



FLOTECT Vane Operated Flow Switch

INSTALLATION AND OPERATING INSTRUCTIONS

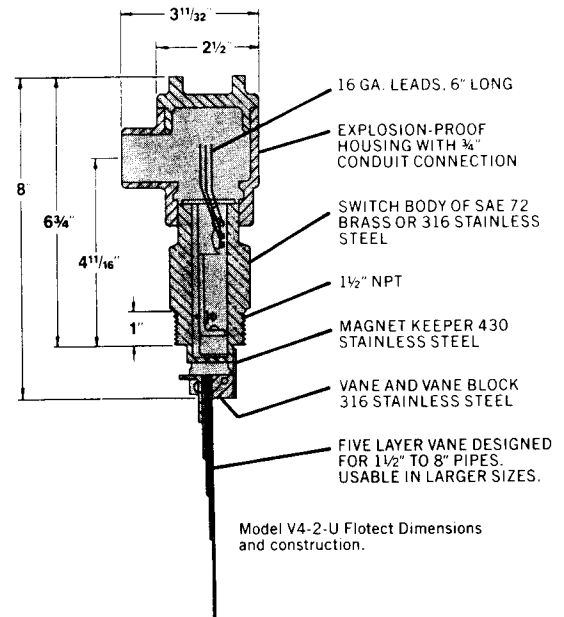
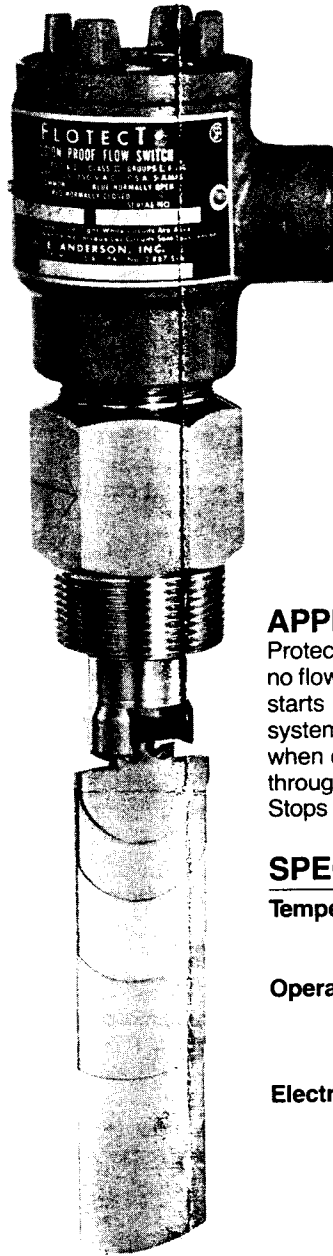
Explosion-Proof; U.L. and C.S.A. listed – Class I, Groups C, D; Class II, Groups E, F, G. CENELEC: EExd 11B T6.

Dependable protection against flow variation or stopping in pipelines for fluids, gasses and flowing solids.

Supplied with custom or universal multi-layer vanes for field installation in pipes from 1 1/2".

Compact and reliable, the Flotect V4 Flow switch operates automatically to protect equipment and pipeline systems against damage from reduction or loss of flow. Installed in thousands of pipelines and processing plants around the world, this unique magnetically actuated switching design gives superior performance. Universal multi-layer vane accommodates pipe sizes from 1 1/2" up. Custom vanes are available with factory calibration. There are no bellows, springs, or seals to fail. Instead, the free-swinging vane attracts a magnet within the solid metal switch body above, actuating a snap switch by means of a simple lever arm.

Features include: Simplicity of design and a leak-proof switch body, machined from bar stock for pressures to 2000 psig, (138 bar), it eliminates the possibility of process fluid entering the switch compartment. The threaded conduit enclosure cover permits easy inspection or replacement of electrical assembly without shutting down the process, or removing electrical conduit. Power must be disconnected. The unit fits directly into pipeline with tee, thredolet or flange for easy installation. Pendulum-like vane action responds accurately to fluid flow rate. The custom vane or multi-layer vane is sensitive to low velocity flows, yet it is rugged enough to withstand high flow surges. If desired, a delay timer can be wired into the installation. All units are explosion-proof and listed with U.L. and C.S.A. for Class I, Groups C and D, Class II, Groups E, F, and G or are flame-proof to CENELEC EExd IIB T6.

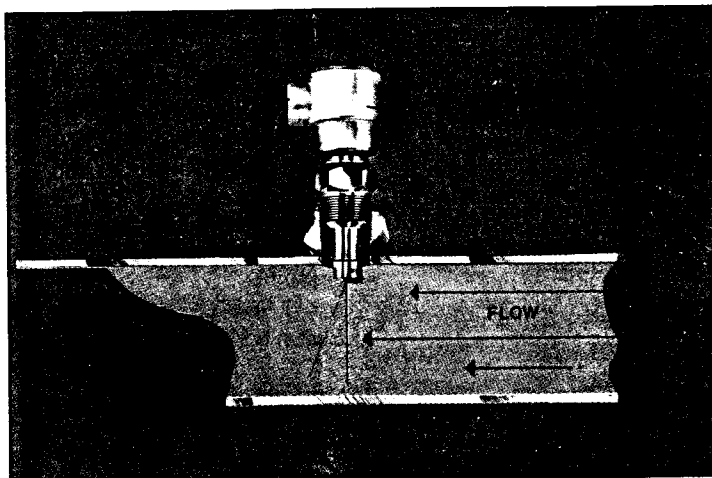


APPLICATIONS

Protects motors, pumps and other equipment against low flow and no flow. Controls sequential operation of pumps, etc. Automatically starts auxiliary pumps and engines or actuates alarm and signal systems. Stops water cooled engines, machines and processes when coolant flow is interrupted. Shuts down burner when air flow through heating coil fails. Controls dampers according to flow. Stops machines if cooling oil flow ceases.

SPECIFICATIONS

- Temperature limits:** Standard 275°F (135°C). High temperature option (not U.L., C.S.A. or CENELEC), 400°F (205°C) max.
- Operating Pressure:** Brass 1000psig (69bar)
316S.S. 2000psig(138bar)
Ratings to 5000psig(345bar) available (SPDT only).
- Electrical Rating:** U.L. and CENELEC: 10A@125/250 Vac
C.S.A.; 5A@125/250 Vac, 5A resistive 3A inductive@30Vdc
Optional ratings (not UL, CSA or CENELEC); MV option; Gold contacts, 1.0A@125 Vac MT option: 400°F (205°C), 5A@125/250Vac
- Wiring:** U.L./C.S.A. unit; 16 gauge copper wire, 6" long, mechanically and solder bonded to switch.
CENELEC unit: Terminal board.
- Switch body:** One piece milled and bored Brass or 316 SS. Other materials on request.
- Vane:** 316 SS 1 1/4" (40mm) wide. Std. trim includes 430 SS and silver solder. Other materials on request.
- Piping Connection:** 1 1/2" NPT std for mounting in 1 1/2" thredolet. For other mounting see back page. Thredolet fittings available.
- Installation:** Within 5° of vertical for proper operation. Units for horizontal installation (vertical pipes) on request.
- Weight:** 4lb.-5oz. (1.96Kg)
- Options:** All 316SS wetted parts. Teflon coated wetted parts. DPDT circuits. Cartridge heater to melt paraffin, etc. Time delay relay.



INSTALLATION

1. Remove packing material from switch body-cap and remove tape from magnet keeper. Adjust vane length if necessary on multi-layer vanes only. Install switch in thredolet previously welded to line. In some cases, it may be necessary to install the switch in a flange or tee. Note: extreme care must be exercised in welding the fitting to the line so that it is plumb and level.

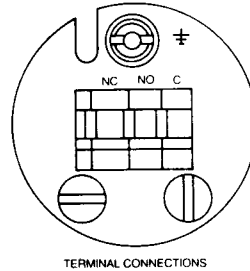
2. The arrow on the side of the switch must point in the direction of flow.

3. **U.L. and C.S.A. units only:** Thread connecting wires through conduit and connect.

Black – Common
Blue – N.O.
Red – N.C.

Note: Double pole, double throw switches have dual black, blue and red leads. These are connected in the same manner as single pole, double throw switches, as described above.

CENELEC units only: Wire in accordance with local electrical codes. Cable should enter enclosure housing through an approved Ex cable gland (not supplied). Stripped and tinned leads are simply pushed into wire entry of terminal block. Depress spring release with small screwdriver when inserting or removing fine stranded leads. Be sure strands do not bridge across terminal spacing. Double pole, double throw switches have dual terminal blocks.



Note: The switch is deactivated and contacts are in normal condition when there is no flow in the line.

4. Make sure conduit or cable are properly sealed. Electrical components must be kept free of moisture, including condensation, at all times. **CAUTION:** To prevent ignition of hazardous atmosphere, disconnect the device from the supply circuit before opening. Keep assembly tightly closed when in operation.

5. Inspect and clean wetted parts at regular intervals.

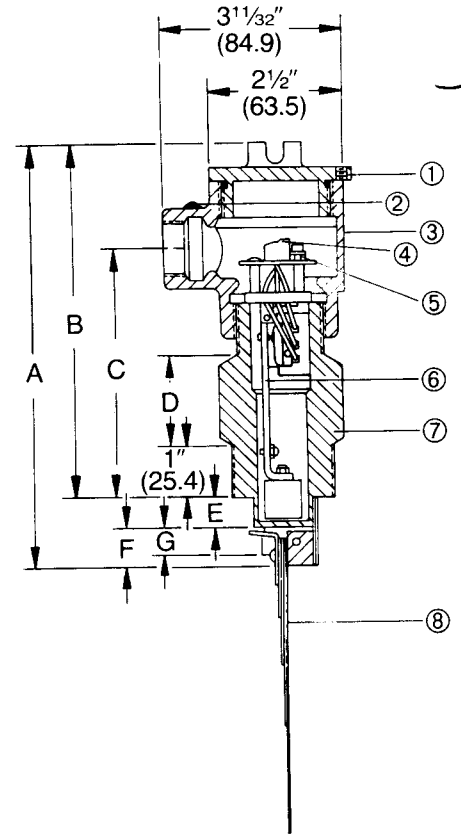
6. **CENELEC units only:** The "T" class is dependent upon the ambient temperature of the media. The approved ratings are: T6 at 75°C, T5 at 90°C, T4 at 125°C, T3 at 135°C.

7. Custom vane units have been calibrated at factory to meet requirements. Do not change.

ADJUSTMENT OF MULTI-LAYER VANE

Remove only those layers which are too long. Leave the smaller layers to reinforce the vane. The longest vane fits 6" (150mm) or larger pipe, the second longest vane fits 4" (100mm) pipe, etc. Actuation-Deactuation rates are shown in the charts on the next page. To remove vane layers, proceed as follows:

1. Remove the two screws and lockwashers holding the layers together. Do not lose these special corrosion resistant type 316 stainless steel screws and lockwashers.
2. Remove the unwanted layers.
3. Resecure the vane with the original two screws and lockwashers.
4. With a hammer, lightly peen the ends of the screws so that they can't back out.
5. If you lose the screws or lockwashers, don't replace with other parts which may corrode and break. That would void the warrantee and might cause severe damage to equipment located downstream of the switch.



CENELEC unit shown, for U.L./C.S.A. unit see first page.

DIM.	V4		V4-2	
	IN.	MM	IN.	MM
A	8 ³ / ₁₆	208	8	203
B	6	152	6 ³ / ₄	171
C	4 ¹ / ₁₆	119	3 ¹ / ₁₆	100
D	1	25.4	1 ³ / ₄	44
E	1 ⁵ / ₁₆	33	9 ¹ / ₁₆	14
F	7 ⁷ / ₈	22	1 ¹ / ₁₆	17
G	1 ¹ / ₁₆	17	1/2	13

PARTS LIST

1. Cover lock. (CENELEC unit only).
2. External ground. (CENELEC unit only).
3. Enclosure housing and cover.
4. Terminal block. (CENELEC unit only, UL/CSA unit has 6" leads).
5. Internal ground.
- * 6. Magnet arm and switch assembly.
7. Switch body.
- * 8. Vane assembly.

*Approved replacement parts.

APPROXIMATE ACTUATION-DEACTUATION FLOW RATES FOR COLD WATER

UPPER FIGURES IN GPM. LOWER FIGURES IN M3/HR.

VANE LAYERS	1.5" PIPE	2" PIPE	3" PIPE	4" PIPE	6" PIPE	8" PIPE	10" PIPE	12" PIPE	14" PIPE	16" PIPE	18" PIPE	20" PIPE
1	7- 3 1.6-0.7	15- 8 3.4-1.8	45-22 10- 5	95-40 22- 9	210-120 48- 27	375-175 85- 40	600-300 136- 68	900-450 204-102	1200-600 273-136	1400-800 318-182	2000-1000 454- 227	2400-1200 545- 273
1&2		7- 4 1.6-0.9	23- 14 5.2-3.2	50- 35 11.4-7.9	130-90 30-20	230-150 52- 34	450-250 102- 57	650-350 148- 79	900-500 204-114	1200-650 273-148	1450-800 329-182	1800-1000 409- 227
1, 2&3			11- 7 2.5-1.6	27- 19 6.1-4.3	80-60 18-14	160-115 36- 26	300-180 68- 41	450-275 102- 62	600-350 136- 79	750-450 170-102	1000-600 227-136	1200-700 273-159
1, 2, 3&4				17- 12 3.9-2.7	60-45 14-10	120-90 27-20	230-150 52- 34	310-200 70- 45	430-280 98- 64	550-360 125- 82	700-450 159-102	850-550 193-125
1, 2, 3, 4&5					40- 30 9.1-6.8	80-65 18-15	135-100 31- 23	200-140 45- 32	290-200 66- 45	360-250 82- 57	460-325 104- 74	575-400 131- 91

Actuation rates are based on cold water at a specific gravity of 1.0. For fluids of different specific gravity, actuation rates may be approximated by dividing the rate shown by the square root of the specific gravity.

APPROXIMATE ACTUATION-DEACTUATION FLOW RATES FOR AIR

UPPER FIGURES IN SCFM. LOWER FIGURES IN NM3/S.

VANE LAYERS	1.5" PIPE	2" PIPE	3" PIPE	4" PIPE	6" PIPE	8" PIPE	10" PIPE	12" PIPE	14" PIPE	16" PIPE	18" PIPE	20" PIPE
1	32- 17 0.02-0.008	65- 32 0.03-0.02	210- 105 0.10-0.05	400- 200 0.19-0.09	950- 475 0.45-0.22	1550- 850 0.73-0.40	2400-1300 1.1- 0.6	3450-1900 1.6- 0.9	4700-2600 2.2- 1.2	6400-3500 3.0- 1.7	8000-4400 3.8- 2.1	10000-5500 4.7- 2.6
1&2		23- 13 0.01-0.006	120- 70 0.06-0.03	195- 140 0.09-0.07	550- 375 0.26-0.18	1100- 700 0.52-0.33	1850-1200 0.87- 0.57	2700-1750 1.3- 0.8	3400-2200 1.6- 1.0	4800-3100 2.3- 1.5	6000-3900 2.8- 1.8	7400-4800 3.5- 2.3
1, 2&3			60- 48 0.03-0.02	135- 100 0.06-0.05	375- 265 0.18-0.13	725- 500 0.34-0.24	1200- 850 0.57-0.40	1850-1300 0.87- 0.61	2600-1800 1.2- 0.8	3350-2350 1.6- 1.1	4300-3000 2.0- 1.4	5300-3700 2.5 1.7
1, 2, 3&4				65- 50 0.03-0.02	260- 200 0.12-0.09	500- 400 0.24-0.19	875- 700 0.41-0.33	1250-1000 0.59- 0.47	1900-1500 0.90- 0.71	2500-2000 1.2- 0.9	3100-2500 1.5- 1.2	3900-3100 1.8- 1.5
1, 2, 3, 4&5					130- 100 0.06-0.05	310- 250 0.15-0.12	650- 525 0.31-0.25	1000- 800 0.47-0.38	1600-1250 0.76- 0.59	2200-1750 1.04- 0.83	2800-2250 1.3- 1.1	3550-2850 1.7- 1.3

Values shown in both charts are nominal. If normal flows exceed actuation rates by less than 10%, custom vanes are recommended. Figures are based on standard vertical installation in a 1½" thredolet in a horizontal run of pipe.

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. Liability under this warranty is limited to repair or replacement F.O.B. factory of any parts which prove to be defective within that time or repayment of the purchase price at the Seller's option provided the instruments have been returned, transportation prepaid, within one year from the date of purchase. 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 F.O.B. factory 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.

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APPLICATION DRAWINGS FOR FLOTECT® AUTOMATIC FLOW SWITCHES

