
U N I V E R S A L
U M
F L O W M O N I T O R S

Flow Monitor Installation and
Maintenance Instructions
for Vane and Piston Style
Variable Area Flow Monitors

See our Website for a copy of the
Warranty Statement at www.universalflow.com
or give us a call at 248/542-9635
to have one sent.

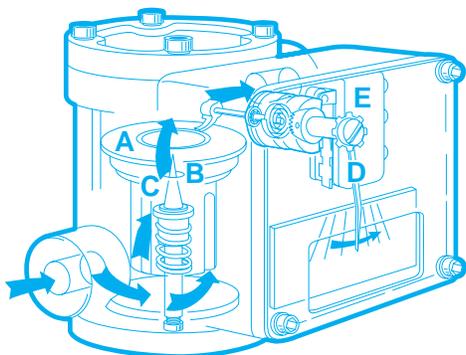
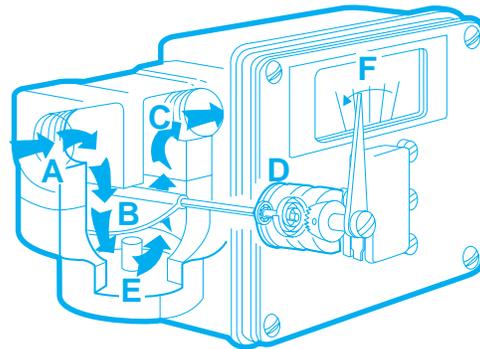
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The following manual includes the installation and maintenance instructions for flow meters manufactured by Universal Flow Monitors Inc. All flow monitors are individually calibrated for use with a specific fluid requested in the order entry process. Different fluids should not be used without first consulting the factory to verify compatibility of materials and flow parameters, such as viscosity and specific gravity for liquids, or operating pressure, temperature and specific gravity for gases, of the new application. Meter designs are of the variable-area type and operate with a relatively low, pressure drop. The flow elements are either a swinging vane or a repositioning piston.

INDEX	
How Vane and Piston Flow Meters work.....	2
Special Use Meters.....	3
Construction Materials and Engineering Data....	4
Readout Specifications.....	5-8
Periodic Maintenance.....	10
Calibration Notes.....	11
Dimension Information.....	12-16
Replacement Parts Kits.....	17-33
Return Authorization Information.....	34-37

How the swinging-vane design works

Fluid enters at **A**, passes around the semi-circular vane **B**, exits at outlet **C**. The vane resists the flow because of the spring **D**. The further the vane is pushed the larger the passageway **E** becomes. This minimizes the increase in pressure drop. The vane shaft turns to operate the pointer **F** and remote signal devices such as the switch **G**. The shaft can also turn switch cams and transducers to actuate any remote readout devices present.



How the piston design works

Fluid flow causes a spring-loaded piston **A** having a circular opening at its center **B** to move along the axis of a precision-tapered shaft **C**. This creates a variable orifice in direct proportion to the flow rate. The equilibrium position of the piston is mechanically linked to the readout pointer **D**, and the strong force developed as fluid pressure acts on a large piston area that easily actuates the readout device **E**. Pressure drop increases over rated flow range, averaging 3 PSI.

Special Use Meters

Universal Flow Monitors has several special use flow meters for specific applications such as air, lube and water. These meters are constructed of materials that are known to be compatible with the particular service intended. To select a seal, gasket, cover, readout, or dial assembly kit for any of these models requires conversion of the model prefix to that of a standard line meter. Additionally, accurate conversion of your specific use meter requires identification of size and seal materials. Use the following tables to select your correct standard model prefix, housing size and seal material:

MODEL PREFIX:			
AS	(svh)	-use-	SN-ESF
AM	(mvh)	-use-	MN-ESF
AL	(lvh)	-use-	LN-ESF
O	(svh)	-use-	SN-ASB
O	(mvh)	-use-	MN-ASB
OK	(svh)	-use-	SN-BSF
OK	(mvh)	-use-	MN-BSF
OO	(ph)	-use-	LL-ABPSB
WB	(svh)	-use-	SN-BSE
WB	(mvh)	-use-	MN-BSE
WB	(lvh)	-use-	LN-FSE
WP	(ph)	-use-	LL-BBPSE
WVS	(svh)	-use-	SN-BSE
WVM	(mvh)	-use-	MN-BSE
WVL	(lvh)	-use-	LN-FSE
WW	(ph)	-use-	LL-BBPSE
WW	(svh)	-use-	SN-BSE
WW	(mvh)	-use-	MN-BSE
WW	(lvh)	-use-	LN-FSE
Others consult factory			

(ph=piston housing, svh=small vane housing, mvh=medium vane housing, lvh=large vane housing).

Note: Other manuals are available for Vortex, Sensor Manifold, FlowStream, Mensah, Octopus, Insite and Transmitter

Construction Materials and Engineering Data

Prior to installation always double check the system pressure, temperature, wetted parts' compatibility, electrical ratings, and all other requirements to verify that the flow meter supplied is appropriate for the application.

HOUSINGS	SN	SM	SH	SX	MN	MM	MH	MX	ML	LN	LE	XHF	LL**	LP**	LH**
HOUSING MATERIAL and WEIGHT (lb) †															
Aluminum	4	4			9	9				65		4-in 70 6-in 78 8-in 100	4	4	
Aluminum/Nylon Bowl	3				7	7									
Aluminum/Hard Coat	4	4			9	9									
Brass	6	6			16	16				135			10		
Aluminum Bronze												4-in 200 6-in 220 8-in 260			
Brass/Nylon Bowl	5				13	13									
Cast Iron	6	6	7		19	19	30			120			10	10	
Cast Iron/Nylon Bowl	5				13										
Cast Iron/Nickel Plated/Teflon Impregnated	6	6	7		19	19	30			120			10	10	
Carbon Steel	6	6	7		21	21	30			120	120	4-in 200 6-in 220 8-in 260	12	12	14
Carbon Steel/Nickel Plated			7				30				120				
Naval Bronze	6	6			16	16				135					
Naval Bronze/Nylon Bowl	5				13										
Polypropylene									12						
Polysulphone				1.75				6							
PVC				1.75				6	12						
Teflon									12						
Tefzel				1.75				6							
316 Stainless Steel	6	6	7		21	21	30			120	120	4-in 200 6-in 220 8-in 260	12	12	14
MAXIMUM FLUID TEMPERATURE (°F)															
200 (Optional 300 & 400 °F)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
100 for PVC and PP, 200 for Others *				•				•	•						
MAXIMUM OPERATING PRESSURE LIQUIDS/GASES (PSIG)															
300/125 (PSIG)	•				•					•		•			
500/125														•	
500/200		•				•									
1000/167											•				
1500/375															•
2000/500 Iron & Steel			•				•								
2000/500, 1200/450 Stainless Steel			•				•								
*100 PVC, 150 Tefzel, 200 Polysulphone				•											
*100 PVC, 200 Tefzel & Polysulphone								•							
*100, 50 Teflon									•						
150 Plastic, 300 Metal Cap/125 Metal Cap													•		

* Liquids only

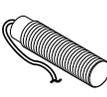
†Add 2 pounds for control boxes other than A.

**Piston and cap material. Polysulfone plastic cap can be used in LL units up to 150 PSI (liquid), metal cap (same as housing) is used for all other units.

Installation

These are in-line devices that can be mounted in any position without affecting performance. First, attach the meter at the port marked "in" by the appropriate means (threaded or flanged) ensuring the flow goes into that port. When threading pipe into a cast iron meter, **do not use teflon tape to seal the pipe threads**. Then connect the meter at the "out" port. The installation diagrams on pages 10-13 give the critical mounting dimensions. To insure maximum accuracy, install control valves downstream of the flow meter. If this is a gas application, back pressure must be maintained on the meter equal to the calibrated pressure. Units may have visual indication of flow only, or use a variety of switches, potentiometers, transmitters, or pneumatic switches.

Switch Specifications

									
Option (SYMBOL)	1,2	1B,2B	3,4	61,62	71,72	53,54	7, 7C*, 18	17, 17C*, 19	30,31
Switch Type	SPDT 3-Wire	High-Vibration SPDT 3-Wire	SPDT 4-Wire	High-Temp SPDT 3-Wire	Gold-Contact SPDT 3-Wire	Hermetically-Sealed SPDT 3-Wire	SPDT 3-Wire	DPDT 3-Wire	SPST Proximity
Rated By	UL/CSA/CE	UL/CSA/CE	UL/CSA (CE Pending)	UL/CSA (CE Pending)	UL/CSA (CE Pending)	MIL-S-8805	UL/CSA/ *CENELEC	UL/CSA/ *CENELEC	UL/CSA
Rating	15A-125,250, or 480 VAC 2A-600 VAC 1/2A-125 VDC, 1/4A-250 VDC 1/8 HP-125 VAC, 1/4 HP-250 VAC 6A Resistive & 5A Inductive-24 or 48 VDC	15A-125,250, or 480 VAC 2A-600 VAC 1/2A-125 VDC, 1/4A-250 VDC 1/8 HP-125 VAC, 1/4 HP-250 VAC 6A Resistive & 5A Inductive-24 or 48 VDC	15A-125,250, or 480 VAC 1A-125 VDC, 1/2A-250 VDC, 1/4 HP-125 VAC, 1/2 HP-250 VAC 3A Resistive & 2.5A Inductive-48 VDC 24 VDC= 6A Res. & 5A Ind.	15A-125,250, or 480 VAC 2A-600 VAC, 1/2A-125 VDC, 1/4A-250 VDC, 1/8 HP-125 VAC 1/4 HP-250 VAC, 6A Res. & 5A Ind.-24 or 48 VAC VDC	15A-125,250, or 480 VAC 2A-600 VAC, 1/2A-125 VDC, 1/4A-250 VDC, 1/8 HP-125 VAC 1/4 HP-250 VAC, 6A Res. & 5A Ind.-24 or 48 VAC VDC	5A res., 3A ind., 115 VAC, 400 Hz, 28 VDC	11A, 1/4 hp, 125/250 VAC; 5A res., 28 VDC; 0.5A res., 125 VDC	11A, 1/4 hp, 125/250 VAC; 5A res., 28 VDC; 0.5A res., 125 VDC	0.5A, 20-250 VAC/VDC
Use	General Purpose	General Purpose	General Purpose	High-Temperature	General Purpose	General and Corrosive Use	Hazardous Location	Hazardous Location	Hazardous Location
Deadband (Not to exceed)	7% ¹ 7% ²	7% ¹ 7% ²	7% ¹ 7% ²	7% ¹ 7% ²	7% ¹ 7% ²	7% ¹ 7% ²	15% ¹ 25% ²	15% ¹ 25% ²	10% ¹ 15% ²

¹Flow rates ≥15 GPM/56 LPM with exception of piston style.

²Flow rates ≤14 GPM/52 LPM including piston style.

The above chart shows each switch pictorially, details it by option number and switch type, and describes its rating and the rating agency, its use and deadband.

PIN IDENTIFICATION FOR B-H TYPE CONNECTORS

3-POSITION CONNECTOR (PC3)

For a 4-20 mA loop

GRN/1-GRD
RED/2-NEG
RED/3-POS

4-POSITION CONNECTOR (PC4)

For a 3-wire switch

BLK/1-N.O.
WHT/2-N.C.
RED/3-COM
GRN/4-GRD

5-POSITION CONNECTOR (PC-5)

For a 3-wire switch

RED/1-COM
RED/2-N.C.
GRN/3-GRD
RED/4-N.O.
RED/5-N/U

For a 4-wire switch (DC)

BLU/1-NC1
BLU/2-NO1
GRN/3-GRD
BLU/4-NO2
BLU/5-NC2

For a 4-wire switch (AC)

RED/1-NC1
RED/2-NO1
GRN/3-GRD
RED/4-NO2
RED/5-NC2

6-POSITION CONNECTOR (PC6)

For a two 3-wire switches

ORN/1-NO1
BLU/2-NC1
BLK/3-COM1
WHT/4-NO2
RED/5-NC2
GRN/6-COM2

8-POSITION CONNECTOR (PC8)

For a two 4-wire switches

ORN/1-NC1 (1)
BLU/2-NC2 (1)
WHT-BLK/3NO1 (1)
BLK/4-NO2 (1)
WHT/5-NC1 (2)
RED/6-NC2 (2)
GRN/7-NO1 (2)
RED-BLK/8-NO2 (2)

Setting Single Electrical Switches

Usually the switches are set at the factory as indicated in the model code on the nameplate, or as indicated on an attached paper tag. To reset the switch point for common switch options 1, 1B, 3, 11, 53, 61, and 71, proceed as follows.

Warning: Shut off the electric power to the control box before opening it.

1. Remove the nameplate, window, and gasket from the control box.
2. The cam that actuates the switch is located just under the pointer. The position of the cam dictates the flow rate at which the cam will trip the switch.
3. Turn the pointer so that it points at the desired flow rate on the scale. Against low spring forces you can do this by grasping the pointer itself (and holding it in position while you adjust the cam).

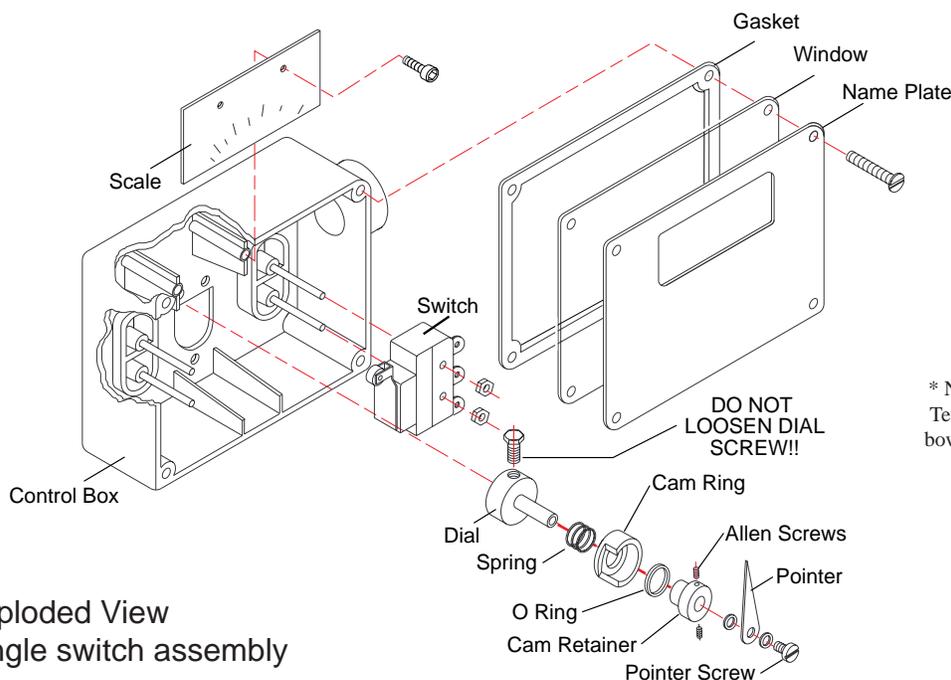
NOTE: Some flow meters with higher spring forces (medium, large, and extra large vane style) have an extended shaft which provides a means of manually moving the vane and simulating flow. A wrench (supplied with those units) is used to turn an extension of the shaft located at the back of the unit, opposite from the control box.

Flow meters with very high spring force and no extended shaft (typically MN, MM, MH, series) can be handled by *removing the bowl (under the housing).

WARNING: Isolate meter from process and be sure to bleed off any remaining pressure, as well as purge the line of any hazardous chemical prior to removing the bowl.

To maintain factory calibration accuracy, mark the bowl mounting orientation and replace the bowl in the same position after the cam is properly adjusted. The vane is then grasped and turned. To get the edge of the vane out of its recessed seat, use a socket head screw wrench as a lever, inserting it into one of the vane set screws to rotate the vane. To properly set the cam, the set point must be approached from the normal flow condition. I.E., a low flow contact is set for decreasing flow by moving the indicator above the low flow set point and adjusting the cam to activate or deactivate the switch just as it arrives at the low flow setting. To set the cam for an increasing set point, the cam is adjusted to activate/deactivate the switch as it approaches the set point from zero.

4. While holding the pointer/shaft/vane in the desired position, depress the cam ring fully (approx. 1/16 inch) and rotate it until the switch actuates (clicks). Release your downward pressure and the cam ring will lock at that position.
5. If you can't hear the switch click, you can determine contact closure with an ohmmeter connected across the switch terminals. Connect to the common and normally open or normally close on the switch.
6. To check the setting, direct the pointer again to the desired flow rate, noting where the switch actuates. Make adjustments as necessary. If the bowl was removed please place on guide roll pins and firmly tighten, in a X motion.
7. It's much easier to set the switch point if you can do it with actual flow present. Adjust the flow to the desired point where you want a signal to occur and turn the cam to actuate the switch as outlined above.
8. Replace window, nameplate, and gasket before turning on electric power.



* NOTE: It is recommended that all Teflon bowl seals be replaced when bowl is removed. This is symbol "T" found in model code. (ex. MN-IIT-ect.)

Exploded View
Single switch assembly

Setting Dual Electrical Switches

Cam Set Screw Adjustment

For switch options 2, 2B, 4, 7, 7C, 17, 17C, 18, 18C, 19, 19C, 30, 31, 54, 62, and 72, cams are supplied with set screws for adjustment. Dual switch units have two independent cams, stacked one on top of the other.

WARNING: Shut off electric power to control box before removing control box cover.

1. Remove the nameplate, window, and gasket from the control box.
2. With a 5/16 nut driver remove upper switch from control box.
3. Using a 1/8" hex wrench*, loosen lower cam screw just enough to rotate cam.
4. Turn the pointer so that it points at the desired flow rate on the scale. Against low spring forces you can do this by using a screwdriver and turning the pointer screw (and holding it in position while you adjust the cam).

NOTE: Some flow meters with higher spring forces (medium, large, and extra large vane style) have an opening on the opposite side of the meter from the control box. A wrench (supplied with those units) can be used to turn an extension of the shaft. Flow meters with very high spring force and no extended shaft (medium) can be changed by removing the bowl (under the housing).

WARNING: Isolate meter from process and be sure to bleed off any remaining pressure, as well as purge the line of any hazardous chemical prior to removing the bowl.

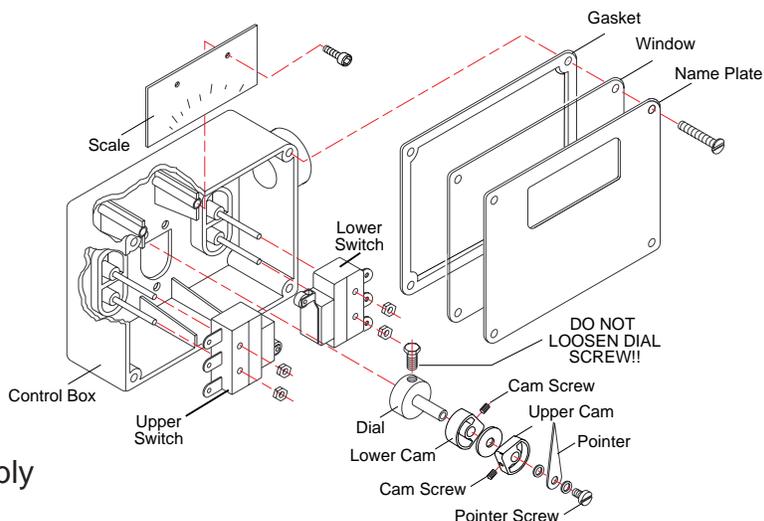
To maintain factory calibration accuracy, mark the bowl mounting orientation and replace the bowl in the same position after the cams are properly adjusted. The vane is then grasped and turned. To get the edge of the vane out of its recessed seat, use a socket head screw wrench as a lever, inserting it into one of the vane set screws to rotate the vane. To properly set the cam, the set point must be approached from the normal flow condition. I.E., a low flow contact is set for decreasing flow by moving the indicator above the low flow set point and adjusting the cam to activate or deactivate the switch just as it arrives at the low flow setting. To set the cam for an increasing set point, the cam is adjusted to activate/deactivate the switch as it approaches the set point from zero.

5. While holding the pointer, shaft and vane in the desired position, rotate the bottom cam until it actuates the bottom switch (switch will click). Still holding the pointer, shaft and vane in the desired position, tighten the cam screw with a hex wrench.

NOTE: If you cannot hear the switch click, you can determine contact closure with an ohmmeter connected across the switch terminals. The lower switch is now set.

6. To check the setting, move the pointer again to the desired flow rate, noting where the switch actuates. Make adjustments as necessary.
7. It's much easier to set the switch point if you can do it with actual flow present. Adjust the flow to the desired point where you want a signal to occur and turn the cam to actuate the switch as outlined above.
8. Place upper switch back into position in control box.
9. Again using a 1/8" hex wrench loosen upper cam just enough to rotate on dial.
10. Repeat steps 4 through 6.
11. Replace the gasket, window and nameplate before turning electrical power on.

*Due to control box space constraints, the supplied 1/8 inch hex wrench has been modified by grinding down the short end of the wrench. Additional modified wrenches can be obtained through UNIVERSAL FLOW MONITORS, consult factory.

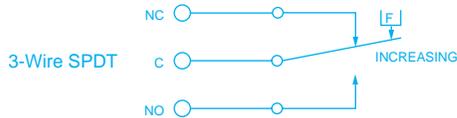


Exploded View
Dual switch assembly

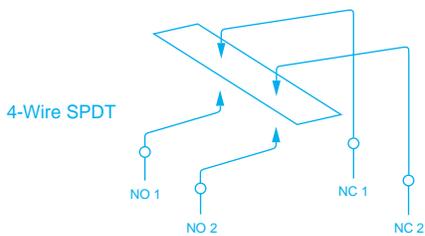
WARNING: Instrument to AC power lines constitute a potential electric shock to users. Make certain that the branch circuit is disconnected from the power supply before touching anything inside the control box.

Electric Switch Wiring Diagrams

Make connections according to the appropriate diagram below. (Switches may be removed to facilitate wiring them.)



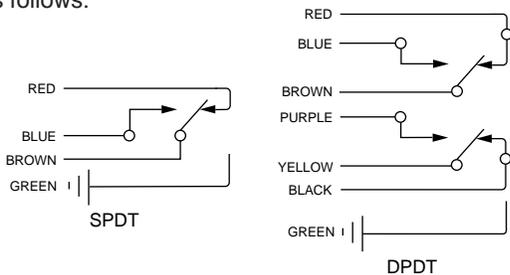
Switch options 1, 1B, 2, 2B, 53, 54, 61, 62, 71, 72



Switch options 3,4

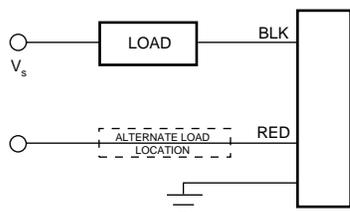
Switch options 7, 7C, 17, 17C, 18, 18C, 19, 19C, 30 and 31 are all CSA and UL rated for use in hazardous locations DIV. 1, Class 1, Groups A, B, C & D, Class 2, Groups E, F & G (switches with a suffix of "C" are CENELEC rated).

The explosion-proof switches come with color coded leads as follows:



Switch options 7, 7C, 18, 18C

Switch options 17, 17C, 19, 19C



EXPLOSION-PROOF PROXIMITY

Switch options 30,31

Pneumatic Switch Option

Universal's pneumatic switch option gives you reliable air-operated remote signalling. The switch is available on all Universal flow monitors. The unit is actually a cam-operated 5-port multi-purpose 4-way valve with flow paths that can be optionally connected, to supply ON-OFF signals.

The valve has a hardened stainless steel packless spool sliding in an electronics nickel plated body. The unit is best used with instrument air. In any case, the air must be clean and dry.

Connection is simplified with its push-on type barb tube connectors. No tubing inserts, ferrules, collars, seals, or threads are required. (Tubing should be 1/8" I.D.)

The unit comes mounted in the standard flow monitor control box.

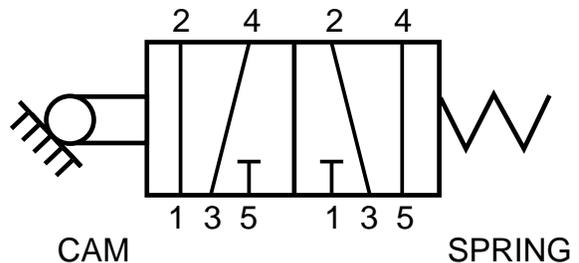
Operation

The operation of this switch is the same as directional valves commonly used to direct flow to air cylinders, motors, and similar devices. The function of the switch is to provide air control signals to activate a remote and/or pilot-operated signalling device, or as part of a logic circuit.

ON-OFF Signalling

For simple ON-OFF operation of the valve, to signal a low-flow condition, just three ports are utilized. (See simplified fluid power symbol.) Port 3 is the "IN" port, port 4 is the "OUT" port, and port 5 is the "Exhaust" port. The unit is cam operated with a spring return. When the cam is not actuating it, the spring controls the valve spool. In the spring controlled position, port 3 is connected to port 4. In the cam-controlled position, port 3 is connected to port 5 the exhaust port.

When flow is above the minimum level required (above the switch point), the valve is held in the cam-controlled position, routing the air to exhaust. So the control box is purged with instrument air during normal operation. When flow falls below the switch point, the valve shifts to the spring-controlled position. Port 3 to 4 is then connected, completing the circuit to the signalling device.

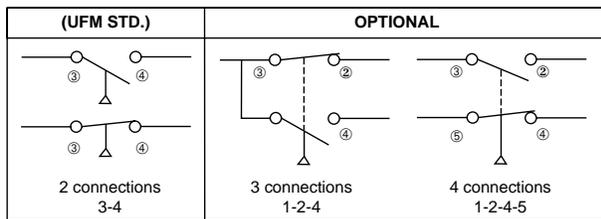


Switch options 11

Cam-controlled position shown at left, spring-controlled position at right.

Air Logic Circuits

This multi-purpose valve offers a number of circuiting possibilities. Operation is illustrated in the symbols shown here. When the cam is not actuating it, the spring controls the valve spool. The air logic symbols for the valves spring-controlled position are shown. Care should be taken that unused ports are not blocked, as these act as exhaust ports. When flow is above the switch point, the valve is held in the cam-controlled position. When flow falls below the switch point, the valve shifts to the spring-controlled position, changing the condition of the flow paths.

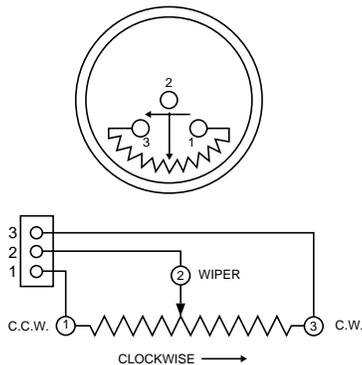


Engineering Data

Pressure Rating: vacuum to 125 PSIG. Fully balanced. Cv=0.12, when tubed with 1/8" I.D. polyurethane tubing. Leakage: no greater than .002 SCFM when supplied with 50 PSIG pressure. Fittings: 10-32 to 1/8" I.D. push-on barbs.

Wiring a Potentiometer (options RP and TP)

RP and TP boxes contain a potentiometer that will give a varying voltage with flow. Our standard pot is 10k ohms with an output of less Than 2k ohms. Power rating is 1 watt. These may be ordered with or without the switches described previously. They should be wired as shown below. Note: resistance of wiring should not exceed 2 ohms. When ordering a remote transmitter for the purposes of keeping the transmitter out of a hazardous location, there must be a barrier on each of the three branches. (Consult factory for additional instructions).



10kΩ POTENTIOMETER

Wiring a transmitter (in control boxes RT, TT and TTL)

RT, TT and TTL boxes contain a transmitter (and driving potentiometer) that provide a two wire 4-20 mA DC linear output signal proportional to flow.

The transmitter comes factory calibrated for the fluid and application specified in the ordering process. Recalibration is only necessary if the transmitter is replaced or installed in a different flow meter. Connect a shielded twisted pair of wires (not provided) to the terminals marked + and - in the left hand junction box of the control box. The wire must be between AWG size 22 and 12. (see chart below).

Wire Length Chart	
Wire Gauge	Maximum Signal Wire Length*
22 AWG	1000 Feet
20 AWG	1500 Feet
18 AWG	2500 Feet
16 AWG	3000 Feet
14 AWG	3500 Feet
12 AWG	4000 Feet

* Based on using instrument grade twisted shielded signal cable and adhering to wire separation guide line.

An electrical ground connection must be made to the ground screw provided in the box. The twisted wire pair connects the transmitter and all receiving equipment in a loop. Supply power (typical 24 VDC at 30mA) must be supplied by one of the receiving units or by a separate power supply. Several receivers (such as recorders or controllers) may be connected in series, but only one power supply source should be used. NOTE: The loop should be grounded, at only one point in the loop. Refer to: RT, TT, TTL manuals for additional information on transmitters.

Calibration

All flow meters are individually calibrated (for a specific fluid) before leaving the factory. Scales are therefore not interchangeable. Be sure any scale removed is put back in the same meter.

(For additional information see separate transmitter manual RT, TT, TTL)

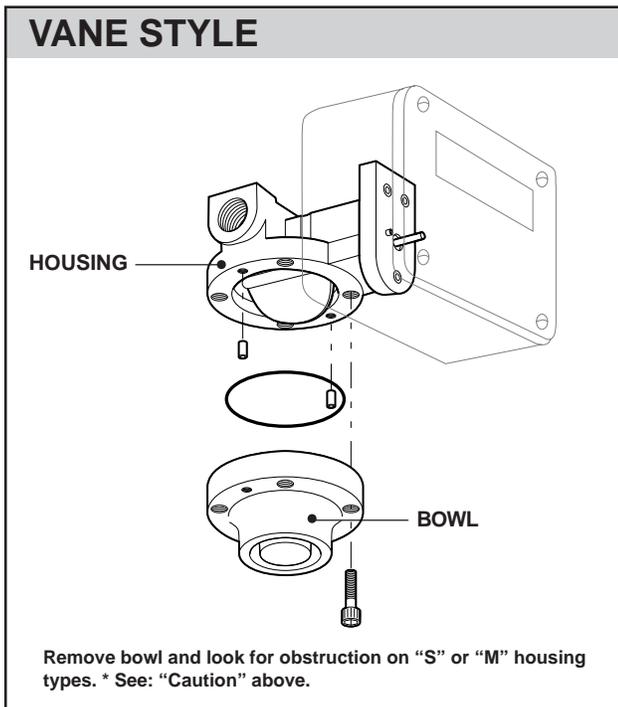
Periodic Maintenance

Periodic maintenance (Vane type meters)

Check the meter function by varying flow through it and observing if the flow indications are tracking. If not, there may be an obstruction around the flow sensing element.

CAUTION: Shut off flow to the meter and bleed off pressure prior to disassembly. The meter may also have to be purged if it is metering hazardous materials.

Mark position of bowl on both the body and bowl to ensure reassembly in the proper position. Open the flow chamber as shown in the diagram. Check for obstructions and remove any. If the vane is in good condition (not pitted or corroded), and the spring is intact, it is likely the original calibration is still good. Reassemble the meter, matching the marks previously made on the bowl and meter body, and continue the operation. Actual verification of flow accuracy requires a flow prover or calibration flow test stand.



If there is no sign of corrosion or blockage and the flow element is still frozen in place, it is likely that the O-rings have been chemically attacked. If the attack is not likely to be repeated, then replacement O-rings can be ordered as a seal kit. If the chemical attack is due to a permanent change in fluid conditions, then the meter must be rebuilt using new O-rings of a different material. Please consult the factory when making this selection. It is also possible that gaskets, switches, control box mechanical moving parts and O-rings may become damaged and need replacement. Select these parts kits from page 12-28 according to the flow meter model number.

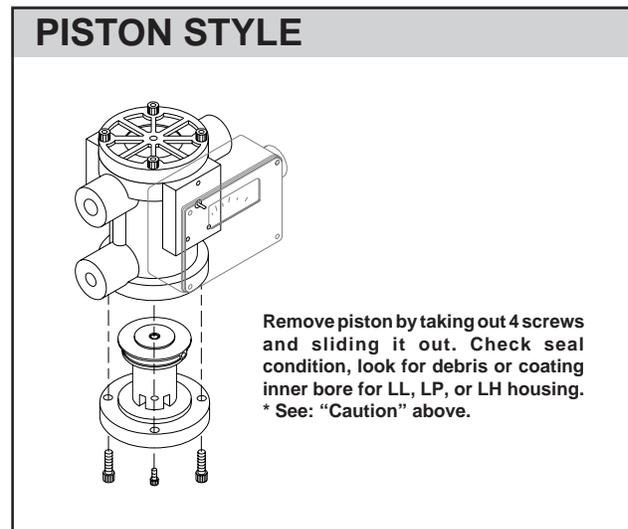
Periodic Maintenance (Piston type meters)

In the piston design, individual springs cannot be changed. All internal parts are contained in a replaceable capsule, including a piston, piston seal, and stainless steel spring. The capsule is easily removed to correct a malfunction or to change the flow range, as follows:

CAUTION: Shut off flow to the meter and bleed off pressure prior to disassembly. The meter may also have to be purged if it is metering hazardous materials.

Loosen the four cap screws from the lower end cap, and pull the end cap and attached flow sensing capsule out of the housing. The capsule may be cleaned by flushing in a liquid, or by a blast of compressed air. However, we do not recommend disassembly of the capsule. Before installing a cleaned or replacement capsule, clean the interior of the housing with a rag or brush. The tell-tale arm that controls the motion of the pointer must be held out of the way while the capsule is installed. This is done by removing the name plate from the control box, and moving the pointer, by hand, in the direction of maximum scale reading while slipping the capsule and end cap into position. The pointer may then be released, the end cap tightened, and the face plate reinstalled.

If your model number contains a "Z," followed by digits, you have a non-standard option. Please contact the factory for an explanation of your complete model number.



Calibration Notes

If the flowmeter will be used to measure flows at varying pressures (as in applications for portable meters) a standard unit calibrated for 90 psig @ 70°F is supplied, and correction factors from Table 1 are applied against the readings to get actual SCFM.

If the flowmeter is to measure air at a constant and repeatable pressure, it will be factory calibrated to read directly in actual SCFM, with air temperature assumed to be 70°F. Readings taken with air at other than 70°F can be corrected by using the correction factors in Table 2.

Table 1 Pressure

PSIG	10	20	30	40	50	60	70	80	90	100	110	120
Factor	.49	.58	.65	.72	.79	.84	.90	.95	1.0	1.05	1.09	1.13

Table 2 Temperature

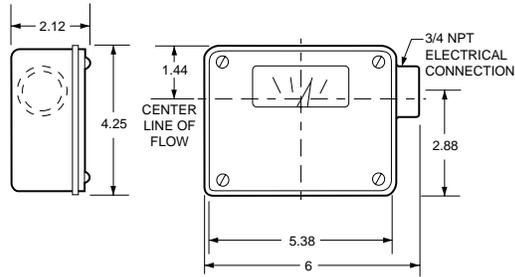
Temp °F	30	50	70	90	120	150	200	250	300	350
Factor	1.04	1.02	1.00	0.98	0.96	0.93	0.90	0.86	0.84	0.81

$$\sqrt{\frac{14.7}{14.7 + 90.0}} \div \sqrt{\frac{14.7}{14.7 + X}}$$

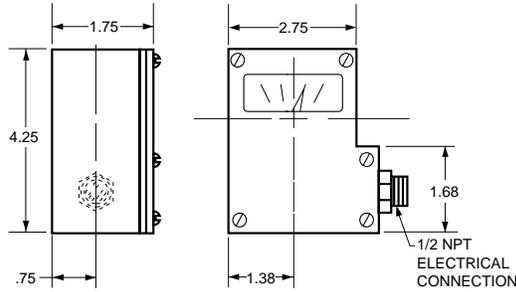
X = System Pressure

Dimensional information

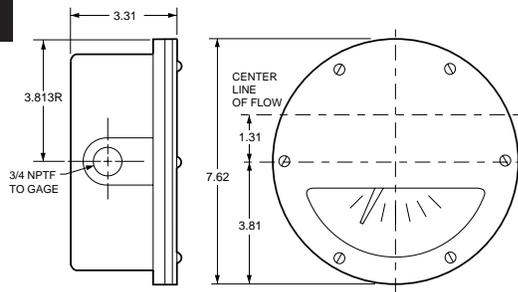
"A" Style Control Box



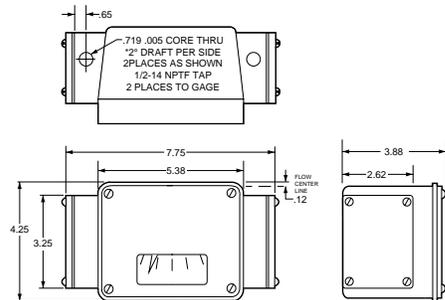
"M" Style Control Box



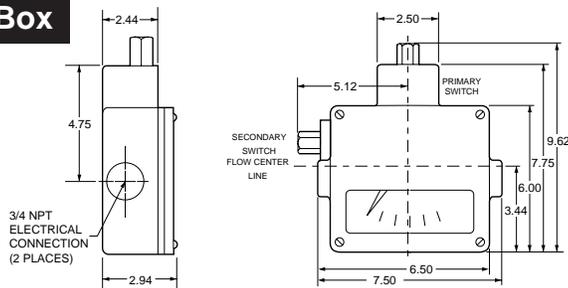
"R" Style Control Box



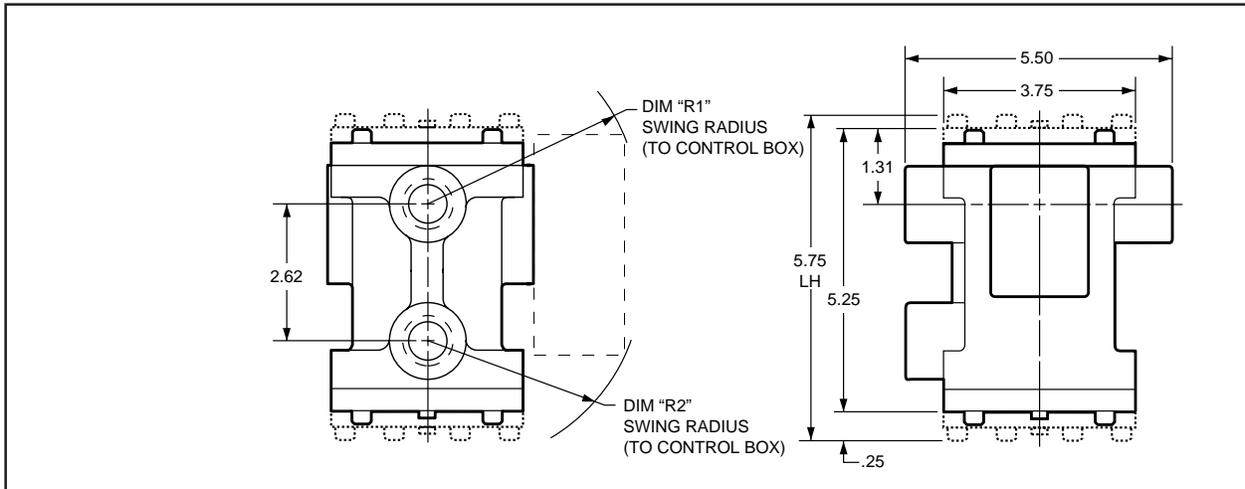
"T" Style Control Box



"X" Style Control Box



NOTE: Dimensional information on these drawings are for general reference only. Please request certified drawings with your order when installation dimensions are critical.



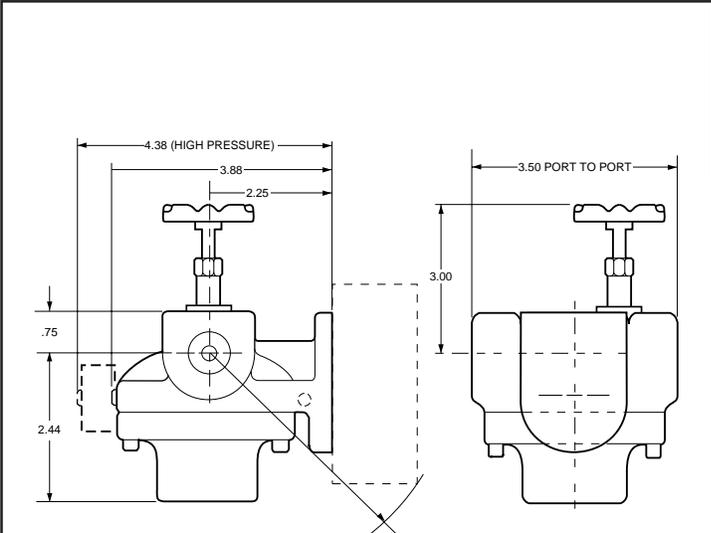
Piston Body



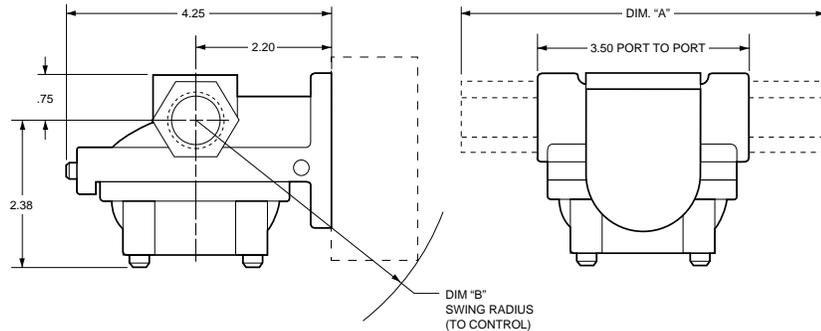
	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "R1"	5.62	5.06	7.25	7.00	8.38
DIM "R2"	5.06	5.68	6.68	6.50	6.75



Small Body



	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "R"	5.00	5.62	8.62	7.00	7.12



	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "B"	5.00	5.56	8.62	7.00	7.12

STYLE	FITTING SIZE (NPTF)	DIM "A"
MALE	1/4	6.00
	1/2	6.25
	3/4	6.50
	1	6.50
FEMALE	ALL	5.50

SX Body

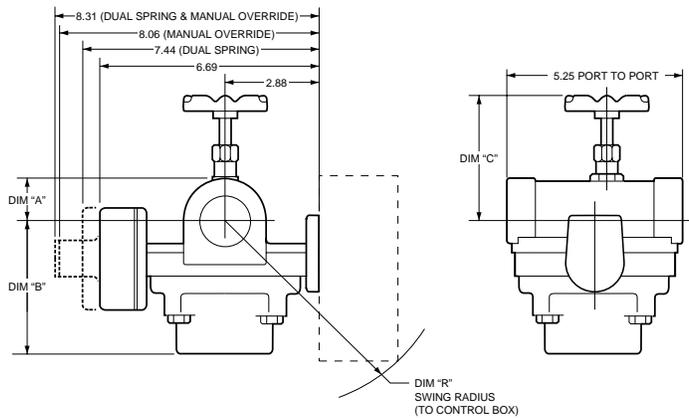


Shown with A/Box



Shown with A/Box

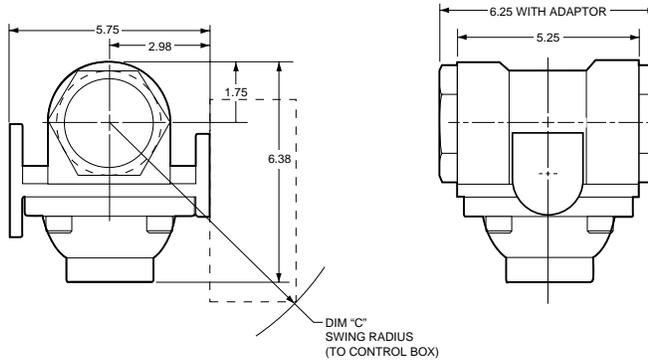
Medium Body



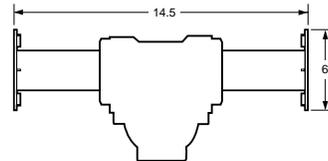
	1/2" TO 1-1/2"	2"
DIM "A"	1.44	1.75
DIM "B"	4.38	4.75
DIM "C"	3.75	4.00

	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "R"	5.75	6.44	9.50	7.81	8.12

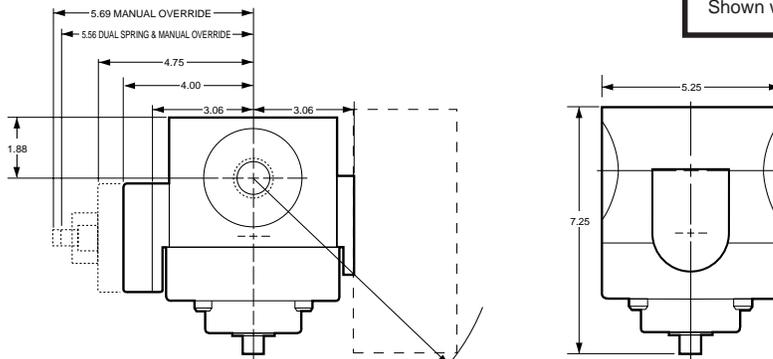
MX Body



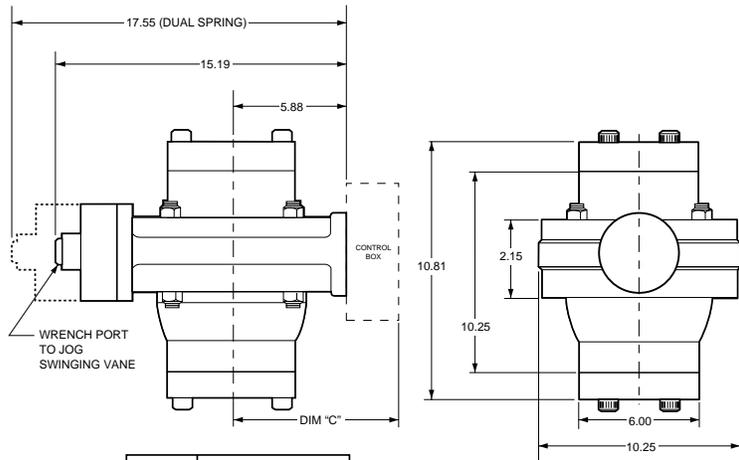
	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "C"	6.00	6.75	9.50	8.00	7.62



MH Body



	CONTROL BOX STYLE				
	"A" BOX	"M" BOX	"R" BOX	"T" BOX	"X" BOX
DIM "B"	6.12	7.56	9.62	8.25	8.25



	CONTROL BOX STYLE		
	"R" BOX	"T" BOX	"X" BOX
DIM "C"	3.38	3.88	3.00

Large Body

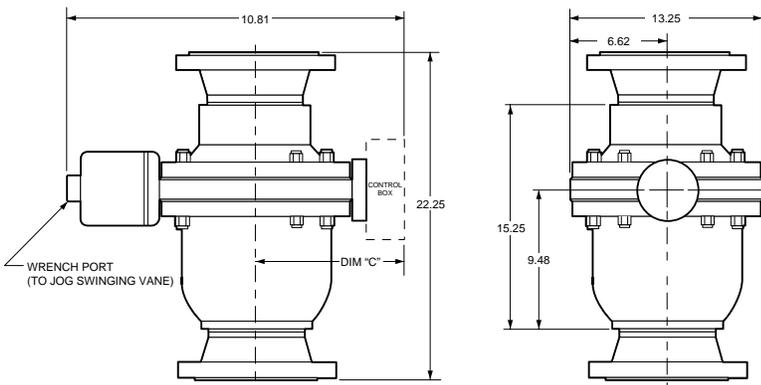


Shown with R/Box



Shown with R/Box

XHF Body



	CONTROL BOX STYLE		
	"R" BOX	"T" BOX	"X" BOX
DIM "C"	10.69	10.31	11.25

Replacement Parts

Select replacement part kits from the following charts using the model code stamped on the name plate of the flow meter. Model code descriptions can be found on all UFM specification sheets. The first two digits will define the correct flow monitor series. (NOTE: See page 2 for special use meters, if you do not find your particular series listed.)

How to order a Dial Assembly Kit:

Pg. 18-22

How to order a Readout Kit:

Pg. 23-25

How to order a Cover Assembly Kit:

Pg. 26-28

How to order a Gasket Kit:

Pg. 29-30

How to order a Seal Kit:

Pg. 31-33

HOW TO ORDER A DIAL ASSEMBLY KIT: (DAK)

The meters in this manual are all mechanical in nature. The flow elements are connected to the control boxes via a shaft that rotates with changing flow rates. The parts that are attached to this shaft and that reside inside the control box are referred to as the "Dial Assembly". If any of these parts are damaged, the replacement parts are sold as a kit. All "Dial Assembly" kit part numbers begin with "DAK". The remainder of the part number is derived from the model code of the meter. The kit numbers correlate to the model codes as follows:

MN-BSB30GM-8-32V1.0-A1NR

DAK-MN-A-1

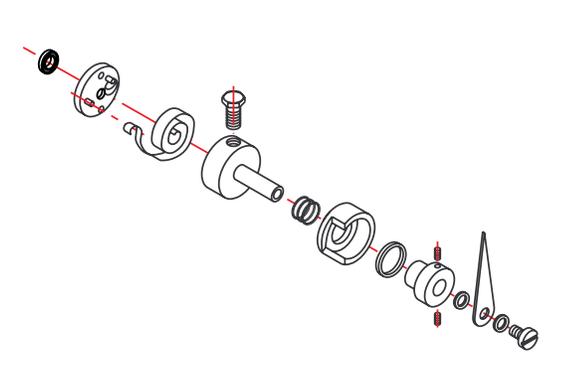
EX. DAK - MN - A - 1

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL*	A	0	L
	LP*	M	1, 1B	R
	LH*	R	2, 2B	U
	SH*	T	3	D
	SN*	X	4	
	SM*		61	
	SX*		62	
	ML		53	
	MN		54	
	MX		71	
	MM		72	
	MH		7, 7C	
	LN		18, 18C	
	LE		17, 17C	
	XHF		19, 19C	
			30	
			31	
			11	

*** Flow direction required for these models only.**

The following kit diagrams are subsets of the main parts assembly. The accompanying diagrams will clarify which parts are included for each meter series.

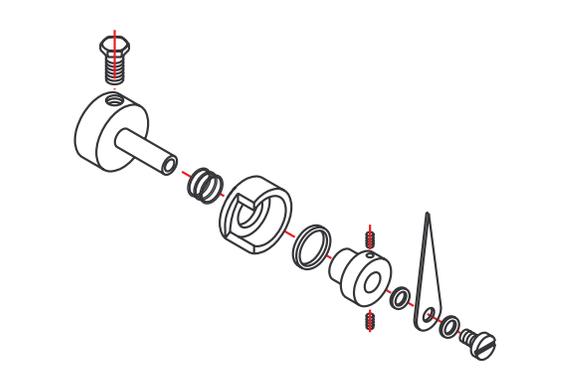
Single Switch Assy.



EX. DAK - LL - A - 1 - R

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL	A	1, 1B	L
	LP	R	3	R
	LH	T	61	U
	SN	M	53	D
	SM		11	
	SH		71	
	SX			

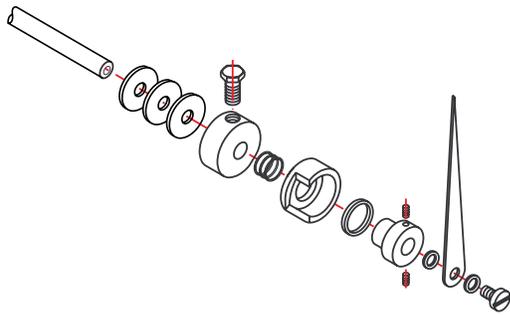
Single Switch Assy.



EX. DAK - MN - A - 1

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	MN	A	1, 1B
	MM	R	3
	MH	T	61
	MX	M	53
	ML		11
			71

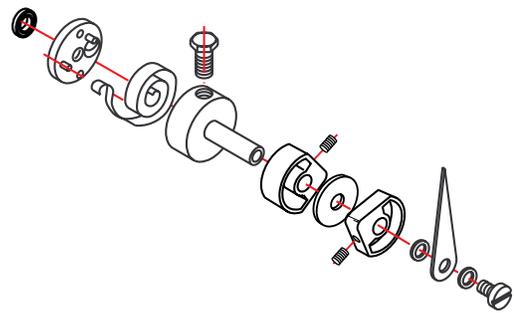
Single Switch Assy.



EX. DAK - LN - R - 1

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	LN LE XHF	R T	1, 1B 3 61 53 11 71

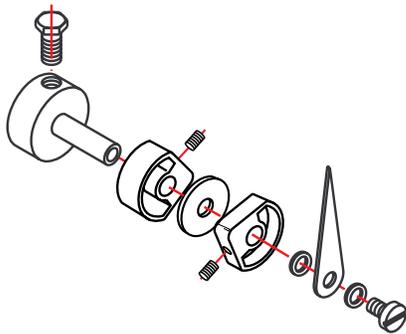
Double Switch Assy.



EX. DAK - LL - A - 2 - R

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL LP LH SN SM SH SX	A R	2, 2B 4 62 54 72	L R U D

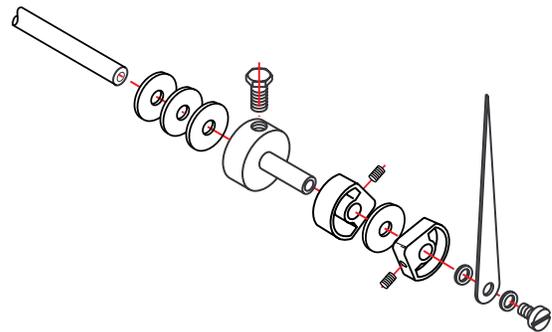
Double Switch Assy.



EX. DAK - MN - R - 2

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	MN MM MH MX ML	A R	2, 2B 4 62 54 72

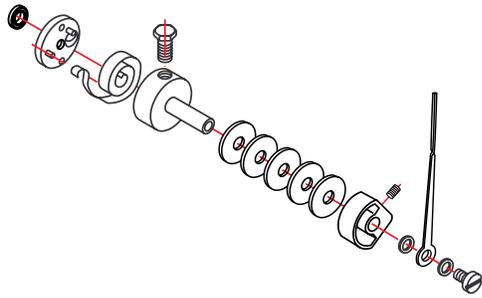
Double Switch Assy.



EX. DAK - LN - R - 2

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	LN LE XHF	R	2, 2B 4 62 54 72

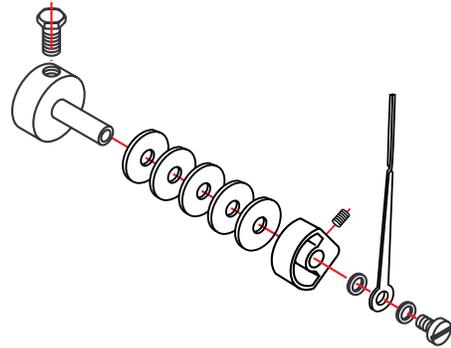
Single Switch Assy.



EX. DAK - LL - X - 7 - R

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL LP LH SN SH SX	X	7, 7C 17, 17C	L R U D

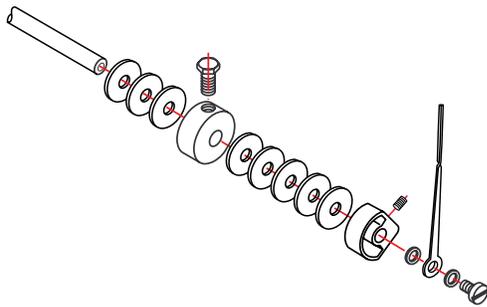
Single Switch Assy.



EX. DAK - MN - X - 7

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	MN MM MH MX ML	X	7, 7C 17, 17C

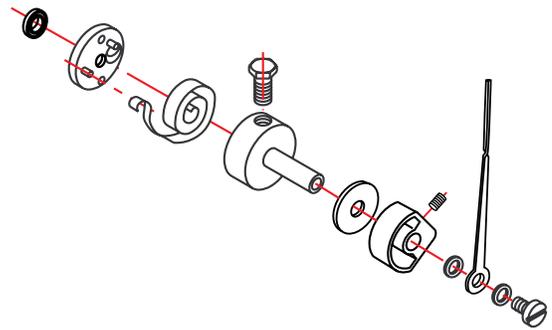
Single Switch Assy.



EX. DAK - LN - X - 7

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	LN XHF	X	7, 7C 17, 17C

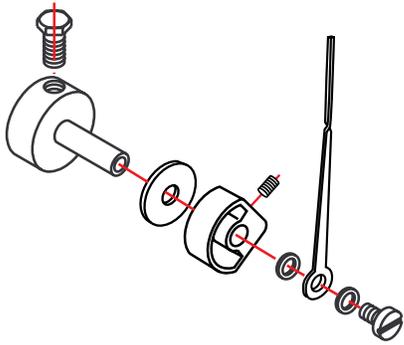
Single Switch Assy.



EX. DAK - LL - X - 30 - R

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL LP LH SN SH SX	X	30	L R U D

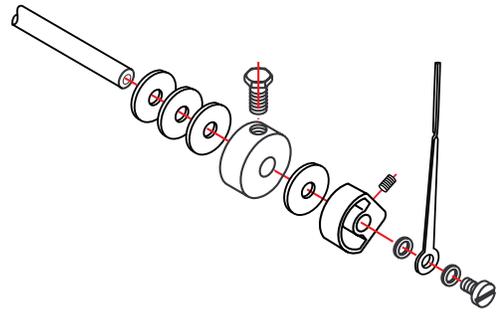
Single Switch Assy.



EX. DAK - MN - X - 30

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	MN MM MH MX ML	X	7, 7C 17, 17C 30

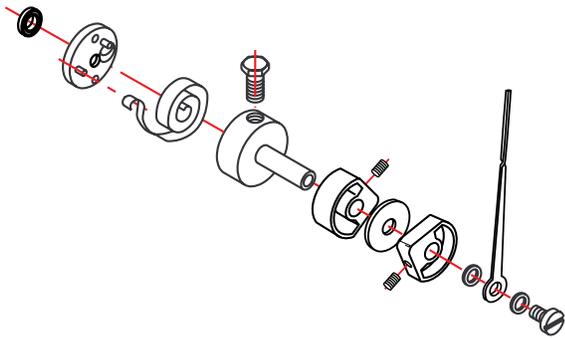
Single Switch Assy.



EX. DAK - LN - X - 30

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	LN XHF	X	7, 7C 17, 17C 30

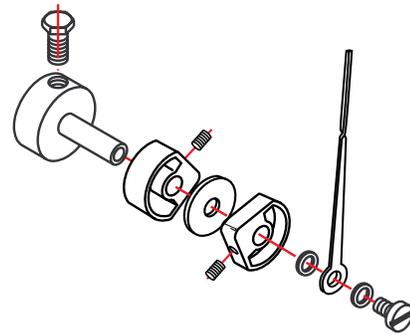
Double Switch Assy.



EX. DAK - LL - X - 31 - R

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	FLOW DIRECTION
DAK	LL LP LH SM SN SH SX	X	31	L R U D

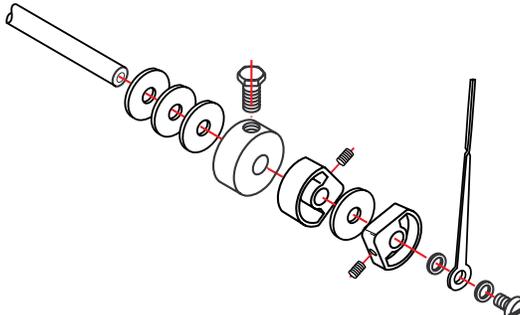
Double Switch Assy.



EX. DAK - MN - X - 18

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	MN MM MH MX ML	X	18, 18C 19, 19C 31

Double Switch Assy.



EX. DAK - LN - X - 18

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
DAK	LE LN XHF	X	18, 18C 19, 19C 31

HOW TO ORDER A READOUT KIT: (ROK)

The meters in this manual are all mechanical in nature. The flow elements are connected to the control boxes via a shaft that rotates with changing flow rates. The parts that are actuated by this mechanical action that reside inside of the control box are called the "Readout". If any of these parts are damaged, the replacement parts are sold as a kit. All "Readout Assembly" kit part numbers begin with "ROK". The remainder of the part number is derived from the model code of the meter. The part numbers correlate to the model codes as follows:

MN-BSB30GM-8-32V1.0 -A1NR

└──────────┬──────────┘

└──────────┬──────────┘

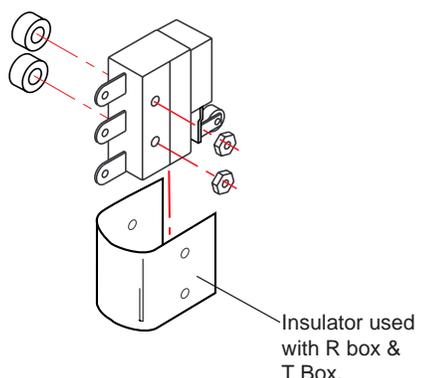
ROK-MN-A-1

EX. ROK - MN - A - 1 - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	OPTIONS
ROK	LL	A	0	CE HT
	LP	M	1, 1B	
	LH	R	2, 2B	
	SN	T	3	
	SM	X	4	
	SH		61	
	MN		62	
	MM		53	
	MH		54	
	LN		71	
	LE		72	
	XHF		7, 7C	
	SX		18, 18C	
	MX		17, 17C	
	ML		19, 19C	
			30	
		31		
		11		

The following kit diagrams are subsets of the main parts assembly. The accompanying diagrams will clarify which parts are included for each flow meter series.

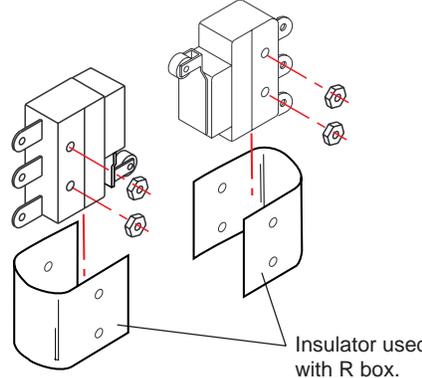
Single Switch Assy.



EX. ROK - LL - A - 1B - CE

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	OPTIONS
ROK	ALL	A	1, 1B	CE HT
		R	3	
		T	61	
		M	53	
			71	

Double Switch Assy.



EX. ROK - LL - A - 2B - CE

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT	OPTIONS
ROK	ALL	A	2, 2B	CE HT
		R	4	
			54	
			62	
			72	

HOW TO ORDER A READOUT KIT: (ROK)

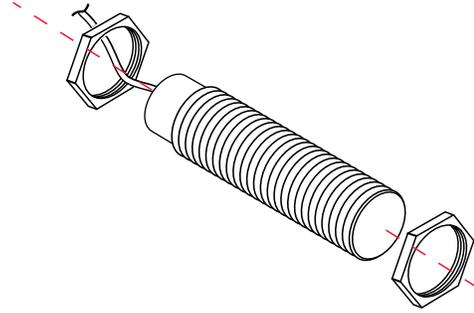
Single Switch Assy.



EX. ROK - LL - X - 7

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
ROK	LL LP LH SN SM SH MN MM MH LN LE XHF ML	X	7, 7C 17, 17C

Single Switch Assy.



EX. ROK - LL - X - 30

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
ROK	ALL	X	30

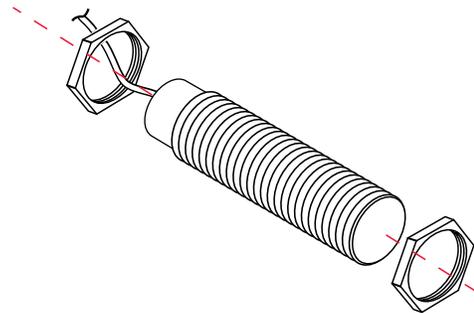
Double Switch Assy.



EX. ROK - XHF - X - 19

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
ROK	MN MM MH LN LE XHF ML	X	18*, 18C* 19*, 19C*

Double Switch Assy.



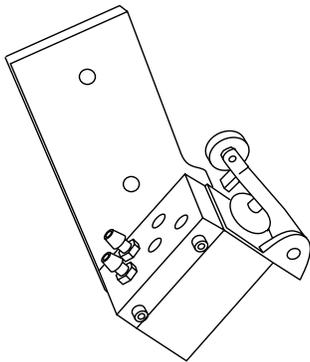
EX. ROK - LL - X - 31

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
ROK	ALL	X	31*

GENMAN-200.5 2/03 * Includes 2 switch assemblies.

* Includes 2 switch assemblies.

Single Pneumatic Switch for All Series

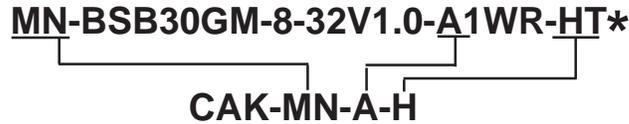


EX. ROK - LL - A - 11

GENERAL DESIGNATOR	SERIES	BOX TYPE	READOUT
ROK	ALL	A	11

HOW TO ORDER A COVER ASSEMBLY KIT: (CAK)

The meters in this manual are all mechanical in nature. The flow elements are connected to the control boxes via a shaft that changes angle with changing flow rates. If any of these parts are damaged, the replacement parts are sold as a kit. All "Cover Assembly Kits" part numbers begin with "CAK". The remainder of the part number is derived from the model code of the meter. The part numbers correlate to the model codes as follows:



How to order a Cover Assembly Kit:

EX. CAK - LL - A - W - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS	
CAK	LL	LN	A	N,W,X	HT
	LP	LE	M	W or X	C
	LH	XHF	R	W or X	TG
	SN	SX	T	W or X	CE
	SM	MX	X	W or X	
	SH	ML	RTZ	W or X	
	MN		TTZ	W or X	
	MM				

"*" HT Option at the end of the model code requires an "HT" designator in the kit part number for high temperature applications (not available with "N" type control boxes, SX, MX, or ML meters).

NOTE: Model number and UFM # must be supplied with order to stamp new name plate.

The following kit diagrams are subsets of the main assembly. The accompanying diagrams will clarify which parts are included.

A Box (Vane Style)

EX. CAK - SN - A - W - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	SN	A	N	C
	SM			HT
	SH			TG
	MN			CE
	MM			
	MH			
	SX			
	MX			
	ML			

Flow Any Direction

A Box (Piston Style)

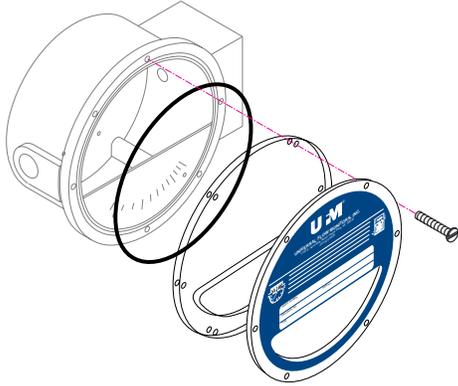
EX. CAK - LL - A - N - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	LL	A	N	C
	LP			HT
	LH			TG
				CE

Flow Any Direction

HOW TO ORDER A COVER ASSEMBLY KIT: (CAK)

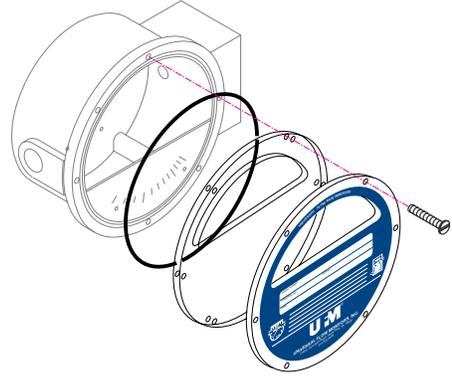
R Box (Flow to right)



EX. CAK - LL - R - X - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	ALL EXCEPT: LN LE XHF	R RP RT RTZ	W X	C HT TG CE

R Box (Flow to Left)

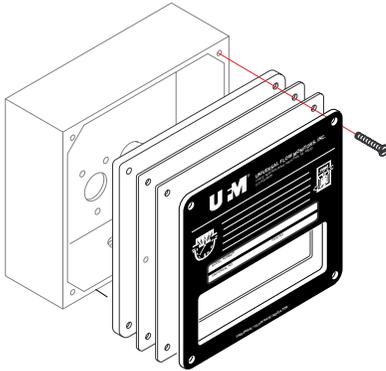


EX. CAK - LN - R - W - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	LN LE XHF	R RP RT RTZ	W X	C HT TG CE

* LEFT TO RIGHT - UP or DOWN FLOW ONLY
NOTE : HT = HIGH TEMPERATURE OPTION.

X Box

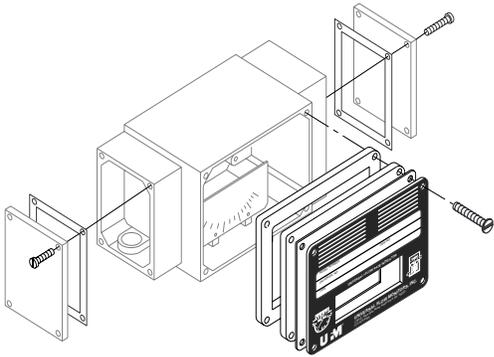


EX. CAK - SN - X - X - C

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	SN SM SH MN MM MH SX ML MX LN LE XHF	X	X	C HT TG

HOW TO ORDER A COVER ASSEMBLY KIT: (CAK)

T Box (Flow to right)

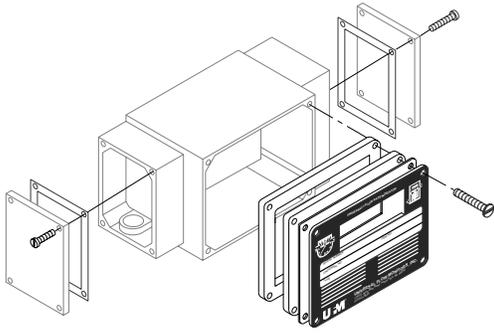


EX. CAK - LL - T - X - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	ALL EXCEPT: LN LE XHF	T	X	C HT TG

* LEFT TO RIGHT, UP OR DOWN FLOW ONLY

T Box (Flow to left)

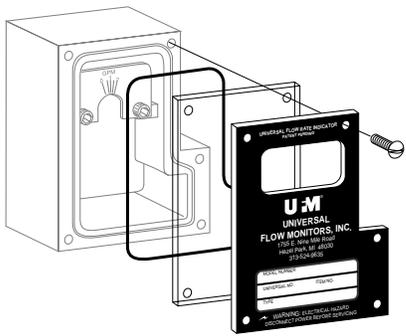


EX. CAK - LN - T - X - HT

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	LN LE XHF	T	X	C HT TG

FLOW RIGHT TO LEFT ONLY

M Box

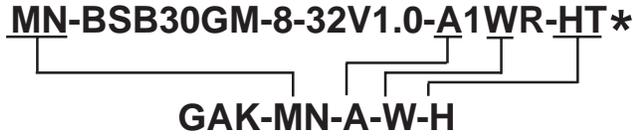


EX. CAK - LL - M - W - C

GENERAL DESIGNATOR	SERIES	BOX TYPE	ENCLOSURE TYPE	OPTIONS
CAK	LL LP LH SN SM SH SX MX MN MH MM	M	W	C HT

HOW TO ORDER A GASKET ASSEMBLY KIT: (GAK)

The meters in this manual are all mechanical in nature. The flow elements are connected to the control boxes via a shaft that changes angle with changing flow rates. The various parts of the meters are sealed from the atmosphere by gaskets. If any of these gaskets are damaged, the replacement parts are sold as a kit. All "Gasket Assembly" kit part numbers begin with "GAK". The remainder of the part number is derived from the model code of the meter. The part numbers correlate to the model codes as follows:



How to order a Gasket Kit:

EX. GAK - LL - T - W - HT

GENERAL DESIGNATOR	SERIES PRESSURE	BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	LL LP LH SN SM SH MN MM MH LN LE XHF SX MX ML	A M R T	N W X	HT

"*"HT option at the end of the model code requires an "HT" designator in the kit part number for high temperature applications (not available with "N" type control boxes, SX, MX, or ML meters).

The following kit diagrams are subsets of the main assembly.

The accompanying diagrams will clarify which parts are included.

A Box Gasket Assy.

EX. GAK - MN - A - W - HT

GENERAL DESIGNATOR	SERIES		BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	*LL	MN	A	N	HT
	*LP	MM		W	
	*LH	MH		X	
	*SN	*SX			
	*SM	MX			
	*SH	ML			

* Not part of kit

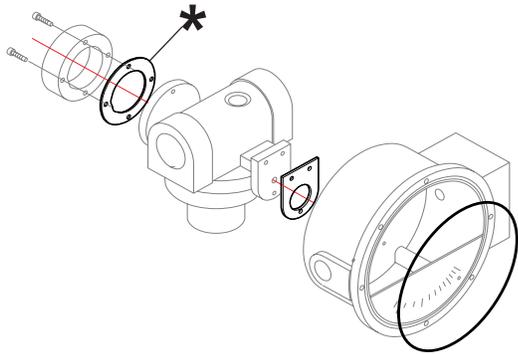
M Box Gasket Assy.

EX. GAK - MN - M - W - HT

GENERAL DESIGNATOR	SERIES		BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	*LL	MN	M	N	HT
	*LP	MM		W	
	*LH	MH			
	*SN	*SX			
	*SM	MX			
	*SH	ML			

HOW TO ORDER A GASKET ASSEMBLY KIT: (GAK)

R Box Gasket Assy.

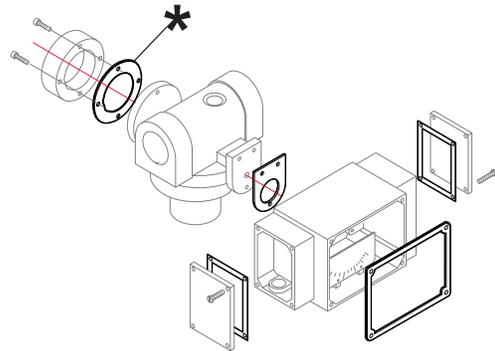


EX. GAK - MN - R - W - HT

GENERAL DESIGNATOR	SERIES		BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	*LL	MM	R	W	HT
	*LH	MH		X	
	*SN	LN			
	*SM	XHF			
	*SH	*SX			
	MN	MX			
		ML			

* Not part of kit

T Box Gasket Assy.

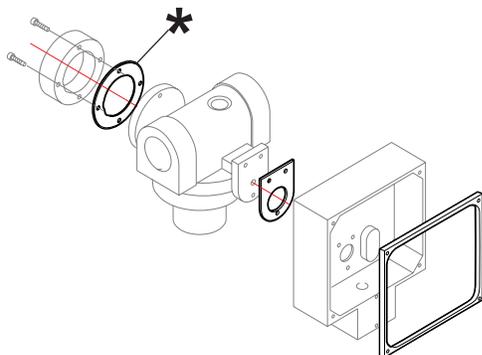


EX. GAK - MN - T - W - HT

GENERAL DESIGNATOR	SERIES		BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	*LL	MM	T	W	HT
	*LP	MH		X	
	*LH	LN			
	*SN	LE			
	*SM	XHF			
	*SH	*SX			
	MN	MX			
		ML			

* Not part of kit

X Box Gasket Assy.



EX. GAK - MN - X - X - HT

GENERAL DESIGNATOR	SERIES		BOX TYPE	ENCLOSURE TYPE	OPTIONS
GAK	*LL	MM	X	W	HT
	*LP	MH		X	
	*LH	LN			
	*SN	LE			
	*SM	XHF			
	*SH	*SX			
	MN	MX			
		ML			

* Not part of kit

HOW TO ORDER A SEAL ASSEMBLY KIT: (SAK)

The meters in this manual are all mechanical in nature. The flow elements are connected to the control boxes via a shaft that rotates with changing flow rates. The fluid is prevented from leaking out of the flow meter body by O-rings acting as “seals”. If any of these seals are damaged, the replacement parts are sold as a kit. All “Seal Assembly” kits part numbers begin with “SAK”. The remainder of the part number is derived from the model code of the meter. The part numbers correlate to the model codes as follows:



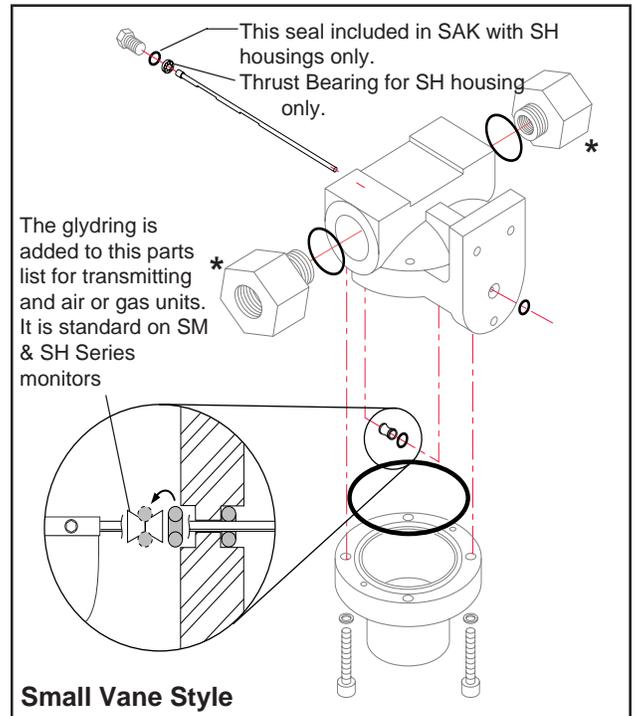
EX. SAK - MN - B - A - G

GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	BOX TYPE	AIR OR GAS UNIT
SAK	LL LP LH SN SM SH MN MM MH LN LE XHF SX MX ML	B E F J T K H A	A M R T X	G (No Symbol for Liquids)

The following kit diagrams are subsets of the main parts assembly kit. The accompanying diagrams will clarify which parts are included for each flow meter series.

EX. SAK - SN - B - S - R - G

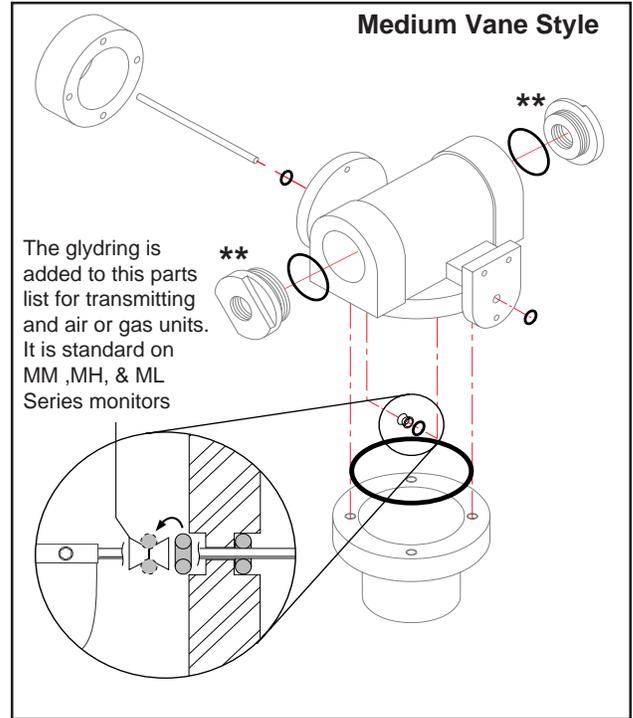
GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	INTERNALS	BOX TYPE	AIR OR GAS UNIT
SAK	SN SM SH *SX	B E F J T K H A	S I T H L C R P	A M R RT RP T X	G (No Symbol for Liquids)



NOTE: SHAFT IS INCLUDED IN SMALL SERIES (SN,SM,SH,SX) ONLY.
* SX Series requires additional static seals for port adaptors.

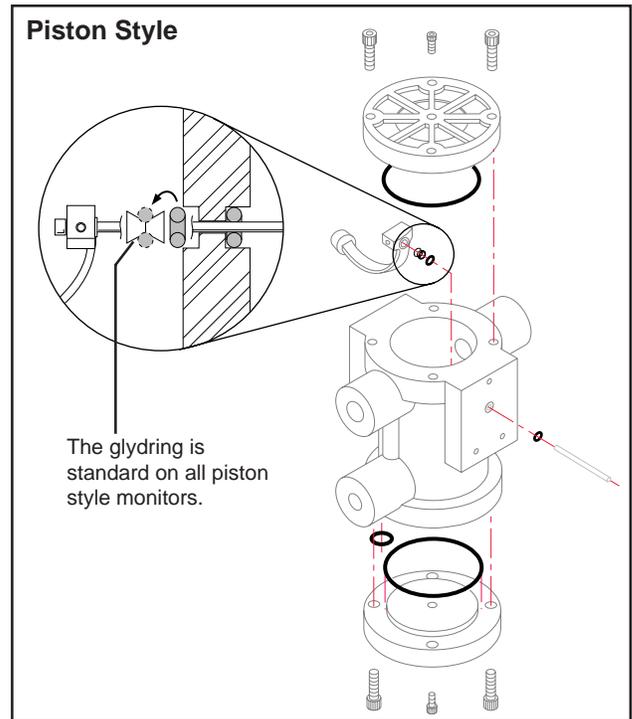
HOW TO ORDER A SEAL ASSEMBLY KIT: (SAK)

EX. SAK - MN - B - R - G				
GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	BOX TYPE	AIR OR GAS CAL.
SAK	MN MM MH ML MX	B E* F J T K H A	A M R RP RT T X	G (No Symbol for Liquids)



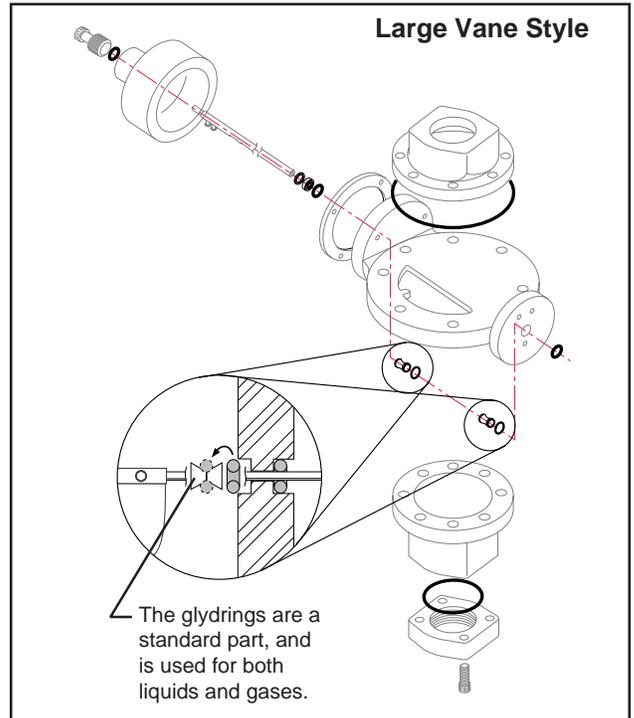
*EPR O-Rings swell when in contact with oil, grease or petroleum based fluids. The shaft seals will have one Buna-N seal substituted for the EP o-ring for use in the "spring pocket".
 ** MX Series with port adaptors require static seals.
 (See drawing to right)

EX. SAK - LL - F - T - G				
GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	BOX TYPE	AIR OR GAS CAL.
SAK	LL LP LH	B E F J T K H	A M R RP RT T X	G (No Symbol for Liquids)

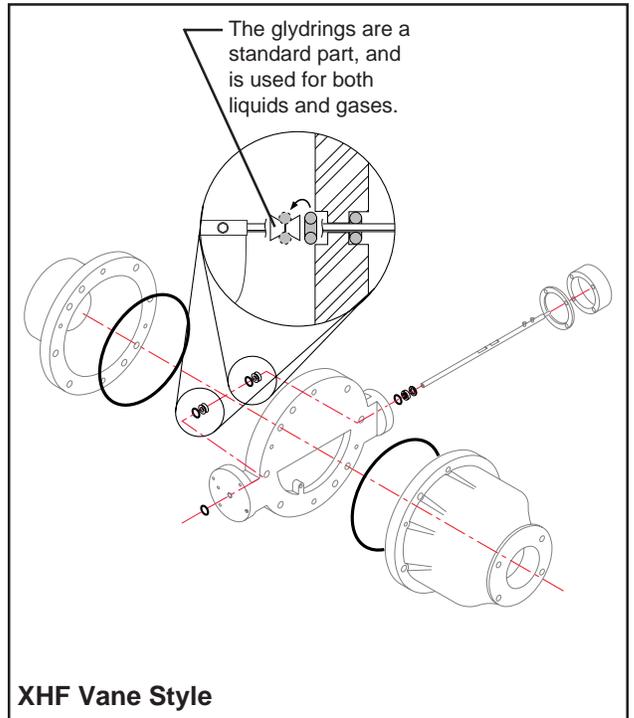


HOW TO ORDER A SEAL ASSEMBLY KIT: (SAK)

EX. SAK - LN - B - R - G				
GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	BOX TYPE	AIR OR GAS CAL.
SAK	LN LE	B E F J T K H A	M R RP RT T X	G (No Symbol for Liquids)



EX. SAK - XHF - B - R - G				
GENERAL DESIGNATOR	SERIES	SEAL MATERIAL	BOX TYPE	AIR OR GAS CAL.
SAK	XHF	B E F J T K H A	M R RT RP T X	G (No Symbol for Liquids)



NOTICE

RETURN MATERIAL AUTHORIZATION

Please read the following UFM policy information carefully. By following the guidelines outlined below you will assist in providing a timely evaluation and response regarding the status of your flow meter. UFM evaluates all AUTHORIZED RETURNED MATERIALS in a timely manner and will promptly provide notification regarding the status of the related materials and/or a written quotation indicating the total charges and description of the necessary repairs.

1. All returns must have a RMA form completed by the customer.
2. Any meter returned that was previously in service must have the OSHA requirements completed and a MSDS included where applicable.
3. An RMA number will only be issued when UFM has received a copy of the completed RMA form and any applicable MSDS.
4. A "Return Goods" shipping label (located in the back of the Instruction Manual) must be used for returning materials to UFM.
5. A purchase order must accompany all returns to cover the cost of the repair evaluations.
6. Returned goods must be shipped prepaid or they will be rejected.

REPAIRABLE MATERIAL

Written authorization to proceed with the repair under the assigned Purchase Order, must be received within 30 days of repair quotation. If the unit(s) are repaired, the \$90.00 evaluation charge will be applied to the quoted repair costs. If no repairs are authorized within this 30 day period, the customer will be billed \$90.00 plus shipping charges and the materials will be returned to the customer.

NON-REPAIRABLE MATERIAL

A written notice that the material is not repairable will be provided to the customer by UFM. If no disposition to scrap or return the material is received from the customer within 30 days, unrepairable material will be scrapped and the customer will be billed the \$90.00 evaluation charge. If a UFM replacement unit is purchased within 30 days of non-repairable condition notice, the \$90.00 evaluation fee will be waived. The return of non-repairable materials may be ordered by customer Purchase Order providing for shipping and handling charges.

RETURN FOR RESTOCK

All goods returned for restock adjustment **must** be:

- A. New and unused.
- B. **Returned to the factory within ONE YEAR of date of original shipment.**
- C. Returned through the distributor where the goods were originally purchased.

This material will also be subject to an evaluation charge of \$90.00 and must be accompanied by a Purchase Order.

The customer will be advised of the restocking adjustment for all restockable goods. Upon acceptance of the restocking adjustment, by the customer, the \$90.00 evaluation fee will be waived and a credit issued by UFM against the assigned Purchase Order. The customer will be advised of any **non-restockable** goods and will be charged the \$90.00 evaluation fee plus any shipping charges if returned to the customer.

If no disposition is received by UFM within 30 days, the goods will be scrapped and the \$90.00 evaluation fee will be billed.

WARRANTY RETURNS

Warranty returns must be accompanied by a Purchase Order and must be shipped prepaid to UFM. UFM will review the goods and advise the customer of the evaluation and validity of the warranty claim. Valid warranty claims will be repaired or replaced at no charge. No evaluation fee will be charged to repairs made under valid warranty. Return shipping costs will be prepaid by UFM. Should UFM determine the returned material is not defective under the provisions of UFM's standard warranty, the customer will be advised of needed repairs and associated costs. All materials returned without a valid warranty will be subject to the "**Repairable Material**" policy outlined above.

Form RMAP-100



RETURN MATERIAL AUTHORIZATION

(RMA) REQUEST FORM

FAX TO: UFM Repair Department

(810) 398-4274

IMPORTANT: This form must be filled out completely and faxed to UFM Repair Department prior to UFM issuing a RMA #

Customer: _____	Product Information	Qty: _____
Ship To: _____	Model Code: _____	
_____	Universal #: _____	
_____	Operating Temp: _____	Max Temp: _____
_____	Operating Pressure: _____	Max Pressure: _____
Contact Name: _____	Viscosity _____	Specific Gravity _____
Return P.O.# _____	Date Purchased: _____	Date Installed: _____
Phone# _____		
FAX# _____		

Reason for return: (Please be detailed as possible. **Lack of Information may increase labor charges.**)

Mechanical

- Meter leaks
- Pointer sticks
- Pointer is not accurate (calibration off)
- Alarm switch does not work
- Other (describe below)

Electronics

- No signal
- Inaccurate signal
- Remote Readout
- (MENSAH) Digital Display
- Signal at no flow
- Other (describe below)

Details: _____

Note: There will be a minimum evaluation charge of \$90.00 for all units returned (excluding units covered under warranty). Units WILL NOT be accepted without a valid UFM Return Material Authorization Number (RMA#). A Material Safety Data Sheet on the process fluid must be received by UFM when applicable, prior to the RMA# being issued.

* OSHA Requirements: (to be filled out by customer) **NO EXCEPTIONS!!**

Process Fluid: _____

Meter must be flushed to remove all process fluids.

I hereby certify that the material being returned has been properly flushed and cleaned of all hazardous materials and does not require any special handling.

Print or Type Name _____ Signature: _____

Title _____ Date: _____

RMA# _____
Authorized by _____
Date _____

**DO NOT REMOVE THIS PAGE.
PLEASE COPY RMA FORM.**

FROM:

REMINDER: PLEASE INCLUDE MSDS INFORMATION

TO:

UNIVERSAL FLOW MONITORS, INC.
ATTN: RETURNS/REPAIRS DEPT.
1755 EAST NINE MILE ROAD
HAZEL PARK, MI 48030-0249
U.S.A.

CUSTOMER: _____

RMA#: _____

RUSH DELIVERY REQUIRED: (CIRCLE ONE) YES NO



FROM:

REMINDER: PLEASE INCLUDE MSDS INFORMATION

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ATTN: RETURNS/REPAIRS DEPT.
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CUSTOMER: _____

RMA#: _____

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UNIVERSAL FLOW MONITORS INC.

1755 E. Nine Mile Road
Hazel Park, MI 48030-0249
Ph. 248-542-9635 / Fax 248-398-4274

www.universalflow.com