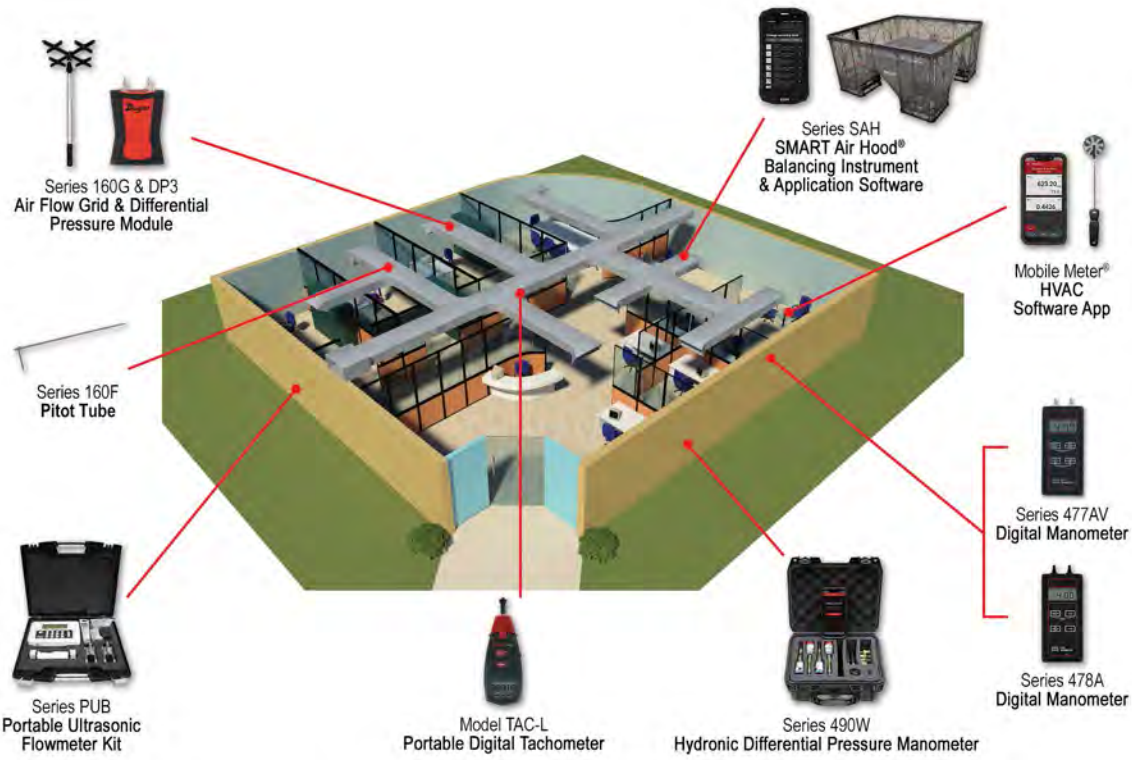
BRONZE

- SMART Air Hood® Balancing Instrument | Series SAH
- Hydronic Differential Pressure Manometer | Series 490A
- Insertion Electromagnetic Flow Transmitter | Series IEF

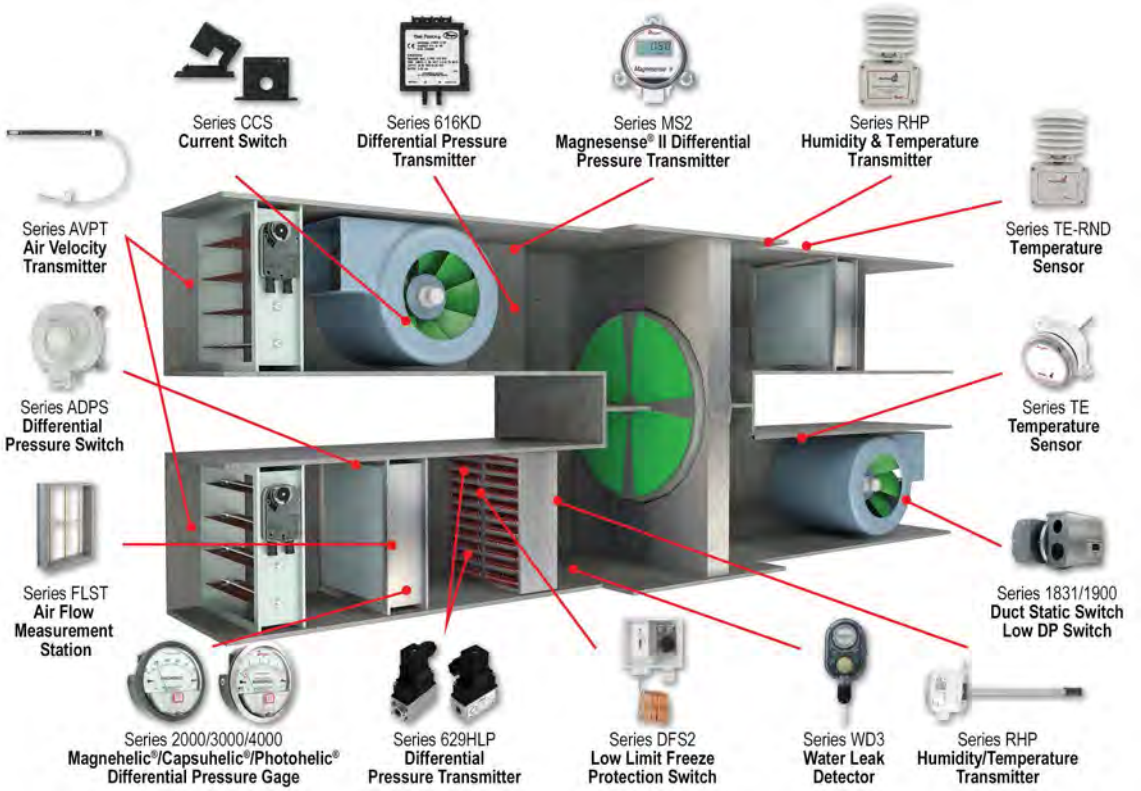
HVAC TESTING



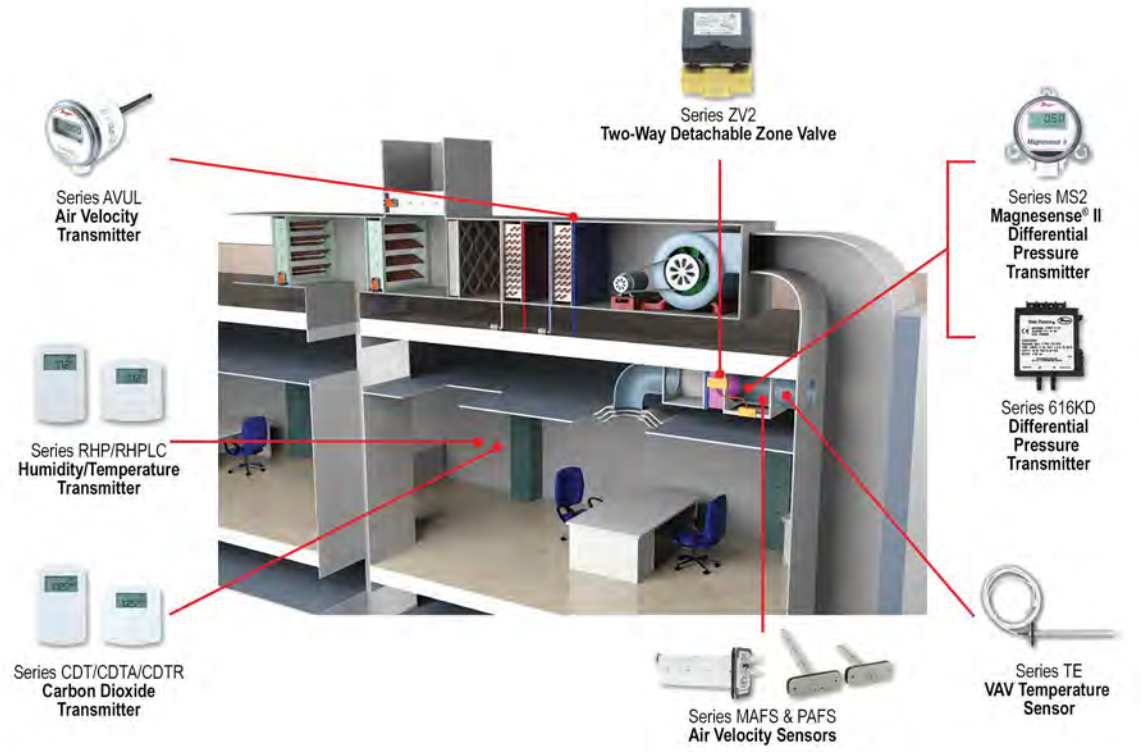
BUILDING BALANCING



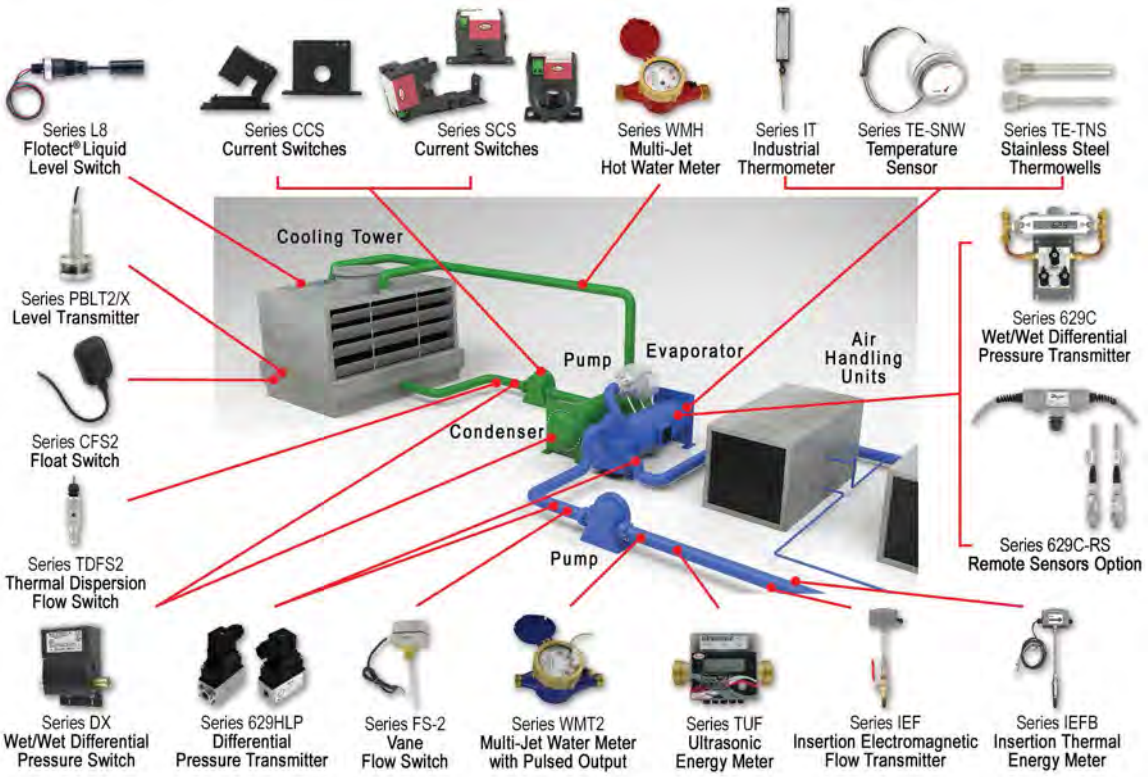
AIR HANDLER



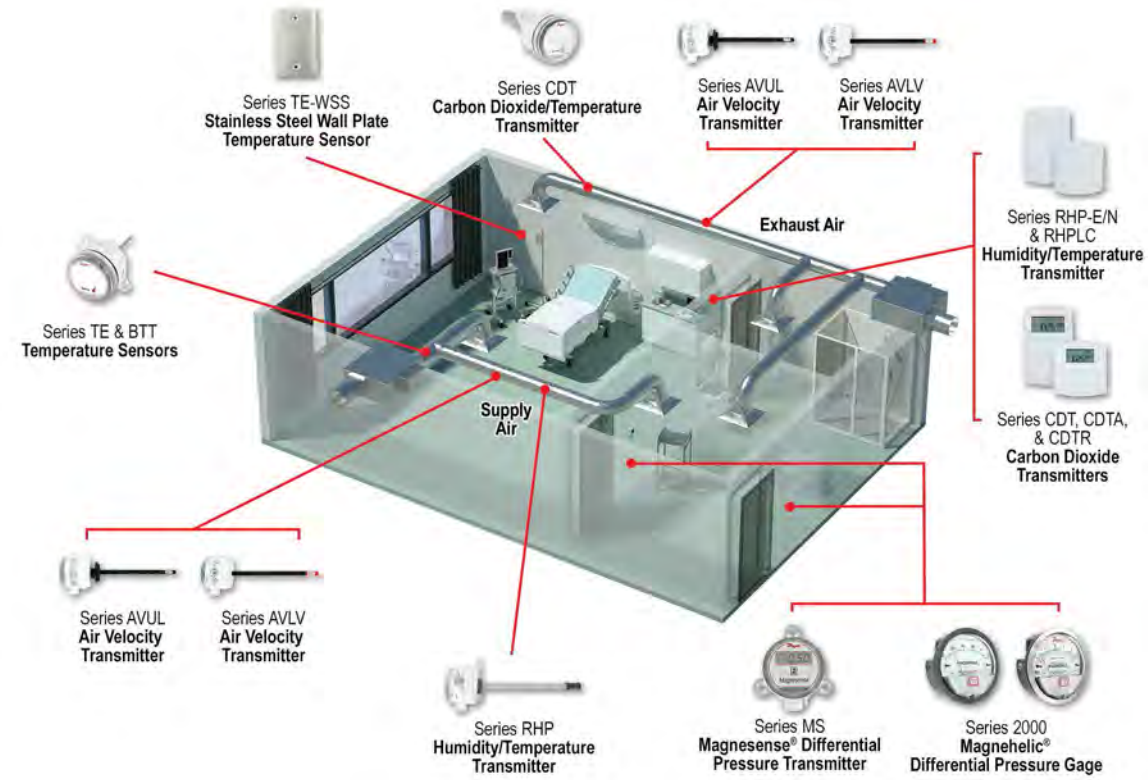
TERMINAL UNIT



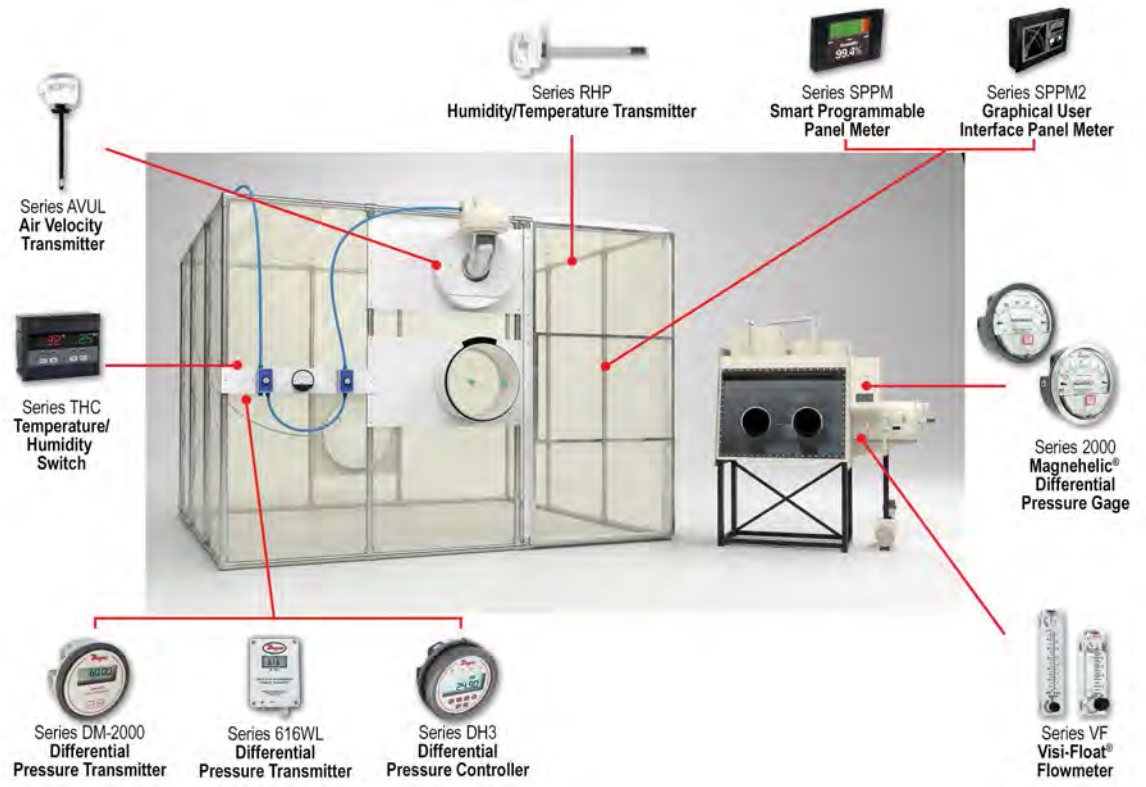
CHILLER PLANT



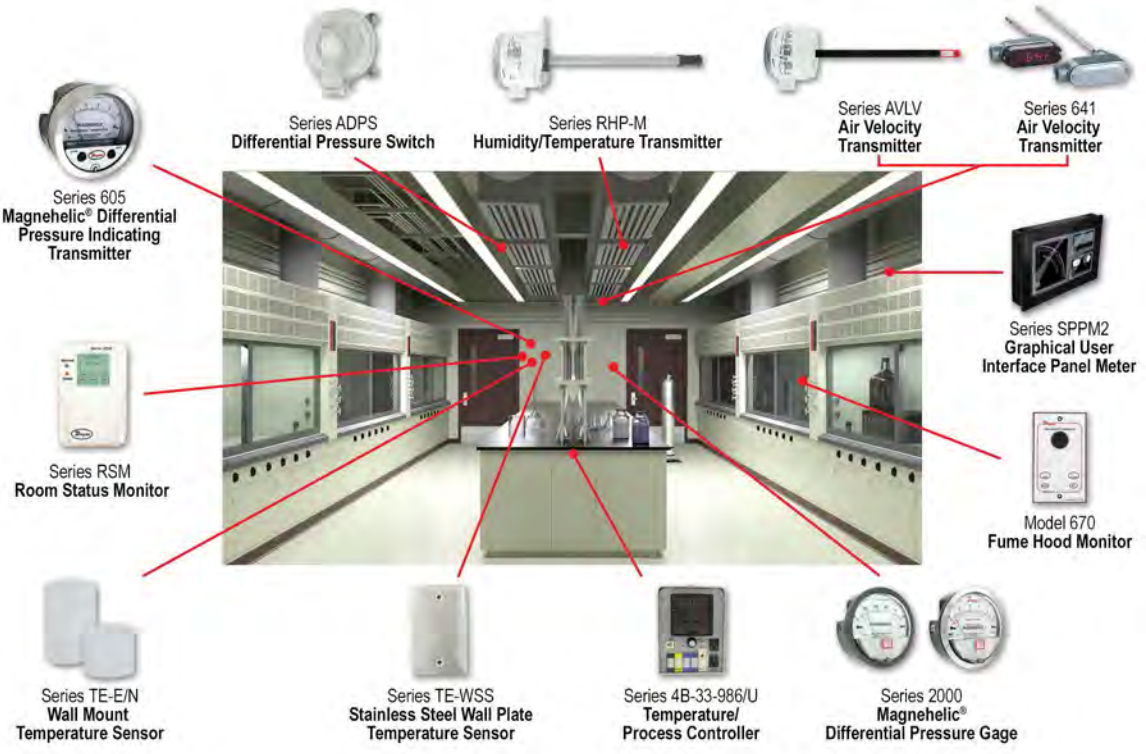
ISOLATION ROOM



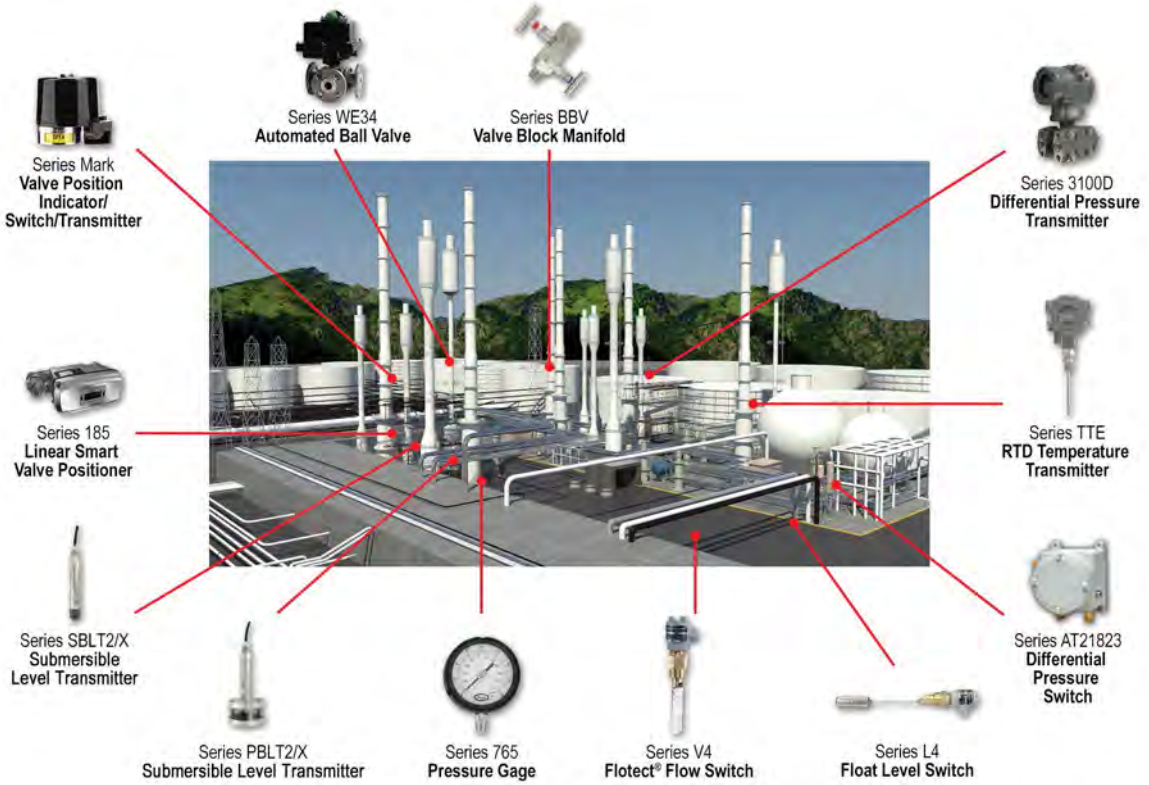
CONTAINMENT CHAMBER/BOX



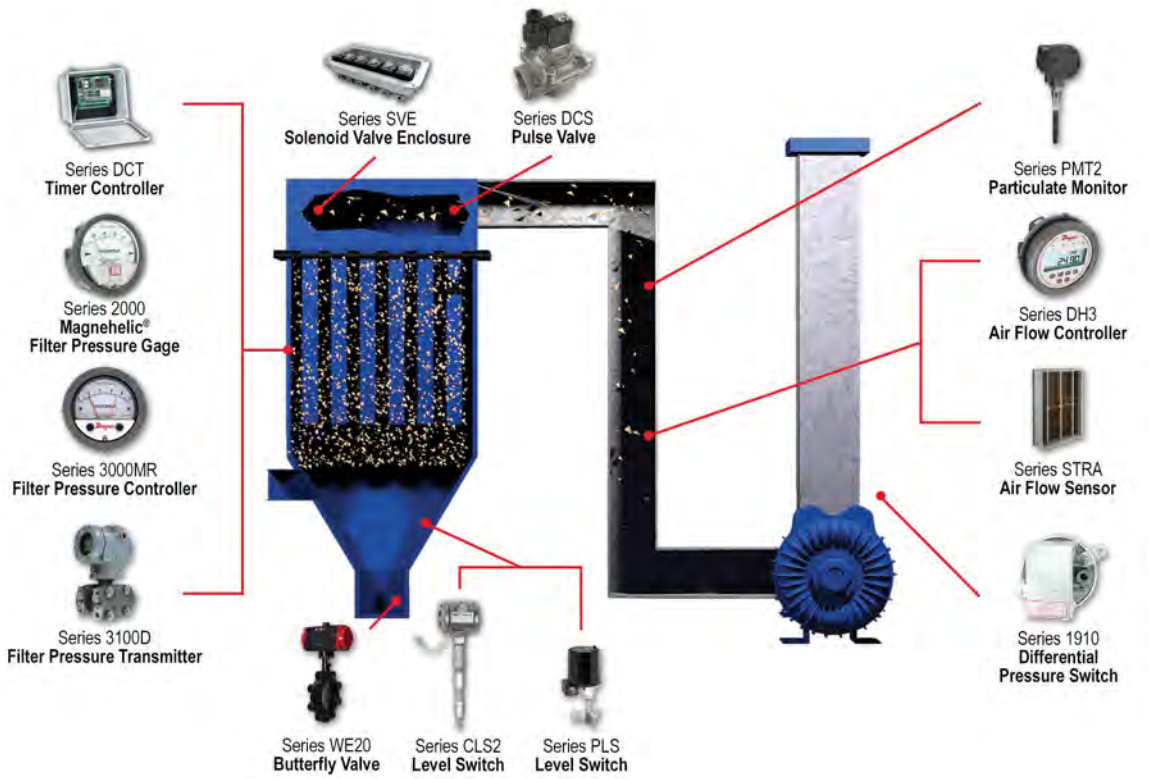
CLEAN ROOM



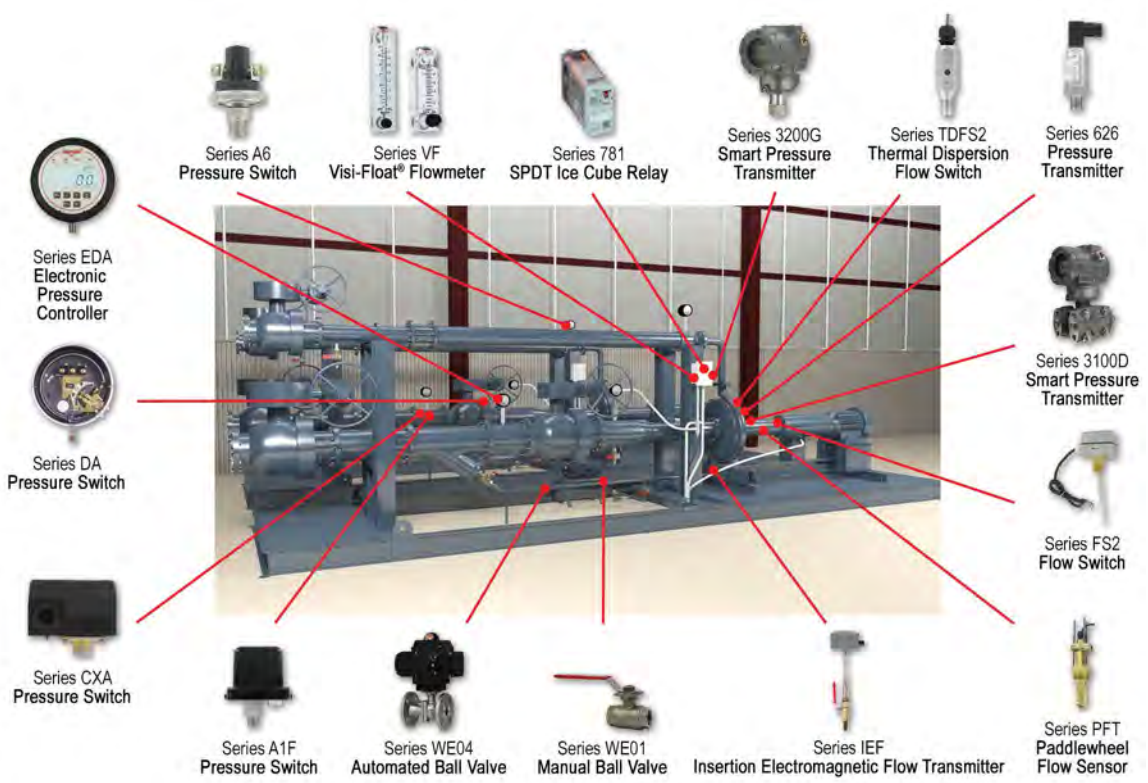
MIDSTREAM REFINERY/CHEM PLANT



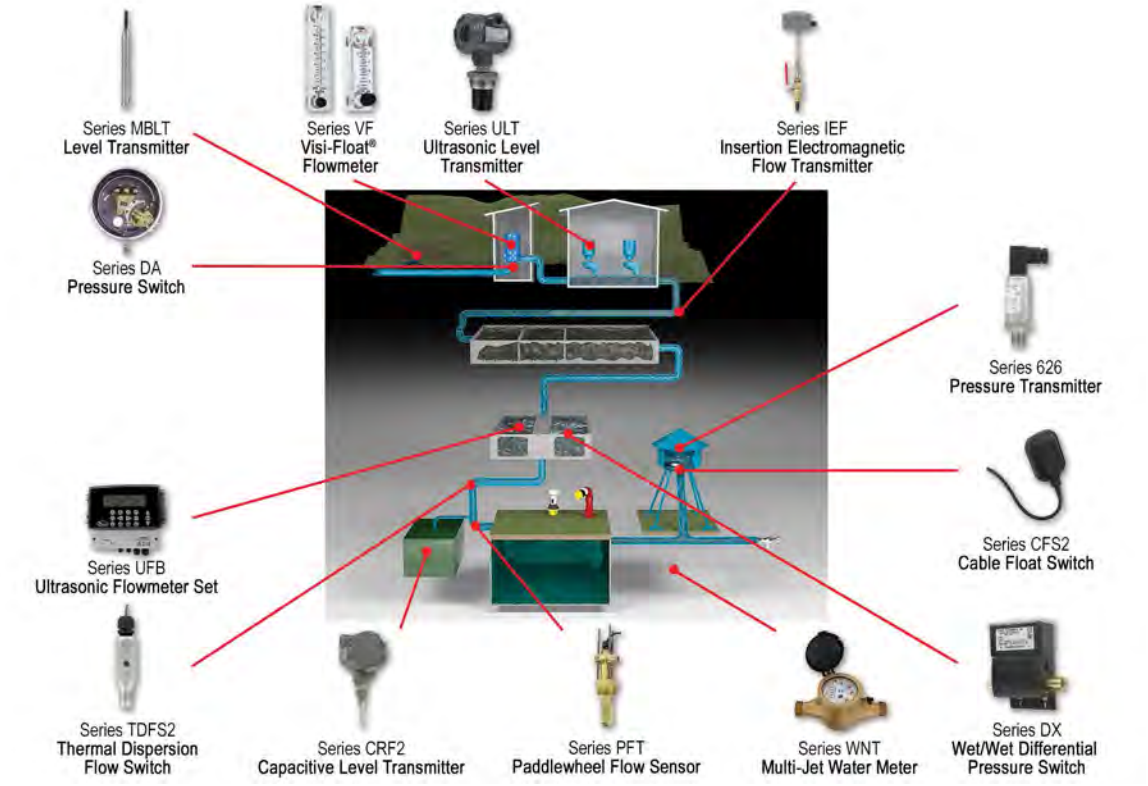
DUST COLLECTOR



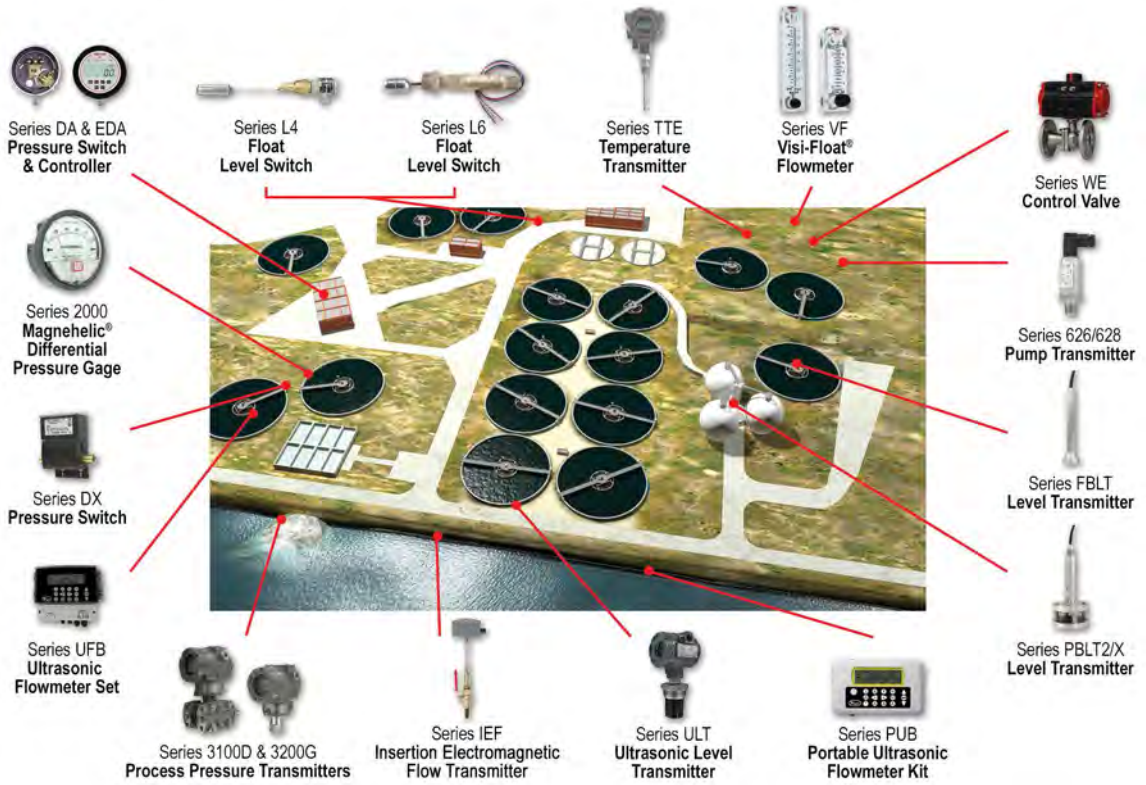
PUMP SKID



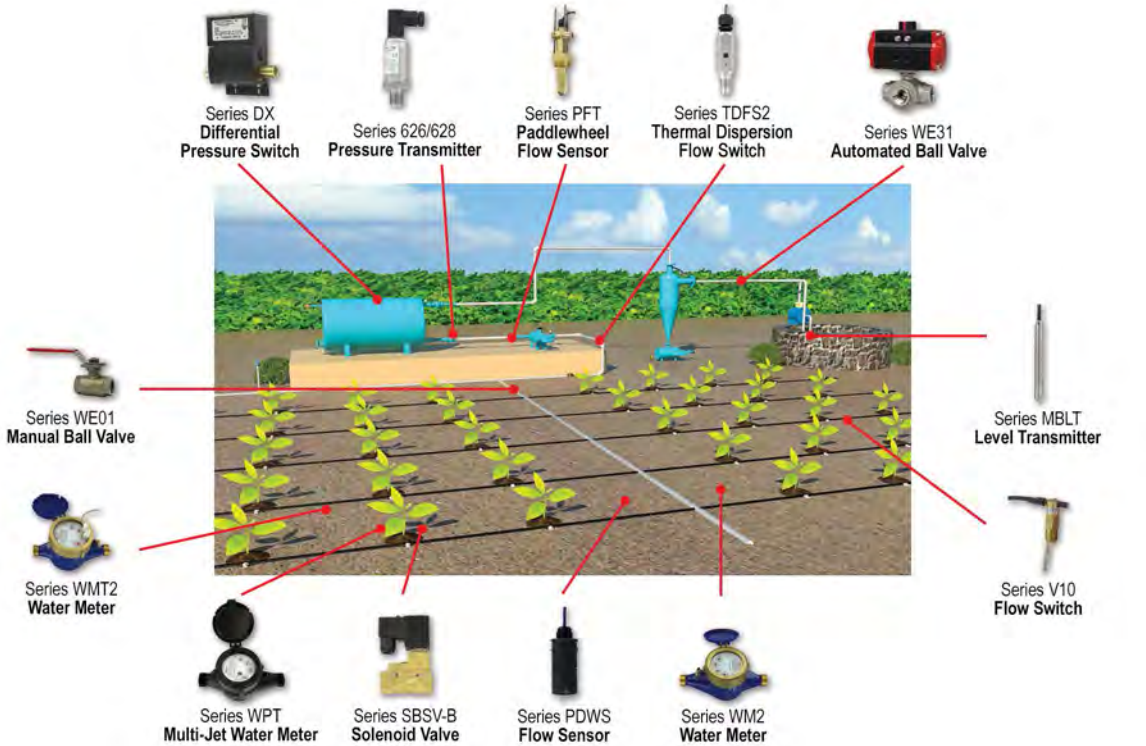
CLEAN WATER



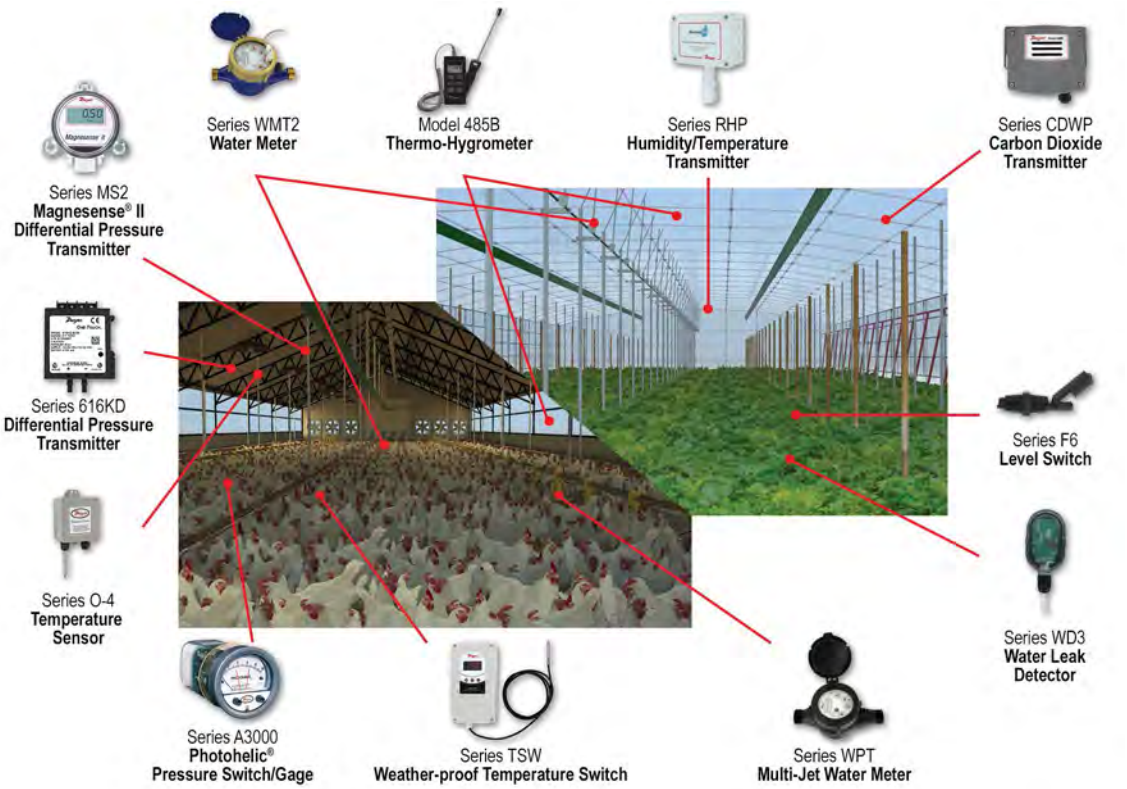
WASTEWATER



IRRIGATION



POULTRY/HOG/GREENHOUSES



RECENT INNOVATIONS

TEST, ADJUST, AND BALANCE KIT
SERIES TABKIT

- Everything a balancing technician needs in a single case
- Durability, repeatability, and reliability in every instrument
- Save time by sending everything back to us, we can recalibrate all equipment in the kit

PAGE 163

THERMO-HYGROMETER PROBE, THERMO-ANEMOMETER PROBE & 100 MM VANE THERMO-ANEMOMETER PROBE
SERIES RP3/AP3/VP3

- New Bluetooth wireless probes
- Wirelessly connect directly to your mobile device
- Used in conjunction with the Dwyer® Mobile Meter® app

PAGE 164

WIRELESS DIFFERENTIAL PRESSURE MODULE
SERIES DP3

- Auto-ranging differential pressure module
- Highly accurate and ideal for low flow applications
- Used in conjunction with the Dwyer® Mobile Meter® app

PAGE 165

PENCIL STYLE AIR VELOCITY TRANSMITTER
SERIES AVPT

- Air velocity ranges from 1000 to 4000 FPM (5 to 20 m/s)
- Insertion lengths of 6 or 12 inches
- Low temperature functionality for outdoor air flow measurement

PAGE 216

AIR VELOCITY TRANSMITTER
SERIES AVLV

- Air velocity ranges from 100 to 400 FPM (0.5 to 2 m/s)
- High accuracy 1 or 2% air velocity measurement device for critical environments
- Analog or BACnet/Modbus® communications simplify device setup

PAGE 217

Modbus® is a registered trademark of Schneider Automation, Inc.

RECENT INNOVATIONS

CARBON DIOXIDE TRANSMITTER
SERIES CDWP

- Single beam dual wavelength NDIR CO_2 sensor automatically corrects for aging effects
- Durable and rugged aluminum housing designed to withstand 168 hour salt spray test
- Ranges include 2,000, 5,000, and 10,000 PPM allowing for use in animal husbandry as well as mechanical rooms utilizing CO_2 based refrigerants

PAGE 226

CARBON MONOXIDE TRANSMITTER AND SWITCH
SERIES CMS300

- Field selectable current or voltage analog outputs
- Integral SPDT relay contact for low or high alarm
- Jumper selectable alarm set points of 25, 60, or 150 PPM

PAGE 232

INSERTION ELECTROMAGNETIC FLOW TRANSMITTER
SERIES IEF

- Field configurable
- Integral or remote displays allow for ultimate flexibility
- Multiple display configurations with a single unit

DEALER DESIGN AWARDS

PAGE 292

ULTRASONIC ENERGY METERS
SERIES TUF

- Manufactured to comply with EN1434-1 requirements
- Compact energy monitoring
- BACnet or Modbus® communication outputs

PAGE 293

INSERTION THERMAL ENERGY METER
SERIES IEFB

- Field configurable
- Integral or remote display for ultimate flexibility
- Complies with high accuracy requirements of EN 1434-1, ASTM E3137, CSA C900.1-13 for accurate heat measurement

PAGES 294-295

Modbus® is a registered trademark of Schneider Automation, Inc.

STANDARD TERMS & CONDITIONS OF SALE

DWYER INSTRUMENTS, INC. - TERMS AND CONDITIONS OF SALE – MARCH 15, 2017

1. **Prices and Specifications** are subject to change without notice.
2. **Shipping dates** are approximate. They are dependent upon credit approval and subject to delays beyond our control.
3. **Terms:** Net 30 days to companies with established credit rating. In the event Buyer fails to fulfill previous terms of payment, or in case Seller shall have any doubt at any time as to Buyer's financial responsibility, Seller may decline to make further deliveries except upon receipt of cash in advance or other special arrangements.
4. **Point and Title:** All material is sold EXW Ex Works Dwyer Instruments, Inc. Title to all material sold shall pass to buyer upon delivery by Seller to carrier at shipping point.
5. **State and Local Taxes:** Any taxes which the Seller may be required to pay or collect upon or with respect to the sale, purchase, delivery, use or consumption of any of the material covered hereby shall be for the account of the Buyer and shall be added to the purchase price.
6. **Special tooling,** dies, silk screens and molds acquired specially to produce goods for Buyer remain the property of Dwyer Instruments, Inc., and may not be removed. They will be maintained in good condition for a minimum period of three years from the date of the original purchase order.
7. **Trade Compliance:** Buyer acknowledges that the products, software, and technology, including technical information and documents (collectively "Items"), of Dwyer Instruments, Inc., are subject to regulation by agencies of the U.S. government including, but not limited to, the U.S. Department of Commerce. Buyer shall comply with the Export Administration Regulations (EAR) and all applicable U.S.laws and regulations regarding the sale, delivery and transfer of said Items. Buyer shall not, without first obtaining the required licenses, authorizations or approvals from the appropriate U.S. government agency; (i) export, re-export, transfer or divert any Item directly or indirectly to any country or national resident thereof, or any person, entity or country that has restrictions imposed upon them by the U.S. government, (ii) engage in, or knowingly sell to any party engaged in activity related to the development, production, use, testing, or maintenance of Weapons of Mass Destruction, including uses related to nuclear, missile, chemical or biological warfare, or (iii) engage in, or knowingly sell to any party engaged in activity related to the development, production, use, or maintenance of any safeguarded or unsafeguarded nuclear fuel facility or components for such facilities. Buyer shall fully cooperate with Seller, without charge, in any official audit or inspection by an authorized agent, official, employee, or accredited representative of the U.S. government. Buyer shall indemnify and hold Seller harmless from, or in connection with, any violation of this Section by Buyer, its employees, consultants, agents, or customers. The obligations, requirements and claims described herein shall survive the expiration of any business relationship with Dwyer Instruments, Inc., including its divisions, subsidiaries and affiliated companies.
8. **Distribution:** Products sold to any entity located in the U.S. must remain in the U.S. unless a Global Distribution Agreement is in force with said entity. OEM's are excluded from this requirement. Those who violate this term are subject to a reduction of discount, loss of discount, or exclusion from purchasing future products. If you want to be a Global Distributor, please contact your Global Sales Manager in your region.
9. **Limited Warranty:** The Seller warrants all Dwyer instruments and equipment to be free from defects in workmanship or material under normal use and service for a period of one year from date of shipment. Products qualifying for an extended warranty period will have the extended warranty as expressly indicated on the catalog page, web page, IOM, or will be covered by a specific written agreement that is (i) approved by an officer of Dwyer Instruments, Inc. and (ii) defines the warranty period. If no express statement of extended warranty is made, then the standard 1 year warranty applies. The Extended Limited Warranty only applies to products manufactured after April 1, 2017. The Warranty period extends from the date of shipment to the initial customer and not the project installation date or use.

   Specific warranty exclusions include, but are not limited to:
   - Specific product components not covered by the extended warranty:
     - o Humidity Sensors
     - o Batteries
     - o Electro-Chemical Gas Sensors
     - o Snap Switches
     - o Any component which exceed its normal life cycle
     - o Other Specific items added as required.
   - Normal or excessive wear and tear is not cause for warranty replacement.
   - Products not properly maintained, operated, installed, or use in an application not suited for the product.
   - Modifications, alterations, changes, or additions outside those which are required for normal operation.
   - Failure to notify Dwyer of any defect within a reasonable time.
   - Damage which the customer has not taken timely action to minimize or mitigate.
   - Products on which the labels, markings, nameplates, etc. have been tampered with.
   - Products which contain broken factory seals or have been tampered with shall void warranty.

   Liability under this warranty is limited to repair or replacement EXW Ex Works Dwyer Instruments, Inc. of any parts which prove to be defective within that time or repayment of the purchase price at the Seller's option. All products must be returned to the Seller, transportation prepaid, unless other arrangements have been pre-approved by Seller. All technical advice, recommendations and services are based on technical data and information which the Seller believes to be reliable and are intended for use by persons having skill and knowledge of the business, at their own discretion. In no case is Seller liable beyond replacement of equipment EXW Ex Works Dwyer Instruments, Inc. or the full purchase price. This warranty does not apply if the maximum ratings label is removed or if the instrument or equipment is abused, altered, used at ratings above the maximum specified, or otherwise misused in any way.
   THIS EXPRESS LIMITED WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER REPRESENTATIONS MADE BY ADVERTISEMENTS OR BY AGENTS AND ALL OTHER WARRANTIES, BOTH EXPRESS AND IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR GOODS COVERED HEREUNDER.

10. **Buyer's Remedies:** THE BUYER'S EXCLUSIVE AND SOLE REMEDY ON ACCOUNT OF OR IN RESPECT TO THE FURNISHING OF NON-CONFORMING OR DEFECTIVE MATERIAL SHALL BE TO SECURE REPLACEMENT THEREOF AS AFORESAID. THE SELLER SHALL NOT IN ANY EVENT BE LIABLE FOR THE COST OF ANY LABOR EXPENDED ON ANY SUCH MATERIAL OR FOR ANY SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES TO ANYONE BY REASON OF THE FACT THAT IT SHALL HAVE BEEN NON-CONFORMING OR DEFECTIVE.
11. **Acceptance:** All orders shall be subject to the terms and conditions contained or referred to in the Seller's quotation, acknowledgment, and to those listed here and to no others whatsoever. By placing an order you accept our terms and conditions. No waiver, alteration or modification of these terms and conditions shall be binding unless in writing and signed by an executive officer of the Seller. All orders are subject to written acceptance by Dwyer Instruments, Inc., Michigan City, Indiana, U.S.A.

FEATURED PRODUCTS

CAPACITIVE LEVEL SWITCH

SERIES CLS2 | page 321

- No moving parts to jam, wear or break
- Auto calibrates for easy set up

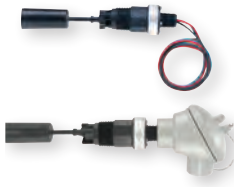
SUBMERSIBLE LEVEL TRANSMITTER

SERIES PBLTX | page 330

- Durable cage style design ensures long life in harsh application environments
- Large flush 36 SS diaphragm will not clog
- cULus intrinsically safe

Dwyer

LIQUID
Level Switches

SERIES	L4 - page 309	L6 - page 310	L8 - page 311	L10 - page 312
				
Service	Liquids	Liquids	Liquids	Liquids
Wetted Materials	316 SS	304 SS	316 SS	304 SS
Temperature Limits	275°F (135°C)	220°F (105°C)	212°F (100°C)	200°F (93°C)
Pressure Limits	2000 psig with option bar	2000 psi (138 bar)	150 PSIG (10.34 bar)	2000 (137.137.8 bar)
Process Connection	1-1/2″ or 2-1/2″ male NPT	1″ male NPT or 1″ female NPT with external float	1″ male NPT	1″ male NPT
Min. Specific Gravity	0.7	0.9	0.6	0.9
Output	SPDT or DPDT	SPDT or DPDT	SPDT	SPST
Mounting Orientation	Horizontal with optional vertical	Horizontal	Horizontal	Horizontal
Agency Approvals	ATEX, CE, CSA, FM, IECEx,UL	ATEX, CE, CSA, FM, IECEx, KTL, UL	CE, cURus	CSA, UR

LIQUID
Level Switches

SERIES	F7-MS - page 317	123 - page 318	102 - page 318	CFS2 - page 319	FSW2 - page 319
					
Service	Liquids	Liquids	Liquids	Liquids	Liquids
Wetted Materials	Brass or 316 SS	304 SS	Cast iron	Polypropylene	Polypropylene
Temperature Limits	Buna-N floats: 180°F (82.2°C) in oil, 230°F (110°C) in water; SS floats: 300°F (148.9°C)	365°F (185°C)	425°F (218°C)	122°F (50°C)	122°F (50°C)
Pressure Limits	750 psi (51.7 bar)	150 psig (10.34 bar)	400 psig (27.6 bar)	14.5 psi (1 bar)	29 psi (2 bar)
Process Connection	1/2″, 1-1/4″, 2″, or 3″ 150# flange	1″ female NPT	1″ female NPT	N/A	N/A
Min. Specific Gravity	0.55	0.88	0.6	0.6	0.6
Output	SPST or SPDT	SPDT, DPDT or (2) SPDT	SPDT, DPDT or (2) SPDT	SPST or SPDT	SPST or SPDT
Mounting Orientation	Vertical ±30°	Vertical	Vertical	Horizontal	Vertical
Agency Approvals	N/A	CSA, UL	UL	CE, UL/CSA	CE

These Selection Guides are for quick comparison of similar products. Please refer to the catalog page number referenced for complete product information and specifications.

LIQUID
Level Switches

SERIES	F7-MLK - page 312	F6 & F7 - page 313	F6 & F7 - page 314	F7-MM - page 316
				
Service	Liquids	Liquids	Liquids	Liquids
Wetted Materials	Buna-N/Brass	Polypropylene, 316 SS, or Buna-N*	Polypropylene, 316 SS, or Buna-N*	Brass or 316 SS
Temperature Limits	221°F (105°C)	176°F (80°C) or higher*	176°F (80°C) or higher*	180°F (82.2°C) or higher*
Pressure Limits	150 psig (10 bar)	50 psig (3 bar) or higher*	15 psig (1 bar) or higher*	1000 psi (68.95 bar)
Process Connection	2″ male NPT	M16x2, 18″ male NPT, 1/2″ male NPT, 3/4″ female NPT, or 3/8″-24″ UNF-2A*	1/8″ or 1/4″ male NPT*	1/8″, 3/4″, or 1″ male NPT, 3-5/8″ flange, 1-5/16-12UNF-2A, 3/8″-24 thread, or 2″ male NPT with 1/2″ conduit
Min. Specific Gravity	0.45	0.45 or higher*	0.45 or higher*	0.45
Output	SPST	SPST	SPST	SPST
Mounting Orientation	Vertical	Horizontal	Vertical	Vertical
Agency Approvals	N/A	N/A	CE, UL*	N/A

*Varies per product

LIQUID
Level Switches

SERIES	OLS - page 320	B-190 - page 320	CLS2 - page 321	CLS1 - page 322
				
Service	Liquids	Liquids	Liquids, powder, bulk materials	Solids, liquids, slurries
Wetted Materials	316 SS, Polysulfone or PFA	316 SS	316 SS	CPVC
Temperature Limits	200°F (93.3°C)	200°F (93.3°C)	185°F (85°C)	240°F (116°C)
Pressure Limits	1000 psig (69 bar)	125 psig (8.6 bar)	365 psi (25 bar)	30 psig (2.06 bar)
Process Connection	1/2″ male NPT	4″ 125 # cast iron flange	3/4″, 1″, or 1-1/2″ male NPT or BSPT or 1-1/2″ or 2″ sanitary clamp	1″ male NPS
Min. Specific Gravity	N/A	0.5	N/A	N/A
Output	NPN open collector	SPST or SPDT	DPDT	SPDT
Mounting Orientation	Any position	Vertical	Vertical or horizontal	Vertical or horizontal
Agency Approvals	N/A	UL	CE, cULus	N/A

These Selection Guides are for quick comparison of similar products. Please refer to the catalog page number referenced for complete product information and specifications.

Dwyer

BULK
Level Switches

SERIES	CLS2 - page 321	CLS1 - page 322	VRLS - page 322	TFLS - page 323	CTF - page 323
					
Service	Liquids, powder and bulk	Liquids, slurries, powder and bulk	Powder and bulk	Powder and bulk	Powder and bulk
Sensing Technology	Capacitance	Capacitance	Vibrating rod	Vibrating tuning fork	Vibrating tuning fork
Wetted Materials	316 SS	CPVC	304 SS	316 SS	304 SS
Temperature Limits	185°F (85°C)	240°F (116°C)	176°F (80°C)	176°F (80°C)	212°F (100°C)
Pressure Limits	365 psi (25 bar)	30 psig (2.06 bar)	150 psi (10 bar)	145 psig (10 bar)	600 psi (40 bar)
Process Connection	3/4″, 1″, or 1-1/2″ male NPT or BSPT or 1-1/2″ or 2″ sanitary clamp	1″ male NPS	1″ male NPT	1-1/2″ male NPT	1″ male NPT
Output	DPDT	SPDT	SPDT	SPDT	PNP/NPN
Mounting Orientation	Vertical or horizontal	Vertical or horizontal	Vertical or horizontal	Vertical or horizontal	Vertical or horizontal
Agency Approvals	CE, cULus	N/A	N/A	N/A	N/A

SUBMERSIBLE
Level Transmitters

SERIES	SBLT2/SBLTX - page 328	MBLT - page 329	PBLT2/PBLTX - page 330	FBLT - page 331
				
Service	Liquids	Liquids	Liquids	Liquids
Wetted Materials	316 SS	316 SS	316 SS	316 SS
Temperature Limits	150°F (66°C)	176°F (80°C)	PBLT2: 180°F (82°C) PBLTX: 176°F (80°C)	176°F (80°C)
Pressure Limits	2x FS	2x FS	2x FS	2x FS
Accuracy	±0.25% FS	±0.25% FS	±0.25% FS	±0.25% FS
Range	0 to 300 psi (10 to 693 ft w.c) (3.2 to 211 m w.c)	0 to 300 psi (10 to 693 ft w.c) (3.2 to 211 m w.c)	0 to 300 psi (10 to 693 ft w.c) (3.2 to 211 m w.c)	0 to 300 psi (10 to 693 ft w.c) (3.2 to 211 m w.c)
Output	4-20 mA	4-20 mA or 0 to 5 V	4-20 mA	4- 20 mA
Agency Approvals	SBLT2: CE SBLTX: CE, cULus	CE	PBLT2: CE PBLTX: CE, cULus	CE

These Selection Guides are for quick comparison of similar products. Please refer to the catalog page number referenced for complete product information and specifications.

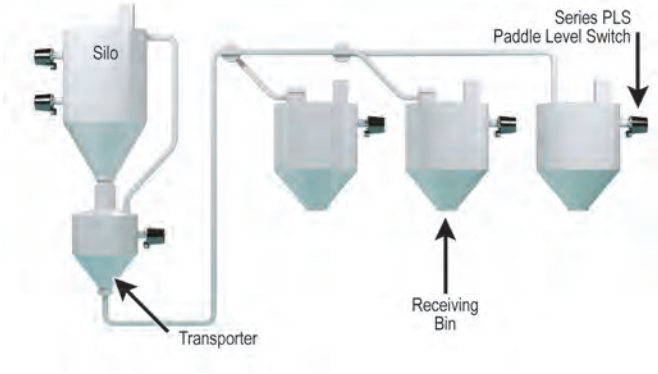
BULK
Level Switches

SERIES	DBLM - page 324	PLS2 - page 324	PLS - page 325	ULTRA-MAG™ - pages 326-327
				
Service	Powder and bulk	Powder and bulk	Powder and bulk	Powder and bulk
Sensing Technology	Rotating paddle	Rotating paddle	Rotating paddle	Magnetic linkage and diaphram
Wetted Materials	Polycarbonate	304 SS	316 SS	Aluminum or 304 SS with urethane, Buna-N, PTFE, silicone rubber, polyester, fluoroelestomer, white Buna-N or EPDM diaphragm
Temperature Limits	140°F (60°C)	176°F (80°C)	300°F (148.9°C)	350°F (176°C)
Pressure Limits	N/A	11.6 psi (0.8 bar)	30 psig (2.07 bar)	60 psig (4.14 bat)
Process Connection	3/4″ male NPT, optional flange and 1-1/4″ to 3/4″ reducer	1-1/4″ male NPT	1-1/4″ male NPT, optional flange	8-3/8″ (212.73 mm) diameter bolt hole circle
Output	SPDT	SPDT	SPDT or DPDT	SPDT
Mounting Orientation	Vertical or horizontal	Vertical or horizontal	Vertical or horizontal	Vertical
Agency Approvals	CE	CE, FM	cUL	CSA, UL

CAPACITIVE, ULTRASONIC AND FLOAT
Level Transmitters

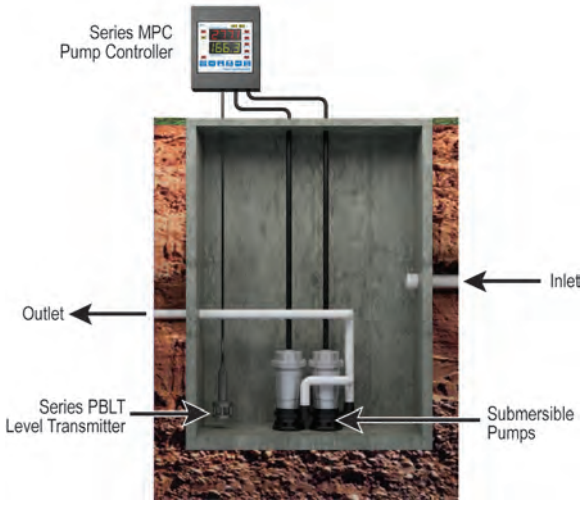
SERIES	CRF2 - page 332	CLT - page 333	ULT - page 334	ULSS/ULSM/ULSL - page 335
				
Service	Liquids, powders, bulk material	Liquids	Liquids	Fluids/liquids
Wetted Materials	316 SS	Brass	303 SS	PVDF, FKM
Temperature Limits	Ambient: 185°F (85°C); Process: 250°F (121°C)	180°F (82°C) in water, 230°F (110 °C) in oil, 230°F (110°C) SS floats	140°F (60°C)	140°F (60°C)
Pressure Limits	100 psi (6.9 bar)	150 psig (10 bar)	30 psi (2 bar)	30 psi (2 bar)
Accuracy	±0.25% FS	±1 mm	±0.2% FS	ULSS: ±0.125″ (3 mm); ULSM/ULSL: ±0.2% FS
Range	12 to 30 ft (3.7 to 9.1 m)	Options from .5 to 68″ (0.01 to 1.73 m)	0 to 24.6 ft (0 to 7.5 m) or 0 to 32.8 ft (0 to 10 m)	ULSS: 0 to 4.1 ft (0 to 1.25 m); ULSM: 0 to 9.8 ft (0 to 3 m); ULSL: 0 to 18 ft (0 to 5.5 m)
Output	4-20 mA	4-20 mA or 0-5 V	4- 20 mA	4-20 mA
Agency Approvals	N/A	N/A	CE, FM	CE

These Selection Guides are for quick comparison of similar products. Please refer to the catalog page number referenced for complete product information and specifications.



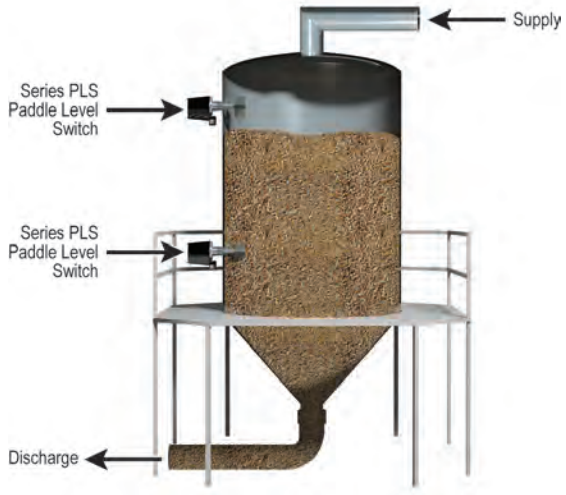
Proximity® Series PLS is used to indicate level status in pneumatic conveying systems

Pneumatic conveying systems use air to transport powder and dry bulk solids through conveying lines. The air is pressurized by positive pressure or vacuum to move the product through the lines into and out of silos, transporters, and receivers. Typical applications have high and low level indication in the storage bins to control the flow of product in or out. The Series PLS is perfect for level use in these storage bins. It has a rotating paddle that is inserted into the bin. As the product level builds up in the bin it stops the paddle from rotating and triggers the level output. The Series PLS is great for this application as it is not affected by pressure changes in the bin.



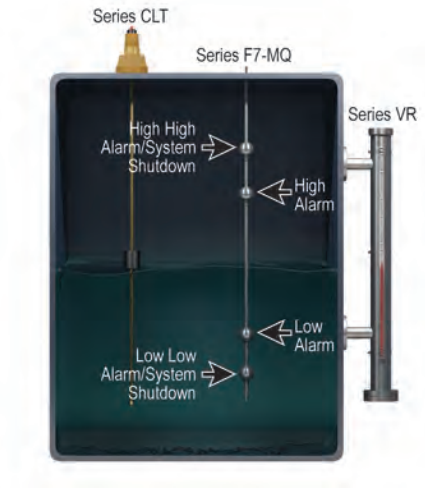
Mercoid® pump controller with level transmitter control pumps in wastewater lift stations

Lift stations are used to transmit wastewater to the treatment facility. Wastewater is transmitted by gravity feed so it has to be continually elevated to provide height to generate the flow. Lift stations are pits located at points in the wastewater system to collect the wastewater that usually have two submersible pumps. Wastewater in the lift station is pumped out to a higher level from where it can flow on to the next lift station or to the treatment facility. The Mercoid® Series MPC pump controller is used with the Series PBLT level transmitter to control the level in the lift station. The Series PBLT is a level transmitter that is submersed in the tank and sends a linear output of the height of wastewater above it. The Series MPC takes the height input and controls the pumps according to how it has been programmed.



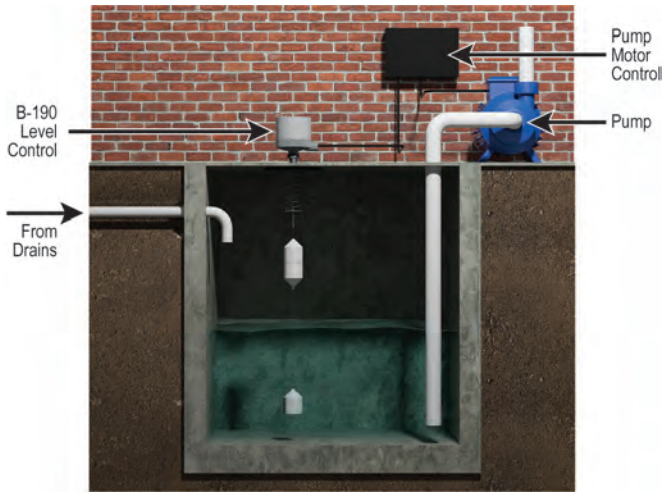
Grain hopper level controlled by Series PLS Paddle Level Switch

The supply of grain pneumatically conveyed to this dispensing hopper is controlled by two Proximity® Series PLS paddle level switches. When the grain level falls to the low limit switch, the supply is turned on until the hopper fills to the level of the high limit switch which turns off the supply. Since grain dust is explosive, the explosion-proof Series PLS provides the required safety protection. The Series PLS is a paddle level switch and is not affected by the varying pressure in the hopper due to the cycling of the pneumatic conveying system.



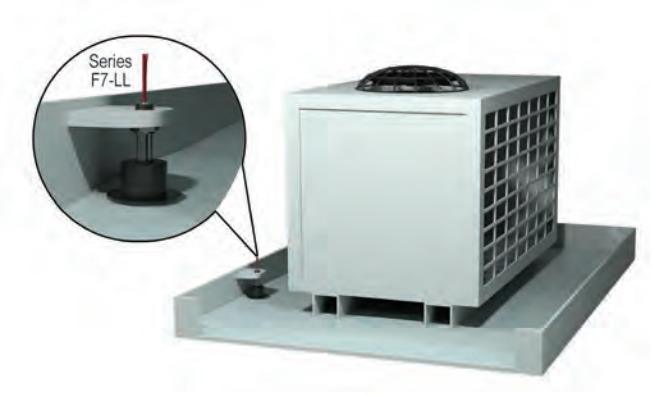
Custom level sensing devices are built to meet each customer's specific requirements, providing visual indication, continuous measurement, and point level control

To meet various tank level measuring needs, Dwyer Instruments, Inc. offers custom-configured products built to customer specifications that provide visual indication, continuous level measurement, and multiple point level measurement. Series VR or MVR View-Rite Level Indicators are a safe way to keep the process isolated while providing true visible indication. Unlike sight glasses, which can crack or break, View-Rite Indicators contain liquids entirely within their stainless steel enclosure. For continuous level measurement needs, the Series CLT uses reed switch technology to offer a more economical solution than expensive ultrasonic, submersible or RT transmitters. Lastly, the Series F7-MQ can be used in virtually any tank to indicate high and low alarms or to control pumps and valves.



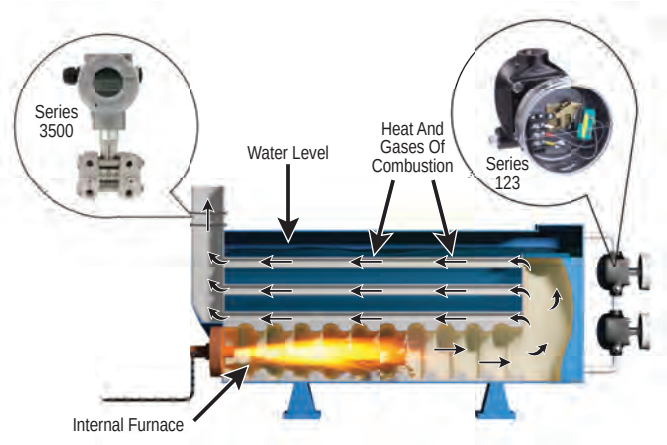
Mercoid® displacer type level control is ideal for controlling industrial sump pumps

Industrial sumps and other underground tanks are ideal applications for top-mounted Mercoid® displacer type level controls. Easily installed, these controls use porcelain displacers that do not float on the surface of liquids, but are suspended on a coil spring and cable. As the liquid in the tank reaches the level of the upper displacers, their weight decreases by an amount equal to the liquid displaced, allowing the spring to move the cable upward, actuating the switch and the pump is turned on. As the liquid level falls below the upper displacers they move only a small amount, staying within the switch deadband until the liquid level falls to the center of the bottom displacer. At this point the switch is deactivated stopping the pump. The pump will remain deactivated until the water level rises to the upper displacers, repeating the cycle. The displacers are not affected by turbulence, pressure or chemicals and are excellent for tanks with viscous or dirty liquids. The level differential is easily adjusted by repositioning of the displacers on the 316 SS cable.



Low level float switch enables sensing in air conditioner drip pans and other shallow level applications

Standard float switches require at least an inch of liquid to attain enough buoyancy to switch. This can be a problem in applications where low level sensing is required. The hat-shaped design of the W.E. Anderson® Series F7-LL provides necessary buoyancy for switching in only 5/8″ of water. This is essential for air conditioner drip pans, low level sumps, and drains. The Series F7-LL is also ideal for low alarms, where running the process dry can result in catastrophic failure.



Mercoid® Series 123 level controls provide high and low alarm on large de-aerator tank

Liquid level in the external piping equals level in the tank. When level rises to high limit, float in upper Series 123 is lifted, actuating switch to sound high level alarm. When level drops to low limit, lower Series 123 sounds low level alarm. In addition, a Series 3500 transmitter monitors the flow at the feedwater outlet. This helps to measure the efficiency of the de-aerator system.

W.E. Anderson® Series OLS indicates level in heavy equipment radiator

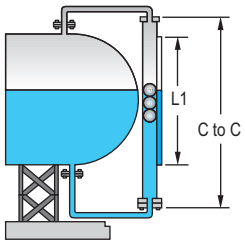
Many types of heavy industrial equipment use a liquid cooling system for the motor. A vibratory trench roller is a machine that compacts sub-bases for roads, parking lots, etc., and is an example of the type of equipment that would utilize this system. This machine incorporates a radiator cooling system. In the system, cooling liquid circulates through the engine preventing it from over heating. As the engine is cooled the cooling fluid heats up. The fluid returns to the radiator to cool down before being circulated through again. If there is not enough cooling fluid in the system the engine will not be cooled enough and damage will occur. A W.E. Anderson® Series OLS optical level switch is installed as a low level alarm. The level alarm is signaled by the Series OLS before the cooling fluid gets to a critical low level, warning the operator of the problem. The Series OLS uses an optical detection system superior for this application as float controls may trip from machine vibration. Also the compact insertion length is ideal for a small radiator.

Dwyer

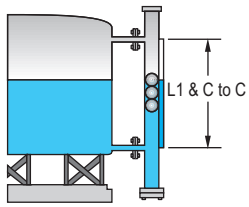
SERIES VR | W.E. ANDERSON™ BY DWYER

VIEW-RITE LEVEL INDICATOR

Customized to Fit Any Application, Durable, 316 SS Housing and Float



Top and bottom



Side and side

TYPICAL MEASUREMENTS	
C to C = L1 + 10.25″ (260.35 mm)	C to C = L1

The **Series VR View-Rite Level Indicator** provides customized level indication to meet a variety of application requirements. Specify any indication length up to 96″ (244 cm) and the View-Rite level indicators incorporate a pressure tight housing with internal float that magnetically activates external level indication flags, switches, or transmitter.

SPECIFICATIONS

Service: Clean, low viscosity liquids.
Pressure Limits: 275 psi (18.9 bar), 225 psi (15.5 bar) @ 100°F (37.8°C), 215 psi (14.8 bar) @ 300°F (148.9°C), 195 psi (13.4 bar) @ 400°F (204.4°C).
Tube Diameter: 2-1/2″ (64 mm).

FEATURES/BENEFITS

- Low maintenance with all 316 L SS wetted material
- Environmentally friendly with process liquid contained inside a pressure-tight housing
- Durable 316 L SS provides maintenance-free operation
- Requires no external power to operate
- Brightly colored flags are easy to read even at long distances

APPLICATIONS

- Pharmaceuticals
- Oil and gas
- Medical equipment
- Food and beverages
- Semiconductor manufacturing
- Boilers

MODEL CHART

Example	VR	-S	SS	1	-TP	D	-0.8	-150	-090	-080	P	1	-I	VR-SSS1-TPD-0.8-150-090-080P1-I
Construction	VR													View-rite level indicator
Wetted Materials		S												316 L SS, fluoroelastomer O-ring
Configuration			TB SS											Top/bottom connections Side/side connections
Process Connection				1 2 4 5 6 7										1/2″ NPT (female on TB; male on SS configuration) 1″ NPT (female on TB; male on SS configuration) 1″ 150# RF flange 2″ 150# RF flange 1″ 300# RF flange 2″ 300# RF flange
Float Access					TP BM TB									Top Bottom Top and bottom (only with SS configuration)
Drain and Vent						N D V B								None Drain, 1/2″ female NPT (only with SS configuration) Vent, 1/2″ female NPT (only with SS configuration) Drain and vent (only with SS configuration)
Specific Gravity							0.0							Specific gravity of fluid: Minimum is 0.8
Operating Pressure								000						Operating pressure in psi: Maximum is 275 psi (18.9 bar)
Operating Temperature									000					Operating temperature of fluid in °F: Maximum is 400°F (204°C)
Indicating Length, L1										000				Indicator length in whole inches: Maximum of 240″ (6.1 m); Minimum of 6″ (15.25 cm)
Indicating Flags											P A			Plastic, white and orange [300°F (149°C) maximum] Aluminum, silver and black
Visual Indicating Scale												N 1 2		None Feet and inches Inches only
Output Options													I V	4-20 mA transmitter of level [300°F (149°) maximum] 0-5 VDC transmitter of level

Note: Models are built to your specifications

OPTIONAL SWITCH MODULES

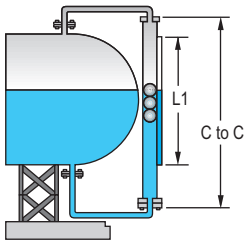
Model	Description
VR-S1	Maximum temperature is 300°F (148.9°C). Polysulfone with 1/4″ female NPT conduit connection.
VR-S2	Maximum temperature is 750°F (399°C). 316 SS with 1/2″ male NPT conduit connection.
VR-S3	Maximum temperature is 750°F (399°C). Explosion-proof terminal box with 1/2″ female NPT conduit connection.

Clamp onto the level indicator. SPST, rated .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC.

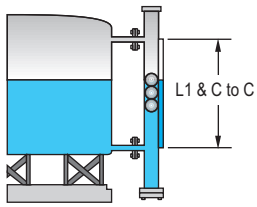
SERIES MVR | W.E. ANDERSON™ BY DWYER

MINI VIEW-RITE LEVEL INDICATOR

Customized, Visual Level Indication, Compact Size



Top and bottom



Side and side

TYPICAL MEASUREMENTS	
C to C = L1 + 7.72″ (196.09 mm)	C to C = L1

The **Series MVR Mini View-Rite Level Indicator** provides customized level indication to meet a variety of application requirements in a 1-1/4″ (32 mm) housing. Specify any indication length up to 96″ (244 cm) and the Mini View-Rite level indicators incorporate a pressure tight housing with internal float that magnetically activates external level indication flags, switches, or transmitter.

SPECIFICATIONS
Service: Clean, low viscosity liquids.
Pressure Limits: ≤ 300°F, 400 psi (27.6 bar); ≥ 300°F, 373 psi (25.7 bar).
Tube Diameter: 1-1/4″ (32 mm).

FEATURES/BENEFITS

- Low maintenance with all 316L SS wetted material
- Environmentally friendly with process liquid contained inside a pressure tight housing
- Durable 316L SS provides maintenance-free operation
- Requires no external power to operate
- Brightly colored flags are easy to read even at long distances

APPLICATIONS

- Pharmaceuticals
- Medical equipment
- Food and beverages
- Semiconductor manufacturing
- Boilers

MODEL CHART

Example	MVR	-S	SS	1	-TP	D	-0.8	-150	-090	-080	P	1	-I	MVR-SSS1-TPD-0.8-150-090-080P1-I
Construction	MVR													Mini view-rite level indicator
Wetted Materials		S												316L SS housing, 316L SS float, fluoroelastomer O-ring
Configuration			TB SS											Top/bottom connections Side/side connections
Process Connection				1 3										1/2″ NPT (female on TB; male on SS configuration) 1/2″ 150# RF flange
Float Access					TP BM TB									Top Bottom Top and bottom (only with SS configuration)
Drain and Vent						N D V B								None Drain, 1/2″ female NPT (only with SS configuration) Vent, 1/2″ female NPT (only with SS configuration) Drain and vent (only with SS configuration)
Specific Gravity							0.0							Specific gravity of fluid: Minimum is 0.8
Operating Pressure								000						Operating pressure in psi: Maximum is 400 psi (27.6 bar)
Operating Temperature									000					Operating temperature of fluid in °F: Maximum is 400°F (204°C)
Indicating Length, L1										000				Indicator length in whole inches: Maximum of 240″ (6.1 m); Minimum of 6″ (15.25 cm)
Indicating Flags											P A			Plastic, white and orange [300°F (149°C) maximum] Aluminum, silver and black
Visual Indicating Scale												N 1 2		None Feet and inches Inches only
Output Options													I V	4-20 mA transmitter of level [300°F (149°) maximum] 0-5 VDC transmitter of level

Note: Models are built to your specifications

OPTIONAL SWITCH MODULES	
Model	**Description**
MVR-S1	Maximum temperature is 300°F (148.9°C). Polysulfone with 1/4″ female NPT conduit connection.
MVR-S2	Maximum temperature is 750°F (399°C). 316 SS with 1/2″ male NPT conduit connection.
MVR-S3	Maximum temperature is 750°F (399°C). Explosion-proof terminal box with 1/2″ female NPT conduit connection.
Clamp onto the level indicator. SPST, rated .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC.	

Dwyer

SERIES WD3

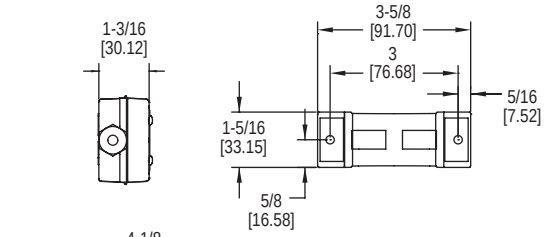
WATER LEAK DETECTORS

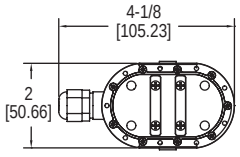
Battery or External Powered, SPST or DPDT Relays

WD3-BP

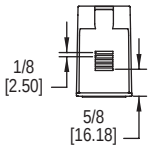
WD3-LP

Bracket





WD3



Bracket

The **Series WD3 Water Leak Detectors** protect equipment from water damage by detecting the presence of water. Model WD3-BP-D1-A is battery powered, all others require AC or DC supply voltages.

FEATURES/BENEFITS
- Audible and visual alerts provide local indication of the alarm condition and internal switch will give remote indication or control to prevent further buildup of water
- Sensing height can be adjusted as low as 1/32″ (0.79 mm) using the included adjustable mounting bracket
- Mounting bracket can attach to any flat surface by either using the attached adhesive strips or mounting screws for easy installation

APPLICATIONS
- AHU drip pans
- Radiant floors
- Data centers
- Sump pumps
- Drains

MODEL CHART

Model	Output	Power	Audible Alarm
WD3-BP-D1-A	SPST NO SSR	Battery	Yes
WD3-LP-D2	DPDT relay	24 VAC (±10%) or 11-27 VDC	No
WD3-LP-D2-A	DPDT relay	24 VAC (±10%) or 11-27 VDC	Yes

ACCESSORIES

Model	Description
A-WD3-BRK	Replacement mounting bracket

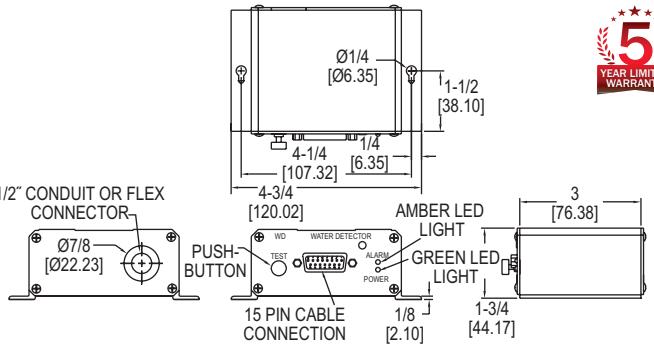
SPECIFICATIONS

Service: Water or conductive fluids.
Minimum Sensing Gap: 1/32″.
Switch Type: Battery powered model: SPST NO SSR; External powered models: DPDT relay.
Electrical Ratings: Battery powered model: Pilot duty rating 250 mA @ 24 VDC; External powered models: 1 A @ 24 VAC/DC.
Audible Alarm: At least 85 dB @ 1′ distance (depends on model).
Visual Alarm: Red LED for water level; Yellow LED for low battery (battery powered model only); Green LED for power condition (external powered models only).
Temperature Limits: 32 to 122°F (0 to 50°C).
Power Requirements: Battery powered model: 3V CR2450 lithium metal battery, installed functional, user replaceable; External powered models: 24 VAC (±10%) or 11-27 VDC.
Power Consumption: Battery powered model: 0.9 mA steady state / 3.0 mA during alarm condition; External powered models: 30 mA steady state / 85 mA during alarm condition.
Battery Life: 5 years steady state / 48 hours during alarm condition.
Electrical Connections: 4.9′ (1.5 m), 22 AWG, PVC, UL plenum rated cable.
Enclosure Material: ABS and polycarbonate with flammability classification UL 94 V-0.
Enclosure Rating: Audible alarm models: Watertight up to 3/4 of the body height; Non-audible alarm models: NEMA 6P (IP 68) submersible.
Weight: 4.85 oz (137.5 g).
Agency Approvals: CE.

SERIES WD | W.E. ANDERSON™ BY DWYER

WATER DETECTOR AND SENSOR TAPE

Detects Low Levels Of Conductive Liquids, Large Measuring Area



The **Series WD** W**ater Detector and Sensor Tape** is designed for dependable detection of water presence even of low conductive liquids. The water sensing tape attaches to module and if any liquid comes in contact with the tape the resistance is changed and the alarm will be triggered. The sensing tape is 1″ wide and can be bought in lengths of 5, 10, 15 and 25′ and is powered by 24 VAC or 24-30 VDC.

FEATURES/BENEFITS
- Sturdy and reliable aluminum enclosure
- Hydrophobic tape does not absorb any liquid allowing for faster drying time and faster return to service after water leak
- Multiple tapes can be connected together to extend the coverage area

APPLICATIONS
- Drip pans under HVAC equipment
- Computer rooms
- Telecommunication facilities
- Leak detection around water pumps

SPECIFICATIONS

Service: Conductive liquid.
Switch Type: DPDT.
Electrical Rating: 1 A @ 24 VAC/VDC.
Power Requirements: 24 VAC, 24-30 VDC.
Power Consumption: 35 mA maximum.
Electrical Connections: Screw terminals.
Conduit Connections: Hole for 1/2″ conduit.
Enclosure: Extruded aluminum.
Sensor Tape: 1″ (25.4 mm) wide and 5′, 10′, 15′ or 25′ long.
Weight: 8 oz (.23 kg).

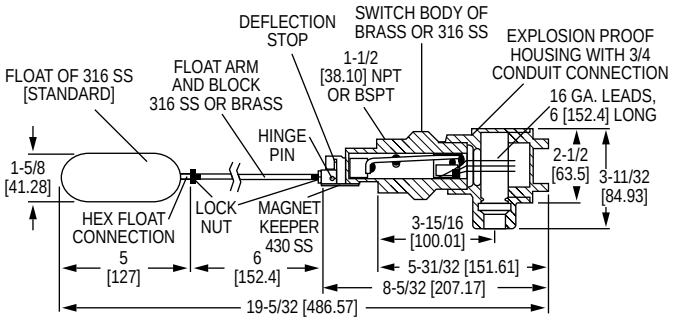
MODEL CHART

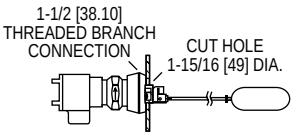
Model	Description
WD	Water module
TP05	5′ (1.52 m) tape
TP10	10′ (3.05 m) tape
TP15	15′ (4.57 m) tape
TP25	25′ (7.62 m) tape

SERIES L4 | W.E. ANDERSON™ BY DWYER

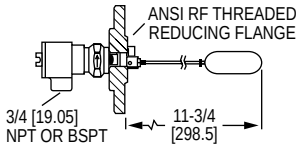
FLOTECT® FLOAT SWITCH

Magnetically Operated Switch, Leak Proof Body, Explosion-Proof

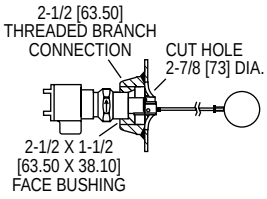




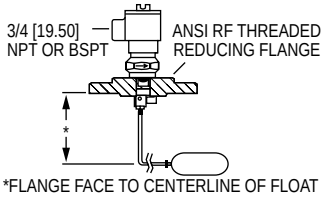
Standard installation



Horizontal, flange installation



Horizontal, 2-1/2 threaded branch connection installation with optional 2-1/2 [64] spherical float



*FLANGE FACE TO CENTERLINE OF FLOAT SPECIFIED BY CUSTOMER. NORMALLY SHOULD NOT EXCEED 20″ [508 mm].

Vertical, flange installation

The **Series L4 Flotect® Float Switch** is a rugged and reliable float switch which operates automatically to indicate tank level.

FEATURES/BENEFITS
- Unique magnetically actuated switching design gives superior performance
- No bellows, springs, or seals to fail
- Free-swinging float attracts a magnet within the solid metal switch body, actuating a snap switch by means of a simple lever arm
- Float arm hinge design limits the arm angle to prevent vertical hang up

APPLICATIONS
- Direct pump control for maintaining level
- Automatic tank dump operations
- Level control
- Valve control
- Level alarm in sumps, scrubber systems, hydro-pneumatic tanks, boilers, and water/wastewater treatment processes

SPECIFICATIONS

Service: Liquids compatible with wetted materials.
Wetted Materials: Float and Rod: 316 SS; Body: Brass or 316 SS standard; Magnet Keeper: 430 SS standard, 316 SS or nickel optional.
Temperature Limits: 4 to 275°F (-20 to 135°C) standard, MT high temperature option 400°F (205°C) [MT option not UL, CSA, ATEX or IECEx]. ATEX and IECEx options: Ambient temperature -4 to 163°F (-20 to 73°C); Process temperature -4 to 163°F (-20 to 73°C).
Pressure Limit: Brass body 1000 psig (69 bar), 316 SS body 2000 psig (138 bar). Standard float rated 100 psig (6.9 bar). For other floats, see options.
Enclosure Rating: Weatherproof and Explosion-proof. **Listed with UL and CSA for Class I, Groups C and D; Class II, Groups E, F, and G.
ATEX CE 2813 Ex II 2 G Ex db IIB T6 Gb -20°C≤Tamb≤73°C. -20°C≤Process Temp≤73°C.
EU-Type Certificate No.: KEMA 03 ATEX 2383.
ATEX Standards: EN 60079-0:2012+A11:2013.
IECEx Certified: For Ex db IIB T6 Gb -20°C≤Tamb≤73°C. -20°C≤Process Temp≤73°C.
IECEx Certificate of Conformity: IECEx DEK 11.0071.
IECEx Standards: IEC 60079-0:2011; IEC 60079-1:2014.
Switch Type: SPDT snap switch standard, DPDT snap switch optional.
Electrical Rating: UL, FM, ATEX and IECEx models: 10 A @ 125/250 VAC (V~). CSA models: 5 A @ 125/250 VAC (V~); 5 A res., 3 A ind. @ 30 VDC (V⎓). MV option: 1 A @ 125 VAC (V~); 1 A res., .5 A ind. @ 30 VDC (V⎓). MT option: 5 A @ 125/250 VAC (V~). [MT and MV option not UL, CSA, FM, ATEX or IECEx].
Electrical Connections: UL and CSA models: 16 AWG, 6″ (152 mm) long. ATEX and IECEx unit: terminal block.
Conduit Connection: 3/4″ (19.05 mm) female NPT standard or M25 with -BSPT option.
Process Connection: 1-1/2″ (38.10 mm) male NPT or 1-1/2″ (38.10 mm) male BSPT standard, 2-1/2″ (63.50 mm) male NPT or 2-1/2″ (63.50 mm) male BSPT standard optional floats.
Mounting Orientation: Horizontal installation standard, optional vertical top mount.
Dead Band: 3/4″ (19 mm) for standard float.
Specific Gravity: 0.7 minimum with standard float. For other floats see model chart.
Weight: 4 lb 9 oz (2.07 kg).
Agency Approvals: ATEX, CE, CSA, FM, IECEx, UL**.

**No housing option (-NH) has no approvals.

OPTIONS

To order add suffix:	Description
-D	DPDT contacts
-NH	No housing
-MV	Gold plated contacts for dry circuits (see electrical rating in specifications, no listings or approvals)
-MT	High temperature rated 400°F (204°C) (see electrical rating in specifications, no listings or approvals)
-TRI	Time delay relay with 2 SPDT contacts, adjustable from 0-1 to 0-31 minutes (increasing flow)
-TRD	Time delay relay with 2 SPDT contacts, adjustable from 0-1 to 0-31 minutes (decreasing flow) (no listings or approvals)
-316	*316 SS magnet keeper option to replace standard 430 SS
-AT	ATEX compliant construction
-IEC	IECEx certified construction
-TOP	Top mounted for vertical flange installation [distance from flange face to centerline of float to be specified, 20″ (508 mm) max]
-50	Optional float (2-1/2″ spherical) 304 SS rated 50 psig (3.5 bar) and 0.5 min. s.g.
-150	Optional float (2-1/2″ spherical) 316 SS rated 150 psig (10.3 bar) and 0.7 min. s.g.
-300	Optional float (2-1/2″ spherical) 304 SS rated 300 psig (20.7 bar) and 0.7 min. s.g.
-BSPT	1-1/2″ female BSPT process connection

*316 SS body and float with 430 SS magnet keeper (wetted part).

Consult factory for price and availability of fittings for L4 installation. Threaded branch connection, bushings, and flanges are available in a variety of sizes and materials.

MODEL CHART

Model	Description	Process Connection
L4	Brass body, side wall mounting	NPT
L4-NH**	Brass body, side wall mounting, no housing	NPT
L4-SS	316 SS* body, sidewall mounting	NPT
L4-SS-NH**	316 SS* body, sidewall mounting, no housing	NPT
L4-BSPT	Brass body, side wall mounting	BSPT
L4-SS-BSPT	316 SS* body, sidewall mounting	BSPT

*316 SS body and float with 430 SS magnet keeper (wetted part).
**No housing option (-NH) has no approvals.

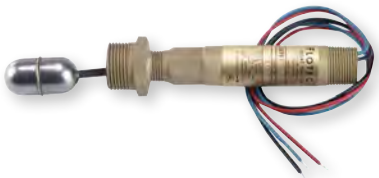
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

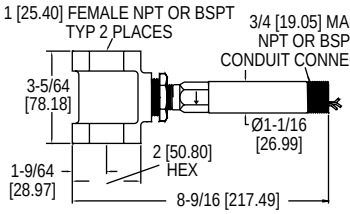
Dwyer

SERIES L6 | W.E. ANDERSON™ BY DWYER

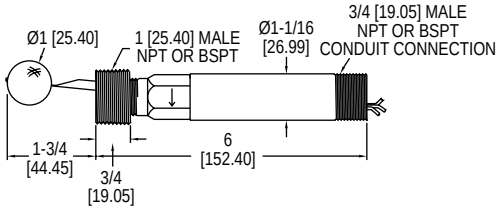
FLOTECT® LIQUID LEVEL SWITCHES

Easy In-wall or External Installation, Up to 2000 psig (138 bar), Compact Size

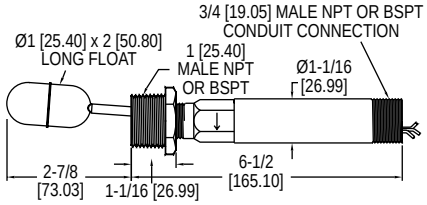




Model L6 with external float chamber



Model L6 with spherical float



Model L6 with cylindrical float

The **Series L6 Flotect® Liquid Level Switches** are rugged and reliable float switches which operates automatically to indicate tank level. It is offered with a 303 SS or brass body with spherical or cylindrical float options.

FEATURES/BENEFITS

- Compact design is built for years of trouble-free service
- Simple and dependable operation with no mechanical linkage
- Float lever pivoted within the body moves when the process liquid displaces the float and magnet on the opposite end of the float lever controls a second magnet on the switch actuating lever located in the switch housing
- Leak proof lower body machined from bar stock
- Side wall or direct tee mounting options available to act as an external float chamber
- Weatherproof and explosion-proof body for demanding outdoor applications
- Electrical assembly can be easily replaced without removing the unit from the installation so that the process does not have to be shut down
- Sensitive to level changes of less than 1/2″ (12 mm)

APPLICATIONS

- Direct pump control for maintaining level
- Automatic tank dump operations
- Level control
- Valve control
- Level alarm in sumps, scrubber systems, hydro-pneumatic tanks, boilers, and water/wastewater treatment processes

OPTIONS

To order add suffix:	Description
-MV	Gold plated contacts for dry circuits (see electrical rating in specifications)
-MT	High temperature rated 400°F (204°C) (see electrical rating in specifications, no listings or approvals, only available on models with stainless steel floats)
-CSA	CSA and UL approved construction, includes weatherproof and explosion-proof junction box
-AT	ATEX compliant construction includes, weatherproof and explosion-proof, junction box
-IEC	IECEx certified construction, weatherproof and explosion-proof, junction box

Note: M25 is not available with the CSA housing.

DPDT Contacts

Note: To order, change seventh character in model number to “D”.
Example: L6EPB-B-D-3-O

Options Not Shown: 1-1/2″ and 2″ (38.10 and 50.80 mm) male NPT or 1-1/2″ and 2″ (38.10 and 50.80 mm) male BSPT process connection, 2″ female NPT or 2″ female BSPT.

SPECIFICATIONS

Service: Liquids compatible with wetted materials.
Wetted Materials: Float: Solid polypropylene or 304 SS; Lower body: Brass or 303 SS; Magnet: Ceramic; External float chamber (tee): Matches lower body choice of brass or 303 SS; Other: Lever arm, spring, pin, etc.: 301 SS.
Temperature Limit: -4 to 220°F (-20 to 105°C) Standard, MT high temperature option 400°F (205°C)(MT not UL, CSA, ATEX, IECEx and KC). ATEX compliant AT, IECEx IEC and KC option ambient temperature -4 to 167°F (-20 to 75°C) process temperature: -4 to 220°F (-20 to 105°C).
Pressure Limits: See model chart.
Enclosure Rating: Weatherproof and explosion-proof. Listed with UL and CSA for Class I, Groups A, B, C and D; Class II, Groups E, F, and G. (Group A on SS body models only).
ATEX CE 2813 Ex II 2 G Ex db IIC T6 Gb Process Temp≤75°C.
EU-Type Certificate No.: KEMA 04ATEX2128.
ATEX Standards: EN 60079-0:2012+A11:2013; EN 60079-1:2014.
IECEx Certified: For Ex d IIC T6 Gb Process Temps≤ 75°C.
IECEx Certificate of Conformity: IECEx DEK II.0039.
IECEx Standards: IEC 60079-0:2011; IEC 60079-1:2014.
Korean Certified (KC) for Ex db IIC T6 Gb Process Temp≤75°C.
KTL Certificate Number: 12-KB4BO-0091.
Switch Type: SPDT snap switch standard, DPDT snap switch optional.
Electrical Rating: UL models: 5 A @ 125/250 VAC (V~). CSA, ATEX and IECEx models: 5 A @ 125/250 VAC (V~); 5 A res., 3 A ind. @ 30 VDC (V⎓). MV option: .1 A @ 125 VAC (V~). MT option: 5 A @125/250 VAC (V~). [MT option not UL, CSA, ATEX or IECEx].
Electrical Connections: UL models: 12-KB4BO-0091 18 AWG, 18″ (457.20 mm) long. ATEX/CSA/IECEx models: Terminal block.
Upper Body: Brass or 303 SS.
Conduit Connection: 3/4″ (19.05 mm) male NPT standard, 3/4″ (19.05) female NPT or M25 with BSPT option on junction box models.
Process Connection: 1″ (25.40 mm) male NPT or 1″ (25.40 mm) male BSPT on models without external float chamber, 1″ (25.40 mm) female NPT or 1″ (25.40 mm) female BSPT on models with external float chamber.
Mounting Orientation: Horizontal with index arrow pointing down.
Specific Gravity: See chart.
Weight: Approximately 1 lb (.5 kg) without external float chamber, 1.75 lb (.8 kg) with external float chamber.
Agency Approvals: ATEX, CE, CSA, IECEx, KTL, UL.

MODEL CHART

Model	Body	Installation	Float Material	Process Connection	Max. Pressure psig (bar)	Min. S.G.
L6EPB-B-S-3-O	Brass	Side wall mounting	Polypropylene spherical	NPT	1000 (69)	0.9
L6EPB-B-S-3-A	Brass	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L6EPB-B-S-3-C	Brass	Side wall mounting	304 SS spherical	NPT	350 (24.1)	0.7
L6EPB-B-S-3-B	Brass	Brass external float chamber (tee)	Polypropylene spherical	NPT	250 (17.2)	0.9
L6EPB-B-S-3-H	Brass	Brass external float chamber (tee)	304 SS spherical	NPT	250 (17.2)	0.7
L6EPS-S-S-3-O	303 SS	Side wall mounting	Polypropylene spherical	NPT	2000 (138)	0.9
L6EPS-S-S-3-A	303 SS	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L6EPS-S-S-3-C	303 SS	Side wall mounting	304 SS spherical	NPT	350 (24.1)	0.7
L6EPS-S-S-3-S	303 SS	304 SS external float chamber (tee)	Polypropylene spherical	NPT	2000 (138)	0.9
L6EPS-S-S-3-L	303 SS	304 SS external float chamber (tee)	304 SS spherical	NPT	350 (24.1)	0.7

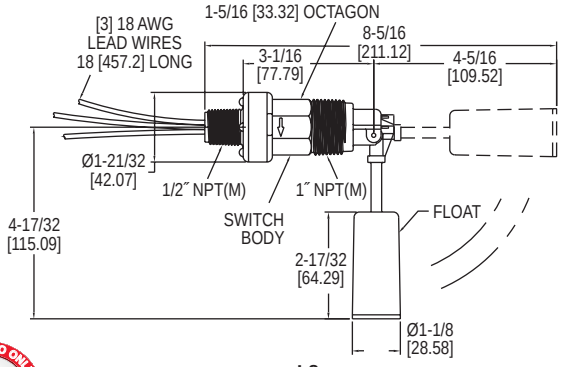
BSPT process connection and M25 conduit connection. **Note:** To order, change eighth character in model to “4”. **Example:** L6EPB-B-S-4-A

USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

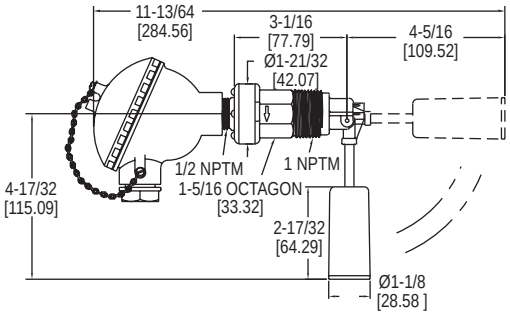
MODEL L8 | W.E. ANDERSON™ BY DWYER

FLOTECT® LIQUID LEVEL SWITCHES

Low Cost, Leak Proof Body, Excellent Chemical Resistance



L8



L8-WP2

The **Model L8 Flotect® Liquid Level Switches** are float switches constructed of polyphenylene sulfide, Ceramic 8 and 316 SS. This liquid level switch provides accurate set point control of liquids with specific gravities as low as 0.6.

FEATURES/BENEFITS

- Features a leak proof body and float constructed from tough, durable polyphenylene sulfide which has excellent chemical resistance
- Liquid level snap switch is magnetically actuated with no direct mechanical linkage to leak or fail, assuring longer life and decreased maintenance costs
- Quick and easy installation with simple placement of the unit in a horizontal position with the index arrow pointing down
- UL recognized as an industrial motor controller per UL standard 508, suitable for mounting in a protected environment

APPLICATIONS

- Environmental control
- Waste water
- Scrubber systems
- Holding tanks
- Cooling towers
- Chemical/petroleum processing
- Plating and washing tanks
- Sewage treatment
- Car washes
- Remediation systems
- Thermal storage systems
- HVAC and building automation systems

SPECIFICATIONS
Service: Compatible liquids.
Wetted Materials: Float and body: Polyphenylene sulfide (PPS); Pin and spring: 316 SS or Inconel®; Magnet: Ceramic 8.
Temperature Limit: 212°F (100°C).
Pressure Limit: 150 psig (10.34 bar).
Enclosure Rating: General purpose. WP/WP2 option is weatherproof.
Switch Type: SPDT snap switch. MV option is a SPDT gold contact snap switch.
Electrical Rating: 5 A @ 125/250 VAC, 5 A resistive, 3 A inductive @ 30 VDC. MV option: 1 A @ 125 VAC, 1 A resistive, 0.5 A inductive @ 30 VDC.
Electrical Connections: 18 AWG, 18˝ (460 mm) long.
Conduit Connection: 1/2˝ male NPT, 1/2˝ female NPT on WP and WP2.
Process Connection: 1˝ male NPT.
Mounting Orientation: Horizontal with index arrow pointing down.
Weight: 5 oz (0.142 kg).
Specific Gravity: 0.6 minimum.
Agency Approvals: CE, cURus.

MODEL CHART	
Model	**Description**
L8	Level switch

OPTIONS	
To order add suffix:	**Description**
-MV	Gold plated contacts for dry circuits. Rated 1 A @ 125 VAC; 1 A resistive, 0.5 A inductive @ 30 VDC
Example: L8-MV	
-INC	Inconel® alloy. Inconel® alloy replaces standard 316 SS wetted parts. Wetted parts are Inconel® Alloy, Ceramic 8, and Polyphenylene Sulfide.
Example: L8-INC	
-WP	Weatherproof enclosure. Optional housing is phenylpolioxide and provides weatherproof protection for electrical wiring. (Not UL approved)
Example: L8-WP	
-WP2	Weatherproof enclosure. Optional housing is aluminum and provides weatherproof protection for electrical wiring. (Not UL approved)
Example: L8-WP2	

Inconel® is a registered trademark of Huntington Alloys Corporation

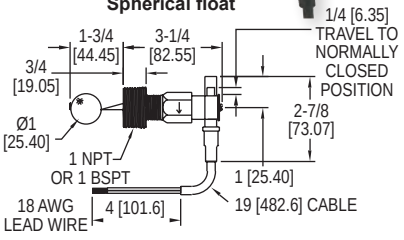
Dwyer

SERIES L10 | W.E. ANDERSON™ BY DWYER

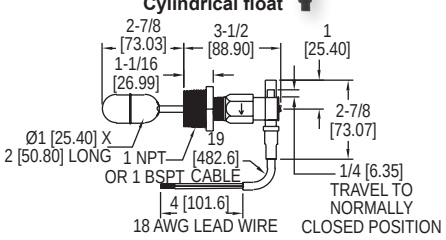
FLOTECT® MINI-SIZE LEVEL SWITCH

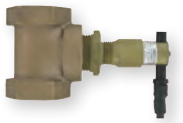
Easy In-wall or External Installation, Specific Gravities as Low as 0.5

Spherical float

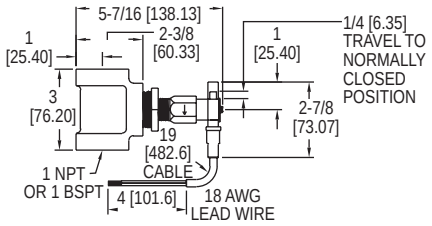


Cylindrical float





External float chamber



The **Series L10 Flotect® Mini-Size Float Switch** is a series of economical, compact liquid level floats. It is offered in brass or 303 SS bodies and external tees as well as polypropylene or 304 SS floats with 1″ NPT male threads, for direct side mounting through a half coupling, or with factory installed tee for external mounting. This series can be used in liquids with specific gravities as low as 0.5.

FEATURES/BENEFITS

- Hermetically sealed, magnetically actuated SPST reed switch which is encapsulated in a polypropylene housing
- Simple field switch adjustment allows user to toggle between normally open (NO) or normally closed (NC) with no change in the electrical connection
- Switch is easily replaced without affecting process installation for quick and low cost maintenance
- Combines low cost with top quality materials and construction for great value and years of reliable liquid level control

APPLICATIONS

- Direct pump control for maintaining level
- Automatic tank dump operations
- Level control
- Valve control

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Float: Solid polypropylene or 304 SS; Body: Brass or 303 SS; Magnet: Ceramic; External float chamber (tee): None, brass, or 304 SS; Other: Lever arm, pin, spring, etc.: 301 SS, 302 SS, 316 SS.
Temperature Limit: 200°F (93°C).
Pressure Limit: Brass body: See chart; 303 SS body: Polypropylene float: 2000 psig (137.8 bar), Cylindrical float: 200 psig (13.8 bar), Spherical float: 350 psig (24.1 bar).
Enclosure Rating: Weatherproof, meets NEMA 4X (IP66).
Switch Type: SPST hermetically sealed reed switch. Field adjustable for NO or NC.
Electrical Rating: 1.5 A @ 24 VDC res., 0.001 A @ 200 VDC res., 0.5 A @ 120 VAC.
Electrical Connections: 18 AWG, 19″ (483 mm) long, PVC jacket. Rated 221°F (105°C).
Process Connection: 1″ male NPT or 1″ male BSPT on models without external float chamber. Change 3 in model number to 4 for 1-1/4″, to 5 for 1-1/2″, or 6 for 2″. 1″ female NPT or 1″ female BSPT on models with external float chamber.
Mounting Orientation: Horizontal with index arrow pointing down.
Specific Gravity: See chart.
Switch Enclosure: Nylon.
Weight: Approximately 10 oz (0.283 kg) without external float chamber, 2.32 lb (1.05 kg) with external float chamber.
Agency Approvals: CE, CSA and UR.

MODEL CHART

Model	Installation	Float Material	Process Connection	Max. Pressure psig (bar)	Min. S.G.
L10-B-3-O	Side wall mounting	Polypropylene spherical	NPT	1000 (69)	0.9
L10-B-3-A	Side wall mounting	304 SS cylindrical	NPT	200 (13.8)	0.5
L10-B-3-C	Side wall mounting	304 SS spherical	NPT	350 (24.1)	0.7
L10-B-3-B	Brass tee	Polypropylene spherical	NPT	250 (17.2)	0.9
L10-B-3-H	Brass tee	304 SS spherical	NPT	250 (17.2)	0.7

OPTIONS

BSPT Process Connection and M25 Conduct Connection
Note: To order, add "-BSPT" to the end of the model number.
Example: L10-B-3-0-BSPT

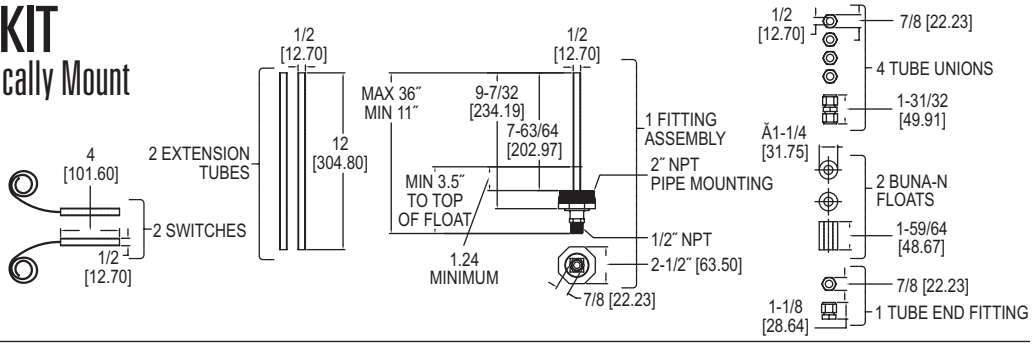
303 SS Body
Note: To order, change fourth character to "S". **Example:** L10-S-3-0

USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

MODEL F7-MLK | W.E. ANDERSON™ BY DWYER

MULTI-LEVEL SWITCH KIT

One or Two Station Level Switch, Vertically Mount



The **Model F7-MLK Multi-Level Switch Kit** provides a customized level system to suit specific application requirements. The F7-MLK Multi-Level Switch Kit contains all the components necessary for the design and fabrication of a 1 or 2 station level switch for pipe plug mounting.

FEATURES/BENEFITS

- Customize stem length (max.: 36″; min.: 11″), actuation point, distance between floats, and lead wire lengths
- Includes two level stations (switch, tube, and Buna-N float), two brass extension tubes 12″ length, four brass tube unions, one end fitting, and one mounting plug

APPLICATIONS

- General purpose level monitoring
- Gas and oil
- Low specific gravity

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials (Float/Stem): Buna-N/Brass.
Temperature Limits: 221°F (105°C).
Pressure Limits: 150 psig (10 bar).
Switch Type: SPST, NO or NC.
Electrical Rating: 60 Watts: 0.4 A @ 220 VAC, 0.5 A @ 110 VAC, 0.2 A @ 120 VDC, 0.5 A @ 24 VDC.
Electrical Connections: 22 AWG x 72″ (183 cm) leads.
Process Connection: 2″ male NPT pipe plug.
Mounting Orientation: Up to 30° angle from vertical.
Stem Length: 36″ (91 cm) max.; 11″ (27.94 cm) min.
Tube/Fitting Size: 1/2″ OD.
Minimum Specific Gravity: 0.45.
Weight: 3.5 lb (1.6 kg).

Note: Top floats 3.5″ (8.89 cm) min. distance.

MODEL CHART

Model	Description
F7-MLK	Multi-level switch kit
Note: 316 SS version also available, please see F7-MLK2 on Dwyer website.	

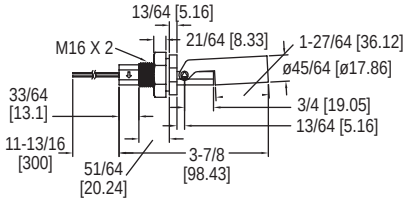
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

LEVEL SWITCHES - HORIZONTAL/SPECIALTY

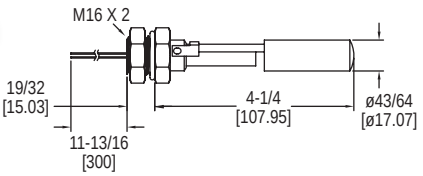
Low Cost, Hermetically Sealed Contacts

HORIZONTAL

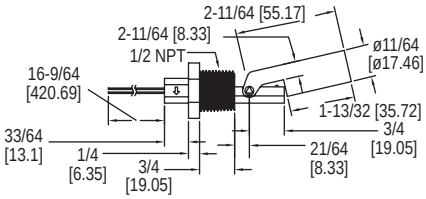
F6-HPS-11



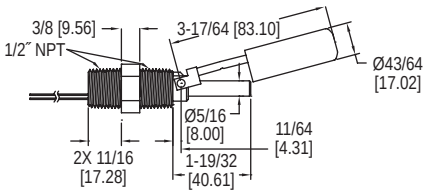
F6-MHS



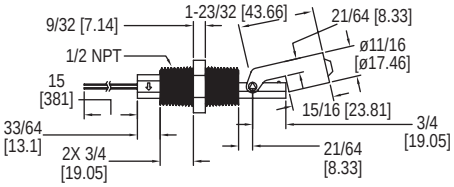
F6-HPS-21



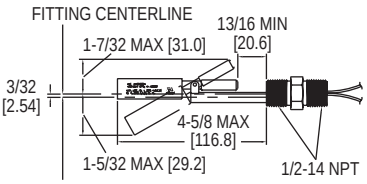
F6-MHS2



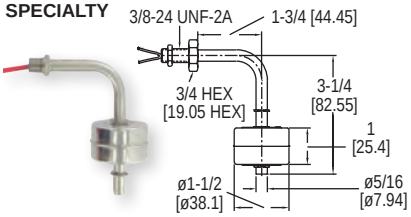
F6-HPS-31



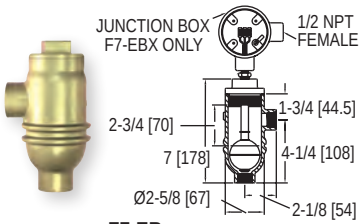
F7-HSS



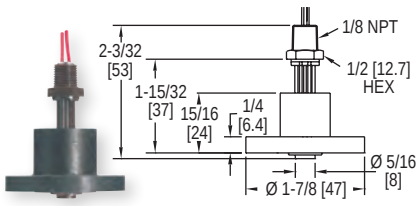
SPECIALTY



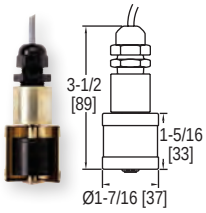
F7-SS6



F7-EB



F7-LL



F7-WBB

The **Series F6 & F7 Horizontal and Specialty Level Switches** are designed to mount through the walls of tanks or other vessels and unique applications to provide point level indication.

FEATURES/BENEFITS

- Hermetically sealed reed switches are actuated by magnets permanently bonded inside the float arm and can be easily adapted to open or close a circuit on rising or falling levels

APPLICATIONS

- Water level monitoring
- Oil level control
- Chemical level indication
- Sumps
- Stand pipes
- Tank level control

MODEL CHART

Model	Applications	Material Float/Stem	Temperature Limits	Pressure Limits	Min. S.G.	Electrical Rating	Wire Leads	Mtg	Weight oz (g)
F6-HPS-11	Water, oils, chemicals	Polypropylene/ polypropylene	176°F (80°C)	116 psig (8 bar)	0.60	20 VA: 0.08 A @ 240 VAC	20 AWG, 11.8″ (30 cm)	M16 x 2	1.23 (38)
F6-HPS-21	Water, oils, chemicals	Polypropylene/ polypropylene	176°F (80°C)	116 psig (8 bar)	0.60	20 VA: 0.08 A @ 240 VAC	20 AWG, 11.8″ (30 cm)	1/2″ NPT	1.23 (38)
F6-HPS-31	Water, oils, chemicals	Polypropylene/ polypropylene	176°F (80°C)	116 psig (8 bar)	0.60	20 VA: 0.08 A @ 240 VAC	20 AWG, 11.8″ (30 cm)	1/2″ NPT	1.41 (40)
F6-MHS	Corrosives	304 SS/304 SS	257°F (125°C)	218 psig (15 bar)	0.85	20 VA: 0.08 A @ 240 VAC	22 AWG, 11.8″ (30 cm)	M16 x 2	3.35 (95)
F6-MHS2	Water, oils, chemicals	304 SS/304 SS	257°F (125°C)	363 psig (25 bar)	0.85	70 VA: 0.7 A @ 250 VAC	22 AWG, 11.8″ (30 cm)	1/2″ NPT	4.8 (136)
F7-HSS†	High temp/pressure, corrosive, expl.	316 SS/316 SS	392°F (200°C)	300 psig (20.7 bar)	0.60	30 VA: 0.14 A @ 220 VAC	22 AWG, 24″ (61 cm)	1/2″ NPT (int/ext)	3 (94)
Model	**Style/Applications**	**Material Float/Stem**	**Temperature Limits**	**Pressure Limits**	**Min. S.G.**	**Electrical Rating**	**Wire Leads**	**Mtg**	**Weight oz (g)**
F7-SS6	Bent stem/liquids with metal particles	316 SS/316 SS	300°F (149°C)	100 psig (7 bar)	0.70	20 VA: 0.08 A @ 220 VAC N.O. operation	22 AWG, 24″ (61 cm)	3/8″-24″ UNF-2A	2 (58)
F7-SS6B	Bent stem/liquids with metal particles	316 SS/316 SS	300°F (149°C)	100 psig (7 bar)	0.70	20 VA: 0.08 A @ 220 VAC N.C. operation	22 AWG, 24″ (61 cm)	3/8″-24″ UNF-2A	2 (58)
F7-EB‡**	Non-intrusive bottle type/ Outside tank mounting	Brass/316 SS (Brass housing)	300°F (149°C)	500 psig (34 bar)	0.75	20 VA: 0.08 A @ 240 VAC	18 AWG, 24″ (61 cm)	3/4″ NPT female	5 lb 5 oz (2.4 kg)
F7-LL	Vertical/detect levels as low as 5/8″	Polysulfone/ Buna-N	180°F (82°C)	50 psig (3 bar)	–	20 VA: 0.08 A @ 240 VAC	22 AWG, 72″ (182 cm)	1/8″ NPT male	2 (58)
F7-WBB	25′ cable, slosh shield/ Sumps, stand pipes	Brass/Buna-N	180°F (82°C)	150 psig (10 bar)	0.45	20 VA: 0.08 A @ 240 VAC	22 AWG, 25′ (7.6 m)	–	10.8 (310)

† F7-HSS is rated explosion-proof for Class I, Groups A, B, C, D; Class II, Groups E, F, G; Class III.
‡ Explosion proof model available with DPDT switch. **Example:** F7-EBX
** Model available with normally closed switch. **Example:** F7-EBNC

USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

SERIES F6 & F7 | W.E. ANDERSON™ BY DWYER

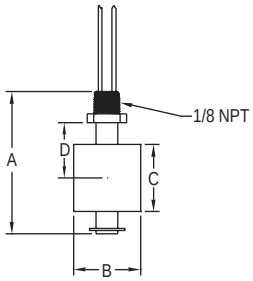
UL LISTED

LEVEL SWITCHES - VERTICAL

Low Cost, Reliable and Compact, Hermetically Sealed Contacts

F7-SB

F7-ST713



DIMENSIONS - IN (MM)				
Model	(A) Stem Length	(B) Float Diameter	(C) Float Height	(D) Actuation from Hex①
F7-SB	2.75 (70)	1.38 (35)	1.13 (29)	1.2 (31)
F7-SS2	2.06 (52)	1.0 (25)	1.0 (25)	0.73 (19)
F6-SS	2.17 (55)	1.11 (28)	1.11 (28)	–
F7-MPP	1.63 (41)	0.63 (16)	0.63 (16)	0.47 (12)
F7-PP	2.18 (55)	1.18 (30)	1.0 (25)	0.69 (18)
F7-BT	2.18 (55)	1.18 (30)	1.0 (25)	0.69 (18)
F7-C11	2.06 (52)	1.0 (25)	1.0 (25)	0.56 (14)
F7-PVC	3.44 (87)	1.5 (38)	1.81 (46)	0.75 (19)
F7-T1	3.47 (88)	2.13 (54)	1.94 (49)	0.92 (22)
F7-ST713	3.38 (86)	2.06 (52)	2.06 (52)	1.09 (28)
F7-ST714	3.38 (86)	2.06 (52)	2.06 (52)	1.09 (28)

①Distance between hex and liquid (S.G. = 1.0) level at actuation point will vary with specific gravity changes.

The **Series F6 & F7 Vertical Level Switches** are designed to be mounted at the maximum or minimum level point to provide level indication and control. Models are shipped with normally open switch contacts which close as the float rises toward the mounting threads.

FEATURES/BENEFITS

- Combine low cost and reliability with fast, simple installation
- Hermetically sealed reed switches are actuated by magnets permanently bonded inside the float and can be easily adapted to open or close a circuit on rising or falling levels
- Easily reverse switch action by removing the float, rotating it end-for-end and replacing it on the stem
- Vertical models mount internally, oriented within 30° of vertical, or select optional fittings for external mounting
- Switch ratings are suitable for many solid state control systems and monitors or alarms
- Simple relay interfaces can be used for higher current applications

APPLICATIONS

- Water level monitoring
- Oil level control
- Chemical level indication
- Sumps
- Stand pipes
- Tank level control
- High viscosity liquids

ACCESSORIES - FOR EXTERNAL MOUNTING OF VERTICAL MODELS	
Model	Description
A-347	1/8″ x 1-1/4″ NPT carbon steel adapter
A-347-SS	1/8″ x 1-1/4″ NPT 316 SS adapter
A-348	1/8″ x 1-1/2″ NPT carbon steel adapter

MODEL CHART

Model	Applications	Material Float/Stem	Temperature Limits	Pressure Limits	Min. S.G.	Electrical Rating	Wire Leads	Mtg NPT (M)	Weight oz (g)
F7-SB*	General purpose	Buna-N & epoxy/ 316 SS	220°F (105°C)	150 psig (10 bar)	0.60	25 VA: 1 A @ 220 VAC	22 AWG 18″ (45 cm)	1/8″	2 (58)
F7-SS2*	High temp/pressure, corrosives	316 SS (CYC)/ 316 SS	300°F (149°C)	450 psig (31 bar)	0.75	25 VA: 1 A @ 200 VAC	22 AWG 18″ (45 cm)	1/8″	1.2 (34)
F6-SS	Corrosives	316 SS/316 SS	257°F (125°C)	218 psig (15 bar)	0.65	20 VA: 0.08 A @ 240 VAC	20 AWG 11.8″ (30 cm)	1/8″	1.59 (45)
F7-MPP**	Broad chemical compatibility	Polypropylene/ polypropylene	180°F (82°C)	100 psig (6.89 bar)	0.90	10 VA: 0.1 A @ 100 VAC	22 AWG 24″ (61 cm)	1/8″	0.8 (23)
F7-MPP-NO**	Broad chemical compatibility	Polypropylene/ polypropylene	176°F (80°C)	100 psig (6.89 bar)	0.90	50 VA: 0.2 A @ 240 VAC	22 AWG 24″ (61 cm)	1/8″	0.8 (23)
F7-PP*	Broad chemical compatibility	Polypropylene & epoxy/polypropylene	220°F (105°C)	100 psig (6.89 bar)	0.60	30 VA: 0.14 A @ 220 VAC	22 AWG 24″ (61 cm)	1/8″	0.8 (23)
F7-BT*	Oils & fuels	Buna-N & epoxy/ PBT***	220°F (105°C)	150 psig (10 bar)	0.45	30 VA: 0.14 A @ 220 VAC	22 AWG 24″ (61 cm)	1/8″	0.7 (20)
F7-C11	General purpose	Buna-N/brass	180°F (82°C)	150 psig (10 bar)	0.45	20 VA: 0.08 A @ 240 VAC	22 AWG 24″ (61 cm)	1/8″	1.5 (43)
F7-PVC	Chemical & plating	CPVC/CPVC	180°F (82°C)	15 psig (1 bar)	0.85	20 VA: 0.08 A @ 240 VAC	22 AWG 24″ (61 cm)	1/4″	5 (140)
F7-T1	Viscous, sticky or corrosive liquids	PTFE/TFE	300°F (149°C)	30 psig (2 bar)	0.80	20 VA: 0.08 A @ 240 VAC	22 AWG 24″ (61 cm)	1/4″	6 (170)
F7-ST713	Oils, water & chemicals	316 SS/316 SS	300°F (149°C)	750 psig (52 bar)	0.80	20 VA: 0.08 A @ 240 VAC	22 AWG 24″ (61 cm)	1/4″	6 (170)

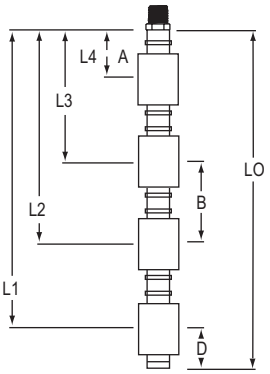
*UL listed **F7-MPP is normally closed/F7-MPP-NO is normally open ***PBT-Polybutylene terephthalate

USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

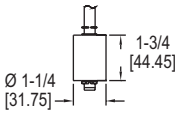
SERIES F7-MQ | W.E. ANDERSON™ BY DWYER

QUICK-SHIP MULTI-STATION LEVEL SWITCH

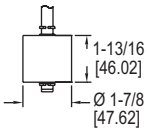
Fast Delivery, Customized, Up to Four Actuation Levels



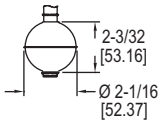
ACTUATION LEVELS		
A	**B**	**D**
1-1/2″ (38.10 mm)	3″ (76.20 mm)	2″ (50.80 mm)
Each switching point requires one float. A=Minimum distance from actuation point to bottom of mounting B=Minimum distance between actuation levels D=Minimum distance from end of unit to lowest actuation point		



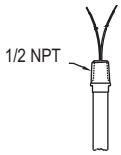
F1 float dimensions



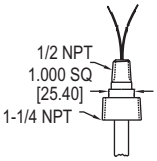
F2 float dimensions



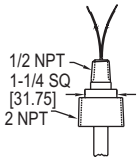
F3 float dimensions



Type 1 mounting dimensions



Type 2 mounting dimensions



Type 3 mounting dimensions

The **Series F7-MQ Quick-Ship Multi-Station Level Switch** provides a customized level switch to meet application requirements. Switches can be configured with up to four different control points and stem lengths up to 72″ (1.82 m). Stems and floats are available in 316 SS or brass, SPST or SPDT switches, and choice of mountings.

FEATURES/BENEFITS

- Customized level indication quickly and affordably
- Rugged construction with multiple options yielding exceptional versatility
- Capable of supporting larger, more buoyant floats
- Durable construction asserts long reliability in contaminated or turbulent media

APPLICATIONS

- Water level monitoring
- Oil level control
- Tank level control
- Diesel level monitoring

SPECIFICATIONS
Service: Compatible liquids. **Temperature Limits:** F1 and F2 with water: 0 to 180°F (-18 to 82°C); Oil: -40 to 230°F (-40 to 110°C); F3: -40 to 300°F (-40 to 149°C). **Electrical Connections:** 24″ (61 cm) free leads; #22 AWG TFE and #18 AWG polymeric. **Mounting Orientation:** Vertical ±30°.

MODEL CHART

Example	F7-MQ	B	1	-4	F3	3	-07.00	-11.00	-15.00	-20.00	-24.00	J	F7-MQB1-4F33-07.00-11.00-15.00-20.00-24.00-J
Construction	F7-MQ												Multi-station level, 1 to 4 switch points
Stem & Connection Material		B S											Brass with beryllium copper stops 316 SS with SS ARMCO PH-15-7MO stops
Connection Type			1 2 3										1/2″ NPT (float F2, F3 only) 1-1/4″ NPT (float F1 only) 2″ NPT (float F2, F3 only)
Switch Points				#									Put 1 to 4 for the number of switch points desired
Float Type					F1 F2 F3								**Material** / **Min. s.g.** / **Max. Pressure** Buna-N / 0.75 / 150 psi (10.3 bar) Buna-N / 0.55 / 150 psi (10.3 bar) 316 SS / 0.75 / 750 psi (51.7 bar)
Switch Type*						1 3							SPST, .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC SPDT, .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC
Set Point Distance, L4†							00.00						In inches referenced from bottom of process connection
Set Point Distance, L3†								00.00					In inches referenced from bottom of process connection
Set Point Distance, L2†									00.00				In inches referenced from bottom of process connection
Set Point Distance, L1†										00.00			In inches referenced from bottom of process connection
Overall Length, L0											00.00		Min. length is L1+D; Max. length with connection length is 72″ (1.82 m)
Options												J	Junction box for wire leads, NEMA 4 (not available with connection type 1)

NO switch is standard. For NC place an "" after the corresponding set point distance in the model number.

†No numbers needed beyond the number of switches specified.

Note: Models are built to your specifications

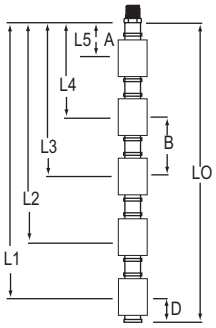
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

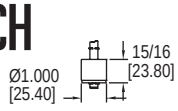
SERIES F7-MM | W.E. ANDERSON™ BY DWYER

MINIATURE MULTI-STATION LEVEL SWITCH

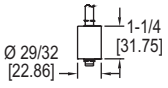
Custom, Lightweight, Low Cost, 316 SS or Buna-N Floats



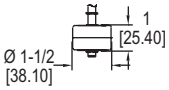
ACTUATION LEVELS			
Float Type	**A**	**B**	**D**
F1	7/8″	1-3/4″	3/4″
F2	3/4″	1-7/8″	1-1/16″
F3	3/4″	1-13/16″	15/16″
F4	13/16″	2-7/16″	1-7/16″
F5	9/16″	2-7/16″	1-3/4″
F6	15/16″	1-7/8″	7/8″ (NO); 1-3/16″ (NC)
F7	13/16″	2″	1-1/8″
F8	3/4″	1-7/8″	1-1/16″
Each switching point requires one float. A=Minimum distance from actuation point to bottom of mounting B=Minimum distance between actuation levels D=Minimum distance from end of unit to lowest actuation point			



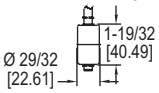
F1 float dimensions



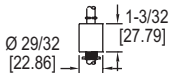
F2 float dimensions



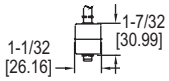
F3 float dimensions



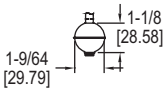
F4, F5 float dimensions



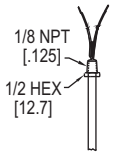
F6 float dimensions



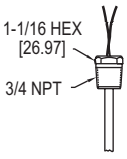
F7 float dimensions



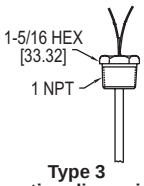
F8 float dimensions



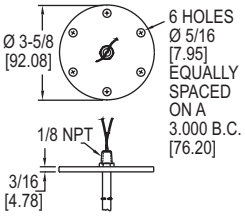
Type 1 mounting dimensions



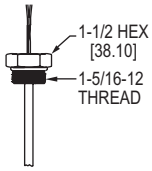
Type 2 mounting dimensions



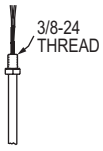
Type 3 mounting dimensions



Type 4 mounting dimensions



Type 5 mounting dimensions



Type 6 mounting dimensions

The **Series F7-MM Miniature Multi-Station Level Switch** provides a customized level switch to meet application requirements in a miniature size. Control up to five different level points across a maximum length of 48″ (121 cm). Stems and mounting fixtures are available in 316 SS or brass.

FEATURES/BENEFITS

- Customized miniature level indication in a compact, lightweight design ideal for tanks less than 4′ (1.2 m) deep
- Rugged construction with multiple options yielding exceptional versatility
- Miniature custom level switches are sturdy, compact and lightweight yet still rugged and durable

APPLICATIONS

- Water level monitoring
- Oil level control
- Tank level control
- Diesel level monitoring

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Stem, connection, and float.
Temperature Limits: F1 and F2: Water, 180°F (82.2°C); Oil, -40 to 250°F (-40 to 121.1°C). All other floats: -40 to 300°F (-40 to 148.9°C).
Electrical Connection: 24″ (61 cm) free leads #22 AWG, TFE jacketed.
Mounting Orientation: Vertical ±30°.

MODEL CHART

Example	**F7-MM**	**B**	**1**	**-5**	**F1**	**1**	**-03.00**	**-07.00**	**-11.00**	**-15.00**	**-20.00**	**-25.00**	**F7-MMB1-5F11-03.00-07.00-11.00-15.00-20.00-25.00**		
Construction	F7-MM												Multi-station level, 1 to 5 switch points		
Stem & Connection Material		B S											Brass with beryllium copper stops 316 SS with SS ARMCO PH-15-7MO stops		
Connection Type			1 2 3 4 5 6										1/8″ NPT 3/4″ NPT (cannot be used with float F1, F3, F7 and F8) 1″ NPT (cannot be used with float F3) 3-5/8″ flange [maximum pressure is 50 psi (3.45 bar)] 1-5/16-12UNF-2A (cannot be used with float F3) 3/8-24		
Switch Points				#									Put 1 to 5 for the number of switch points desired		
Float Type					F1 F2 F3 F4 F5 F6 F7 F8								**Material** Buna-N Buna-N 316 SS 316 SS 316 SS PTFE 316 SS 316 SS	**Min. s.g.** 0.45 0.60 0.70 0.85 1.10 0.65 0.85 0.90	**Max. Pressure** 300 psi (20.68 bar) 250 psi (17.24 bar) 100 psi (6.89 bar) 150 psi (10.34 bar) 400 psi (27.58 bar) 1000 psi (68.95 bar) 275 psi (18.96 bar) 600 psi (41.37 bar)
Switch Type*						1 2							SPST, .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC SPST, .8 A @ 120 VAC, .4 A @ 240 VAC		
Set Point Distance, L5†							00.00						In inches referenced from bottom of process connection		
Set Point Distance, L4†								00.00					In inches referenced from bottom of process connection		
Set Point Distance, L3†									00.00				In inches referenced from bottom of process connection		
Set Point Distance, L2†										00.00			In inches referenced from bottom of process connection		
Set Point Distance, L1†											00.00		In inches referenced from bottom of process connection		
Overall Length, L0												00.00	Min. length is L1+D; Max. overall length is 48″ (121 cm)		
NO switch is standard. For NC place an "" after the corresponding set point distance in the model number.															
†No numbers needed beyond the number of switches specified.															
Note: Models are built to your specifications															

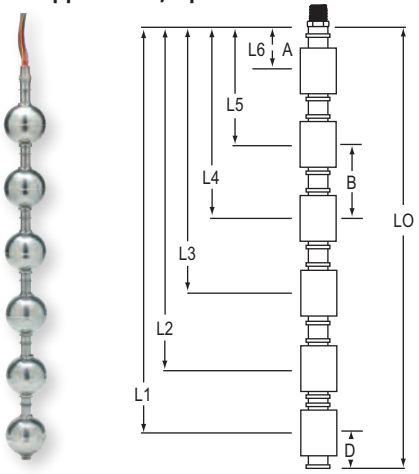
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

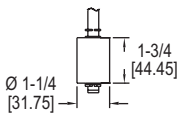
SERIES F7-MS | W.E. ANDERSON™ BY DWYER

MULTI-STATION LEVEL SWITCH

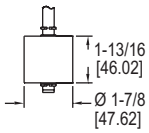
Customize To Fit Application, Up to Six 316 SS or Buna-N Floats



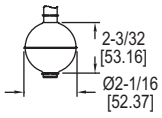
ACTUATION LEVELS		
A	**B**	**D**
1-1/2″ (38.10 mm)	3″ (76.20 mm)	2″ (50.80 mm)
Each switching point requires one float. A=Minimum distance from actuation point to bottom of mounting B=Minimum distance between actuation levels D=Minimum distance from end of unit to lowest actuation point		



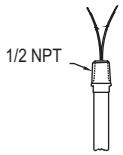
F1 float dimensions



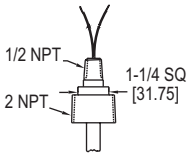
F2 float dimensions



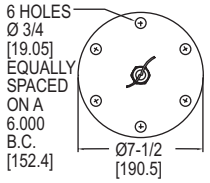
F3 float dimensions

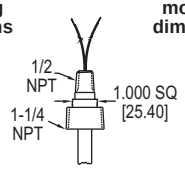


Type 1 mounting dimensions

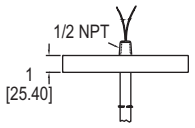


Type 3 mounting dimensions





Type 2 mounting dimensions



Type 4, 5 mounting dimensions

The **Series F7-MS Multi-Station Level Switch** provides a customized level switch to meet application requirements. Switches can be configured with up to six different control points and stem lengths up to 140″ (3.56 m). Stems and floats are available in 316 SS or brass, SPST or SPDT switches, and choice of mountings.

FEATURES/BENEFITS
- Customized level indication quickly and affordably
- Rugged construction with multiple options yielding exceptional versatility
- Capable of supporting larger, more buoyant floats
- Durable construction asserts long reliability in contaminated or turbulent media

APPLICATIONS
- Water level monitoring
- Oil level control
- Tank level control
- Diesel level monitoring

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Stem, connection, and float.
Temperature Limits: Buna-N floats: 180°F (82.2°C) in water, -40 to 230°F (-40 to 110°C) in oil; SS floats: -40 to 300°F (-40 to 148.9°C).
Wire Leads: 24″ (61 cm) free leads; #22 AWG, TFE jacketed, and #18 AWG polymeric.
Mounting Orientation: Vertical ±30°.

MODEL CHART

Example	F7-MS	B	1	-5	F3	1	-04.00	-07.00	-11.00	-15.00	-20.00		-24.00	J	F7-MSB1-5F31-04.00-07.00-11.00-15.00-20.00-24.00-J
Construction	F7-MS														Multi-station level, 1 to 6 switch points
Stem and Connection Material		B S													Brass with beryllium copper stops 316 SS with SS ARMCO PH-15-7MO stops
Connection Type			1 2 3 4 5												1/2″ NPT (float F2, F3 only) 1-1/4″ NPT (float F1 only) 2″ NPT 3″ 150# flange carbon steel (conn. material S only, float F2, F3 only) Max. pressure: 150 psi (10.3 bar) 3″ 150# flange 316 SS (conn. material S only, float F2, F3 only) Max. pressure: 150 psi (10.3 bar)
Switch Points				#											Put 1 to 6 for the number of switch points desired
Float Type					F1 F2 F3										**Material** / **Min. s.g.** / **Max. Pressure** Buna-N / 0.75 / 150 psi (10.3 bar) Buna-N / 0.55 / 150 psi (10.3 bar) 316 SS / 0.75 / 750 psi (51.7 bar); Units >72″: 300 psi (20.7 bar)
Switch Type*						1 2 3									SPST, .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC SPST, .8 A @ 120 VAC, .4 A @ 240 VAC SPDT, .17 A @ 120 VAC, .08 A @ 240 VAC, .13 A @ 120 VDC, .06 A @ 240 VDC
Set Point Distance, L6†							00.00								In inches referenced from bottom of process connection
Set Point Distance, L5†								00.00							In inches referenced from bottom of process connection
Set Point Distance, L4†									00.00						In inches referenced from bottom of process connection
Set Point Distance, L3†										00.00					In inches referenced from bottom of process connection
Set Point Distance, L2†											00.00				In inches referenced from bottom of process connection
Set Point Distance, L1†												00.00			In inches referenced from bottom of process connection
Overall Length, L0													00.00		Min. length is L1+D; Max. length with connection type 1: 36″ (91.4 cm), type 2: 60″ (152.4 cm) and types 3, 4, 5: 140″ (355.6 cm)
Options														J	Junction box for wire leads, NEMA 4 (not available with connection type 1)

NO switch is standard. For NC place an "" after the corresponding set point distance in the model number.
†No numbers needed beyond the number of switches specified.
Note: Models are built to your specifications

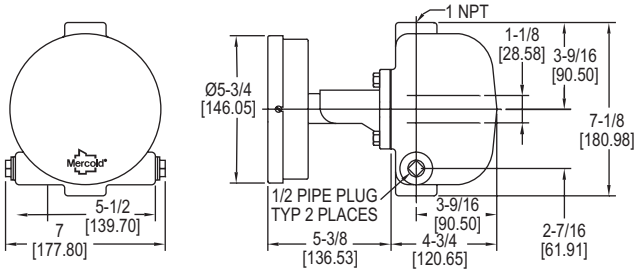
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

SERIES 123 & 125 | MERCOID® BY DWYER

BOILER WATER LEVEL CONTROL

Heavy Duty, Cast Iron Chamber



The **Series 123 & 125 Boiler Water Level Control** is designed for boiler applications, the Model 123 is primarily used for low water cut-off or feed-water control. The 125 offers the same long lasting service with a direct action mercury switch movement that provides a close deadband where needed.

FEATURES/BENEFITS
- Special snap action switch mechanism options eliminates frequent operation due to surging water level
- Transparent cover provides convenient visible operation of the switch
- Flanged chamber for easy clean out and replacement of float or switch mechanism without removing the unit from piping

APPLICATIONS
- Boiler low water cut-off
- Boiler feed-water control
- Condensate tanks
- Deaerators

MODEL CHART	
Model	**Switch Type**
123-153	SPDT mercury
123-7000-153	SPDT snap

SPECIFICATIONS

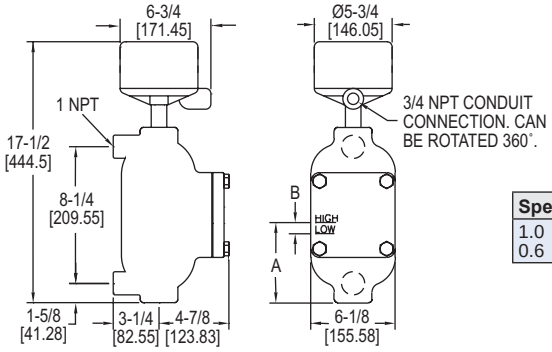
Service: Compatible liquids. Cast iron is not for use with lethal or flammable substances either liquid or gaseous.
Wetted Materials: Body: Cast iron; Float: 304 SS; Trim and packing gland: Brass; Packing: Carbon; Body gasket: Carbon.
Temperature Limit: Ambient temperature: 212°F (100°C); Process temperature: 365°F (185°C).
Pressure Limit: 150 psig (10.34 bar).
Enclosure Rating: General purpose. Optional weatherproof.
Switch Type: SPDT snap switch or mercury switch. Optional DPDT or two stage.

Electrical Rating: Snap switch: 12 A @ 120 VAC, 5 A @ 240 VAC, 0.5 A @ 125 VDC resistive, 0.25 A @ 250 VDC resistive; Mercury switch: 4 A @ 120 VAC/DC, 2 A @ 240 VAC/DC.
Electrical Connections: Screw terminal.
Conduit Connection: 7/8″ (22.23 mm) hole for 1/2″ (12.7 mm) conduit.
Process Connections: 1″ female NPT.
Mounting Orientation: Vertical.
Deadband: Approximately 1-1/2″ (38.1 mm).
Specific Gravity: 0.88 min.
Options: Manual reset.
Weight: 20 lb (9.1 kg).
Agency Approvals: CSA, UL. (Snap switch is not rated).

SERIES 102 & 1102 | MERCOID® BY DWYER

FLANGED CHAMBER TYPE LEVEL CONTROL

Operating Pressures to 300 PSIG



Specific Gravity	A	B
1.0	5-1/16 [129 mm]	3/4 [19 mm]
0.6	5-13/16 [148 mm]	1 [25.4 mm]

The **Series 102 & 1102 Flanged Chamber Type Level Control** is external cage type level switches which are self-contained in a side mount body. The 102 series will operate to a minimum specific gravity of 0.60 and the 1102 series will operate to a specific gravity of 0.40. These series contain a stainless steel float and offer a choice of cast iron, cast steel, or cast 316 SS float chamber.

FEATURES/BENEFITS
- Unique design allows the simple removal of four bolts from the inspection plate to examine the float and chamber for cleaning or wear without disconnecting the piping or electrical circuitry
- Electrical enclosures provide general purpose, weatherproof, explosion-proof or explosion-proof/vapor proof capability as well as cost effective cast 316 SS float chamber option
- Electrical circuits using hermetically sealed snap action or mercury contacts are available in a variety of actions including SPST, SPDT, DPDT and DPST combinations
- The 102 design features three 1″ NPT process connections for side/side or side/bottom piping allowing the bottom 1″ NPT connection to be used as a drain when using the side/side process connection

APPLICATIONS
- Pressure or vacuum vessels
- Chemical processing plants
- Steam and electric generating stations
- Hydraulic accumulators
- Vapor-liquid separators
- Scrubbers
- Oil refineries
- Storage tanks

SPECIFICATIONS

Service: Compatible liquids. Cast iron is not for use with lethal or flammable substances either liquid or gaseous.
Wetted Materials: Body: Cast iron. Optional cast steel or 316 SS; Float and trim: 303 SS, 304 SS, 316 SS, and 430 SS. Option of all 316 SS; Body gasket: Carbon.
Temperature Limit: Ambient Temperature: 212°F (100°C); Process Temperature: 425°F (218°C).
Pressure Limit: 300 psig (20.7 bar). Optional rating to 400 psig (27.6 bar).
Enclosure Rating: NEMA 4X (IP66). Optional general purpose or explosion-proof.
Repeatability: ±1/4″ (6.4 mm).
Switch Type: SPDT snap switch, hermetically sealed snap switch, or mercury switch. Optional DPDT or two stage.

Electrical Rating: Snap switch: 12 A @ 120 VAC, 5 A @ 240 VAC, 0.5 A @ 125 VDC resistive, 0.25 A @ 250 VDC resistive; Hermetically sealed snap switch: 5 A @ 125 VAC, 5 A @ 240 VAC, 5 A @ 30 VDC resistive; Mercury switch: 4 A @ 120 VAC/DC, 2 A @ 240 VAC/DC. Higher contact ratings available for the mercury switch.
Electrical Connections: Screw terminal.
Conduit Connection: 3/4″ female NPT.
Process Connections: 1″ female NPT.
Mounting Orientation: Vertical.
Set Point Adjustment: ±1″ (25.4 mm).
Specific Gravity: 0.6 min.
Weight: 35 lb (15.9 kg).
Agency Approvals: UL.

MODEL CHART	
Model	**Switch Type**
102-WT-4810-C-60	SPDT mercury
102-WT-7810-C-60	SPDT snap
102-WT-7810HM-C-60	SPDT hermetically sealed snap

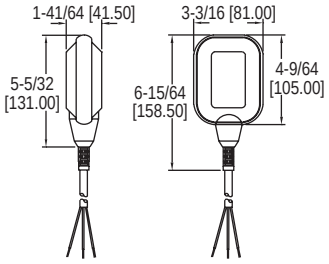
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

SERIES CFS2 | MERCOID® BY DWYER

CABLE FLOAT SWITCH

Mercury-Free, UL/CSA Approved Options



The **Series CFS2 Cable Float Switch** is a mechanically actuated floating switch intended to activate electrical components, such as pumps, to start and stop automatically. Optional cables are available. Contact factory for cable length options ranging from 10 to 70´ (3 to 21 m).

FEATURES/BENEFITS
- High reliability with mercury-free, magnetic, mechanical internal design
- Economical pricing with multiple option available for increased versatility
- Easy installation with counterweights and cable hangers to suit a variety of mounting applications

APPLICATIONS
- Water level monitoring
- Tank level control
- High or low level alarm
- Municipal water control
- Industrial water control
- Filling or draining reservoirs and tanks
- Pump automation

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Enclosure: Polypropylene; Cable: See model chart.
Temperature Limits: 32 to 122°F (0 to 50°C).
Pressure Limits: 14.5 psi (1 bar).
Enclosure Rating: IP68.
Switch Type: See model chart.
Electrical Rating: CFS2-XXBXX-XX: 10 (8) A @ 250 VAC; CFS2-XXDXX-XX: 1 HP @ 125 VAC 16 FLA; 2 HP @ 250 VAC 12 FLA.
Shipping Weight: Enclosure: 5.43 oz (154 g); Cable: 0.77 oz (21.27 g) per ft.
Agency Approvals: See model chart.

ACCESSORIES

Model	Description
A-457	7.76 oz (220 g) counterweight
A-459	Cable hanger

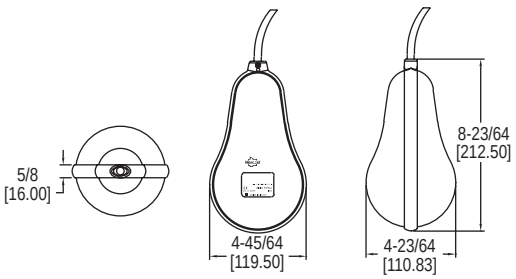
MODEL CHART

Model	Cable Type	Approvals	Switch Type	Cable Length	Model	Cable Type	Approvals	Switch Type	Cable Length
CFS2-ONBPN-20	PVC	CE	SPST NO	20´ (6.10 m)	**CFS2-DNBPN-40**	PVC	CE	SPDT	40´ (12.19 m)
CFS2-ONBPN-30	PVC	CE	SPST NO	30´ (9.14 m)	**CFS2-DNBPN-50**	PVC	CE	SPDT	50´ (15.24 m)
CFS2-ONBPN-40	PVC	CE	SPST NO	40´ (12.19 m)	**CFS2-DNBPN-60**	PVC	CE	SPDT	60´ (19.29 m)
CFS2-ONBPN-50	PVC	CE	SPST NO	50´ (15.24 m)	**CFS2-DNBPN-80**	PVC	CE	SPDT	80´ (24.38 m)
CFS2-CNBPN-20	PVC	CE	SPST NC	20´ (6.10 m)	**CFS2-DNBPN-100**	PVC	CE	SPDT	100´ (30.48 m)
CFS2-CNBPN-30	PVC	CE	SPST NC	30´ (9.14 m)	**CFS2-OGDSN-20**	SJOW	UL/CSA	SPST NO	20´ (6.10 m)
CFS2-CNBPN-40	PVC	CE	SPST NC	40´ (12.19 m)	**CFS2-OGDSN-30**	SJOW	UL/CSA	SPST NO	30´ (9.14 m)
CFS2-CNBPN-50	PVC	CE	SPST NC	50´ (15.24 m)	**CFS2-OGDSN-40**	SJOW	UL/CSA	SPST NO	40´ (12.19 m)
CFS2-DNBPN-7	PVC	CE	SPDT	7´ (2.13 m)	**CFS2-OGDSN-50**	SJOW	UL/CSA	SPST NO	50´ (15.24 m)
CFS2-DNBPN-10	PVC	CE	SPDT	10´ (3.05 m)	**CFS2-CGDSN-20**	SJOW	UL/CSA	SPST NC	20´ (6.10 m)
CFS2-DNBPN-15	PVC	CE	SPDT	15´ (4.57 m)	**CFS2-CGDSN-30**	SJOW	UL/CSA	SPST NC	30´ (9.14 m)
CFS2-DNBPN-20	PVC	CE	SPDT	20´ (6.10 m)	**CFS2-CGDSN-40**	SJOW	UL/CSA	SPST NC	40´ (12.19 m)
CFS2-DNBPN-30	PVC	CE	SPDT	30´ (9.14 m)	**CFS2-CGDSN-50**	SJOW	UL/CSA	SPST NC	50´ (15.24 m)

SERIES FSW2 | MERCOID® BY DWYER

FREE-FLOATING LEVEL SWITCH

Designed for Industrial Applications, Mercury-Free, Self Counter-Weighted



The **Series FSW2 Free-Floating Level Switch** is a self-counterweighted, mechanically actuated floating switch intended to activate electrical components, such as pumps, to start and stop automatically. Optional cables are available. Contact factory for cable length options ranging from 10 to 70´ (3 to 21 m).

FEATURES/BENEFITS
- Body is free of any irregularities allowing substances to effortlessly glide off and consists of a double airtight chamber with high-pressure melted polypropylene re-injection sealing to ensure a perfect seal reducing maintenance events
- High reliability with mercury-free, magnetic, mechanical internal design
- Economical pricing with multiple option available for increased versatility
- Seamless installation with self-counterweighted body and cable hangers to suit a variety of mounting applications

APPLICATIONS
- Wastewater level monitoring
- Tank level control
- High or low level alarm
- Municipal wastewater control
- Industrial wastewater control

SPECIFICATIONS

Service: Compatible liquids, slurries.
Wetted Materials: Enclosure: Polypropylene; Cable: PVC.
Operating Temperature: 32 to 122°F (0 to 50°C).
Pressure Limits: 29 psi (2 bar).
Enclosure Rating: IP68.
Switch Type: See model chart.
Electrical Rating: 10 (3) A @ 250 VAC.
Mounting Orientation: Vertical.
Shipping Weight: Enclosure: 2.4 lb (1100 g); Cable: 0.77 oz (21.27 g) per ft.
Agency Approvals: CE.

ACCESSORIES

Model	Description
A-459	Cable hanger

MODEL CHART

Model	Switch Type	Cable Length ft (m)	Model	Switch Type	Cable Length ft (m)
FSW2-ONPN-20	SPST NO	20 (6.10)	**FSW2-DNPN-10**	SPDT	10 (3.05)
FSW2-ONPN-30	SPST NO	30 (9.14)	**FSW2-DNPN-15**	SPDT	15 (4.57)
FSW2-ONPN-40	SPST NO	40 (12.19)	**FSW2-DNPN-20**	SPDT	20 (6.10)
FSW2-ONPN-50	SPST NO	50 (15.24)	**FSW2-DNPN-30**	SPDT	30 (9.14)
FSW2-CNPN-20	SPST NC	20 (6.10)	**FSW2-DNPN-40**	SPDT	40 (12.19)
FSW2-CNPN-30	SPST NC	30 (9.14)	**FSW2-DNPN-50**	SPDT	50 (15.24)
FSW2-CNPN-40	SPST NC	40 (12.19)	**FSW2-DNPN-60**	SPDT	60 (18.29)
FSW2-CNPN-50	SPST NC	50 (15.24)	**FSW2-DNPN-80**	SPDT	80 (24.38)
			FSW2-DNPN-100	SPDT	100 (30.48)

Dwyer

SERIES OLS | W.E. ANDERSON™ BY DWYER

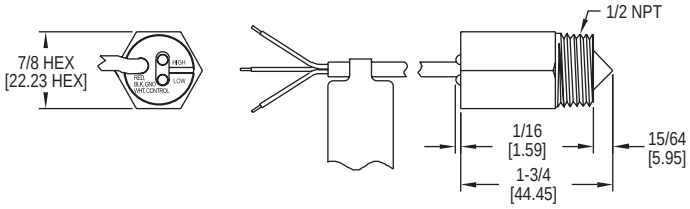
OPTITROL® OPTICAL LEVEL SWITCHES

Low Cost, Compact, LED Indication, No Moving Parts

OLS-10

OLS-11

OLS-12



The **Series OLS Optitrol® Optical Level Switches** are low cost, rugged optical level switches that indicate the presence or absence of liquid via infrared light that is reflected back through the prism lens. This series offers three optional materials, 316 SS, polysulfone and PFA.

FEATURES/BENEFITS
- Provides rapid response while employing no moving parts for stable process control
- Bright red and green LED's indicate the presence or absence of liquid for true, local indication
- Three optional materials, 316 SS, polysulfone and PFA provide application flexibility
- Compact switch can be quickly mounted horizontally or vertically for each installation

APPLICATIONS
- Food and beverage systems
- Liquid holding tanks
- Hydraulic reservoirs
- Pharmaceutical systems
- Air conditioning systems
- Sumps

SPECIFICATIONS

Service: Noncoating compatible liquids.
Wetted Materials: See model chart.
Temperature Limit: Process: OLS-10, 11: 200°F (93.3°C), OLS-12: 120°F (48.9°C); Ambient: OLS-10, 11: 175°F (79.4°C), OLS-12: 120°F (48.9°C).
Pressure Limit: OLS-11, 12: 200 psig (13.8 bar); OLS-10: 1000 psig (69 bar).
Repeatability: ±0.02″ (0.5 mm).
Switch Type: NPN open collector.
Power Requirements: 10-28 VDC.
Output Signal: Vout (max) = 28 VDC, Isink (max) = 100 mA.
Current Consumption: 35 mA max.
Electrical Connections: 38″ (965.2 mm) 3 conductor cable, 22 AWG wire.
Process Connection: 1/2″ male NPT.
Mounting Orientation: Can be mounted in any position.
Specific Gravity: No min.
Weight: 3 oz (0.085 kg).

MODEL CHART

Model	Wetted Materials
OLS-10	316 SS/polysulfone
OLS-11	Polysulfone
OLS-12	PFA

SERIES B-190 | MERCOID® BY DWYER

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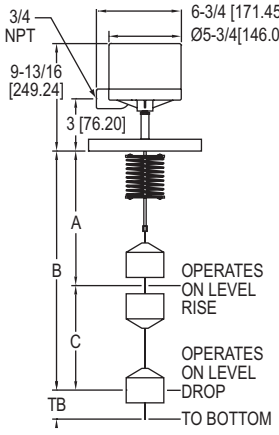
LIQUID LEVEL SWITCH-CONTROL

Top Mounted Displacer Type, Adjustable Setpoints, Magnetic Operation, Optional Hermetically Sealed Snap Switch



DIMENSIONS FOR 1.0 S.G. @ 100°F (38°C)

A		C		TB	B
Max.	Min.	Max.	Min.	Max.	Min.
116-1/2″ [2.66 m]	6-1/2″ [165 mm]	114″ [2.9 m]	6-3/4″ [172 mm]	2-1/2″ [64 mm]	122-1/4″ [3.1 m]

The **Series B-190 Liquid Level Switch-Control** is a top mount displacer type level control. They work on the principle that submerged solids weigh less in liquids, and as the liquid level rises and their weight decreases, the tension on the spring by which they are suspended is decreased. This Series is offered in a range of cable lengths, specific gravities, circuit types and enclosure ratings.

FEATURES/BENEFITS
- Extremely versatile design
- Displacers are suspended on a coil spring and do not float on the surface of liquids and are unaffected by turbulence or pressure
- Excellent for applications with viscous or dirty liquids

APPLICATIONS
- Pumping stations
- Foaming liquids
- Sanitary/sewage treatment
- Paints and varnishes
- Agitated or turbulent fluids
- Heavy oil refineries
- Chemical plants
- Power generating stations
- Viscous or dirty liquids

MODEL CHART

Model	Switch Type
B190-WT-4810-S-A-1.0-6	SPDT mercury
B190-WT-7810-S-A-1.0-6	SPDT snap
B190-WT-7810HM-S-A-1.0-6	SPDT hermetically sealed snap

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Cable, spring and stops: 316 SS; Optional Inconel® spring; Displacers: Porcelai; Optional 304 SS, 316 SS, or carbon graphite.
Temperature Limits: Ambient temperature: 32 to 200°F (0 to 93°C); Process temperature: 32 to 200°F (0 to 93°C).
Pressure Limit: 125 psig (8.6 bar). Higher ratings available.
Enclosure Rating: NEMA 4X. Optional general purpose or explosion-proof.
Switch Type: SPDT snap switch, hermetically sealed snap switch, or mercury switch. Optional DPDT or two stage.
Electrical Rating: Snap switch: 12 A @ 120 VAC, 5 A @ 240 VAC, 0.5 A @ 125 VDC resistive, 0.25 A @ 250 VDC resistive; Hermetically sealed snap switch: 5 A @ 120 VAC, 5 A @ 240 VAC, 5 A @ 30 VDC resistive; Mercury switch: 4 A @ 120 VAC/DC, 2 A @ 240 VAC/DC. Higher contact ratings available for the mercury switch.
Electrical Connections: Screw terminal.
Conduit Connection: 3/4″ female NPT.
Process Connections: 4″ 125 cast iron flange. Other material, size, and rating flanges are available.
Mounting Orientation: Vertical.
Set Point Adjustment: Adjustable by moving displacers see dimension chart for minimum and maximum values.
Deadband: Adjustable by moving displacers see dimension chart for minimum and maximum values.
Specific Gravity: Standard is 1.0. Specify when ordering by replacing 1.0 in model number with specific gravity setting desired. Settable range is 0.5 to 1.2.
Cable Length: 10′ (3 m) standard. Optional up to 100′ (30.5 m).
Weight: 25 lb (11.34 kg).
Agency Approvals: UL (None on HM switch).

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Dwyer

SERIES CLS2 | PROXIMITY® BY DWYER

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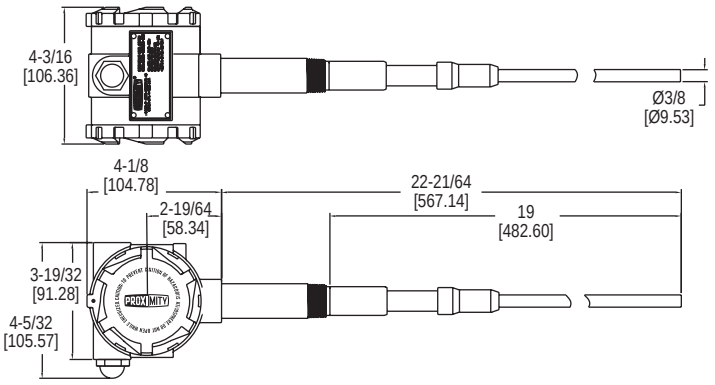
CAPACITIVE LEVEL SWITCH

Powder, Bulk, or Liquids, Auto-Calibration



The **Series CLS2 Capacitive Level Switch** is a capacitive technology level switch which can be used for liquids, powders and bulk materials. It is offered with PVDF and 316 SS wetted material, weatherproof enclosure, DPDT output and a variety of process connections.

FEATURES/BENEFITS

- No moving parts permitting for no jams, no wear, nothing to break, and no maintenance
- Impulse RF admittance measurement combined with an active guard, provides excellent level measurement and stability while being insensitive to material buildup
- Immune to external RF sources like walkie-talkies and cell phones as well as minimal interference with radio communication or other electronic systems
- Automatic calibration with no need to turn calibration pots, just push the calibration button and an external magnet to activate the calibration without having to open the enclosure saving time
- Coat guard probe is not affected by sticky, dusty, or clingy materials that coat or build preventing false alarms
- Status indication via an ultra-high brightness external red LED switch status indicator, and internal indicators for power, sensor, and switch status that can be seen externally with window cap option (external LED on weatherproof model only)
- Can be used for liquid interface applications to detect the level of two immiscible liquids that have different dielectric constants such as oil and water
- Failsafe setting with output switches that can be set for NO or NC condition on loss of power
- Time delay prevents false alarms from material splashing, agitation, etc.
- Removable terminal block snaps in and out enabling easy wiring outside of the enclosure
- Universal power supply with one model that works from 12-240 VAC/DC without any jumpers or change of setting
- Wetted materials of PVDF and 316 SS assure great chemical compatibility and meet food grade requirements

APPLICATIONS

- Sewage and wastewater
- Food and beverage
- Pharmaceuticals
- Sumps
- Boilers and steam generators
- Caustics and acids
- Reservoirs

SPECIFICATIONS

Service: Liquids, powder, and bulk materials compatible with wetted materials.
Wetted Materials: 316 SS and polyvinylidene fluoride (PVDF).
Temperature Limits: Ambient: -40 to 185°F (-40 to 85°C), -4 to 185°F (-20 to 85°C) with under 24 VAC/DC power supply; Process: -40 to 250°F (-40 to 121°C).
Pressure Limit: 365 psi (25 bar).
Enclosure Rating: Weatherproof, NEMA 4X (IP66).
Switch Type: DPDT (two form C).
Electrical Rating: 8 A @ 120/240 VAC res., 30 VDC. 1/2 hp @ 120 VAC and 1/4 hp @ 240 VAC ind.
Power Requirements: 12-240 VAC/DC.
Power Consumption: 2.8 watts max.
Electrical Connection: 1/2″ NPT conduit opening, screw termination with removable terminal block.
Process Connection: See model chart.
Mounting Orientation: Vertical or horizontal.
Set Point Adjustment: Trips when product touches probe. Cut or extend probe to length of desired trip point. Can be cut as short as 1″ and can be extended by welding on to probe. (Minimum length will be effected by material being sensed.)
Response Time: 0.2 s.
Time Delay: Adjustable, 0 to 60 s.
Spark/Static Protection: 10 M Ω dissipation resistance with spark gap. Surge current to 100A max.
Sensitivity: 8 selectable settings, 1, 2, 4, 6, 8, 10, 14, 20 pF (at 30 pF nominal free capacitance).
Agency Approvals: cULus.

MODEL CHART

Example	CLS2	-W	1	1	R	K	1	-019	-M20	CLS2-W11RK1-019-M20
Series	CLS2									Capacitive level switch
Enclosure		W								Weatherproof
Switch			1							DPDT rated 8 A @ 12/240 VAC, 30 VDC res.
Power Supply				1						12-240 VAC/DC
Probe Type					R T C					Standard rod: 316 SS, .375″ diameter Threaded rod: 316 SS (can attach 47″ (1.2 m) field extensions.*) Cable: 316 SS with weight
Insulator Material						K				PVDF
Process Connection							1 2 3 4 5 6 8 9			3/4″ male NPT 1″ male NPT 1-1/2″ male NPT 3/4″ BSPT 1″ BSPT 1-1/2″ BSPT 1-1/2″ sanitary clamp 2″ sanitary clamp
Probe Length								XXX		Insertion length in inches. Example 019 is 19″ length. (Minimum length is 6″, with 3/4″ sensing tip)
Options									M20 WC	M20 conduit connection with cable gland Window cap

Example: CLS2-W11RK1-019.

*Extension rods sold separately. Contact factory for part number.

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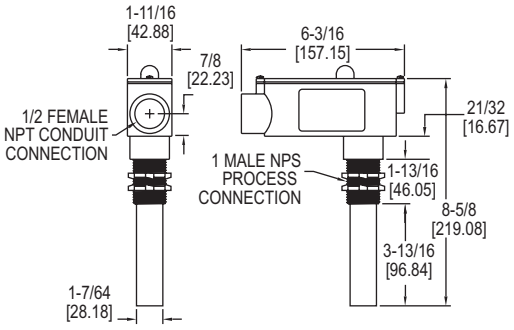
MODEL CLS1

CAPACITANCE LEVEL SWITCH

For Solids, Liquids or Slurries, Fail-Safe Protection, <1 pF Sensitivity



The **Model CLS1 Capacitance Level Switch** provides reliable point level measurement of solids, liquids and slurries in metallic or non-metallic tanks and vessels. It detects the presence or absence of material in contact with the probe by sensing a change in the capacitance.

FEATURES/BENEFITS
- Electronics provide highly sensitive measurement detection (requires less than a 1 picofarad shift from ambient)
- State of the art technology ignores material build-up on the vessel sidewall or along the probe assembly
- One time calibration is simple with a single multi-turn potentiometer
- Red LED on housing indicates sensor status
- Adjustable 1-30 second time delay and a 5 A, SPDT fail-safe relay output
- Added installation flexibility with vertically or horizontally mounting

APPLICATIONS
- High or low level detection
- Bins
- Silos
- Tanks
- Hoppers
- Chutes

SPECIFICATIONS

Service: Solids, liquids, or slurries.
Wetted Material: CPVC.
Temperature Limits: Process: -40 to 240°F (-40 to 116°C); Ambient: -40 to 185°F (-40 to 85°C).
Enclosure Rating: NEMA 4X (IP66), PVC, dust tight, water resistant.
Switch Type: SPDT.
Electrical Rating: 5 A @ 250 VAC.
Power Requirements: 120 VAC, 1.5 VA.
Conduit Connection: 3/4″ female NPT.
Process Connection: 1″ male NPS.
Mounting Orientation: Vertical or horizontal.
Sensitivity: Adjustable to < 1 pF.
Fail-Safe: Switch selectable, high/low.
Time Delay: Adjustable 1 to 30 s.
Weight: 2.0 lb (0.91 kg).

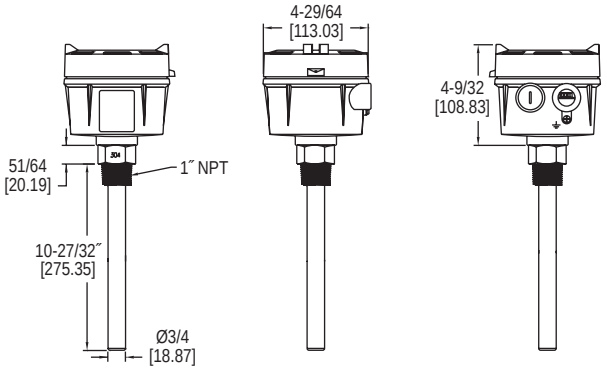
MODEL CHART

Model	Description
CLS1	Capacitance level switch

MODEL VRLS | PROXIMITY® BY DWYER

VIBRATING ROD LEVEL SWITCH

Economical, No Material Build Up, For Powder or Bulk Solids



The **Model VRLS Vibrating Rod Level Switch** is economical choice in level detection of powders and bulk solids. The VRLS incorporates a piezoelectric crystal that vibrates the rod at its natural frequency, when contact material is present it dampens the vibrations and the switch changes state.

FEATURES/BENEFITS
- Probe design allows for self-cleaning, ensuring no build-up or bridging of material and accurate detection
- No mechanical moving parts with no routine maintenance required
- Sensitivity is adjustable for detection ranging from large granular material to small powders with low bulk densities.
- The failsafe mode can be set for failure on high level or failure on low level using a selector switch in the enclosure
- Unaffected by the dielectric constant of the sensed material, making it superior to a capacitance level switch for applications where the dielectric constant is too low, where there is more than one material being used in one vessel, and when material moisture content can change
- Ideal for applications where the bulk density is too low for a rotating paddle level switch

APPLICATIONS
- Pulp and paper processing
- Mining
- Food and beverage
- Silos
- Hoppers

SPECIFICATIONS

Service: Dry powder or bulk materials compatible with wetted materials.
Sensitivity: Min. bulk density of 20 lb/ft³ (320 kg/m³).
Wetted Materials: 304 SS.
Temperature Limits: Ambient: -40 to 140°F (-40 to 60°C); Process: -40 to 176°F (-40 to 80°C).
Pressure Limit: 150 psi (10 bar).
Power Requirement: 20-250 VAC/VDC, 50/60 Hz.
Power Consumption: 15 VA.
Enclosure: Aluminum, painted.
Enclosure Rating: IP65.
Switch Type: SPDT.
Electrical Rating: 5 A @ 250 VAC.
Electrical Connections: Screw terminals.
Conduit Connection: 1/2″ female NPT x 2.
Process Connection: 1″ male NPT.
Indication Lights: Internal: green and red LED.
Sensing Delay: 0 to 6 s.
Weight: 4.4 lb (2.0 kg).

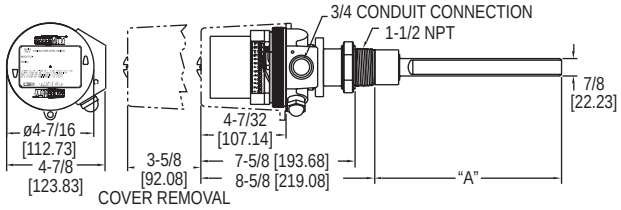
MODEL CHART

Model	Description
VRLS-01	Vibrating rod level switch

SERIES TFLS | PROXIMITY® BY DWYER

TUNING FORK LEVEL SWITCH

Perfect for Sensing Low Bulk Density or Low Dielectric Materials



Extension Length	DIM "A"
None	9-1/4 (234.95)
6 in	15-7/8 (403.23)
12 in	21-7/8 (555.63)
18 in	27-7/8 (708.03)
24 in	33-7/8 (860.43)
36 in	45-7/8 (1165.23)
48 in	57-7/8 (1470.03)

The **Series TFLS Tuning Fork Level Switch** is ideal for level control of powders and fine grained solids, especially those with a low bulk density. The TFLS incorporates a piezoelectric crystal that vibrates the fork at its natural frequency, when contact material is present it dampens the vibrations and the switch changes state.

FEATURES/BENEFITS
- Status indication with external LED switch indicator, and internal indicators for normal and alarm status
- No calibration required for quick and easy installation
- No mechanical moving parts with no routine maintenance required
- Unaffected by the dielectric constant of the sensed material, making it superior to a capacitance level switch for applications where the dielectric constant is too low, where there is more than one material being used in one vessel, and when material moisture content can change
- Vibrating fork design is ideal for low bulk density and low dielectric constant products, detecting products down to 1.8 lb/ft³ (30 g/l)
- Ideal for applications where the bulk density is too low for a rotating paddle level switch
- Adjustable sensitivity can be set to ignore lighter bulk density products and only detect heavier products, such as sand, gravel, or polyester chips in water
- Unit is not affected by vibration from conveying systems, motors, or the movement of material
- Mounted in any position and is available with factory built extensions for mounting on the top of the storage vessel
- Failsafe setting with output switch that can be set for NO or NC condition on loss of power
- Time delay prevents false alarms from material surges
- Universal power supply yields one model which works with 90-265 VAC and 24 VDC

APPLICATIONS
- Pulp and paper processing
- Food and beverage
- Lime, styrofoam, tobacco, dry cereals, sugar, animal feed, milk powder, flour, insulation, cement, paper shavings, plastic granules, sawdust, carbon black, light fibers, detergent powders, dyes, chalk, silica, sand, wood chips

SPECIFICATIONS

Service: Dry powder or bulk materials compatible with wetted materials. Can detect bulk materials submerged in liquid.
Sensitivity: Minimum bulk density of 1.8 lb/ft³ (30 g/l), max particle size 0.4˝ (10 mm).
Wetted Materials: 316 SS.
Temperature Limits: Ambient: -4 to 140˚F (-20 to 60°C); Process: -4 to 176°F (-20 to 80°C).
Pressure Limit: 145 psig (10 bar).
Power Requirement: 90-265 VAC, 50/60 Hz; 24 VDC.
Power Consumption: 4 VA.
Enclosure: Aluminum, powder coated.
Enclosure Rating: Weatherproof, NEMA 4X (IP66).
Switch Type: SPDT.
Electrical Rating: 5 A @ 230 VAC.
Electric Connections: Screw terminals.
Conduit Connection: 3/4˝ female NPT.
Process Connection: 1-1/2˝ male NPT.
Indication Lights: External: Red LED; Internal: Green and red LED's.
Sensing Delay: (Max) covered probe: 2 s; Uncovered probe: 3 to 7 s.
Time Delay: Separate settings for covering and uncovering the probe. Adjustable from 2 to 20 s.
Weight: 5.5 lb (2.5 kg).

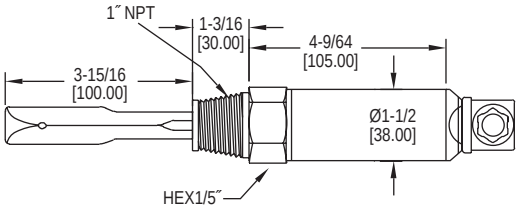
MODEL CHART

Model	Description
TFLS-W11SR1	Tuning fork level switch
Contact factory for fork extension options in stainless steel.	

MODEL CTF | PROXIMITY® BY DWYER

MINI TUNING FORK LEVEL SWITCH

Compact, Cost Effective, DIN Connection



The **Model CTF Mini Tuning Fork Level Switch** is an ideal choice for level control of powders. The CTF incorporates a piezoelectric crystal that vibrates the fork at its natural frequency, when contact material is present it dampens the vibrations and the switch changes state. This series offers a PNP or NPN output.

FEATURES/BENEFITS
- DIN connection and compact size allows for application in places a larger tuning fork level switch may not be suitable, providing great versatility
- No mechanical moving parts with no routine maintenance required
- Unaffected by the dielectric constant of the sensed material, making it superior to a capacitance level switch for applications where the dielectric constant is too low, where there is more than one material being used in one vessel, and when material moisture content can change
- Ideal for applications where the bulk density is too low for a rotating paddle level switch

APPLICATIONS
- Chemical processing
- Pulp and paper processing
- Mining
- Food and beverage

SPECIFICATIONS

Service: Dry powder compatible with wetted materials.
Sensitivity: Min. bulk solid density: 4.4 lb/ft³ (70 g/l).
Wetted Materials: Tuning Fork: 316 L SS; Process connection: 304 SS.
Temperature Limits: Ambient: -40 to 140°F (-40 to 60°C); Process: -40 to 212°F (-40 to 100°C).
Pressure Limit: 600 psi (40 bar).
Power Requirement: 12-55 VDC.
Power Consumption: 10 mA @ 12-24 VDC; 0.5 W (max.).
Enclosure: Aluminum, painted.
Enclosure Rating: IP65.
Switch Type: 3-wire PNP or NPN output.
Electrical Rating: 350 mA (max) @ 12 to 55 VDC.
Conduit Connection: Valve plug DIN 43650.
Process Connections: 1˝ male NPT.
Indication Lights: External red LED.
Sensing Delay: Max. covered probe: 1 to 3 s.; Uncovered probe: 1 to 3 s.
Weight: 2.2 lb (1.0 kg).
Agency Approvals: CE.

MODEL CHART

Model	Description
CTF-02	Mini tuning fork level switch with NPN output
CTF-03	Mini tuning fork level switch with PNP output

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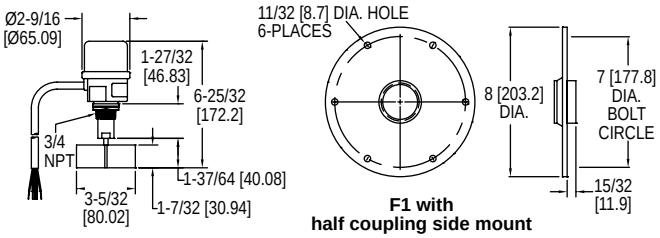
MODEL DBLM | PROXIMITY® BY DWYER

MINI-BIN DRY BULK LEVEL MONITOR

Compact, 4-Vane Paddle



F1 with half coupling side mount

The **Model DBLM Mini-Bin Dry Bulk Level Monitor** provides reliable level sensing for dry bulk solids where mounting space is limited. Model DBLM Mini-Bin operates by using a 1 rpm synchronous motor to rotate a four vane, plastic paddle, and when material surrounds paddle and impedes rotation, the motor is de-energized and triggers a SPDT snap switch. Mount the Mini-Bin with optional 1-1/4″ to 3/4″ reducer to replace standard size units.

FEATURES/BENEFITS
- Compact, side mount control reports high, intermediate, and low level conditions, eliminating overflows, choking, clogs or empty vessels
- Unaffected by the dielectric constant of the sensed material, making it superior to a capacitance level switch for applications where the dielectric constant is too low, where there is more than one material being used in one vessel, and when material moisture content can change

APPLICATIONS
- Mining
- Food and beverage
- Grain silos
- Hoppers

SPECIFICATIONS

Service: Dry bulk solids.
Wetted Materials: Polycarbonate paddle, SS shaft, PTFE washer.
Temperature Limits: -4 to 140°F (-20 to 60°C).
Enclosure Rating: Polycarbonate, NEMA 1 (IP10).
Switch Type: SPDT snap switch.
Electrical Rating: 3 A @ 250 VAC.
Power Requirements: 110 VAC, 50/60 Hz, 220 VAC optional, consult factory.
Power Consumption: 1.5 watt.
Electrical Connections: 18 AWG, 12″ leads wrapped in conduit.
Process Connection: 3/4″ male NPT, optional flange and 1-1/4″ to 3/4″ reducer.
Mounting Orientation: Side mount.
Weight: 0.77 lb (350 g).
Agency Approvals: CE.

MODEL CHART

Model	Power Supply
DBLM3040	110 VAC
DBLM3140	220 VAC

ACCESSORIES

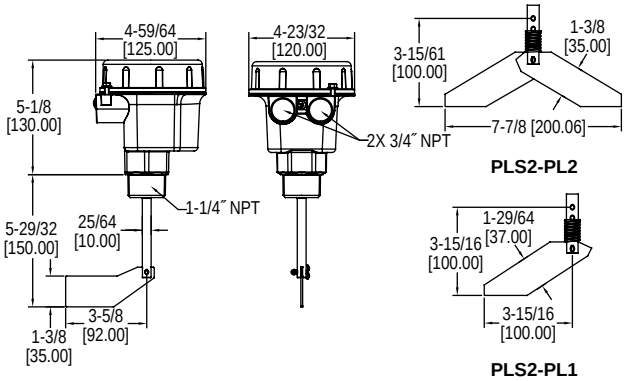
Model	Description
F1	8″ x 1-1/4″ NPT flexible carbon steel mounting flange
A-335	1-1/4″ to 3/4″ reducer 220

SERIES PLS2 | PROXIMITY® BY DWYER

PADDLE LEVEL SWITCH

3 Sensitivity Settings, Top or Side Mounting

VIDEO ONLINE



PLS2-PL2

PLS2-PL1

The **Series PLS2 Paddle Level Switch** is an electromechanical level switch designed for level monitoring of bulk materials. The rotating measuring vane is driven by a brushless synchronous motor at one revolution per minute and as product builds up, the paddle rotation is impeded and the resulting motor torque activates the output switch and stops the motor. The PLS2 is designed with the industry standard 1-1/4″ male NPT connection and unit can be side or top mounted.

FEATURES/BENEFITS
- Torque adjusting mechanism eliminates the need for different sized paddles
- 3 sensitivity settings for spring force can be set for light to very sticky materials
- Brushless synchronous motor assures long term reliability and efficiency
- Motor shuts ceases operation when paddle stalls
- Screw cover for easy access with no worries about losing bolts or screws
- Top or side mountable for added installation flexibility
- Unaffected by the dielectric constant of the sensed material, making it superior to a capacitance level switch for applications where the dielectric constant is too low, where there is more than one material being used in one vessel, and when material moisture content can change

APPLICATIONS
- Mining
- Food and beverage
- Silos
- Hoppers

SPECIFICATIONS

Service: Dry powder or bulk materials compatible with wetted materials.
Wetted Materials: Paddle: 304 SS; Exposed shaft: 303 SS; Shaft seal: NBR; Process connection: Aluminum.
Temperature Limits: Process: -13 to 176°F (-25 to 80°C); Ambient: -4 to 140°F (-20 to 60°C).
Pressure Limit: 11.6 psi (0.8 bar).
Power Requirement: Select by model number: 115 VAC, 230 VAC or 24 VDC.
Power Consumption: AC versions: 4 VA; DC version: 2.5 watt.
Enclosure: Aluminum, powder coated.
Enclosure Rating: NEMA 4 (IP66); Rated for Class II & III, Div. 1, Group E, F, G.
Switch Type: SPDT micro switch.
Electrical Rating: 5 A @ 250 VAC, 3 A @ 30 VDC.
Electric Connections: Screw terminals.
Conduit Connection: 3/4″ female NPT.
Process Connection: 1-1/4″ male NPT.
Mounting Orientation: Side or top mounting.
Sensitivity: Min. material density of 6 lb/ft³ (96 kg/m³).
Permitted Mechanical Loading: Standard shaft: 67 lbf (300 N) max; Optional extension: 22 lbf (100 N) max.
Weight: 2.6 lb (1.2 kg).
Agency Approvals: CE, FM.

MODEL CHART

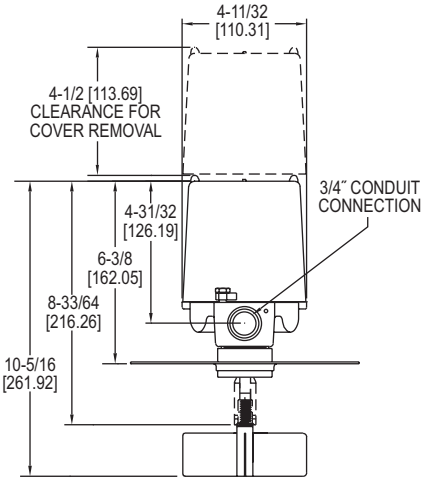
Model	Description
PLS2-E-1-1	Explosion-proof paddle level switch, 115 VAC power supply
PLS2-E-1-2	Explosion-proof paddle level switch, 230 VAC power supply
PLS2-E-1-3	Explosion-proof paddle level switch, 24 VDC power supply
Note: Models include single sided non-spring paddle.	

ACCESSORIES

Model	Description
PLS2-PL1	Single sided spring paddle
PLS2-PL2	Double sided spring paddle
PLS2-EX1	8.5″ shaft extension
PLS2-EX2	19.6″ shaft extension
PLS2-EX3	39.4″ shaft extension
PLS2-EX4	78.7″ shaft extension

PADDLE LEVEL SWITCH

Weatherproof and Explosion Proof Option, Rotary Paddle Level Control, Top or Side Mounting for Dry Bulk Materials



VIDEO ONLINE

ISOLATED MAGNETIC DRIVE

PDL-1
Minimum bulk density of 5 lb/ft³ (80 kg/m³).

PDL-2
Minimum bulk density of 30 lb/ft³ (481 kg/m³).

PDL-3
Minimum bulk density of 30 lb/ft³ (481 kg/m³). Fits through a 1-1/4″ coupling eliminating the need for a mounting flange.

PDL-4
Minimum bulk density of 70 lb/ft³ (1122 kg/m³). Fits through 1-1/4″ coupling eliminating the need for a mounting flange.

The **Series PLS Paddle Level Switch** uses a 1 RPM synchronous motor to rotate a paddle and sense the presence of dry powder or bulk materials. Movement is impeded when product comes into contact with the paddle and the resulting motor torque activates the output switches and stops the motor. The PLS is designed with the industry standard 1-1/4″ male NPT connection and mounting flanges.

FEATURES/BENEFITS

- Magnetic drive isolates and completely seals the control head from the process and environment preventing material or dust from entering the control head
- Motor shuts-off when paddle stalls increasing motor life, preventing motor burnout, and decreasing power usage
- Slip clutch design enabled by the magnetic drive that prevents damage to motor and drive mechanism from sudden or excessive loading on the paddle
- Status indication light on weatherproof models
- Screw cover on the enclosure for easy access with no worries about losing bolts or screws
- Modular design to allow field installation of any paddle, flanges, shaft extensions, or shaft guards
- Flexible coupling available for protection of the paddle and drive from side loads, surges or impacts. Recommended for top mount applications with shaft extension and applications with large or heavy materials

APPLICATIONS

- Mining
- Food and beverage
- Silos
- Hoppers

SPECIFICATIONS

Service: Dry powder or bulk materials compatible with wetted materials.
Sensitivity: Min material density of 5 lb/ft³ (80 kg/m³), max of 200 lb/ft³ (3200 kg/m³).
Wetted Materials: Paddles: 316 SS; Exposed shaft: 316 SS; Shaft seal: PTFE; Mounting boss: Aluminum; Flexible coupling: 316 SS; Mounting flanges: Carbon steel or 316 SS; Shaft extension and shaft guards: Galvanized steel or 316 SS.
Temperature Limits: Standard construction: Process: -40 to 300°F (-40 to 148.9°C); Ambient: -40 to 185°F (-40 to 85°C); High temperature option: Process: -40 to 500°F (-40 to 260°C); Ambient: -40 to 185°F (-40 to 85°C).
Pressure Limit: 30 psig (2.07 bar) max for .5 micron or larger material.
Power Requirement: Select by part number: 110-120 VAC, 230 VAC, 24 VAC, 48 VAC or 12 VDC.
Power Consumption: Weatherproof models: 5 watts; Explosion-proof models: 3 watts.
Enclosure: Aluminum, powder coated.
Enclosure Rating: Weatherproof (W, WH construction): NEMA 4X (IP66); Explosion-proof (E, EH construction): NEMA 4X (IP66) and rated for Class I, Div. 1 & 2, Groups C & D, Div. 1 & 2, Groups E, F, & G.
Switch Type: SPDT or optional DPDT snap switch.
Electrical Rating: 15 A @ 120.
Electric Connections: Screw terminals.
Conduit Connection: 3/4″ female NPT.
Process Connection: 1-1/4″ male NPT. Optional flange.
Indication Light: Red LED that activates when switch is made or when switch is not made with RL option (Not available on explosion-proof models).
Options: Time delay relay, high temperature construction, top mount, shaft extensions, shaft shields, flexible couplings, other power voltages, reversed light.
Agency Approvals: cUL approved as an auxiliary device or as an auxiliary device for hazardous locations.
Weight: Control head only: 4 lb (1.81 kg).

MODEL CHART

Paddle Model	Flange Model	Description
PDL-1	FLG-CSH	Carbon steel with half coupling
PDL-2	FLG-CSF	Carbon steel with full coupling
PDL-3	FLG-SSH	316 SS with half coupling
PDL-4	FLG-SSF	316 SS with full coupling

Note: Contact the factory for shaft extensions, protective shields, and other options. More detailed information available in our Measurement & Control for Powder, Dust, and Bulk Materials Catalog.

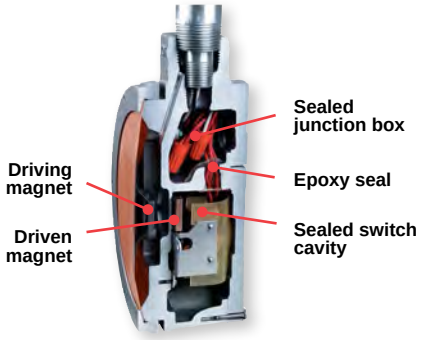
MODEL CHART - CONTROL ASSEMBLIES

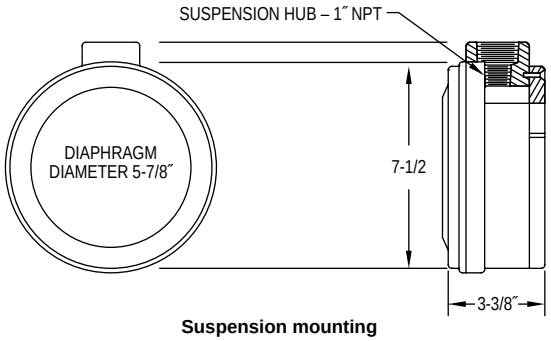
Model	Description
PLS-W-S-1-0-0-0-0	Weatherproof construction, SPDT switch, 120 VAC power supply. Order paddles and flanges separately.
PLS-W-S-1-3-0-0-0	Weatherproof construction, SPDT switch, 120 VAC power supply, includes PDL-3 paddle.
PLS-W-S-1-2-CSH-0-0	Weatherproof construction, SPDT switch, 120 VAC power supply, includes PDL-2 paddle and FLG-CSH flange.

*316 SS mounting boss available.

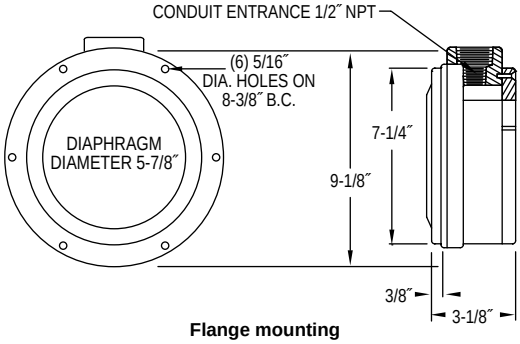
ULTRA-MAG™ EXPLOSION-PROOF LEVEL SWITCHES

For Powder and Bulk Solids





Suspension mounting



Flange mounting

The **Series E, G, & P Ultra-Mag™ Explosion-Proof Level Switches For Powder and Bulk Solids** are explosion-proof series of level switches for powder and bulk solids that utilize a unique magnetic linkage and diaphragm design to sense the presence of powder and bulk solids in a variety of bins, vessels, and hoppers.

FEATURES/BENEFITS

- Uses a unique magnetic linkage which isolates the electrical compartment from controlled product, reducing maintenance and improving sensitivity
- Sealed switch compartment and sealed leads yield the exceptionally reliable operation
- A wide selection of diaphragms and switches is available with choices of flange or suspension mounting to fit a specific application
- Extremely sensitive indication and very economical
- Magnetic linkage makes this simple explosion-proof diaphragm switch the most rugged and reliable level control for a variety of products

APPLICATIONS

- Mining
- Food and beverage
- Silos
- Hoppers

MOUNTING SELECTION

A choice of either suspension or flange mounting is available to match your application. Flange mounting is the best choice for control of low or intermediate level in vessels containing granular product that does not "bridge", "rathole", or otherwise build up on vessel walls. Choose suspension mounting for high level in vessels and for better operation with "bridging" product.❶

Note: The mounting configuration is represented by the letter "S" for suspension or "F" for flange which is the second digit in the part number.❷

DIAPHRAGM SELECTION

A wide variety of diaphragms are available to match product bulk density, flowability, abrasiveness and temperature requirements while providing maximum sensitivity. The best choice for vessels subject to pressure or vacuum is "breathable" fabric (P Series), requiring no venting. Non-porous elastomer (G Series) type diaphragms are the best choice for more abrasive product and broader temperature range applications. Venting is always required with the G series and if used in pressurized vessels, venting to the tank atmosphere is required to allow pressure equalization. A slide rule "Diaphragm Selector" is available from the factory to help you choose the diaphragm best suited to your application.

SPECIFICATIONS

Service: Compatible powder or bulk solids.
Wetted Materials: Mounting flange: See model chart. Aluminum or 304 SS; Diaphragm: See model chart. Urethane, Buna-N, PTFE, silicone rubber, polyester, fluoroelastomers, white Buna-N (food grade), or EPDM.
Temperature Limits: Depends on diaphragm material, see model chart. Standard switch: -40 to 185°F (-40 to 85°C); High temperature switch: -40 to 350°F (-40 to 176°C).
Pressure Limit: 60 psig (4.14 bar).
Enclosure Rating: General purpose or weatherproof and explosion-proof. See model chart.
Switch Type: See model chart.
Electrical Rating: See model chart.
Electrical Connections: 18 gage solid core, 600 V TEW 105°C, style 1015. Epoxy sealed at conduit entrance. 12″ (304.8 mm) long.
Conduit Connection: 1/2″ female NPT.
Process Connection: For flanged models standard is 8-3/8″ (212.725 mm) diameter bolt hole circle.
Mounting Orientation: Flange mount or suspend depending on model.
Set Point Adjustment: Internal screw.
Options: Suspension kits and flange adapter rings.
Weight: 7 lb (3.18 kg).
Agency Approvals: UL.

❶Suspension and Flange Mounting Kits: See page 327 (Ultra Mag™)
❷Part Number: See page 327 (Ultra Mag™)

ULTRA-MAG™ EXPLOSION-PROOF LEVEL SWITCHES

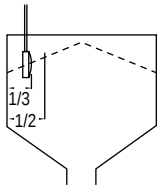
For Powder and Bulk Solids

DIAPHRAGM SELECTION GUIDE			
Product	**Suggested Diaphragm***	**Product**	**Suggested Diaphragm***
Abrasive	3D	Polypropylene powder	7A
Aggregate	3D	Polypropylene resin	17
Alumina	3D	Polystyrene beads	3D
Ash, dry	3D	Pot ash	3D
Baking powder	7B	Powdered metal	3D
Baking soda	7B	Powdered ore	3D
Barite	3D	PVC powder	7A
Bark, ground	6G	PVC resin	17
Barley, ground or meal	17	Rice	17
Barley, whole	4B	Rye	3D
Beans, edible	4B	Salt	3D
Bentonite	3D	Sand, dry	3D
Bond, foundry	17	Sand, dry silica	3D
Carbon black	7A	Sand, Foundry prepared	5A
Cement, klinker	8A	Sand, shake out	3D
Cement, portland	4B	Sawdust, dry	6G
Chips, hogged fuel	6G	Sea coal	3D
Coal	3D	Sesame seed	3D
Compost	5A	Shale, crushed	3D
Core sand, foundry	3D	Silica, flour	3D
Corn, shelled	8A	Sludge, sewage dried	1A
Diatomaceous earth	7A	Sludge, sewage, ground	1A
Drill mud	3D	Soda ash	3D
Flour	7B	Soybeans, cracked	3D
Fly ash	3D	Soybean, flake	7A
Glass batch	3D	Soybean, flour	7A
Gravel	3D	Soybean meal	3D
Iron ore, crushed	3D	Soybean, whole	3D
Kaolin clay	3D	Sugar beets, whole	6H
Lime, hydrated	5A	Sugar refined	7B
Lime, stone	3D	Sunflower seed	7A
Oats	4B	Taconite pellets	3D
Peanuts in shell	7A	Talcum powder	3D
Peanuts, shelled	3D	Walnut shells, crushed	3D
Perlite	7A	Wheat	8A
Phosphate, rock	3D	Wheat, wet	5A
Polyethylene powder	7A	Wood, chips	6G
Polyethylene resin	17	Wood, dust	6G
Polypropylene fluff	7A		

*Diaphragm codes become 4th and 5th characters in model number.

SUSPENSION MOUNTING

Suspension mounting is normally used for high level monitoring in vessels. For product over 20 lb/ft³, the level switch (diaphragm face) should be located about 1/3 of the distance from the vessel wall to the point of entry of the product. For product less than 20 lb/ft³, the unit should be located closer to the point of entry of the product, about 1/2 the distance from the vessel wall to the point of entry. Pressure required to depress the diaphragm and trip the switch is in the range of 5 to 15 oz in the horizontal direction (perpendicular to the diaphragm). Suspension mounting provides the easiest vertical adjustment capability, greatest sensitivity and best maintenance conditions.



SUSPENSION ASSEMBLY KITS

Pre-assembled kits are available from the factory, or you can build your own kits using standard pipe fittings shown in our Proximity Bill of Materials (Form No. 101). Pipes and fittings are normally galvanized steel, but aluminum and SS pipes and fittings are available. Units are secured to a steel cover plate that rests on a rectangular steel flange welded into the top of the vessel. Aluminum and stainless coverplates and flanges are also available. Standard 48″ L x 1″ pipe provides working depth (WD) up to 48″. Longer pipe (to provide greater WD) is available. GS Series switches have upper (L1 = 28″ standard) and lower (L2 = 20″ standard) 1″ pipes, with a tee (for stilling pot) in between. A stilling pot is required to equalize pressure and keep dirt from building up behind the diaphragm. PS series require a 1/2″ conduit in 1″ suspension pipe for explosion-proof applications. The 1/2″ conduit (56″ standard length) is a standard part of the GS series assembly.

MODEL CHART - ALUMINUM FLANGE ADAPTER RINGS			
Model	**Tank Outside Diameter**	**Model**	**Tank Outside Diameter**
126-009	15″	**126-016**	84″
126-010	30″	**126-017**	96″
126-011	36″	**126-018**	10′
126-012	42″	**126-019**	12′
126-013	48″	**126-020**	14′
126-014	60″	**126-021**	24′
126-015	72″		

MODEL CHART - "P" AND "G" SERIES SUSPENSION ASSEMBLY KITS	
Model	**Description**
901-409	″P Series suspension assembly includes 1/2″ pipe (56″ std length), 1″ pipe (48″ std length), 1″ pipe coupling, 1-1/2 NPT strain relief on 1″ pipe. Galvanized mild steel pipe, explosion proof, standard.
901-412	″G″ Series suspension assembly includes 1/2″ pipe (56″ std length), watertight strain relief and 1″ coupling, upper 1″ pipe (28″ std length), lower 1″ pipe (20″ std length), strain relief with 1-1/2″ NPT, 1″x1″x1″ Tee, 1″ street ell and 1″ pipe-4″ long stilling pot. Galvanized steel pipe, explosion proof, standard.
Note: Specials include aluminum or stainless steel assemblies. Flange port and cover assemblies are sold separately. Consult factory for details.	

MODEL CHART									
Example	**E**	**-EX**	**-G**	**-S**	**-D**	**-3D**	**-A**		**EX-G-S-D-3D-A***
Certification 1	E								Ultra-Mag™ explosion-proof level switches
Certification 2		EX							Explosion-proof (UL) Class I, Div I and II, Groups C and D; Class II, Div I and II, Groups E, F, and G General purpose (no code)
Basic Magnetic Pressure Sensing Series			G P						Elastomeric diaphragm-venting required*. (Diaphragms 1A - 8A) Breathable fabric diaphragm-no venting required. (Diaphragms 16 and 17 only)
Mounting (Top = Suspension/ Side = Flanged)				S F T					Suspended (G series require suspension vent fittings)* Subtract 10 lbs./cu. ft.-greater sensitivity Flanged, aluminum standard Flanged, 304 SS
Housing Material					D A E				Aluminum Aluminum, anodized Aluminum, epoxy coated
Diaphragm Material (Temperature) (Bulk Density)						3D 3E 4B 5A 6D 6E 6G 7A 7B 8A 16 17			Urethane, .031″ thick, (10 to 150°F), (> 30 lb/ft³) Urethane, orange, .062″ thick, (10 to 150°F), (> 90 lb/ft³) Buna-N, black, .020″ thick, (-20 to 212°F), (20 to 90 lb/ft³) PTFE/glass on silicone rubber, .024″ thick, (-40 to 350°F), (> 35 lb/ft³) Silicone rubber, gray, .062″ thick, (-40 to 350°F), (15 to 30 lb/ft³) Silicone rubber on glass, red, .032″ thick, (-40 to 350°F), (> 90 lb/ft³) ″6C″ w/urethane overlay, (-40 to 350°F), (wood chips diaphragm with ″A2″) Silicone rubber on glass (White), .015″ thick, (-40 to 350°F), (5 to 40 lb/ft³) Buna-N (food applications-white), .060″ thick, (-20 to 212°F), (30 to 90 lb/ft³) EPDM, black, .036″ thick, (-40 to 275°F), (40 to 90 lb/ft³) Polyester filter fabric, white, 150 micron permeability, (-30 to 275°F), (30 to 90 lb/ft³) Polyester nitex, white, 15 micron permeability (-30 to 275°F), (30 to 90 lb/ft³)
Switch Type							A T V G		Standard, SPDT, 15 A @ 125, 250 VAC High temp, SPDT, 5 A @ 125, 250 VAC; 24 VDC** High vibration, SPDT, 15 A @ 125, 250 VAC Gold contacts, SPDT, 1 A @ 125 VAC, 1/2 A @ 24 VDC
Special Controls								A2 A3	Wood chip control (with ″6G″ diaphragm only) High sensitivity actuator (for very light product)
*GS - G series suspended controls require suspension vent fittings. **Not UL listed.									
Note: The ″EX″ prefix must he added to the 6-digit model number for ″explosion-proof standard″. General purpose units do not require the ″EX″ or other prefix.									

Dwyer

SERIES SBLT2 & SBLTX | MERCOID® BY DWYER

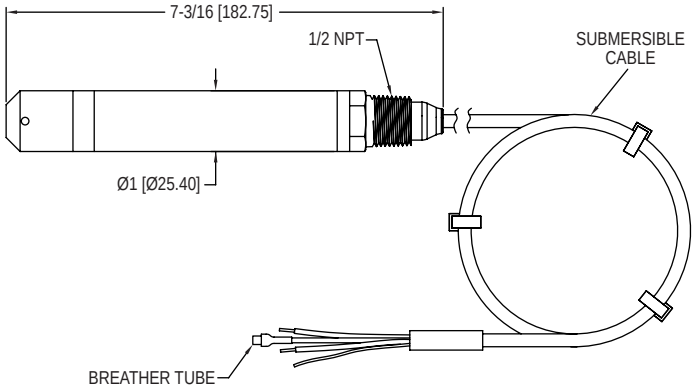
SUBMERSIBLE LEVEL TRANSMITTERS

Perfect for Ground Water and Wells, Lightning Protected, Standard 72 Hour Lead Time

SBLT2

SBLTX
(ATEX option available)

NOW WITH 72 HOUR
OUT OF STOCK LEAD TIME!



The **Series SBLT2 & SBLTX Submersible Level Transmitters** are manufactured for years of trouble free service. These series measure the height of liquid above the position in the tank referenced to atmospheric pressure. The transmitter consists of a piezoresistive sensing element, encased in a 316 SS housing.

FEATURES/BENEFITS

- Slim design for tight applications with bullet nose design which protects the diaphragm from damage
- Incorporates lightning and surge protection utilizing dual arrestor technology, grounded to case, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty) on SBLT2 models
- Maintenance free filter eliminates particulate or water droplets from entering the transducer
- UL approved intrinsically safe on SBLTX models for use in hazardous locations when used with proper barrier
- 270 lb tensile strength shielded and vented cable
- Excellent chemical compatibility
- NPT connection allows the unit to be rigidly installed in a pipe/conduit, or the addition of a A-625 hanging loop for attaching a chain for pulling out of the installation
- Standard 72 hour lead time ensures minimal downtime

APPLICATIONS

- Well monitoring
- Ground water monitoring
- Environmental remediation
- Surface water monitoring
- Down hole
- Water tanks

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Body: 316 SS, 316 L SS; Bullet nose: PVC; Cable: Polyether polyurethane or ETFE; Seals: Fluoroelastomer.
Accuracy: ±0.25% FS.
Temperature Limit: SBLT2: Polyurethane: 0 to 150°F (-18 to 66°C); ETFE: 0 to 200°F (-18 to 93°C); SBLTX -4 to 176°F (-20 to 80°C); Polyurethane: -4 to 149°F (-20 to 65°C).
Compensated Temperature Range: SBLT2: 0 to 140°F (-18 to 60°C); SBLTX: 0 to 176°F (-18 to 80°C).
Thermal Effect: ±0.02% FS/°F.
Pressure Limit: 2X FS.
Power Requirement: SBLT2: 10-30 VDC (≤ 1000 ft (305 m) of cable); SBLTX: 10-28 VDC.
Output Signal: 4-20 mA DC, 2-wire.
Response Time: 50 ms.
Max. Loop Resistance: 900 Ω at 30 VDC.
Electrical Connections: Wire pigtail.
Mounting Orientation: Suspended in tank below level being measured.
Electrical Protection: SBLT2: Lightning and surge protection; SBLTX: None.
Weight: 2.2 lb (1.0 kg).
Agency Approvals: SBLT2: CE; SBLTX: CE, cULus intrinsically safe for Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III Div. 1; ATEX: II 1 G Ex ia IIC T4 Ga and II 1 D Ex ia IIIC T135C Da (according to control drawing 001833-43)*.

*Up to 196´ (59.5 m) for ETFE cable; Up to 333´ (101.5 m) for polyurethane cable.

OPTIONS

Model	Description
-P1	1/4˝ NPT male
-P2	1/4˝ NPT female
-P3	1/4˝ BSPT male ISO 228 R
-P4	1/4˝ BSPT female ISO 228 RC
-P11	3/4˝ clean-out type
-ATEX	ATEX intrinsically safe

-P11 option

MODEL CHART

Model	Range psi* (ft w.c.) [m w.c.]	Cable Length ft (m)	Cable Type
SBLT2-5-40-ETFE	5 (11.54) [3.52]	40 (12.2)	ETFE
SBLT2-10-40-ETFE	10 (23.09) [7.04]	40 (12.2)	ETFE
SBLT2-15-60-ETFE	15 (34.63) [10.56]	60 (18.3)	ETFE
SBLT2-20-60-ETFE	20 (46.18) [14.08]	60 (18.3)	ETFE
SBLT2-5-40	5 (11.54) [3.52]	40 (12.2)	Polyurethane
SBLT2-10-40	10 (23.09) [7.04]	40 (12.2)	Polyurethane
SBLT2-15-60	15 (34.63) [10.56]	60 (18.3)	Polyurethane
SBLT2-20-60	20 (46.18) [14.08]	60 (18.3)	Polyurethane
SBLT2-3.5M-5M	4.97 (11.48) [3.5]	16.40 (5)	Polyurethane
SBLT2-5M-10M	14.21 (32.81) [10]	32.81 (10)	Polyurethane
SBLT2-10M-18M	25.58 (59.06) [18]	59.06 (18)	Polyurethane

*Configured ranges below 5 psi (11.54´ w.c.) (3.52 m w.c.) ±1% FS accuracy.

Note: For intrinsically safe approval, change model number from SBLT2 to SBLTX. For custom ranges or cable lengths, contact factory.

ACCESSORIES

Model	Description
MTL5541	Galvanic barrier
MTL7706	Intrinsically safe zener barrier
A-297	Dessicant filter for vent tube. Removes humidity for protection of the sensor. Changes color to show saturation
A-625	316 SS cable hanger use with NPT option for attaching chain for easy pulling out of application

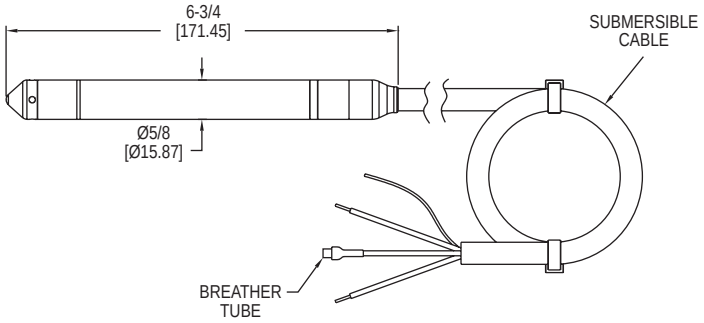
A-297 **A-625**

Dwyer

SERIES MBLT | MERCOID® BY DWYER

MINIATURE SUBMERSIBLE LEVEL TRANSMITTER

Only 0.63″ (16 mm) in Diameter, Perfect for Wells and Boreholes, Low Power Models for Telemetry Systems



The **Series MBLT Miniature Submersible Level Transmitter** measures the height of liquid above the position in the tank referenced to atmospheric pressure. The transmitter consists of a piezoresistive sensing element, encased in a 0.63″ (16 mm) diameter 316 SS housing.

FEATURES/BENEFITS

- Slender 0.63″ (16 mm) diameter design fits in narrow openings
- Constructed for years of trouble free service with welded 316 SS body and 316 SS nose cap
- Body top is 316 SS and tapered to prevent damage or snares when pulling the unit out of the installation
- ±0.10% or ±0.25% FS accuracy output is more precise than BFSL or BSL rated outputs used by most competitors
- Maintenance free filter eliminates particulate or water droplets from entering the transducer
- Comes with a choice of polyether polyurethane or ETFE cable materials for excellent chemical compatibility
- Incorporates lightning and surge protection, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty)

APPLICATIONS

- Ballast tanks
- Ground water monitoring
- Surface water monitoring
- Dewatering
- Down hole
- Remote telemetry
- Remote flood monitoring
- Narrow conduit or pipe installations
- Remediation and environmental monitoring

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Body and nose: 316 SS; Cable: Polyether polyurethane or ETFE; Seals: Fluoroelastomer; Label: Polyolefin.
Accuracy: ±0.25% or ±0.10% FS**.
Temperature Limits: -4 to 176°F (-20 to 80°C).
Compensated Temperature Limits: 0.25%: (0 to 70°C); 0.10%: (0 to 60°C).
Thermal Effect: 0.25%: ±0.45% FS TEB; 0.10%: ±0.30% FS TEB.
Pressure Limit: 2x FS.
Power Requirements: Current output: 10-33 VDC; Voltage output: 8-33 VDC; 5 mA max (no load).
Output Signal: 4-20 mA DC 2-wire or 0-5 V* (model depending).
Response Time: < 50 ms.
Max Loop Resistance: 1000 Ω @ 30 VDC (current output).
Voltage Output Impedence: 10 Ω + 4.4 Ω / 100´ cable (voltage output).
Electrical Connections: Wire pigtail.
Mounting Connection: Suspended below point being monitored.
Electrical Protection: Surge/lightning protected per EN61000-4-5, Class 5.
Weight: Body: 0.235 lb (0.107 kg); Cable: 0.037 lb (0.017 kg) per foot.
Agency Approvals: CE.

*Consult factory for additional outputs.
**4.3 to 4.9 psi (10 to 11.54 in w.c.) configured ranges ±0.30% FS accuracy

OPTIONS

For custom ranges, cable lengths, or ETFE cable, contact the website.

ACCESSORIES

Model	Description
A-297	Dessicant filter for vent tube. Removes humidity for protection of the sensor. Changes color to show saturation

A-297

MODEL CHART

4-20 mA output Model ±0.10%	4-20 mA output Model ±0.25%**	0-5 V output Model ±0.25%**	Range psi (´ w.c.) [m w.c.]	Cable Length	Cable Type
-	MBLT-2SC-IVPP-5-40	MBLT-2SC-VVPP-5-40	5 (11.54) [3.52]	40´	Polyether polyurethane
-	MBLT-2SC-IVPF-15-40	MBLT-2SC-VVPF-15-40	6.50 (15) [4.57]	40´	Polyether polyurethane
-	MBLT-2SC-IVPM-5-12.2	MBLT-2SC-VVPM-5-12.2	7.10 (16.40) [5]	12.2 m	Polyether polyurethane
-	MBLT-2SC-IVPM-10-30**	MBLT-2SC-VVPM-10-30**	14.22 (32.84) [10]	9.14 m	Polyether polyurethane
MBLT-2SB-IVPF-20-40	MBLT-2SC-IVPF-20-40	MBLT-2SC-VVPF-20-40	8.66 (20) [6.10]	40´	Polyether polyurethane
MBLT-2SB-IVPF-30-50	MBLT-2SC-IVPF-30-50	MBLT-2SC-VVPF-30-50	12.99 (30) [9.14]	50´	Polyether polyurethane
MBLT-2SB-IVPM-10-15.2	MBLT-2SC-IVPM-10-15.2	MBLT-2SC-VVPM-10-15.2	14.21 (32.81) [10]	15.2 m	Polyether polyurethane
MBLT-2SB-IVPF-50-70	MBLT-2SC-IVPF-50-70	MBLT-2SC-VVPF-50-70	21.65 (50) [15.24]	70´	Polyether polyurethane
MBLT-2SB-IVPM-20-26	MBLT-2SC-IVPM-20-26	MBLT-2SC-VVPM-20-26	28.42 (65.62) [20]	26 m	Polyether polyurethane
MBLT-2SB-IVPM-30-36	MBLT-2SC-IVPM-30-36	MBLT-2SC-VVPM-30-36	42.63 (98.43) [30]	36 m	Polyether polyurethane
MBLT-2SB-IVPF-100-120	MBLT-2SC-IVPF-100-120	MBLT-2SC-VVPF-100-120	43.31 (100) [30.48]	120´	Polyether polyurethane
MBLT-2SB-IVPM-40-46	MBLT-2SC-IVPM-40-46	MBLT-2SC-VVPM-40-46	56.83 (131.23) [40]	46 m	Polyether polyurethane
MBLT-2SB-IVPF-150-170	MBLT-2SC-IVPF-150-170	MBLT-2SC-VVPF-150-170	64.96 (150) [45.72]	170´	Polyether polyurethane
MBLT-2SB-IVPM-60-66	MBLT-2SC-IVPM-60-66	MBLT-2SC-VVPM-60-66	85.25 (196.85) [60]	66 m	Polyether polyurethane
MBLT-2SB-IVPF-200-220	MBLT-2SC-IVPF-200-220	MBLT-2SC-VVPF-200-220	86.62 (200) [60.96]	220´	Polyether polyurethane
MBLT-2SB-IVPF-350-370	MBLT-2SC-IVPF-350-370	MBLT-2SC-VVPF-350-370	151.58 (350) [106.68]	370´	Polyether polyurethane
MBLT-2SB-IVPM-100-106	MBLT-2SC-IVPM-100-106	MBLT-2SC-VVPM-100-106	142.09 (328.08) [100]	106 m	Polyether polyurethane
MBLT-2SB-IVPM-200-206	MBLT-2SC-IVPM-200-206	MBLT-2SC-VVPM-200-206	284.18 (656.17) [200]	206 m	Polyether polyurethane
MBLT-2SB-IVPF-690-710	MBLT-2SC-IVPF-690-710	MBLT-2SC-VVPF-690-710	298.83 (690) [210.31]	710´	Polyether polyurethane

**4.3 to 4.9 psi (10 to 11.54 in w.c.) configured ranges ±0.30% FS accuracy

Dwyer

SERIES PBLT2 & PBLTX | MERCOID® BY DWYER

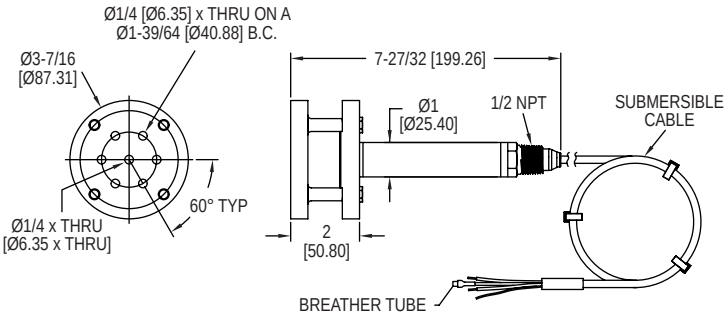
SUBMERSIBLE LEVEL TRANSMITTERS

Perfect for Sludge and Slurries, Lightning Protected, Standard 72 Hour Lead Time

PBLT2

PBLTX
(ATEX option available)

NOW WITH 72 HOUR OUT OF STOCK LEAD TIME!



The **Series PBLT2 & PBLTX Submersible Level Transmitters** are manufactured for years of trouble free service in the harshest applications. These Series measure the height of liquid above the position in the tank referenced to atmospheric pressure. The transmitter consists of a piezoresistive sensing element, encased in a 316 SS housing with cage and large diameter 316 SS diaphragm seal.

FEATURES/BENEFITS

- Durable cage design with large diameter 316 SS diaphragm seal that is non-clogging and damage resistant to floating solids
- Incorporates lightning and surge protection utilizing dual arrestor technology, grounded to case, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty) on PBLT2 models
- Maintenance free filter eliminates particulate or water droplets from entering the transducer
- UL approved intrinsically safe on PBLTX models for use in hazardous locations when used with proper barrier
- 270 lb tensile strength shielded and vented cable
- Excellent chemical compatibility
- NPT connection allows the unit to be rigidly installed in a pipe/conduit, or the addition of a A-625 hanging loop for attaching a chain for pulling out of the installation
- Standard 72 hour lead time ensures minimal downtime

APPLICATIONS

- Wastewater
- Sludge pits, clarifiers, digesters
- Alum tanks
- Chemical storage tanks
- Oil tanks
- Lime slurry
- Sumps
- Reservoirs

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Body: 316 SS, 316 L SS; Cable: Polyether polyurethane or ETFE; Seals: Fluoroelastomer.
Accuracy: ±0.25% FS (includes linearity, hysteresis, and repeatability).
Temperature Limit: PBLT2: 0 to 200°F (-18 to 93°C); PBLTX: ETFE -4 to 176°F (-20 to 80°C); Polyurethane: -4 to 149°F (-20 to 65°C).
Compensated Temperature Range: PBLT2: 0 to 180°F (-18 to 82°C); PBLTX: 0 to 176°F (-18 to 80°C).
Thermal Effect: ±0.02% FS/°F.
Pressure Limit: 2X FS.
Power Requirement: PBLT2: 13-30 VDC; PBLTX: 10-28 VDC.
Output Signal: 4-20 mA DC, 2-wire.
Response Time: 50 ms.
Loop Resistance: 900 Ω.
Electrical Connection: Wire pigtail.
Mounting Orientation: Suspended in tank below level being measured.
Electrical Protection: PBLT2: Lightning and surge protection; PBLTX: none.
Weight: 4.3 lb (2.0 kg).
Agency Approvals: PBLT2: CE, PBLTX: CE, cULus intrinsically safe for Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, Div. 1; ATEX: II 1 G Ex ia IIC T4 Ga and II 1 D Ex ia IIIC T135C Da (According to control drawing 001833-44)*.

*Up to 196´ (59.5 m) for ETFE cable; Up to 333´ (101.5 m) for polyurethane cable.

MODEL CHART

Model	Range psi* (ft w.c.) [m w.c.]	Cable Length ft (m)	Cable Type
PBLT2-5-40	5 (11.54) [3.52]	40 (12.2)	ETFE
PBLT2-10-40	10 (23.09) [7.04]	40 (12.2)	ETFE
PBLT2-15-60	15 (34.63) [10.56]	60 (18.3)	ETFE
PBLT2-20-60	20 (46.18) [14.08]	60 (18.3)	ETFE
PBLT2-5-40-PU	5 (11.54) [3.52]	40 (12.2)	Polyurethane
PBLT2-10-40-PU	10 (23.09) [7.04]	40 (12.2)	Polyurethane
PBLT2-15-60-PU	15 (34.63) [10.56]	60 (18.3)	Polyurethane
PBLT2-20-60-PU	20 (46.18) [14.08]	60 (18.3)	Polyurethane
PBLT2-3.5M-5M-PU	4.97 (11.48) [3.5]	16.40 (5)	Polyurethane
PBLT2-5M-10M-PU	7.10 (16.38) [5]	32.81 (10)	Polyurethane
PBLT2-10M-18M-PU	14.21 (32.78) [10]	59.06 (18)	Polyurethane

*Configured ranges below 5 psi (11.54´ w.c.) (3.52 m w.c.) ±1% FS accuracy.

Note: For intrinsically safe approval, change model number from PBLT2 to PBLTX. For custom ranges or cable lengths, contact factory.

OPTIONS

Model	Description
-ATEX	ATEX intrinsically safe

ACCESSORIES

Model	Description
MTL5541	Galvanic barrier
MTL7706	Intrinsically safe zener barrier
A-297	Dessicant filter for vent tube. Removes humidity for protection of the sensor. Changes color to show saturation
A-625	316 SS cable hanger use with NPT option for attaching chain for easy pulling out of application

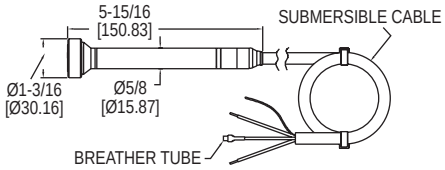
A-297 A-625

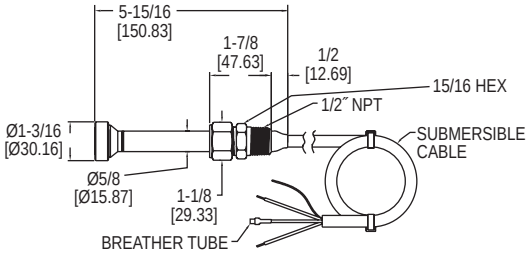
FLUSH TIP SUBMERSIBLE LEVEL TRANSMITTERS

Perfect for Sludge and Slurries, Lightning Protected, ±0.25% Accuracy, Slim Body

FBLT

FBLT with NPT option





NPT option

The **Series FBLT Flush Tip Submersible Level Transmitters** measure the height of liquid above the position in the tank referenced to atmospheric pressure. The transmitter consists of a piezoresistive sensing element, encased in a narrow 316 SS housing with PTFE coated flush diaphragm tip.

FEATURES/BENEFITS

- Flush diaphragm tip will not clog in harsh applications
- Maintenance free filter eliminates particulate or water droplets from entering the transducer
- Comes with a choice of polyether polyurethane or ETFE cable materials for excellent chemical compatibility
- Incorporates lightning and surge protection, eliminating both power supply surges and lightning ground strike transients (surge protection is not guaranteed and is not covered by warranty)
- Narrow body design allows the FBLT to fit into stilling wells and narrow installations
- Robust FKM fluoroelastomer diaphragm that is PTFE coated for a stick resistant surface holds up in aggressive fluids
- Diaphragm cavity is filled with a gel that will not leak out versus oil or grease
- Optional NPT connection allows the unit to be rigidly installed in a pipe/conduit, or the addition of the A-625 hanging loop for attaching a chain for pulling out of the installation

APPLICATIONS

- Sewage lift stations
- Industrial slurries
- Industrial sumps
- Landfill leachate
- Reservoirs
- Sludge pits
- Oil tanks

SPECIFICATIONS

Service: Compatible liquids.
Wetted Materials: Body: 316 SS; Cable: Polyether polyurethane or ETFE; Diaphragm: PTFE coated FKM fluoroelastomer; Label: Polyethylene polyamid.
Accuracy: ±0.25% FS (10´ w.c. range is ±0.30% FS).
Temperature Limits: -4 to 176°F (-20 to 80°C).
Compensated Temperature Limits: 32 to 140°F (0 to 60°C).
Thermal Effect: ±0.0075%/°F (±0.0135%/°C).
Pressure Limit: 2x range.
Power Requirements: 10-33 VDC.
Output Signal: 4-20 mA DC 2-wire.
Response Time: < 50 ms.
Max Loop Resistance: 1000 Ω @ 30 VDC.
Electrical Connections: Wire pigtail.
Mounting Connection: Suspended below point being monitored.
Electrical Protection: Surge/lightning protected per EN61000-4-5, Class 5.
Weight: Body: 0.3 lb (0.136 kg); Cable: 0.037 lb (0.017 kg) per foot.
Agency Approvals: CE.

MODEL CHART

Model	Range psi (´ w.c.) [m w.c.]	Cable Length	Cable Type
FBLT-2SC-IVPF-10-20*	4.33 (10) [3.05]	20´	Polyurethane
FBLT-2SC-IVPF-10-30*	4.33 (10) [3.05]	30´	Polyurethane
FBLT-2SC-IVPP-5-40	5 (11.54) [3.52]	40´	Polyurethane
FBLT-2SC-IVPF-10-40*	4.33 (10) [3.05]	40´	Polyurethane
FBLT-2SC-IVPF-15-40	6.50 (15) [4.57]	40´	Polyurethane
FBLT-2SC-IVPF-20-40	8.66 (20) [6.10]	40´	Polyurethane
FBLT-2SC-IVPF-30-50	12.99 (30) [9.14]	50´	Polyurethane
FBLT-2SC-IVEP-5-40	5 (11.54) [3.52]	40´	ETFE
FBLT-2SC-IVEF-15-40	2.82 (15) [4.57]	40´	ETFE
FBLT-2SC-IVEF-20-40	8.66 (20) [6.10]	40´	ETFE
FBLT-2SC-IVEF-30-50	12.99 (30) [9.14]	50´	ETFE
FBLT-2SC-IVEP-10-40	10 (32.09) [7.04]	40´	ETFE
FBLT-2SC-IVEP-15-60	15 (34.63) [10.56]	60´	ETFE
FBLT-2SC-IVPP-10-40	10 (32.09) [7.04]	40´	Polyurethane
FBLT-2SC-IVPP-10-60	10 (32.09) [7.04]	60´	Polyurethane
FBLT-2SC-IVPP-15-60	15 (34.63) [10.56]	60´	Polyurethane
FBLT-2SC-IVPF-35-60	15.16 (35) [10.67]	60´	Polyurethane
FBLT-2SC-IVPP-20-60	20 (196.85) [60]	60´	Polyurethane

*4.3 to 4.9 psi (10 to 11.54 in w.c.) configured ranges ±0.30% FS accuracy

Note: Cables can be ordered shorter or longer in polyurethane or ETFE. Other ranges are available and can be ordered in psi, ft w.c., or m w.c. Please see website.

OPTIONS

To order add suffix:	Description
-NPT	1/2" NPT connection to connect conduit, piping, or cable hanger. All 316 SS
-FC	Factory calibration certificate

Example: FBLT-2SC-IVPF-20-40-FC

ACCESSORIES

Model	Description
A-297	Dessicant filter for vent tube. Removes humidity for protection of the sensor. Changes color to show saturation
A-625	316 SS cable hanger use with NPT option for attaching chain for easy pulling out of application

A-297

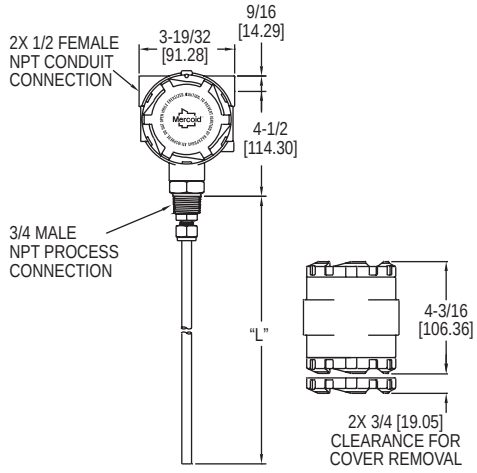
A-625

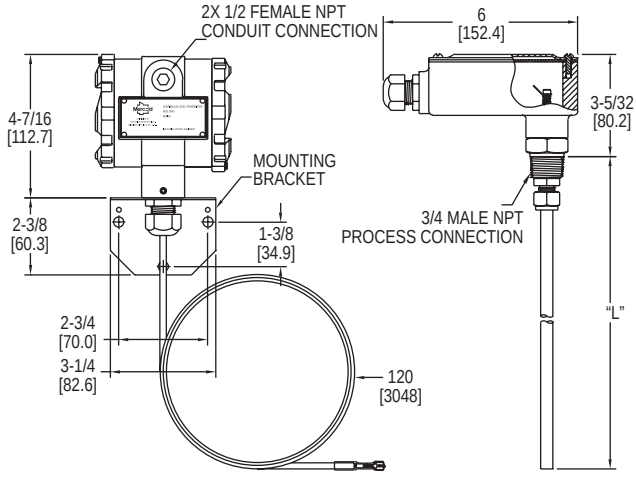
Dwyer

SERIES CRF2 | MERCOID® BY DWYER

CAPACITIVE LEVEL TRANSMITTER

Powder, Bulk or Liquids, No-Moving Parts, Excellent Chemical Resistance





Remote mount housing

The **Series CRF2 Capacitive Level Transmitter** provides a two-wire 4-20 mA output to indicate level of liquids, powders and bulk materials. The CRF2 senses capacitance changes resulting from the height of the material in the tank between the probe and the tank wall. In non-metallic tanks or tanks that do not have the wall parallel to the probe a ground reference must be used.

FEATURES/BENEFITS

- State of the art sensing technology, uses impulse RF admittance measurement which provides excellent accuracy and stability
- Comes with either a rigid or flexible probe depending on application installation need and probe length required
- Easy push-button calibration of zero and span
- Any length probe can be customer ordered for any specific application
- FEP covered probe is ideal for use with corrosive media
- Immune to external RF sources like walkie-talkies and cell phones as well as minimal interference with radio communication or other electronic systems

APPLICATIONS

- Pulp and paper processing
- Food and beverage
- Plastics

SPECIFICATIONS

Service: Liquids, powders, and bulk materials compatible with wetted materials.
Wetted Materials: Standard: Rod/cable: FEP, Connection: 316 SS; Ground option: Rod/cable and connection: 316 SS; Cable spacers: PVC; Flange option: Material of flange.
Capacitance Range: 0 to 2000 pF.
Sensitivity: 0.15 pF.
Minimum Span: 8 pF.
Accuracy: ±0.5 pF or ±0.25% of span, whichever is greater.
Repeatability: ±0.25 pF or ±0.1% of span, whichever is greater.
Temperature Limits: Ambient: -40 to 185°F (-40 to 85°C); Process: -40 to 250°F (-40 to 121°C).
Pressure Limit: 100 psi (6.9 bar).
Power Requirements: 12-35 VDC.
Output Signal: 4-20 mA or 20-4 mA, 2 wire.
Response Time: 0.5 s.
Electrical Connection: Screw terminal.
Conduit Connection: 1/2″ NPT female.
Process Connection: Standard: 3/4″ NPT male; Optional: See model chart.
Enclosure Rating: NEMA 4X (IP66) weather tight/corrosion resistant.
Spark/Static Protection: 10^6 Ω dissipation resistance with spark gap. Surge current to 100 A max.
Calibration: Zero, span, 4 mA, 20 mA.
Mounting Orientation: Vertical.
Weight: 6′ rod type: 3.6 lb (1.63 kg).

MODEL CHART

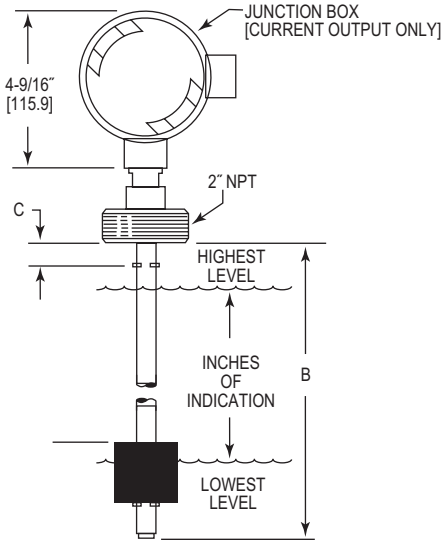
Example	CRF2	-W	R	0	1T	-048	-M20	CRF2-WR01T-048-M20
Series	CRF2							Capacitive level transmitter
Enclosure		W						Weatherproof
		R						Remote mount weatherproof housing
Probe Type			R					Rod
			C					Cable
Ground				0				None included
				A				Attached ground rod (3″ or 4″ flange process connection types only)
				U				Unattached ground rod
Process Connection					1T			3/4″ NPT male
					2T			1″ NPT male
					3T			1-1/2″ NPT male
					1B			3/4″ BSPT
					2B			1″ BSPT
					3B			1-1/2″ BSPT
					1S			1″ sanitary clamp
					2S			1-1/2″ sanitary clamp
					3S			2″ sanitary clamp
					1F			2″ 150# flange, 316 SS
					2F			2″ 150# flange, PVC
					3F			3″ 150# flange, 316 SS
					4F			3″ 150# flange, PVC
					5F			4″ 150# flange, 316 SS
					6F			4″ 150# flange, PVC
Probe Length						XXX		Insertion length in inches. Example 048 is 48″ length. Rod type min: 24″, max: 144″; Cable type min: 24″, max: 360″
Options							M20	M20 conduit connection with cable gland

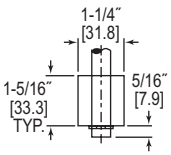
Examples: CRF2-WR01T-072; CRF2-WR01T-096

SERIES CLT | W.E. ANDERSON™ BY DWYER

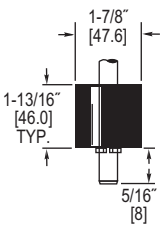
CONTINUOUS LEVEL TRANSMITTER

Customize To Fit Application, 316 SS or Buna-N Floats

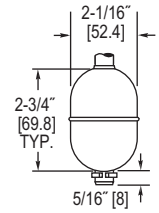




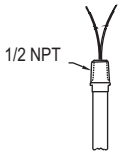
F1 float dimensions



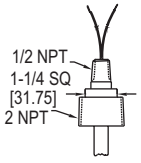
F2 float dimensions



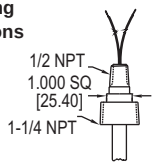
F3 float dimensions



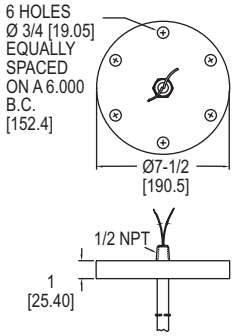
Type 1 mounting dimensions



Type 3 mounting dimensions



Type 2 mounting dimensions



Type 4, 5 mounting dimensions

The **Series CLT Continuous Level Transmitter** provides up to the minute tank level monitoring with a customized level transmitter. Transmitters can be configured for 4-20 mA or proportional voltage output, 316 SS or Buna-N stem and floats, and lengths up to 72″ (183 cm).

FEATURES/BENEFITS

- Customized stem length, actuation point, distance between floats, and lead wire lengths
- 4-20 mA or proportional voltage output outputs continuous level indication

APPLICATIONS

- General purpose level monitoring
- Low specific gravity applications
- Gas and oil

SPECIFICATIONS

Service: Compatible liquids.
Resolution: 1/4″ (6.35 mm).
Temperature Limits: Buna-N floats: 180°F (82°C) in water, -40 to 230°F (-40 to 110°C) in oil; SS floats: -40 to 230°F (-40 to 110°C).
Pressure Limits: Buna-N floats: 150 psig (10 bar); SS floats: 300 psig (21 bar).
Power Requirements: Proportional voltage output models: 10-30 VDC; 4-20 mA output models: 10-40 VDC.
Loop Resistance: 1.4k Ω max.
Electrical Connections: Proportional voltage output: 24″ (61 cm) free leads #22 AWG, TFE jacketed; 4-20 mA output: Junction box.
Enclosure Rating: 4-20 mA models, NEMA 4 (IP56) junction box.
Mounting Orientation: Vertical ±20°.

MODEL CHART

Example	CLT	-V	S	5	F3	-20.25	-02.00	-25.75	CLT-VS5F3-20.25-02.00-25.75
Construction	CLT								Continuous level transmitter
Output		V							Voltage, proportional signal of 0 to supply voltage
		C							4-20 mA (junction box provided)
Stem & Connection Material			B						Brass with beryllium copper stops
			S						316 SS with SS ARMCO PH-15-7MO stops
Connection Type				1					1/2″ NPT (output type V only)
				2					1-1/4″ NPT (float F1 only)
				3					2″ NPT
				4					3″ 150# flange, carbon steel (connection material S only) [max. pres. 150 psi (10.3 bar)]
				5					3″ 150# flange, 316 SS (connection material S only) [max. pres. 150 psi (10.3 bar)]
Float Type					F1				**Material** Buna-N; **Min. s.g.** 0.55; **Max. Pressure** 150 psi (10.3 bar); **Float Factor** 2.0″ (50.8 mm)
					F2				Buna-N; 0.55; 150 psi (10.3 bar); 2.5″ (63.5 mm)
					F3				316 SS; 0.75; 300 psi (20.7 bar); 3.5″ (52.4 mm)
Indication Length						00.00			Length that the unit sends an output for level, maximum is 68″ (173 cm)
Top Float Stop "C" Dimension Overall							00.00		Distance from bottom of mounting connection to upper float stop, minimum is 1/4″ (6.4 mm)
Length "B"								00.00	To calculate overall length, add indication length, top float, stop dimension "C", and float factor, maximum length is 72″ (1.82 m)

Note: Models are built to your specifications

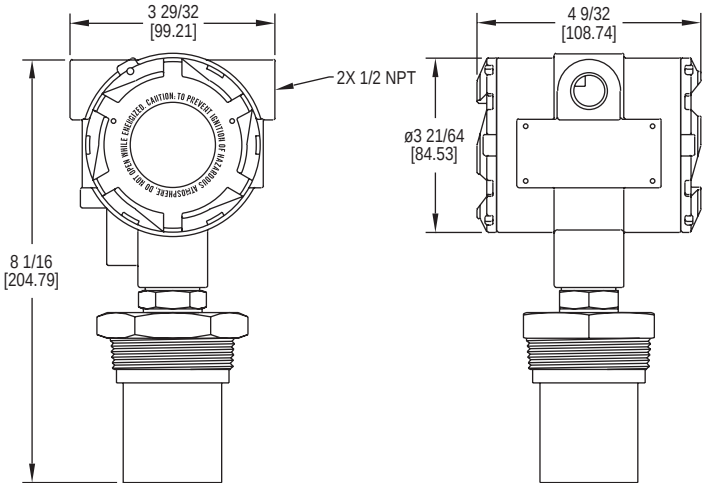
USA: California Proposition 65
⚠WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Dwyer

SERIES ULT | MERCOID® BY DWYER

ULTRASONIC LEVEL TRANSMITTER

Explosion-Proof, Mapping Software, 3″ (76.2 mm) Measuring Column



The **Series ULT Ultrasonic Level Transmitter** provides non-contact measurement of liquid levels in an explosion-proof body. It is capable of measuring up to 32.8′ (10 m) with a PVDF sensor and 4-20 mA output.

FEATURES/BENEFITS

- Provides reliable, accurate, and non-contact level measurement of compatible liquids
- Non-contact technology offers no moving parts to wear, jam, corrode, or get coated like contact technologies
- Mapping software makes effective measuring surface only a 3″ (76.2 mm) diameter column with no concerns of ladders, pipes, or other tank intrusions in the remaining sound cone
- FM approved explosion-proof making it ideal for use in hazardous locations
- Easy programming with 6 digit LCD display and simple menu structure
- Output range is adjustable with choices of inputting tank dimensions or by filling and emptying the tank while calibrating and it automatically and scaling to levels it senses
- Window cover allows easy viewing of display
- Fail-safe output options and diagnostic capabilities

APPLICATIONS

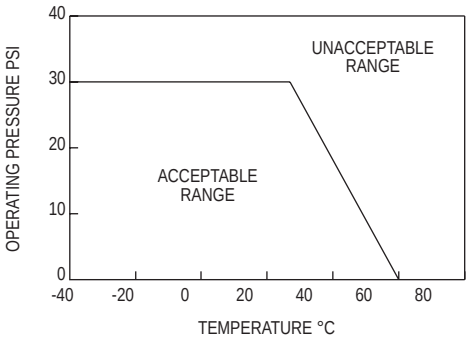
- Water and wastewater
- Pulp and paper processing
- Chemical processing
- Food and beverage

MODEL CHART	
Model	**Range**
ULT-11	24.6′ (7.5 m)
ULT-21	32.8′ (10 m)

SPECIFICATIONS

Service: Compatible fluids. Not for use with powder and bulk solids.
Wetted Materials: Sensor: PVDF; Process connection: 303 SS; O-ring: Fluoroelastomer.
Ranges: 24.6′ (7.5 m), 32.8′ (10 m).
Accuracy: ±0.2% FS.
Resolution: 0.079″ (2 mm).
Blind Zone: Under 8″ (20 cm).
Beam Width: 3″ (7.6 cm) diameter.
Temperature Limits: Ambient: -40 to 140°F (-40 to 60°C); Process: -4 to 140°F (-20 to 60°C).
Temperature Compensation: -40 to 140°F (-40 to 60°C).
Pressure Limits: 30 psi (2 bar) up to 25°C (77°C). Above 25°C (77°F), rating decreases 1.667 psi per 1°C increase. See chart.
Power Requirement: 18-28 VDC (two-wire).
Output Signal: 4-20 mA or 20-4 mA (two-wire).
Max. Loop Resistance: 250 Ω at 24 VDC.
Electrical Connections: Screw terminal.
Conduit Connection: 1/2″ NPT female (two) or optional M20.
Process Connection: 2″ NPT male or optional BSPT.
Enclosure Rating: Weather-proof meets NEMA 4X (IP66), explosion-proof rated Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G.
Mounting Orientation: Vertical.
Failsafe: On lost echo after 30 seconds, user selectable to 4, 20, 21, 22 mA or last signal.
Memory: Non-volatile.
Display: 6 character LCD.
Units: In, cm, ft, m, percent.
Programming: 4 button.
Weight: 4.0 lb (1.8 kg).
Agency Approvals: CE, FM.

TEMPERATURE/PRESSURE DERATING

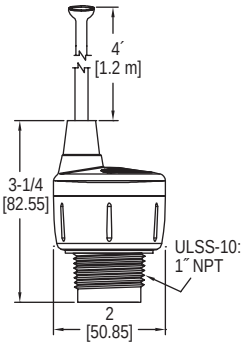


Dwyer

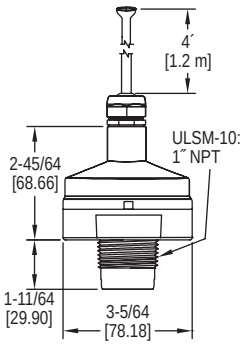
SERIES ULSS, ULSM & ULSL

ULTRASONIC LEVEL SENSORS

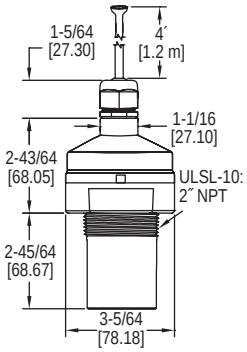
Non-Contact Transmitter, SPST Programmable Relays



ULSS



ULSM



ULSL

The **Series ULSS Ultrasonic Level Sensor** provides non-contact, continuous ultrasonic level measurement of fluids for short range applications. It has a 4.1´ (1.2 m) measuring range with a 0.125˝ (3 mm) accuracy.

The **Series ULSM Ultrasonic Level Sensor** provides non-contact, continuous ultrasonic level measurement of fluids for medium range applications. It has a 9.8´ (3 m) measuring range with a ±0.2% of range accuracy.

The **Series ULSL Ultrasonic Level Sensor** provides non-contact, continuous ultrasonic level measurement of fluids for tall range applications. It has a 18´ (5.5 m) measuring range with a ±0.2% of range accuracy.

FEATURES/BENEFITS

- Via free software, units can be programmed to transmit an output signal and operate four relays for control applications
- Provides reliable, accurate, and non-contact level measurement of compatible liquids
- Non-contact technology offers no moving parts to wear, jam, corrode, or get coated like contact technologies
- Mapping software makes effective measuring surface only a 3˝ (76.2 mm) diameter column with no concerns of ladders, pipes, or other tank intrusions in the remaining sound cone
- Ultrasonic technology paired with automatic temperature compensation provides accurate and reliable measurements in almost all conditions
- Fail-safe logic is easily configured to custom applications via free software removing the need for target calibration
- Full NEMA 6P submersible enclosure rating to ensure excellent product durability

APPLICATIONS

- Water and wastewater
- Pulp and paper processing
- Sump and process tanks
- Chemical processing
- Food and beverage

SPECIFICATIONS

Service: Compatible fluids.
Wetted Materials: Sensor: PVDF; O-ring: FKM.
Ranges: See chart.
Accuracy: ULSS: 0.125˝ (3 mm); ULSM & ULSL: ±0.2% of range.
Resolution: ULSS: 0.019˝ (0.5 mm); ULSM: 0.039˝ (1 mm); ULSL: 0.079˝ (2 mm).
Blind Zone: ULSS: 2˝ (5 cm); ULSM: 4˝ (10 cm); ULSL: 8˝ (20 cm).
Beam Width: ULSS & ULSM: 2˝ (5 cm); ULSL: 3˝ (7.62 cm).
Temperature Limits: Process: 20 to 140°F (-7 to 60°C); Ambient: -31 to 140°F (-35 to 60°C).
Temperature Compensation: Automatic.
Pressure Limit: 30 psi (2 bar).
Power Requirement: 12 to 28 VDC.
Output Signal: 4-20 mA, 2-wire; Invert: 4-20 mA or 20-4 mA; Fail-safe: 4 mA, 20 mA, 21 mA, 22 mA, or hold last.
Loop Resistance: 400 Ω max.
Electrical Connections: 4´ (1.2 m) 9 conductor shielded cable.
Contact Type: 4 SPST relays.
Contact Rating: 1 A max @ 28 VDC max.
Deadband: Selectable (no hysteresis, 1/4˝, 1/2˝, 1˝, 1/2 cm, 1 cm, 2 cm, 5 cm or not available).
Process Connection: 1˝ NPT, 1˝ BSPP (optional).
Enclosure Rating: NEMA 6P (IP68).
Enclosure Material: Polycarbonate; Gland: TPE.
Mounting Orientation: Vertical.
Memory: Non-volatile.
Failsafe: Contact: Power loss: Holds last contact; Power on: Open, close, or last contact.
Programming: Free PC software download (USB adapter required).
Weight: 1 lb (0.45 kg).
Agency Approvals: CE.

MODEL CHART	
Model	**Range**
ULSS-10	4.1´ (1.25 m)
ULSM-10	9.8´ (3 m)
ULSL-10	18´ (5.5 m)
Note: USB adapter necessary for calibration. One adapter can program multiple units.	

ACCESSORIES	
Model	**Description**
ULS-ACC-USB	USB adapter for calibration, PVC
ULS-ACC-121	2˝ x 1˝ NPT reducer bushing fitting (sch. 40), PVC
ULS-ACC-122	2˝ x 1˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-131	3˝ x 2˝ NPT reducer bushing fitting (sch. 40), PVC
ULS-ACC-132	3˝ x 2˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-142	4˝ x 2˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-221	2˝ socket x 1˝ NPT reducer bushing fitting (sch. 40), PVC
ULS-ACC-222	2˝ socket x 1˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-231	3˝ socket x 2˝ NPT reducer bushing fitting (sch. 40), PVC
ULS-ACC-232	3˝ socket x 2˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-241	4˝ socket x 2˝ NPT reducer bushing fitting (sch. 40), PVC
ULS-ACC-242	4˝ socket x 2˝ NPT reducer bushing fitting (sch. 80), PVC
ULS-ACC-510	1˝ NPT polypropylene side mount bracket
ULS-ACC-520	2˝ NPT polypropylene side mount bracket

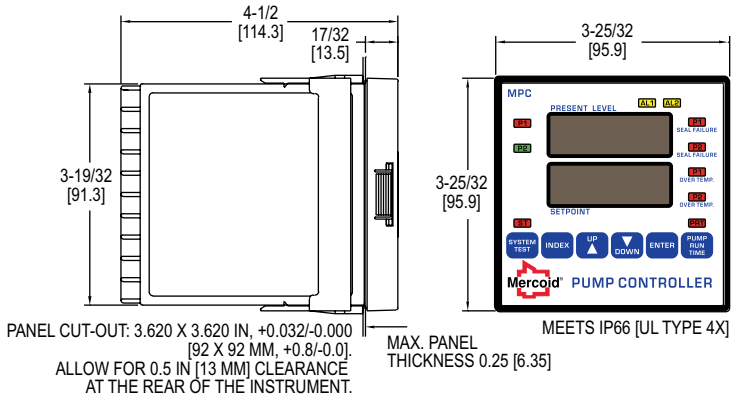
Dwyer

SERIES MPC | MERCOID® BY DWYER

c UL us LISTED

PUMP CONTROLLER

One or Two Pump Control with Built-In Alternation, Over Temperature Protection and Seal Failure Monitoring



The **Series MPC Pump Controller** provides versatile level control in a standard 1/4 DIN package. Designed for use with almost any style level transmitter the unit displays the present level and main set point value. Incorporated in the MPC is programmable level differential for on/off control of one or two pumps, valves, or other devices through two SPDT relays.

FEATURES/BENEFITS

- Selectable pump alternation when used with two pumps to minimize pump wear, with alternation "on" a seal failure or over temperature condition will force the non-failed pump to lead status and stop alternation
- Alarms can be programmed for output indication of pump seal failure or over temperature
- Selectable time delay, for pump two, on power up to prevent both pumps from starting at the same time
- In the event of power loss, upon regaining power a time delay of up to 60 seconds can be selected to prevent excessively large current draw
- Test system function simulates the process input to ensure the pumps are operating or to test programming
- User-friendly programming menu

APPLICATIONS

- Water and wastewater
- Sump and sludge pits, clarifiers, digesters
- Chemical storage tanks
- Oil tanks
- Reservoirs

SPECIFICATIONS

Inputs: 4 (or 0)-20 mA DC or 2 (or 0)-10 VDC selectable.
Input Impedance: Current = 10 Ω; Voltage = 100 K Ω.
Output Ratings: Control relays: SPDT, rated 10 A @ 240 VAC res., 1/4 hp @ 120 VAC, 1/3 hp @ 240 VAC; Alarm relays: SPST, 3 A @ 240 VAC res., 1/10 hp @ 120 VAC.
Control Type: On/off, reverse (pump out) or direct (pump in) acting.
Output Signal: 4-20 mA current process input retransmission.
Power Requirements: 100-240 VAC nominal, +10%-15%, 50 to 400 Hz, single phase; 132-240 VDC nominal, +10%-15%.
Enclosure Rating: NEMA 4X (IP66) front panel face.
Power Consumption: 7.5 VA max.
Accuracy: ±0.25% of span, ±1 least significant digit.
Display: Two 4 digit, 7 segment 0.56″ high LED's.
Display Resolution: 1 count.
Memory Backup: Nonvolatile memory (no batteries required).
Serial Communications: Optional RS-232 or RS-485 with Modbus® protocol.
Ambient Operating Temperature/RH: 14 to 131°F (-10 to 55°C)/0 to 90% up to 104°F (40°C) non-condensing, 10 to 50% at 131°F (55°C) non-condensing.
Front Panel Rating: Meets UL Type 4X (IP66).
Loop Power Supply (Isolated): 24 VDC @ 50 mA, regulated.
Seal Failure (Moisture Sensor): Power: 2.5 VDC; Search current: 3 micro amps; Resolution: 10K to 500K Ω in 10K Ω steps.
Weight: 16 oz (454 g).
Agency Approvals: cULus.

MODEL CHART

Model	Description
MPC	Pump controller

OPTIONS

To order add suffix:	Description
-232	RS-232 Modbus® RTU serial communications
-485	RS-485 Modbus® RTU serial communications
-RV	2-20 VDC voltage retransmission

ACCESSORIES

Weatherproof Enclosures, NEMA 4X (IP66).❶

A-901

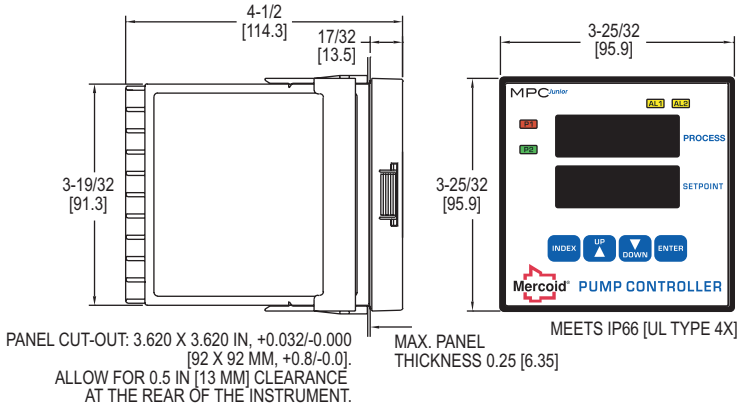
Modbus® is a registered trademark of Schneider Automation, Inc.

Compatible Level Transmitters: See page 328 (Series SBLT2)
See page 330 (Series PBLT2)
Additional Digital Control Panel Meters: See page 338 (Series APM/MPM/PPM)
❶See page 339 (Series A-900 & A-901)

SERIES MPC JR | MERCOID® BY DWYER

PUMP CONTROLLER

One or Two Pump Control with Built-In Alternation



PANEL CUT-OUT: 3.620 X 3.620 IN, +0.032/-0.000 [92 X 92 MM, +0.8/-0.0]. ALLOW FOR 0.5 IN [13 MM] CLEARANCE AT THE REAR OF THE INSTRUMENT.

MAX. PANEL THICKNESS 0.25 [6.35]

MEETS IP66 [UL TYPE 4X]

The **Series MPC JR Pump Controller** provides versatile level control in a standard 1/4 DIN package. Designed for use with almost any style level transmitter the unit displays the present level and main set point value. Incorporated in the MPC JR is programmable level differential for on/off control of one or two pumps, valves, or other devices through two SPDT relays.

FEATURES/BENEFITS

- Selectable pump alternation when used with two pumps to minimize pump wear
- Integral 24 VDC power supply for transmitter
- User selectable security lock-out of programming and/or set points
- Optional process input retransmission as a current (4-20 mA) or voltage (2-10 VDC) analog signal
- Analog output on pump "on" condition for activation of separate pump run time meters

APPLICATIONS

- Water and wastewater
- Sump and sludge pits, clarifiers, digesters
- Chemical storage tanks
- Oil tanks
- Reservoirs

SPECIFICATIONS

Inputs: 4 (or 0)-20 mA DC or 2 (or 0)-10 VDC selectable.
Input Impedance: Current = 10 Ω; Voltage = 5 K Ω.
Output Ratings: Control relays: SPDT, rated 10 A @ 240 VAC res.,1/4 hp @ 120 VAC, 1/3 hp @ 240 VAC; Alarm relays: SPST, 3 A @ 240 VAC res., 1/10 hp @ 120 VAC; Others: 15 VDC @ 20 mA for output one and output two.
Control Type: On/off, reverse (pump out) or direct (pump in) acting.
Power Requirements: 100-240 VAC nominal, +10%-15%, 50 to 400 Hz, single phase; 132-240 VDC nominal, +10%-15%.
Power Consumption: 7.5 VA max.
Accuracy: ±0.25% of span, ±1 least significant digit.
Display: Two 4-digit, 7 segment 0.56″ high LED's.
Display Resolution: 1 count.
Memory Backup: Nonvolatile memory (no batteries required).
Serial Communications: Optional RS-232 or RS-485 with Modbus® protocol.
Ambient Operating Temperature/RH: 14 to 131°F (-10 to 55°C)/0 to 90% up to 104°F (40°C) non-condensing, 10 to 50% at 131°F (55°C) non-condensing.
Front Panel Rating: Meets UL Type 4X (IP66).
Loop Power Supply (Isolated): 24 VDC @ 50 mA, regulated.
Weight: 16 oz (454 g).
Agency Approvals: cULus.

MODEL CHART

Model	Description
MPCJR	Pump controller

OPTIONS

To order add suffix:	Description
-RC	Retransmission of input, 4-20 mA
-RV	Retransmission of input, 0-10 VDC
-232	RS-232 Modbus® RTU serial communications
-485	RS-485 Modbus® RTU serial communications

ACCESSORIES

Weatherproof Enclosures, NEMA 4X (IP66).❶

A-901

Modbus® is a registered trademark of Schneider Automation, Inc.

Compatible Level Transmitters: See page 328 (Series SBLT2)
See page 330 (Series PBLT2)
❶See page 339 (Series A-900 & A-901)

Dwyer

SERIES APM, MPM & PPM

PANEL METERS & PUMP CONTROLLERS

Open Channel Flow, Rate and Total, Multi-Pump Control

APM

MPM

PPM

The **Series APM Panel Meter** is a 1/8 DIN digital panel meter perfect for displaying flow rate and total simultaneously from several analog inputs such as a 4-20 mA or 0-10 V from any flow transmitter. When utilized with an ultrasonic level transmitter, such as the Mercoid Series ULT, this series provides an economical way to measure open channel flow. The dual line display can be configured to read flow rate, total, grand total, as well as engineering units.

The **Series MPM Pump Controller** is also a 1/8 DIN digital panel meter but for multi-pump alternation control. This series features, non-latching, sampling, and fail-safe action in addition to its ability to alternate up to four pumps. This series is also capable of linearizing nonlinear inputs with a variety of pre-programmed math functions. This is helpful in applications where volume is monitored in odd shaped tanks as well as open channel flow monitoring. It accepts 0-20 mA, 4-20 mA, 0-5 V, 1-5 V or 0-±10 V standard.

The **Series PPM Panel Meter** is a 1/8 DIN digital panel meter specifically designed for a variety of pulse inputs. This series is particularly well-suited for flow applications with its large six-digit, dual-line display that can display flow rate and total simultaneously with up to 4 programmable relay options and 4-20 mA output. This series features latching, non-latching, sampling, and fail-safe action in addition to its pump alternation function.

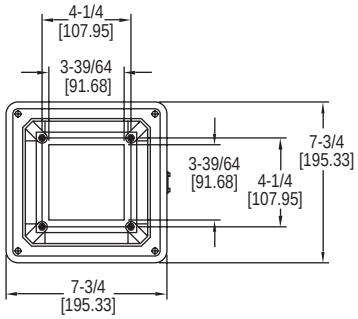
For more information on these products: See page 352

1/4 DIN CONTROL ENCLOSURES

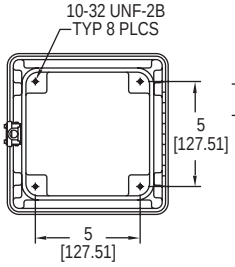
Weatherproof, Durable, Pre-Cut Mounting Hole

A-900

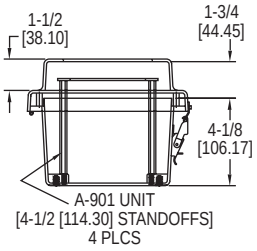
A-901



Top view



Bottom view



Side view

The **Model A-900 & A-901 1/4 DIN Control Enclosures** are rated weatherproof type NEMA 4X to protect controls from dirt, dust, oil, and water. The Model A-900 comes with a standard 1/4 DIN cutout in the front cover and the Model A-901 comes with a clear plastic front window. Both units feature a lockable latch to prevent unauthorized removal of the control from the enclosure.

FEATURES/BENEFITS

- UV stabilized for outdoor use
- Fiberglass material is easily punched or drilled for conduit connections
- Compatible with Love Series 2500, 2600, 4B, 4C, 4G,and Mercoid Series MPC, MPCJR

APPLICATIONS

- Wastewater remote pump stations
- Outdoor industrial ovens/furnaces/boilers

MODEL CHART	
Model	**Description**
A-900	Weatherproof enclosure, NEMA 4X, control direct panel mounts in the front of the enclosure
A-901	Weatherproof enclosure, NEMA 4X, clear plastic window with rear panel for mounting the control inside the enclosure

FOR MODELS: 25XX3, 26XX3, 26X3X, 26X33, MPC, MPCJR		
Ambient Temperature	**A-900 Maximum Current**	**A-901 Maximum Current**
77°F (25°C)	10 amps	10 amps
104°F (40°C)	10 amps	9 amps
131°F (55°C)	7.5 amps	6 amps

ACCESSORIES	
Model	**Description**
A-600	R/C snubber

SPECIFICATIONS

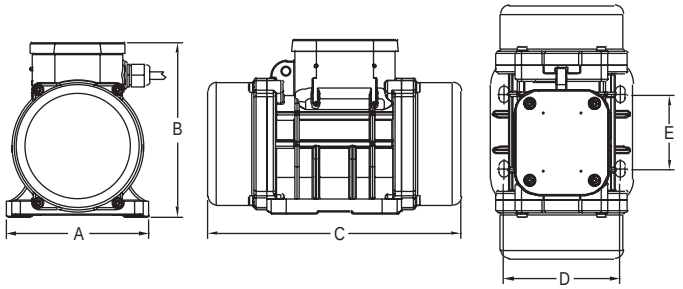
Service: Indoor or outdoor.
Rating: NEMA 1, 2, 3, 3R, 4, 4X, 12 and 13.
Materials: Body: UV stabilized fiberglass reinforced polyester; Snap latch: 304 SS; Hinge: SS; Mounting feet and screws: 304 SS; Window: UV stabilized polycarbonate; Cover gasket: Neoprene.
Enclosure Rating: NEMA 4X (IP66).
Control Temperature Limits: When using the enclosures with controls that have 10 A relay outputs the extra heat generation decreases the maximum ambient temperature value that the control can be used at inside the enclosure. Other outputs on our controls are not a concern.
Agency Approvals: UL.

Dwyer

SERIES EBV | PROXIMITY® BY DWYER

ELECTRIC BIN VIBRATOR

Adjustable Vibration Intensity



DIMENSIONS - IN (MM)					
Model	**A**	**B**	**C**	**D**	**E**
EBV-1	5-1/8 (130)	5-23/64 (136)	8-5/16 (211)	4-11/64 (106)	2-43/64 (68)
EBV-2	5-1/8 (130)	5-23/64 (136)	8-5/16 (211)	4-11/64 (106)	2-43/64 (68)
EBV-3	5-1/8 (130)	6-17/64 (159)	9-3/32 (231)	4-11/64 (106)	2-43/64 (68)
EBV-4	6-7/64 (155)	6-23/32 (170)	10-23/64 (263)	4-7/16 (113)	5-1/8 (130)

The **Series EBV Electric Bin Vibrator** features an adjustable force, which increases the application flexibility and reduces equipment downtime and labor expense. The low amperage draw at 120 V reduces power consumption and makes the vibrators usable in any application. The EBV is capable of running continuously at 100% force output without overheating or mechanical damage.

FEATURES/BENEFITS

- NEMA 4X (IP66) aluminum housing
- Centrifugal force can be adjusted as needed
- Silent operation at 20 dB

APPLICATIONS

- Bin vents
- Bag houses
- Dust collectors

SPECIFICATIONS
Power Requirements: 120 VAC.
Power Consumption: See model chart.
Temperature Limits: -4 to 104°F (-20 to 40°C).
Enclosure: Aluminum.
Enclosure Rating: NEMA 4X (IP66).
Noise Level: 20 dB.
Electrical Connection: Electrical junction box.
Rotational Speed: 3600 RPM.
Weight: See model chart.
Agency Approvals: CE.

MODEL CHART						
	Max Power		**Centrifugal Force**		**Current**	**Weight**
Model	**Kw**	**Hp**	**Kg**	**lb**	**Max Amps**	**lb**
EBV-1	0.09	0.12	71	156.5	1.03	9.3
EBV-2	0.11	0.15	95	209.4	1.3	10.1
EBV-3	0.21	0.28	189	416.7	2.62	15.4
EBV-4	0.28	0.38	323	712.1	3.43	21.6

PRESSURE CONVERSION CHART

in/H₂O	P.S.I.	in/Hg	mm/H₂O	mm/Hg	kg/cm²	bar	mbar	Pa	kPa
.1	.0036	.0073	2.534	.1863	.0002	.0002	.2482	24.82	.0248
.2	.0072	.0146	5.067	.3726	.0005	.0005	.4964	49.64	.0496
.4	.0144	.0293	10.13	.7452	.0010	.0010	.9928	99.28	.0993
.6	.0216	.0440	15.20	1.118	.0015	.0015	1.489	148.9	.1489
.8	.0289	.0588	20.34	1.496	.0020	.0020	1.992	199.2	.1992
1.0	.0361	.0735	25.41	1.868	.0025	.0025	2.489	248.9	.2489
2	.0722	.1470	50.81	3.736	.0051	.0050	4.978	497.8	.4978
3	.1083	.2205	76.22	5.604	.0076	.0075	7.467	746.7	.7476
4	.1444	.2940	101.62	7.472	.0102	.0099	9.956	995.6	.9956
5	.1804	.3673	127.0	9.335	.0127	.0124	12.44	1244	1.244
6	.2165	.4408	152.4	11.203	.0152	.0149	14.93	1493	1.493
7	.2526	.5143	177.8	13.072	.0178	.0174	17.42	1742	1.742
8	.2887	.5878	203.2	14.940	.0203	.0199	19.90	1990	1.990
9	.3248	.6613	228.6	16.808	.0228	.0224	22.39	2239	2.239
10	.3609	.7348	254.0	18.676	.0254	.0249	24.88	2488	2.488
11	.3970	.8083	279.4	20.544	.0279	.0274	27.37	2737	2.737
12	.4331	.8818	304.8	22.412	.0304	.0299	29.86	2986	2.986
13	.4692	.9553	330.2	24.280	.0330	.0324	32.35	3235	3.235
14	.5053	1.029	355.6	26.148	.0355	.0348	34.84	3484	3.484
15	.5414	1.102	381.0	28.016	.0381	.0373	37.33	3733	3.733
16	.5774	1.176	406.4	29.879	.0406	.0398	39.81	3981	3.981
17	.6136	1.249	431.8	31.752	.0431	.0423	42.31	4231	4.231
18	.6496	1.322	457.2	33.616	.0457	.0448	44.79	4479	4.479
19	.6857	1.396	482.6	35.484	.0482	.0473	47.28	4728	4.728
20	.7218	1.470	508.0	37.352	.0507	.0498	49.77	4977	4.977
21	.7579	1.543	533.4	39.22	.0533	.0523	52.26	5226	5.226
22	.7940	1.616	558.8	41.09	.0558	.0547	54.74	5474	5.474
23	.8301	1.690	584.2	42.96	.0584	.0572	57.23	5723	5.723
24	.8662	1.764	609.6	44.82	.0609	.0597	59.72	5972	5.972
25	.9023	1.837	635.0	46.69	.0634	.0622	62.21	6221	6.221
26	.9384	1.910	660.4	48.56	.0660	.0647	64.70	6470	6.470
27	.9745	1.984	685.8	50.43	.0685	.0672	67.19	6719	6.719
28	1.010	2.056	710.8	52.26	.0710	.0696	69.64	6964	6.964
29	1.047	2.132	736.8	54.18	.0736	.0722	72.19	7219	7.219
30	1.083	2.205	762.2	56.04	.0761	.0747	74.67	7467	7.467
31	1.119	2.278	787.5	57.91	.0787	.0772	77.15	7715	7.715
32	1.155	2.352	812.8	59.77	.0812	.0796	79.63	7963	7.963
33	1.191	2.425	836.2	61.63	.0837	.0821	82.12	8212	8.212
34	1.227	2.498	863.5	63.49	.0862	.0846	84.60	8460	8.460
35	1.263	2.571	888.9	65.36	.0888	.0871	87.08	8708	8.708
36	1.299	2.645	914.2	67.22	.0913	.0896	89.56	8956	8.956
37	1.335	2.718	939.5	69.08	.0938	.0920	92.04	9204	9.204
38	1.371	2.791	964.9	70.95	.0964	.0945	94.53	9453	9.453
39	1.408	2.876	990.9	72.86	.0990	.0971	97.08	9708	9.708
40	1.444	2.940	1016	74.72	.1015	.0996	99.56	9956	9.956
41	1.480	3.013	1042	76.59	.1040	.1020	102.0	10204	10.20
42	1.516	3.086	1067	78.45	.1066	.1045	104.5	10452	10.45
43	1.552	3.160	1092	80.31	.1091	.1070	107.0	10701	10.70
44	1.588	3.233	1118	82.18	.1116	.1095	109.5	10949	10.95
45	1.624	3.306	1143	84.04	.1142	.1120	112.0	11197	11.20
46	1.660	3.378	1168	85.90	.1167	.1144	114.5	11445	11.44
47	1.696	3.453	1194	87.76	.1192	.1169	116.9	11694	11.69
48	1.732	3.526	1219	89.63	.1218	.1194	119.4	11942	11.94
49	1.768	3.600	1244	91.49	.1243	.1219	121.9	12190	12.19
50	1.804	3.673	1270	93.35	.1268	.1244	124.4	12438	12.44
51	1.841	3.748	1296	95.27	.1294	.1269	126.9	12693	12.69
52	1.877	3.822	1321	97.13	.1320	.1294	129.4	12941	12.94
53	1.913	3.895	1346	98.99	.1345	.1319	131.9	13190	13.19
54	1.949	3.968	1372	100.8	.1370	.1344	134.4	13438	13.44
55	1.985	4.041	1397	102.7	.1395	.1369	136.9	13686	13.69
56	2.021	4.115	1422	104.6	.1421	.1393	139.3	13934	13.93
57	2.057	4.188	1448	106.4	.1146	.1418	141.8	14182	14.18
58	2.093	4.261	1473	108.3	.1471	.1443	144.3	14431	14.43
59	2.129	4.335	1498	110.2	.1497	.1468	146.8	14679	14.68
60	2.165	4.408	1524	112.0	.1522	.1493	149.3	14927	14.93
61	2.202	4.483	1550	113.9	.1548	.1518	151.8	15182	15.18
62	2.238	4.556	1575	115.8	.1573	.1543	154.3	15430	15.43
63	2.274	4.630	1600	117.7	.1599	.1568	156.8	15679	15.68
64	2.310	4.703	1626	119.5	.1624	.1593	159.3	15927	15.93
65	2.346	4.776	1651	121.4	.1649	.1618	161.8	16175	16.18
66	2.382	4.850	1676	123.3	.1674	.1642	164.2	16423	16.42
67	2.418	4.923	1702	125.1	.1700	.1667	166.7	16672	16.67
68	2.454	4.996	1727	127.0	.1725	.1692	169.2	16920	16.92
69	2.490	5.070	1752	128.8	.1750	.1717	171.7	17168	17.17
70	2.526	5.143	1778	130.7	.1776	.1742	174.2	17416	17.42
71	2.562	5.216	1803	132.6	.1801	.1766	176.6	17664	17.66
72	2.598	5.290	1828	134.4	.1826	.1791	179.1	17912	17.91
73	2.635	5.365	1854	136.4	.1852	.1817	181.7	18168	18.17
74	2.671	5.438	1880	138.2	.1878	.1842	184.2	18416	18.42
75	2.707	5.511	1905	140.1	.1903	.1866	186.6	18664	18.66
76	2.743	5.585	1930	141.9	.1928	.1891	189.1	18912	18.91
77	2.779	5.658	1956	143.8	.1954	.1916	191.6	19160	19.16
78	2.815	5.731	1981	145.7	.1979	.1941	194.1	19409	19.41
79	2.851	5.805	2006	147.5	.2004	.1966	196.6	19657	19.66
80	2.887	5.878	2032	149.4	.2030	.1991	199.1	19905	19.90
81	2.923	5.951	2057	151.2	.2055	.2015	201.5	20153	20.15
82	2.959	6.024	2082	153.1	.2080	.2040	204.0	20402	20.40
83	2.996	6.100	2108	155.0	.2106	.2066	206.6	20657	20.66
84	3.032	6.173	2134	156.9	.2131	.2091	209.1	20905	20.90
85	3.068	6.246	2159	158.8	.2157	.2115	211.5	21153	21.15
86	3.104	6.320	2184	160.6	.2182	.2140	214.0	21401	21.40
87	3.140	6.393	2210	162.5	.2207	.2165	216.5	21650	21.65
88	3.176	6.466	2265	164.4	.2233	.2190	219.0	21898	21.90
89	3.212	6.450	2260	166.2	.2258	.2215	221.5	22146	22.15
90	3.248	6.613	2286	168.1	.2283	.2239	223.9	22394	22.39
91	3.284	6.686	2311	169.9	.2309	.2264	226.4	22642	22.64
92	3.320	6.760	2336	171.8	.2334	.2289	228.9	22890	22.89
93	3.356	6.833	2362	173.7	.2359	.2314	231.4	23139	23.14
94	3.392	6.906	2387	175.5	.2384	.2339	233.9	23387	23.39
95	3.429	6.981	2413	177.4	.2410	.2364	236.4	23642	23.64
96	3.456	7.055	2438	179.3	.2436	.2389	238.9	23890	23.89
97	3.501	7.128	2464	181.2	.2461	.2414	241.4	24138	24.14
98	3.537	7.201	2489	183.0	.2486	.2439	243.9	24387	24.39
99	3.573	7.275	2514	184.9	.2512	.2464	246.4	24635	24.64
100	3.609	7.348	2540	186.8	.2537	.2488	248.8	24883	24.88

P.S.I.	in/H₂O	in/Hg	mm/H₂O	mm/Hg	kg/cm²	bar	mbar	Pa	kPa
1.0	27.71	2.036	703.1	51.75	.0703	.0689	68.95	6895	6.895
1.1	30.45	2.240	773.4	56.89	.0773	.0758	75.84	7584	7.584
1.2	33.22	2.443	843.7	62.06	.0844	.0827	82.74	8274	8.274
1.3	35.98	2.647	914.0	67.23	.0914	.0896	89.63	8963	8.963
1.4	38.75	2.850	984.3	72.40	.0984	.0965	96.52	9652	9.652
1.5	41.52	3.054	1055	77.57	.1055	.1034	103.4	10340	10.34
1.6	44.29	3.258	1125	82.74	.1125	.1103	110.3	11030	11.03
1.7	47.06	3.461	1195	87.92	.1195	.1172	117.2	11720	11.72
1.8	49.82	3.665	1266	93.09	.1266	.1241	124.1	12410	12.41
1.9	52.59	3.686	1336	98.26	.1336	.1310	131.0	13100	13.10
2.0	55.36	4.072	1406	103.4	.1406	.1379	137.9	13790	13.79
2.1	58.13	4.276	1476	108.6	.1476	.1448	144.8	14480	14.48
2.2	60.90	4.479	1547	113.8	.1547	.1517	151.7	15170	15.17
2.3	63.67	4.683	1617	118.9	.1617	.1586	158.6	15860	15.86
2.4	66.43	4.886	1687	124.1	.1687	.1655	165.5	16550	16.55
2.5	69.20	5.090	1758	129.3	.1758	.1724	172.4	17240	17.24
2.6	71.97	5.294	1828	134.5	.1828	.1793	179.3	17930	17.93
2.7	74.74	5.497	1898	139.6	.1898	.1862	186.2	18620	18.62
2.8	77.51	5.701	1969	144.8	.1968	.1930	193.0	19300	19.30
2.9	80.27	5.904	2039	150.0	.2039	.1999	199.9	19990	19.99
3.0	83.04	6.108	2109	155.1	.2109	.2068	206.8	20680	20.68
3.1	85.81	6.312	2180	160.3	.2180	.2137	213.7	21370	21.37
3.2	88.58	6.515	2250	165.5	.2250	.2206	220.6	22060	22.06
3.3	91.35	6.719	2320	170.7	.2320	.2275	227.5	22750	22.75
3.4	94.11	6.922	2390	175.8	.2390	.2344	234.4	23440	23.44
3.5	96.88	7.126	2461	181.0	.2461	.2413	241.3	24130	24.13
3.6	99.65	7.330	2531	186.2	.2531	.2482	248.2	24820	24.82
3.7	102.4	7.535	2601	191.3	.2601	.2551	255.1	25510	25.51
3.8	105.2	7.737	2672	196.5	.2672	.2620	262.0	26200	26.20
3.9	108.0	7.940	2742	201.7	.2742	.2689	268.9	26890	26.89
4.0	110.7	8.144	2812	206.9	.2812	.2758	275.8	27580	27.58
4.1	113.5	8.348	2883	212.0	.2883	.2827	282.7	28270	28.27
4.2	116.3	8.551	2953	217.2	.2953	.2896	289.6	28960	28.96
4.3	119.0	8.775	3023	222.4	.3023	.2965	296.5	29650	29.65
4.4	121.8	8.958	3094	227.5	.3094	.3034	303.4	30338	30.34
4.5	124.6	9.162	2164	232.7	.3164	.3103	310.3	31030	31.03
4.6	127.3	9.366	3234	237.9	.3234	.3172	317.2	31720	31.72
4.7	130.1	9.569	3304	243.1	.3304	.3240	324.0	32400	32.40
4.8	132.9	9.773	3375	248.2	.3375	.3310	331.0	33100	33.10
4.9	135.6	9.976	3445	253.4	.3445	.3378	337.8	33780	33.78
5.0	138.4	10.18	3515	258.6	.3515	.3447	344.7	34470	34.47
5.1	141.2	10.38	3586	263.7	.3586	.3516	351.6	35160	35.16
5.2	143.9	10.59	3656	268.9	.3656	.3585	358.5	35850	35.85
5.3	146.7	10.79	3726	274.1	.3726	.3654	365.4	36540	36.54
5.4	149.5	10.99	3797	279.3	.3797	.3723	372.3	37230	37.23
5.5	152.2	11.20	3876	284.4	.3867	.3792	379.2	37920	37.92
5.6	155.0	11.40	3973	289.6	.3937	.3861	386.1	38610	38.61
5.7	157.8	11.60	4008	294.8	.4007	.3930	393.0	39300	39.30
5.8	160.5	11.81	4078	299.9	.4078	.3999	399.9	39990	39.99
5.9	163.3	12.01	4148	305.1	.4148	.4068	406.8	40680	40.68
6.0	166.1	12.22	4218	310.3	.4218	.4137	413.7	41370	41.37
6.1	168.8	12.42	4289	315.5	.4289	.4206	420.6	42060	42.06
6.2	171.6	12.62	4359	320.6	.4359	.4275	427.5	42750	42.75
6.3	174.4	12.83	4429	325.8	.4429	.4344	434.4	43440	43.44
6.4	177.2	13.03	4500	331.0	.4500	.4413	441.3	44130	44.13
6.5	179.9	13.23	4570	336.1	.4570	.4482	448.2	44820	44.82
6.6	182.7	13.44	4640	341.3	.4640	.4550	455.0	45500	45.50
6.7	185.5	13.64	4711	346.5	.4710	.4619	461.9	46190	46.19
6.8	188.2	13.84	4781	351.7	.4781	.4688	468.8	46880	46.88
6.9	191.0	14.05	4851	356.8	.4851	.4757	475.7	47570	47.57
7.0	193.8	14.25	4922	362.0	.4921	.4826	482.6	48260	48.26
7.1	196.5	14.46	4992	367.2	.4992	.4895	489.5	48950	48.95
7.2	199.3	14.66	5062	372.3	.5062	.4964	496.4	49640	49.64
7.3	202.1	14.86	5132	377.5	.5132	.5033	503.3	50330	50.33
7.4	204.8	15.07	5203	382.7	.5203	.5102	510.2	51020	51.02
7.5	207.6	15.27	5273	387.9	.5273	.5171	517.1	51710	51.71
7.6	210.4	15.47	5343	393.0	.5343	.5240	524.0	52400	52.40
7.8	215.9	15.88	5484	403.4	.5484	.5378	537.8	53780	53.78
8.0	221.4	16.29	5625	413.7	.5625	.5516	551.6	55160	55.16
8.2	227.0	16.70	5765	424.1	.5765	.5654	565.4	56540	56.54
8.4	232.5	17.10	5906	434.4	.5906	.5792	579.2	57920	57.92
8.6	238.0	17.51	6047	444.7	.6046	.5929	592.9	59290	59.29
8.8	243.6	17.92	6187	455.1	.6187	.6067	606.7	60670	60.67
9.0	249.1	18.32	6328	465.4	.6328	.6205	620.5	62050	62.05
9.2	254.7	18.73	6468	475.8	.6468	.6343	634.3	63430	63.43
9.4	260.2	19.14	6609	486.1	.6609	.6481	648.1	64810	64.81
9.6	265.7	19.54	6750	496.5	.6749	.6619	661.9	66190	66.19
9.8	271.3	19.95	6890	506.8	.6890	.6757	675.7	67570	67.57
10.0	276.8	20.36	7031	517.1	.7031	.6895	689.5	68950	68.95
11.0	304.5	22.40	7734	568.9	.7734	.7584	758.4	75840	75.84
12.0	332.2	24.43	8437	620.6	.8437	.8274	827.4	82740	82.74
13.0	359.8	26.47	9140	672.3	.9140	.8963	896.3	98630	89.63
14.0	387.5	28.50	9843	724.0	.9843	.9652	965.2	96520	96.52
14.7	406.9	29.93	10340	760.2	1.033	1.014	1014	101400	101.4
15.0	415.2	30.54	10550	775.7	1.055	1.034	1034	103400	103.4
16.0	442.9	32.58	11250	827.4	1.125	1.103	1103	110300	110.3
17.0	470.6	34.61	11950	879.1	1.195	1.172	1172	117200	117.2
18.0	498.2	36.65	12660	930.9	1.265	1.241	1241	124100	124.1
19.0	525.9	36.68	13360	982.6	1.336	1.310	1310	131000	131.0
20.0	553.6	40.72	14060	1034	1.406	1.379	1379	137900	137.9
21.0	581.3	42.76	14770	1086	1.476	1.448	1448	144800	144.8
22.0	609.0	44.79	15470	1138	1.547	1.517	1517	151700	151.7
23.0	636.7	46.83	16170	1189	1.617	1.586	1586	158600	158.6
24.0	664.3	48.86	16870	1241	1.687	1.655	1655	165500	165.5
25.0	692.0	50.90	17580	1293	1.758	1.724	1724	172400	172.4

CONVERSION FACTORS

P.S.I. x 27.71 = in. H₂O	P.S.I. x .0689 = bar
P.S.I. x 2.036 = in. Hg	P.S.I. x 68.95 = mbar
P.S.I. x 703.1 = mm/H₂O	P.S.I. x 6895 = Pa
P.S.I. x 51.75 = mm/Hg	P.S.I. x 6.895 = kPa
P.S.I. x .0703 = kg/cm²	

Note: Conversion factors rounded.

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