

North American Automatic Manual Reset and Motorized Valves



1516 Manual Reset



1517 Motorized

1516/1517 Automatic Oil Shutoff Valves

- Agency approvals: UL, FM, CSA
- Proof-of-Closure Switch SPDT
- High Capacity - High Pressure
- Durable construction
- Robust switches and terminal blocks

TYPICAL APPLICATIONS

North American Automatic Shutoff Valves are used in fuel supply lines on industrial furnaces, ovens, kilns, boilers, and other heating equipment. They shut off fuel automatically and instantly upon any break in electric power or the safety circuit. They cannot be opened until an interlocking safety or control circuit is complete, restoring power to the valve.

They can be suitable for pipe lines carrying a variety of liquids used in processes other than combustion.

Use 1516 Manual Reset Valves where "manned" opening is required or preferred. (Offered in 1" and 1¼" pipe sizes.)

Specify 1517 Motorized Valves where remote or "un-manned" opening is needed. (Offered in ½" through 1¼" pipe sizes.)

1516 and 1517 Valves are for emergency automatic shutdown only--following any shutdown, close manual shutoff valves promptly.

STANDARDS

All North American 1516 and 1517 Automatic Shutoff Valves have the following standard characteristics:

- Sanctioned by FM, UL, and CSA.
- Enclosure meets NEMA 1, 3, 3S, 4, 12, and CSA 2, 4, and 5 standards.
- SPDT "Proof-of-Closure" switch.
- DPDT "Valve Open" switch.
- Prewired terminal block.
- Cast iron body, rated for 300 psi.
- 120 V ac/60 Hz operation (other characteristics available).
- Top assembly position is field rotatable.
- 6 seconds opening time for most motorized valves on 60 Hz.
- Ambient temperature limits -20°F to 140°F for 1" and 1¼" valves, -20°F to 125°F for 1517 half inch and three quarter inch valves.

OPTIONS

- Steel body (-S) rated for 600 psi.
- Expanded capacity ports.†

† Not available for all sizes.

Valves carry FM, UL, and CSA labels for #2, #4, #5, and #6 fuel oil; kerosene and JP-4. All are IRI approvable. Maximum pressure differentials vary from 100 to 125 psi (depending on size).

Valve action closes aggressively within one second of power loss. A two-stage latch/return motion by the operator opens a Manual Reset Valve after it is re-powered. Motorized Valves allow flow to begin within one second of powering and are fully open in six seconds for most sizes.

PERFORM FREQUENT FIELD INSPECTIONS, LEAK TESTS, AND PROPER MAINTENANCE TO ASSURE CONTINUED SATISFACTORY VALVE PERFORMANCE. REFER TO INSTALLATION/MAINTENANCE BULLETINS.

DO NOT OPERATE MOTORIZED VALVES MORE THAN ONE CYCLE PER MINUTE FOR PERIODS OVER 15 MINUTES TO AVOID OVER-HEATING MOTOR.

TEMPERATURE LIMITS

All valves can handle **fluid temperatures** from -20°F (-28°C) to +250°F (+121°C).

Ambient temperature limits vary. Any valve on this page using dc voltage and all ½" and ¾" series 1517 Valves can handle ambient temperatures from -20°F (-28°C) to +125°F (+52°C). The other valves on this page handle ambient temperatures from -20°F (-28°C) to +140°F (+60°C).

OPERATION

All electro-mechanical valves require a constant supply of electrical energy to their holding actuator solenoids. Once the solenoid is energized, the manual reset valve may be opened manually, or the automatic reset valve will automatically open. Interruption of electrical power causes an immediate "trip" of the valve to its normally-closed position. The swinging gate body has carefully machined sealing surfaces. Frequent use and cycling actually helps to keep the valve clean.

Body Material	Gray Iron	Cast Steel
Top Assembly Function	Sanctioned Service ①	Sanctioned Service ①
Manual Reset	1516-1 1516-2	1516-1-S 1516-2-S
Automatic Reset	1517-01 1517-0 1517-1 1517-2	1517-01-S 1517-0-S 1517-1-S 1517-2-S

① **Sanctioned series** are sold for "clean fuel oils" and carry UL, FM, and CSA sanctions. They are approved for liquefied petroleum gases, #1 and #2 fuel oils, kerosene, JP-4 and preheated #4, #5, and #6 oils with maximum viscosity of 5000 SSU.

Available Sizes and Pressure Ratings

Pipe Size inches	Body C _v Flow Factor	Maximum Inlet Pressure, psig ^③			
		Gray Iron Bodies		Cast Steel Bodies	
		Clean Gases & Oils	Special Service	Clean Gases & Oils	Special Service
½	3.4	300	300	600	600
¾	9.6	300	300	600	600
1	12	300	300	600	600
1¼	17	300	300	600	600

③ Maximum operating pressure differential must not exceed the maximum inlet pressure.

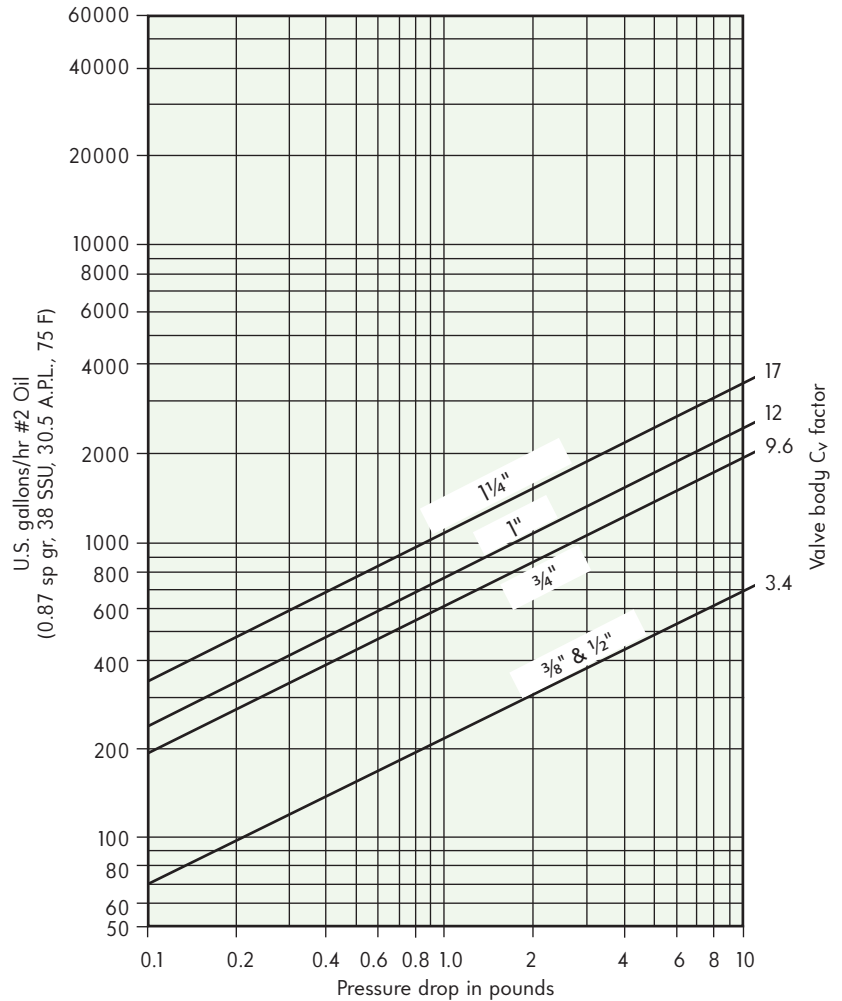
CAPACITIES WITH No. 2 OIL

To select a valve for YOUR application, use either C_v factor calculations, or this graph showing approximate pressure drop at various flows of #2 oil.

Typically, pressure drop for fuel flows should not exceed 10% of inlet pressure.

For preheated #5 or #6 oil, multiply the required flow rate in gph by the factor in the table at right, then select a valve based upon that equivalent flow of #2 oil and the allowable pressure drop.

For example: To size for 5 psig drop with a 3500 gph flow of #6 oil preheated to 140°F, the multiplier is 2. Equivalent flow of #2 oil is then 3500×2 , or 7000 gph. Chart shows that a 5 psig drop requires a valve body with a C_v factor of at least 45.



Oil Grade	#5		#6				
°F at Inlet	125	160	120	140	180	210	220
Factor	1.43	1.11	2.86	2.00	1.25	1.11	1.05

VALVE SELECTION CHART 1516/1517 Oil Shutoff Valves

Material Specifications	Sanctions	Available in Series
1-B valve sizes 1" and 1 1/4"	UL, FM, CSA	1516-1, -2 1517-1, -2
1-D valve sizes 1/2" and 3/4"	UL, FM, CSA	1517-01, -0
2-D all valve sizes	UL, FM, CSA	1516-1, -2-S 1517-1, -2-S 1517-01, -0-S

ELECTRICAL DATA for normally-closed valves

General

Shutoff valves are electrically actuated from the flame safeguard and/or safety control circuits.

Standard valve assemblies include an internal holding solenoid or printed circuit board for 120 volt 60 hertz ac power. (Other electrical current options are available upon request.)

1516/1517 Valves have the internal solenoid. The solenoid (or the printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset versions is powered only during the opening stroke.

Switch wiring diagrams (see page 4) are part of each valve assembly, summarizing electrical data and wiring for a valve equipped with terminal block and a full complement of optional signal switches.

Diagrams show valve in its normally-closed (at rest) position. The indicated internal wiring is present only when the appropriate auxiliary switches are specified. Automatic reset valves always include a VOS-1 SPDT valve-open motor limit switch.

Good practice dictates that auxiliary switches in safety shutoff valves should be used for signal duty **only**, not to operate additional safety devices.

Signal switch designations:

VCS (Valve Closed Switch) is actuated at the end of the "closing" stroke. VCS-1 is SPDT; VCS-2 is DPDT.

VOS (Valve Open Switch) is actuated at the end of the "opening" stroke. VOS-1 is SPDT; VOS-2 is DPDT.

Switch amp ratings are shown on the schematic wiring diagrams. DO NOT EXCEED rated amperage or total load shown.

Volt-Ampere (VA) Ratings

Size	1516 Manual Reset Valves			
	AC Operation		DC Operation	
	Opening	Holding	Opening	Holding
-1 (1") -2 (1¼")	22	22	14	14
1517/1517U Automatic Reset Valves				
-01 (½") -0 (¾")	143	5	-	-
-1 (1") -2 (1¼")	220 ^⑤	22	212	14

⑤ 220 VA is for 60 hertz; if 50 hertz power, VA rating is 342.

NOTE: Total VA of solenoid and switches (manual reset valves) or solenoid, motor and switches (motorized valves) must not exceed the limits shown. The VA rating in the DC column is based on an AC motor and DC solenoid.

Insurance authorities agree...

...the safety of any industrial fuel burning installation is dependent upon well-trained operators who are able to follow instructions, and to react properly in cases of emergency. Their knowledge of, and training on, the specific installation are both vital to safe operation.

Safety controls may get out-of-order without the operator becoming aware of it unless shutdowns result. Production-minded operators have been known to by-pass faulty controls without reporting the trouble.

Continued safe operation of any installation is then assured only if the plant management carefully develops an exact schedule for regular periodic inspection of all safety controls, insisting it then be rigidly adhered to.

A main gas manual shutoff cock should be located upstream from all other fuel train piping components and used to shut off all flow of fuel for servicing and other shutdowns.

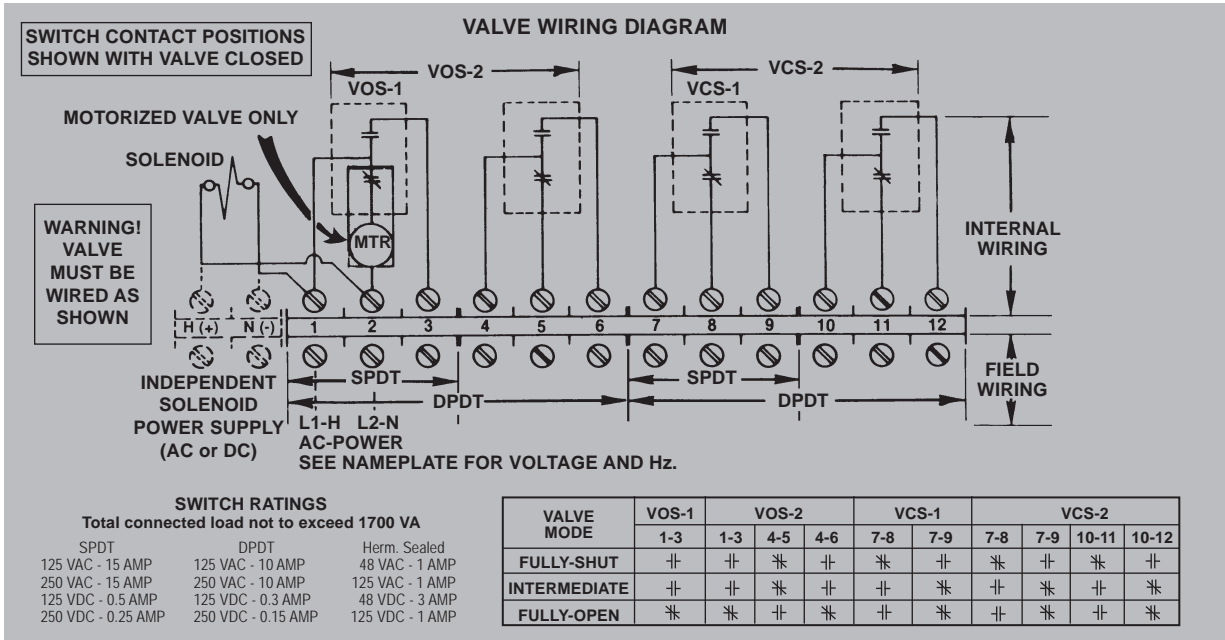
All safety devices should be tested at least monthly† and more often if deemed advisable. Periodic testing for tightness of manual or motorized shutoff valve closure is equally essential.

† per NFPA 86

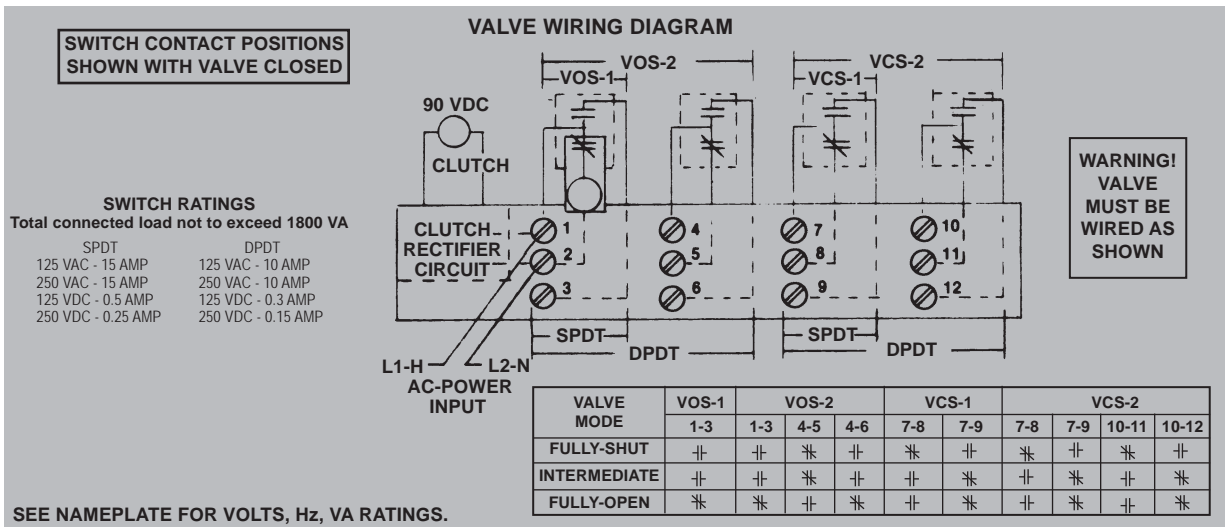
ELECTRICAL DATA for normally-closed valves

Manual Reset Valves
1"-1¼" 1516

Automatic Reset Valves
1"-1¼" 1517



Automatic Reset Valves
½" and ¾" 1517



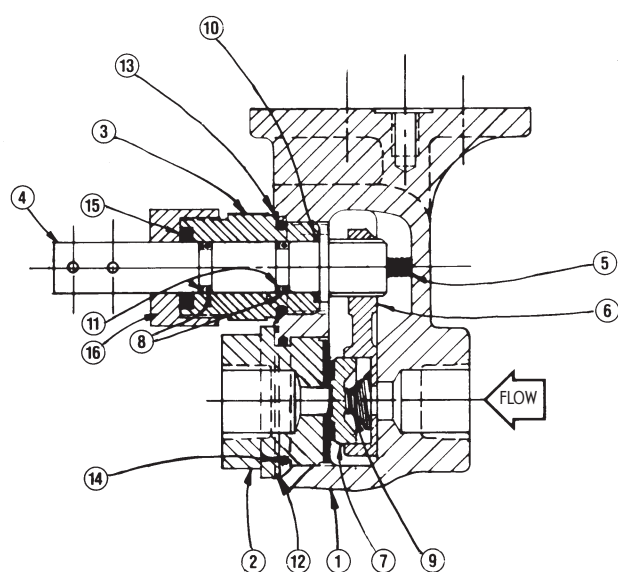
VALVE BODY AND TRIM

Trim identification of oil shutoff valves is two-part. The first digit before the hyphen is a number (1, 2, 3 or 4) identifying body material as in Table 1 below. The second digit after the hyphen identifies trim utilizing the materials listed in Table 2.

Standard valves incorporating a *cast iron body* will normally be identified by 1-B or 1-D. Valves with *steel body* will normally be 2-D.

Table 1. Body (Item 1) Specifications

Body Description	Body 1-	Body 2-
Material	Cast Iron, G3000, CL30	Cast Steel
ASTM Spec	A159	A216-WCB



The drawings shown carry item numbers matching those in the table. This information is furnished for identification only, not for ordering parts.

WARNING: Do not attempt field repair of valve body or electro-mechanical top actuator. Any field alterations void all warranties.

For Valve Assemblies, see Sheet 1516-1517-3.

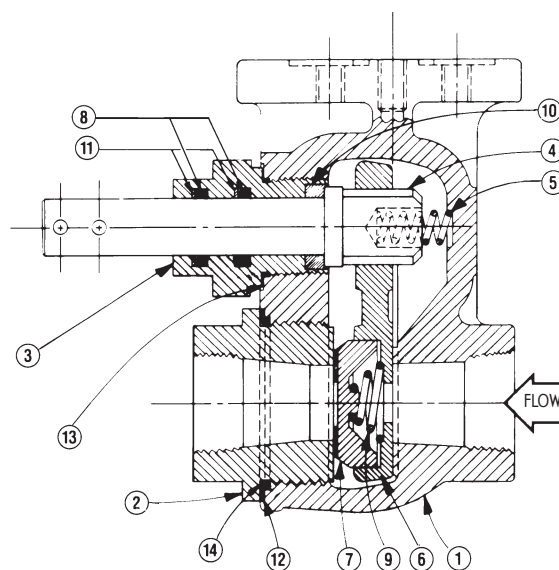


Table 2. Internal Trim Material Specifications

Item No.	Part Description	For ½" and ¾" valves Trim -D	For 1" and 1¼" valves	
			Trim -B	Trim -D
2	Hex Nut or Renewable Seat	Hard-Faced Steel	Cast Iron with #420 Stainless Steel Seat Ring	Hard-Faced Steel
3	Stem Bushing	Zinc-Plated Steel	Zinc-Plated Steel	Zinc-Plated Steel
4	Stem	#416 Stainless Steel	#416 Stainless Steel	#416 Stainless Steel
5	Stem Spring	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel
6	Disc Carrier	Steel	Steel	Steel
7	Disc	Hard-Faced Steel	Nodular Iron	Hard-Faced Steel
8	Stem O-Rings	Hydrin	Viton	Viton
9	Disc Spring	#302 Stainless Steel	#302 Stainless Steel	#302 Stainless Steel
10	Inner Stem Thrust Ring	Teflon	Teflon	Teflon
11	Back-Up O-Rings	Teflon	Teflon	Teflon
12	Body Gaskets	Soft Iron	Soft Iron	Soft Iron
13	Stem Bushing Gasket	Soft Iron	Soft Iron	Soft Iron
14	Body O-Ring	Viton	Viton	Viton
15	Stem Packing Ring	Grafoil	-	-
16	Packing Nut	Zinc-Plated Steel	-	-

COMPONENT IDENTIFICATION
General Maintenance and Spare Parts

Every valve is tested and meets the requirements of ANSI B16.104 Class VI Seat Leakage.

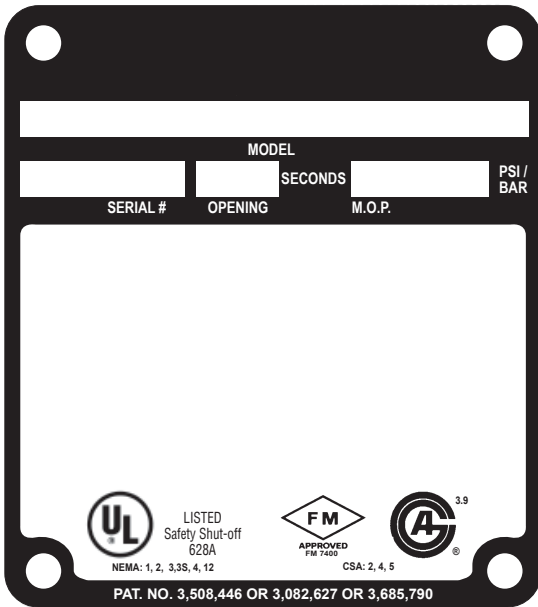
1516/1517 Valves are designed for long trouble-free service. Only items shown as suggested spare parts are considered field replaceable.

WARNING: Do not attempt field repair of valve body, top assembly, or motor drive unit. Any alterations void all warranties.

To determine suggested spare parts, identify series designation and serial number from the valve's nameplate. Refer to the illustration and legend below to identify suggested spare parts.

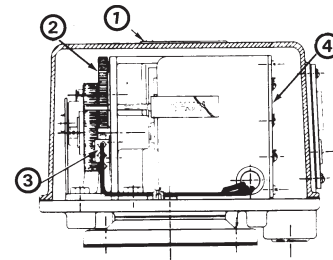
To order, specify:

1. Quantity
2. Assembly part number (if available)
3. Description
4. Electrical specification
5. Full nameplate information (from existing valve)



Nameplate
(shown for listed valves; others similar)

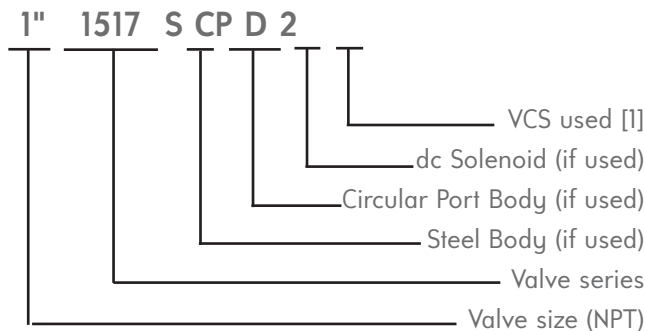
Nameplate designation does not identify external accessory items or motor limit switch



Series 1517
-01, -0 only

Legend:

- ① Nameplate
- ② Motor Operator
- ③ VCS signal switch for normally-closed valve; VOS for normally-open valve
- ④ Printed Circuit Board (PCB)



[1] Signal Switch legend:

- 0 No Switch
- 1 VOS-1 Switch
- 1H VOS-1 (Herm. Sealed)
- 2 VOS-2 Switch
- 2H VOS-2 (Herm. Sealed)

NOTE: VCS (Valve Closed Switch) and VOS (Valve Open Switch) are relative terms indicating valve gate position. In all valves, the top switch is contacted when valve body is in its normal "at rest" position. The opposite is true for the bottom switch.

DIMENSIONS inches

1/2" through 1 1/4" valves with swinging gate bodies

Fig. 1

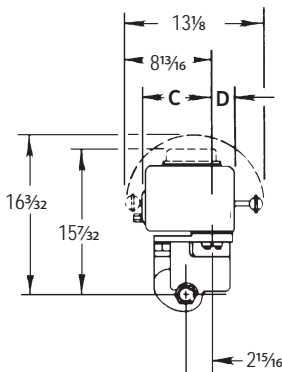
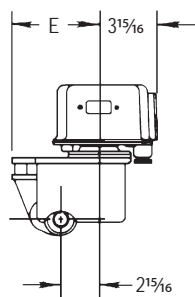
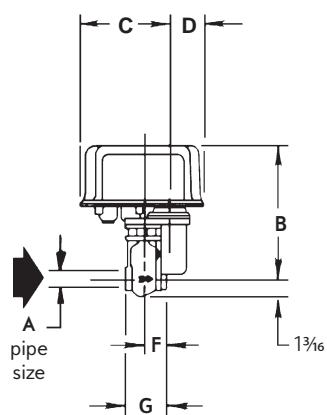
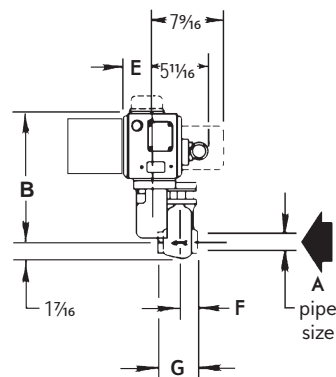
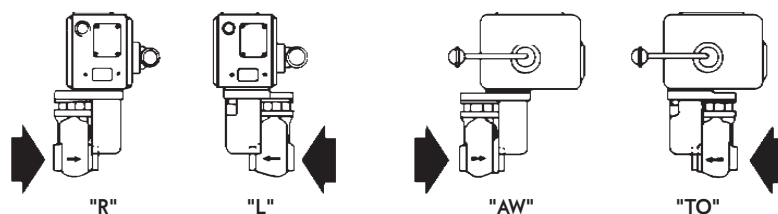


Fig. 2



Available Top Assembly Positions



Top Assembly and Body Flow Direction to be Specified on Order

Valve designation	Fig. no.	dimensions in inches							Wt, lb
		A	B	C	D	E	F	G	
1517, -01, -01-S	1	1/2	11 1/16	6 7/32	2 23/32	6 7/16	1 11/16	3 3/16	30
1517, -0, -0-S	1	3/4	11 1/16	6 7/32	2 23/32	6 7/16	1 11/16	3 3/16	30
1516, -1, -1-S	2	1	13 17/32	7 5/8	2 3/8	3 1/2	1 15/16	4 1/8	37
1517, -1, -1-S	2	1	13 17/32	7 5/8	2 3/8	3 1/2	1 15/16	4 1/8	37
1516, -2, -2-S	2	1 1/4	13 17/32	7 5/8	2 3/8	3 1/2	1 15/16	4 3/16	40
1517, -2, -2-S	2	1 1/4	13 17/32	7 5/8	2 3/8	3 1/2	1 15/16	4 3/16	40

DIMENSIONS SHOWN ARE SUBJECT TO CHANGE. PLEASE OBTAIN CERTIFIED PRINTS FROM FIVES NORTH AMERICAN COMBUSTION, INC. IF SPACE LIMITATIONS OR OTHER CONSIDERATIONS MAKE EXACT DIMENSION(S) CRITICAL.

WARNING: Situations dangerous to personnel and property may exist with the operation and maintenance of any combustion equipment. The presence of fuels, oxidants, hot and cold combustion products, hot surfaces, electrical power in control and ignition circuits, etc., are inherent with any combustion application. Components in combustion systems may exceed 160°F (71°C) surface temperatures and present hot surface contact hazard. Fives North American Combustion, Inc. suggests the use of combustion systems that are in compliance with all Safety Codes, Standards, Regulations and Directives; and care in operation.



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