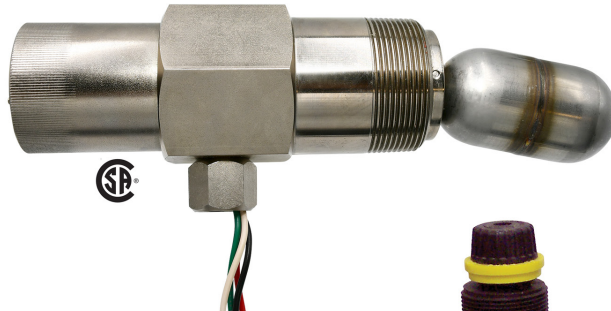


**Electric Switch**



**Pneumatic Switch**



# Liquid Level Switches

## Series LS200, LS200N and LS200NDVOR

### *Installation and Operations Manual*

**Warranty** - A limited warranty on materials and workmanship is given with this FW Murphy product. A copy of the warranty may be viewed or printed by going to <http://www.fwmurphy.com/warranty>



**CAUTION: LS200 Series parts are not interchangeable with other FW Murphy liquid level products. Damage caused by using incorrect parts is not covered by our Limited Warranty.**



Please read the following information before installing. A visual inspection for damage during shipping is recommended before mounting.

**BEFORE BEGINNING INSTALLATION OF THIS FW MURPHY PRODUCT:**

Disconnect all electrical power to the machine.

Make sure the machine cannot operate during installation.

Follow all safety warnings of the machine manufacturer.

Read and follow all installation instructions.

OBSERVE all pressure and electrical ratings and requirements for the devices and the operating environment.

BE SURE all pressure HAS BEEN REMOVED from the vessel before opening any pressure connections.

Please contact FW Murphy immediately if you have any questions.

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## Product Information

**NOTE:** See Replacement Parts in manual for parts available, if needed.

## Certification

Listed for cCSAus Class I, Div 1, Grps C & D locations.

Canadian Registration Number 0F01476.2

## Minimum Allowable Specific Gravity for LS200

Table 1 LS200 Minimum Allowable Specific Gravity			
Model	Float Extension length (inch)	Pressure (psi)	Specific Gravity
LS200	0	2000	0.55
	1		0.7
	6		1
LS200NDVO	0	2000	0.63
	1		0.73
	6		1.02

**Note:** The 6-inch float extension length is for reference only and is not available for the LS200 Series.

## LS200

LS200 Liquid Level Switches with 2-inch NPT mounting are float activated to operate an electrical SPDT snap-switch (optional DPDT on some models) for alarm or shutdown of an engine or electric motor. The LS200 connects directly into the vessel wall and can be used with an FW Murphy weld collar (P/N 15050375) or FW Murphy external float chamber.

Refer to the specification table below for product dimensions.

<p style="text-align: center;"><b>LS200</b></p>	<b>Table 2</b>	
	<b>LS200</b>	
	<b>A</b>	10.16 in. (258 mm)
	<b>B</b>	3.44 in. (87 mm)
	<b>C</b>	1.75 in. (44 mm)
	<b>D</b>	2.80 in. (71 mm)
<b>E</b>	2 NPT	

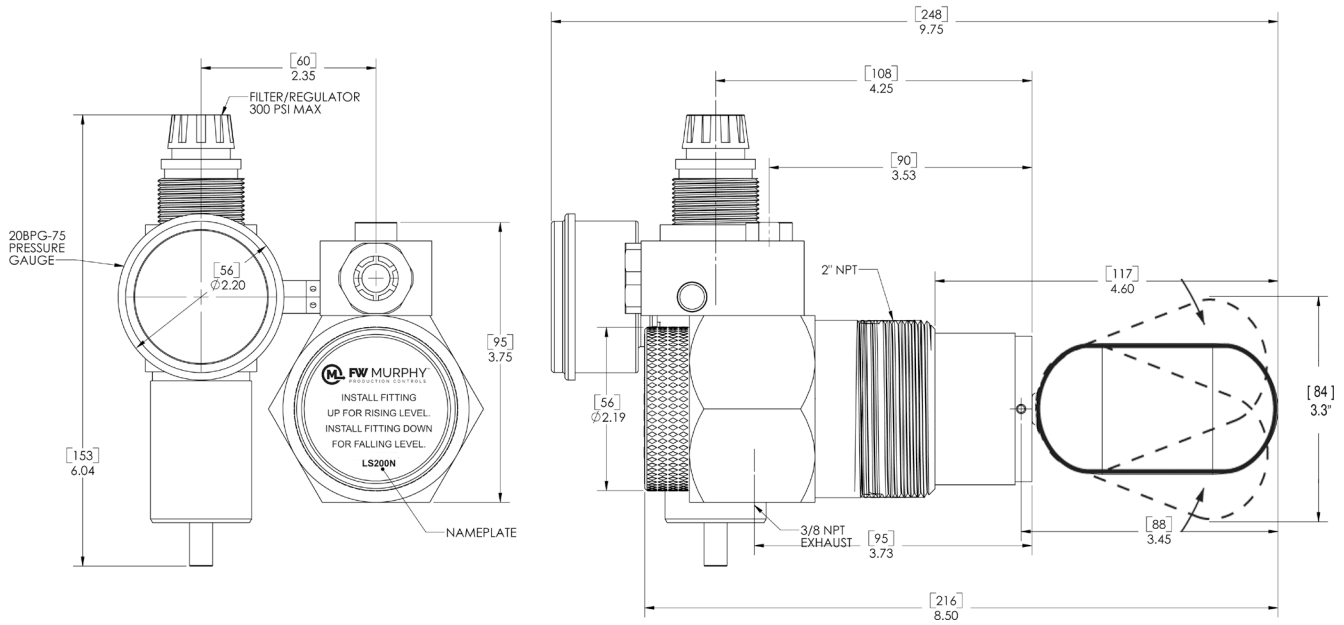
**NOTE:** Refer to Table 3 and Table 4 for clearances.

# LS200NDVOR

LS200NDVOR is a float-activated, pneumatic-vent level device used to operate dump valves or similar devices.

The LS200NDVOR provides a 2-inch NPT mounting with a pneumatic output for interfacing with pneumatic devices such as our FW Murphy pneumatic dump valve or with other pneumatic instrumentation.

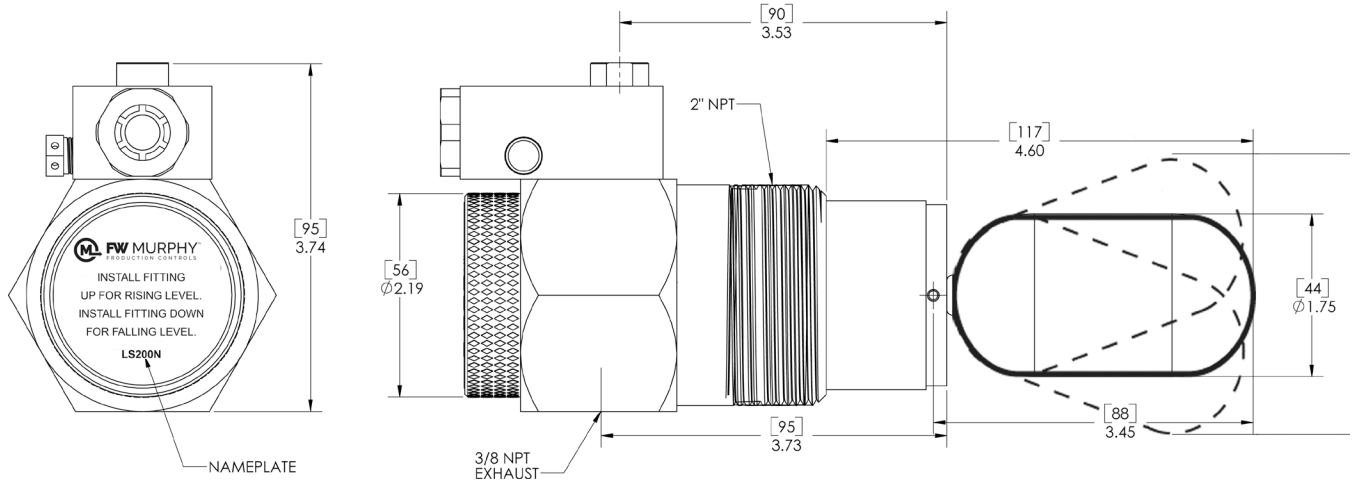
Pneumatic media devices require clean, dry, instrument-quality air or gas. This unit is supplied with a pressure regulator, filter and FW Murphy 20BPG pressure gage for improved system life and trouble-free operation.



**LS200NDVOR pneumatic level switch with dump valve operator, pressure regulator and gage**

## LS200NDVO

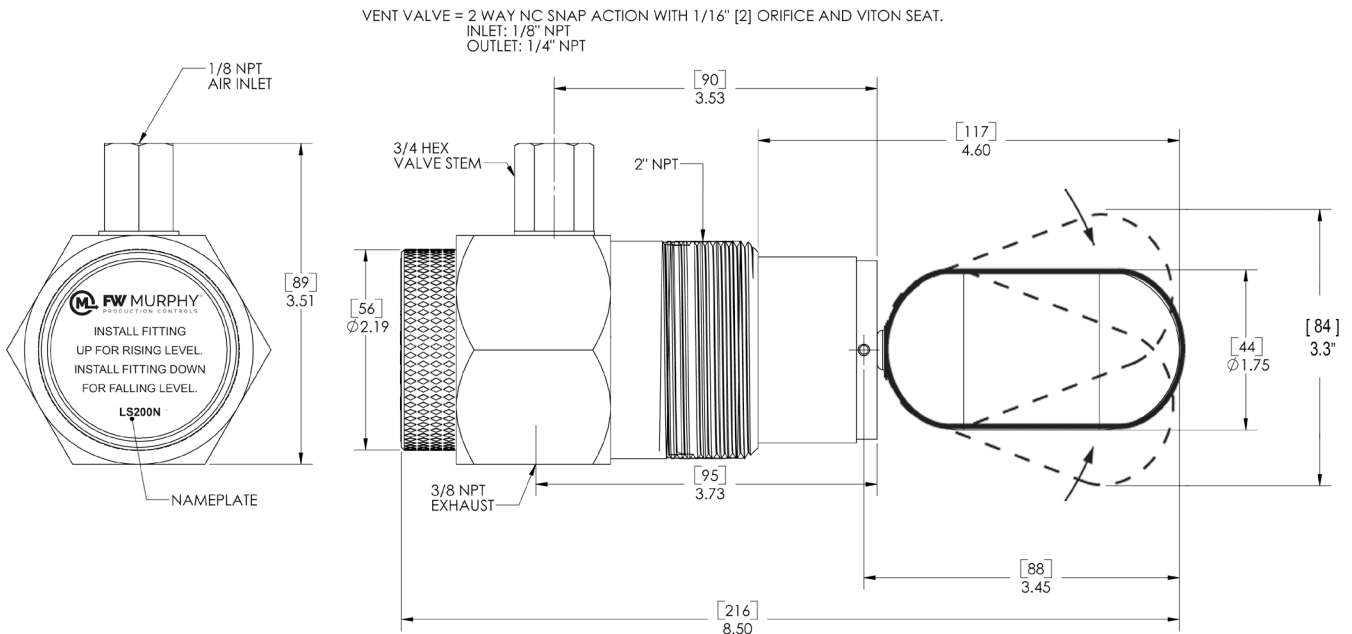
Shown below is the Pneumatic level switch with Dump Valve Operator (DVO) without the pressure regulator (for those applications where the system provides a filter regulator for instrument-quality air or gas as the control medium).



**LS200NDVO pneumatic level switch with dump valve operator**

## LS200N

Shown below is the Pneumatic level switch without the DVO and filter regulator.



**LS200N pneumatic level switch**

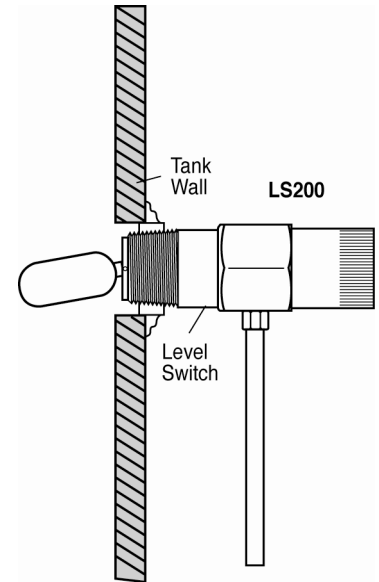
# Pressure Vessel Installation: LS200 and LS200N

## Direct Installation into the Wall of the Pressure Vessel



**CAUTION: Determine that the float travel is not obstructed by the coupling in the vessel wall, internal baffles, etc. Refer to tables 1, 2, 3 and 4 for application data.**

1. Make certain the float and extension are tight.
2. Before installing the level switch, apply pipe thread sealant to the threads. Screw the unit directly into the threaded connection in the wall of the pressure vessel.
3. For LS200, position the electrical connection at the bottom.
4. For LS200N, position the 1/8-inch NPT pneumatic connection on top, and the 3/8-inch NPT vent connection on the bottom.
5. Make the electrical wiring connections according to appropriate wiring diagrams for the alarm or shut-down system used. The electrical connection is 1/2-inch-14 NPT.
6. Insulate all electrical connections and install the cover before reconnecting electrical power.
7. Verify all pressure connections are tight before pressurizing the system.



### Clearance Reference Tables

Nom. Size (inches)	O.D. (inches)	Schedule Number	Wall Thickness (inches)	Inside Diameter (inches)
3	3.5	40ST	0.216	3.068
3	3.5	80XS	0.3	2.9
4	4.5	40ST	0.237	4.026
4	4.5	80XS	0.337	3.826

Product Name	Insertion Depth (inches)		Vertical Clearance (inches)	
	Std.	w/ 1" Extension	Std.	w/ 1" Extension
LS200	4.6	5.6	2.8	3.15
LS200N	5.43	6.4	3.3	3.9
L1200 *	4.65	5.7	3.9	4.55
L1200N *	5.6	6.7	5.3	6.9
L1100*	4.4	5.4	3.4	4.05

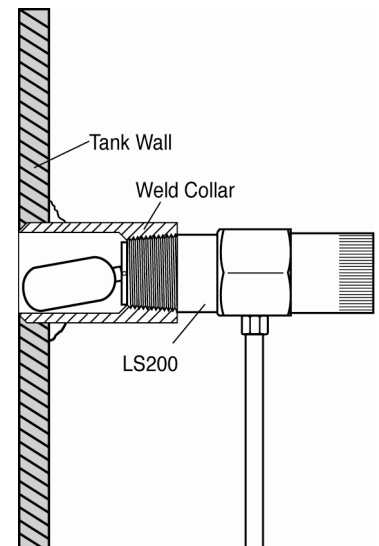
\* Included for reference. These products have been discontinued.



## Installation with a Weld Collar

The weld collar, P/N 15050375, must be welded into the wall of the pressure vessel according to code standards and good welding practices.

**NOTE:** Weld collar 15050375 can be used ONLY with model LS200.

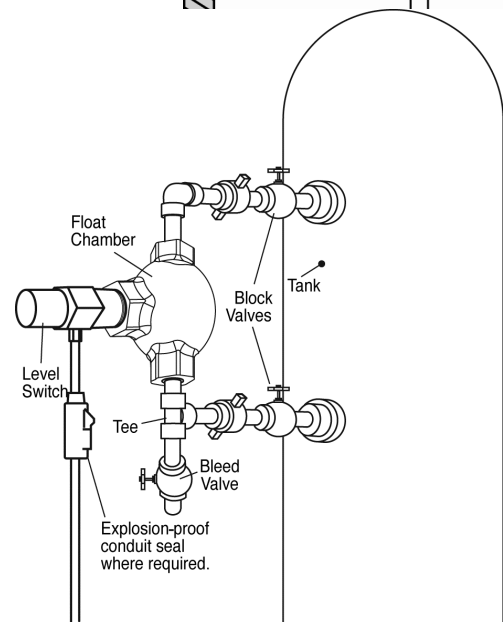


## Installation Using FW Murphy External Float Chamber

1. Install the FW Murphy float chamber 15051098 or 15700799 on the outside wall of the pressure vessel using 1-inch NPT piping or use the mounting surface with a bracket. Position the 2-inch NPT threaded connection at the height where you want the level switch to operate and away from the tank wall.
2. A tee and bleed valve are typically installed at the bottom of the lower 1-inch pipe riser to allow draining of the float chamber for servicing or replacement.

**NOTE:** The illustration shows a typical installation with blocking and bleed valves.

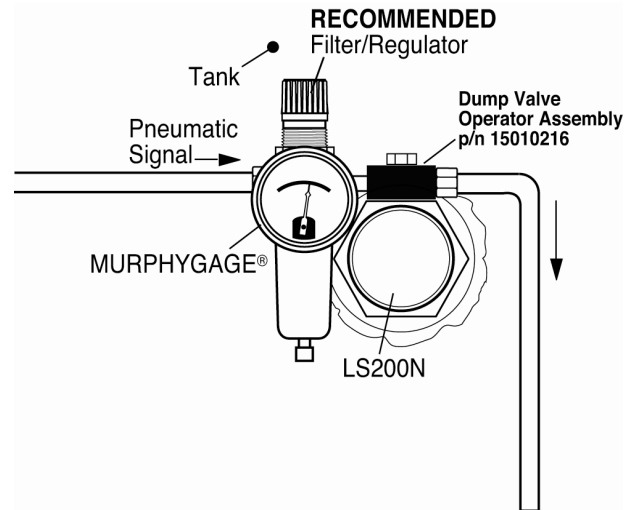
3. Install the LS200 or LS200N/NDVO/NDVOR in the 2-inch NPT connection of the float chamber. BE SURE float travel is not restricted and that the float is tight onto the float shaft.
4. To complete installation and wiring, follow the instructions for mounting directly into wall of the vessel and for wiring.



**CAUTION: Float extensions cannot be used with float chambers.**

## Installation and Adjustment for Pneumatic Models

1. All pneumatic models operate on the vent principle. **The pneumatic signal source must be clean, dry, instrument-quality air or natural gas. The input pneumatic signal must be regulated between 30 and 70 psi (207-483 kPa) [2 -4.83 bar].** If produced gas is used as the signal source, it should be taken after gas passes through the final scrubber. A suitable filter must be positioned before the LS200NDVO to prevent liquids and/or particulates from entering the dump valve operator.



**NOTE:** Check filter periodically for wear and tear and elements that hamper the flow of the pneumatic signal.

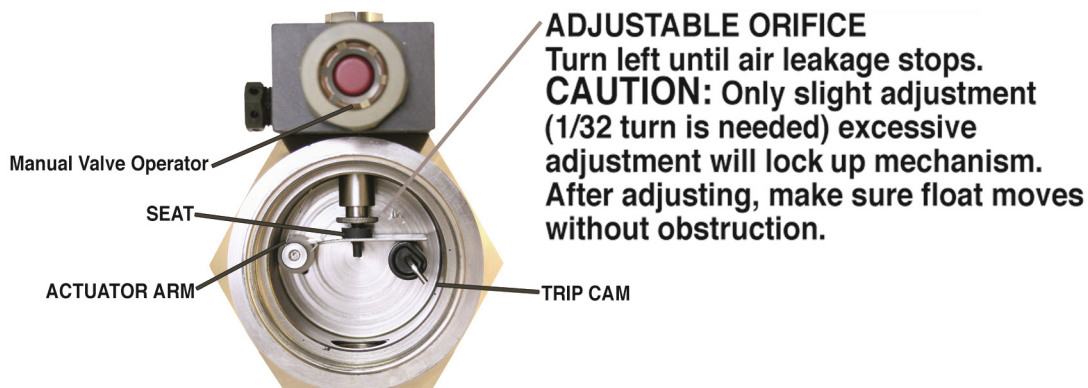
2. All pressure connections must be tight and maintained tight so as not to leak air/gas.



**CAUTION: Avoid excessive Teflon tape, which may inhibit proper operation.**

**Each switch is set to vent on rising level at the factory and should not need field adjustment. For testing the system, we have provided the red Manual Valve Operator on the operator pilot valve.**

3. You may adjust the valve seat if air/gas begins to leak. Take care when adjusting as only slight movement is necessary to stop the leakage; excessive force will bind the seating mechanism. See the instruction below for adjustment.



## Replacing and Installing the DVO Assembly

**NOTE:** When replacing/installing the DVO assembly, tubing and fitting modifications may be required. We suggest removing the LS200NDVO/DVOR from the vessel. Relieve pressure from the vessel or use block valves before removing the LS200NDVO/DVOR.

### Models LS200NDVO & LS200NDVOR

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**NOTE:** Use clean, dry, instrument-quality gas. Use and regular maintenance of filters will improve service life and reliability.

#### Tools Needed

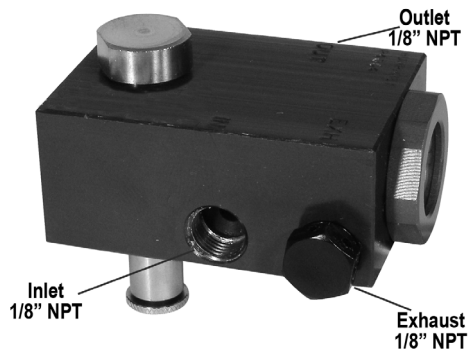
2-1/2 inch hex wrench or pipe wrench with smooth jaws / 9/16-inch hex wrench /  
Tubing cutters and benders

#### Instructions

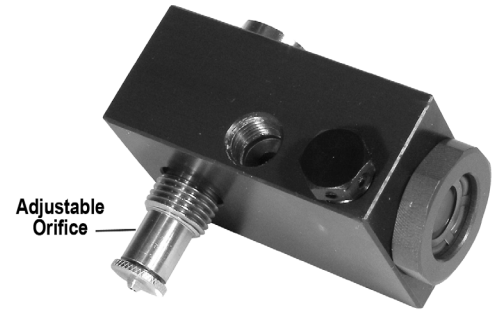
1. Block off and bleed the instrument gas pressure supply to the LS200NDVO/DVOR.
2. Remove the tubing between the LS200NDVO/DVOR and the scrubber dump valve, and remove the supply gas tubing (regulator [-R-] if used).
3. Remove the LS200NDVO/DVOR from the vessel (optional). LOCKOUT / TAGOUT after pressure is removed from the system.
4. If the LS200NDVO/DVOR was removed from the vessel, mount it in a suitable vise on a workbench (if possible).
5. Using the proper tools, disconnect the inlet, outlet and exhaust fittings from the existing DVO. See **Figure 1**. You will reconnect these to the new DVO in a later step.

**NOTE:** The following steps must be done with the DVO in the upright position (on top of the LS200NDVO).

6. Remove the LS200NDVO/DVOR cover. The use of a strap wrench or a pipe wrench may help.
7. With a 9/16-inch hex wrench, loosen the hex head bolt on top of the DVO, and remove the existing DVO from the body.
8. Ensure that the adjustable orifice is fully raised upward so that the actuator arm is not bent when inserted into the body. See **Figure 2**.
9. Insert the new DVO into the body. The DVO manual valve operator must face away from the vessel. See **Figure 3**.



**Figure 1 - DVO**



**Figure 2 – Adjustable Orifice**



**CAUTION:** Ensure that the actuator arm is not bent during reassembly

10. With the DVO aligned over the hex on the LS200NDVO body, tighten the valve using the 9/16-inch hex wrench. You may need to hold the DVO while tightening to keep it from rotating.
11. The pneumatic input signal should be regulated between 30 and 70 psi for proper setting of the adjustable orifice. With the float in the down position, adjust the adjustable orifice down until it touches the seat. See **Figure 4**.

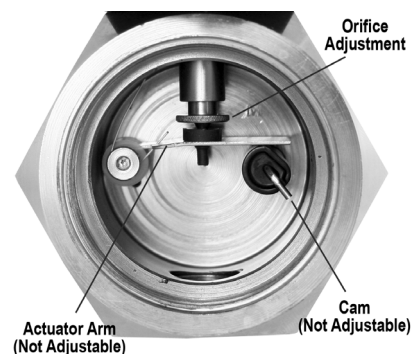
If the DVO is still leaking, make slight adjustments (1/32 turn). Excessive adjustments will lock up mechanisms. After adjusting, make sure float moves freely up and down.

12. Replace the LS200NDVO/DVOR cover.
13. Using the appropriate tools reinstall the inlet, outlet and exhaust fittings to the new DVO.

**NOTE:** Use thread sealant on threads only. Do not allow excess sealant to enter valve.



**Figure 3 – DVO manual valve operator**

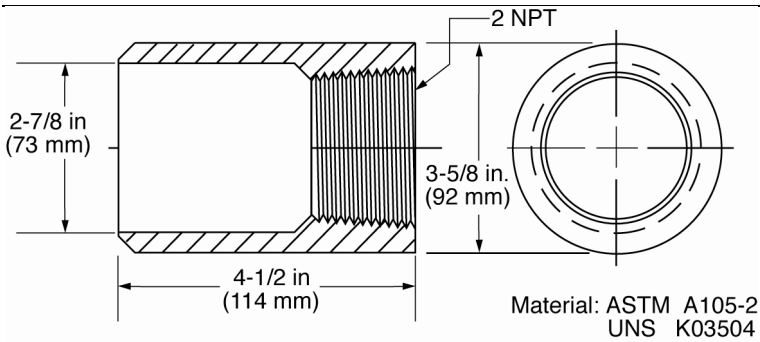


**Figure 4 – Orifice Adjustment with float in down position**

14. Connect to the inlet, outlet and exhaust fittings according to installation drawings.

## Accessories

### 15050375: Weld Collar

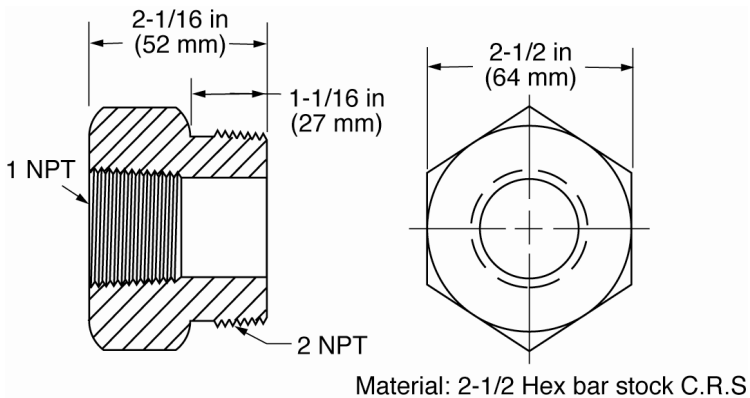


Operating pressure: 2000 psi (13.8 MPa) [138 bar].

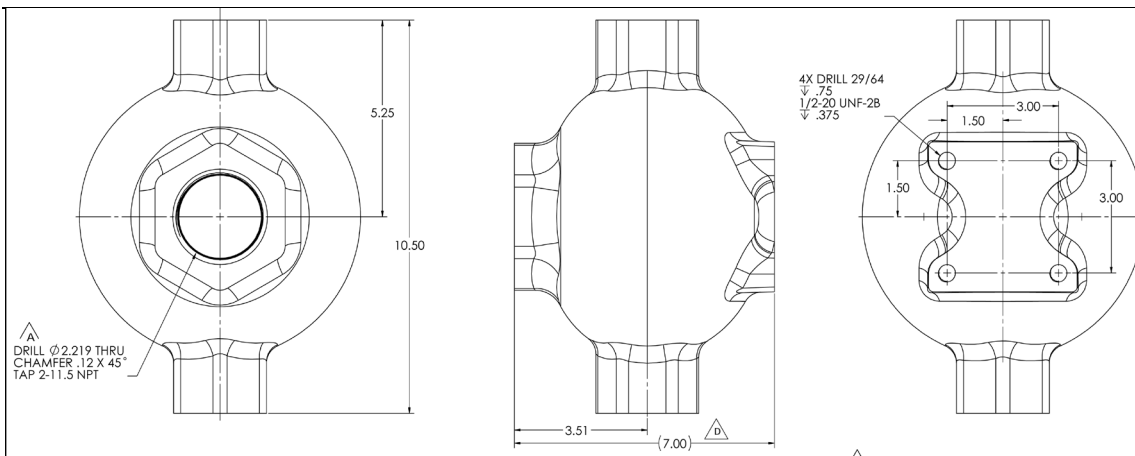
Operating temperature: 400°F (204°C).

### 55050617: DVU150/DVU175 Adapter Bushing

Order by part number designation



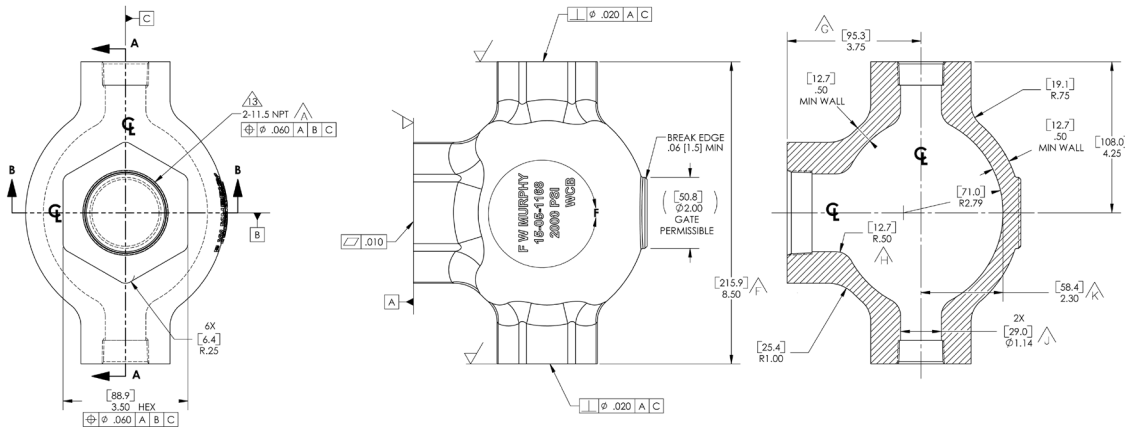
### 15051098: External Float Chamber



Operating pressure: 2000 psi (13.8 MPa) [138 bar]

Operating temperature: 400°F (204°C).

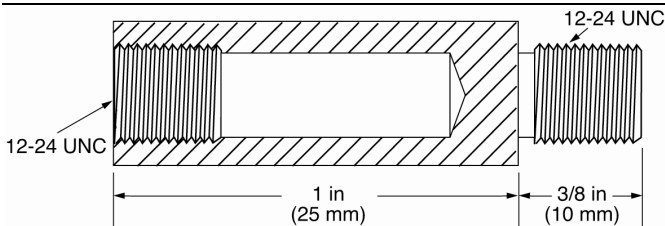
## 15700799: Series 100 External Float Chamber



Operating pressure: 2000 psi (13.8 MPa) [138 bar]

Operating temperature: 400°F (204°C).

## 15000478: Float Shaft Extension for the LS200



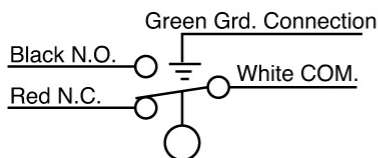
Material: AISI 303, UNS-S30300



**CAUTION: Use of 1-inch extension requires additional clearance. Refer to Tables 1, 2, 3 and 4 for application data.**

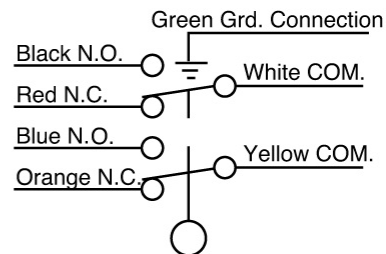
## Electrical

### SPDT (snap-switch)



**Switch Rating:** 5 A @ 125-250- 480 VAC  
 1/2 A @ 125 VDC  
 1/4 A @ 250 VDC  
 2A @ 6-30 VDC Resistive  
 1A @ 6-30 VDC Inductive

### DPDT (snap-switch)



**Switch Rating:** 10 A @ 125-250 VAC  
 1/2 A @ 125 VDC  
 1/4 A @ 250 VDC  
 10 A @ 6-24 VDC Inductive/Resistive

## Specifications

### All Models

Listed for cCSAus Class I, Div 1, Grps C & D locations

Canadian Registration Number: 0F01476.2

Body: Nickel-plated steel; optional 316 stainless steel

Float: 304 stainless steel

Pressure rating: 2000 psig (13.8 MPa) [138 bar] (LS200 models only)

O-ring: Viton

Process connection: 2" NPT

Temperature rating: -20 to 300°F (-29 to 149°C)

### LS200

Electrical: SPDT std. (see Electrical section for configuration/rating)

Wiring: 18 AWG x 36 in. (1.0 mm<sup>2</sup> x 916 mm)

### LS200NDVOR

DVO valve: 3-way N.C. w/manual operator, all connections 1/8" NPT (minimum 30 psig required)

Filter/pressure regulator set:

Regulator: 0 to 75 psig (0 to 517 kPa) [0 to 5.17 bar] range

Maximum input pressure: 300 psig (2.07 MPa) [20.7 bar]

### LS200NDVO

DVO valve: 3-way N.C. w/manual operator; all connections 1/8" NPT

### LS200 N

Vent valve: 2-way N.C. w/ 1/16in. (2mm) orifice and Viton seat; Inlet: 1/8" NPT; outlet 3/8" NPT

### Approximate Shipping Weights and Dimensions

All models: 6 lb. 10 oz. (3 kg)

Dimensions: (w x h x d) 10.18 x 3.36 x .11 in. (259 x 85.34x 2.88 mm)

## Replacement Parts

Order by part number designation.

### LS200

15000479: Stainless steel float for LS200 (not interchangeable with L1200)

15000124: SPDT snap-switch assembly

15000478: 1-inch float shaft extension (not interchangeable with L1200)

### LS200N

15000479: Stainless steel float for LS200N (not interchangeable with L1200)

15000501: Valve stem kit

### LS200NDVO and LS200NDVOR

55050621: Regulator only

15000237: Regulator Gauge Assembly (includes regulator, gauge and fittings)

15010267: Assembly (LS200N DVO Assembly)

# The FW Murphy Gas Compressor Scrubber Level System (SLS)

The system provides for liquid control in gas scrubber applications by dumping liquids to drain and protect compressors with high liquid level switch. Wetted metal parts are made to survive constant use in corrosive environments.

## Filter Regulator and Gage

Instrument-quality  
Air/Gas supply

## Pneumatic Level Control

Float-actuated level snap-acting switch controls pneumatic pressure to open and close Dump Valve. LS200NDVOR: Dump Valve Operator, pressure regulator and pressure indicating gage.

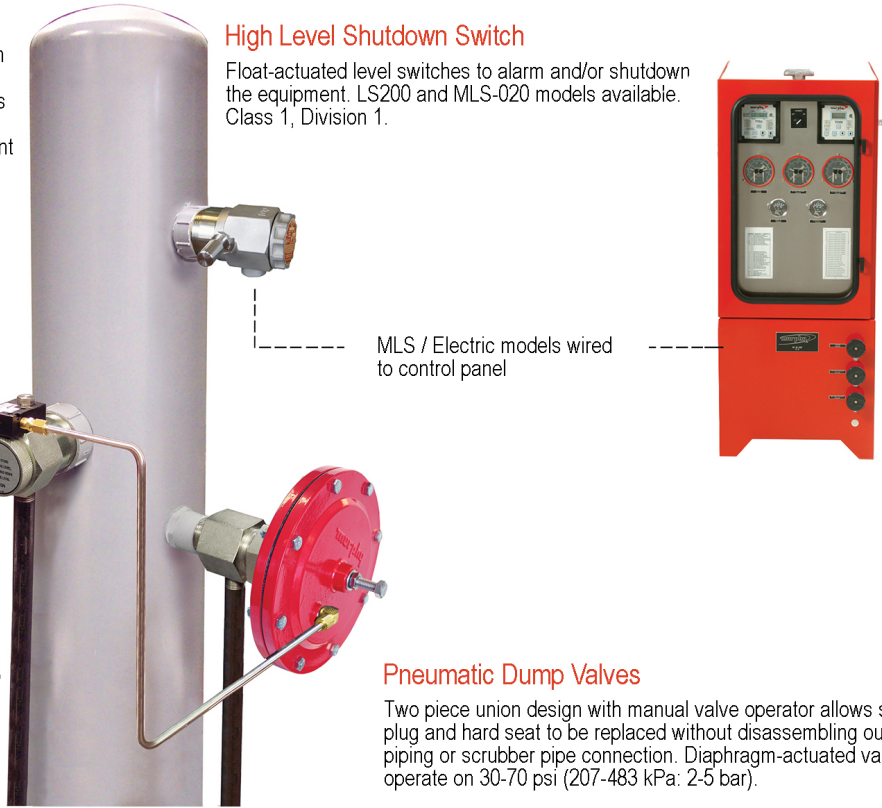
## High Level Shutdown Switch

Float-actuated level switches to alarm and/or shutdown the equipment. LS200 and MLS-020 models available. Class 1, Division 1.

MLS / Electric models wired to control panel

## Pneumatic Dump Valves

Two piece union design with manual valve operator allows soft plug and hard seat to be replaced without disassembling outlet piping or scrubber pipe connection. Diaphragm-actuated valves operate on 30-70 psi (207-483 kPa: 2-5 bar).



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