



Power Flame Incorporated

*The Power to Manage
Energy*

K7 Metering Valve

***Installation and
Operation Manual***

Copyright 2021 Power Flame Incorporated

2001 South 21st Street, Parsons, KS 67357

Telephone: 620-421-0480 FAX: 620-421-0948

Website: <http://www.powerflame.com>

e-mail: CSD@powerflame.com

K7 Manual 12092021 Rev. 0

POWER FLAME K7 METERING VALVE

For use by Qualified Service Personnel Only

Rev. 0



Pending MH15565



WARNING

The improper installation, adjustment, alteration, service or maintenance of this equipment can result in fire, explosion, serious injury, or death. Strict adherence to the National Fire Protection Code (NFPA), along with any and all local codes. Refer to this manual. For assistance or additional information consult the factory, a qualified installer or service agency.

1.	GENERAL PRODUCT INFORMATION	1
1.1	Principle of operation	1
1.2	Model Identification	1
2.	CAPACITIES	2
2.1	Valve Flow Rates	2
2.2	Valve Flow Curves	2
2.3	Selection	7
3.	INSTALLATION AND MOUNTING	8
3.1	Dimensions	8
3.2	Installation and Mounting	9
4.	OPERATION	9
5.	MAINTENANCE	9
6.	WARRANTY	10

1. GENERAL PRODUCT INFORMATION

1.1 Principle of operation

1.1.1 The Power Flame K7 metering valve is listed and labeled by Underwriters Laboratories, Inc. for use with #2 fuel oils at a maximum pressure of 300 PSI. This valve is available in different models to best match to the desired fluid flow rate for the application. It is unique in that it can rotate CW or CCW, offering a wider variety of linkage arrangement possibilities. A graduated dial and pointer is provided as reference to the physical position of the flow metering mechanism. Full flow is reached at the "OPEN" position. Flow decreases as the dial moves toward the "CLOSED" position. This valve is not intended to replace a safety shutoff valve.

1.2 Model Identification

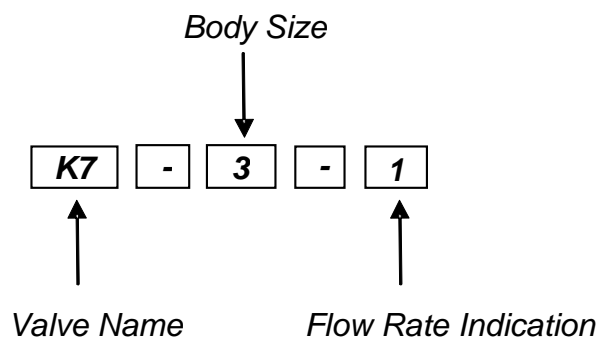
1.2.1 All metering valve model numbers begin with K7-.

1.2.2 The numeric value immediately following the model number designates the valve body size which corresponds to its diameter in inches (3 = 3").

1.2.3 The numeric value immediately following the valve body size indicates the maximum flow at full open position with a 25 PSIG pressure drop across the valve. This value is factory-stamped onto the label. The values listed below are in gallons per hour (GPH).

- a. -0 = 4
- b. -1 = 14
- c. -2 = 23
- d. -3 = 34
- e. -4 = 47
- f. -5 = 63
- g. -6 = 133
- h. -7 = 176
- i. -8 = 230

1.2.4 Any subsequent suffixes (such as A, B, etc.) to the model number are reserved for future use (consult factory).



2.0 CAPACITIES

2.1 Valve Flow Rates

2.1.1 The following tables illustrate the flow at full open position of each valve at the pressure drop indicated in the table.

		Pressure Drop Across Valve in PSIG					
Model		1	10	25	50	75	100
Number	Cv	#2 Oil Capacity (GPH) @ Open Position (0.85 S.G., 60°F)					
K7-3-0	0.013	0.8	2.6	4.1	5.8	7.1	8.2
K7-3-1	0.043	2.8	8.9	14.1	19.9	24.4	28.2
K7-3-2	0.07	4.5	14.4	22.7	32.1	39.3	45.4
K7-3-3	0.105	6.8	21.6	34.1	48.2	59.1	68.2
K7-3-4	0.146	9.5	29.9	47.3	66.9	81.9	94.6
K7-3-5	0.192	12.5	39.5	62.5	88.4	108.3	125.0
K7-3-6	0.408	26.5	83.9	132.7	187.7	229.8	265.4
K7-3-7	0.543	35.3	111.6	176.4	249.5	305.5	352.8
K7-3-8	0.703	45.7	144.6	228.6	323.3	395.9	457.2

Table 1: Full Open Position Flow Rates in Imperial Units

		Pressure Drop Across Valve in kPa					
Model		6.9	68.9	172.4	344.7	517.1	689.5
Number	Cv	#2 Oil Capacity (LPH) @ Open Position (0.85 S.G., 15.5°C)					
K7-3-0	0.013	3.1	9.8	15.5	21.9	26.9	31.0
K7-3-1	0.043	10.7	33.8	53.4	75.5	92.4	106.7
K7-3-2	0.07	17.2	54.3	85.9	121.5	148.8	171.9
K7-3-3	0.105	25.8	81.6	129.1	182.5	223.6	258.2
K7-3-4	0.146	35.8	113.2	179.0	253.2	310.1	358.1
K7-3-5	0.192	47.3	149.6	236.6	334.6	409.8	473.2
K7-3-6	0.408	100.5	317.7	502.3	710.4	870.0	1,004.6
K7-3-7	0.543	133.5	422.3	667.7	944.3	1,156.6	1,335.5
K7-3-8	0.703	173.1	547.3	865.3	1,223.8	1,498.8	1,730.7

Table 2: Full Open Position Flow Rates in SI Units

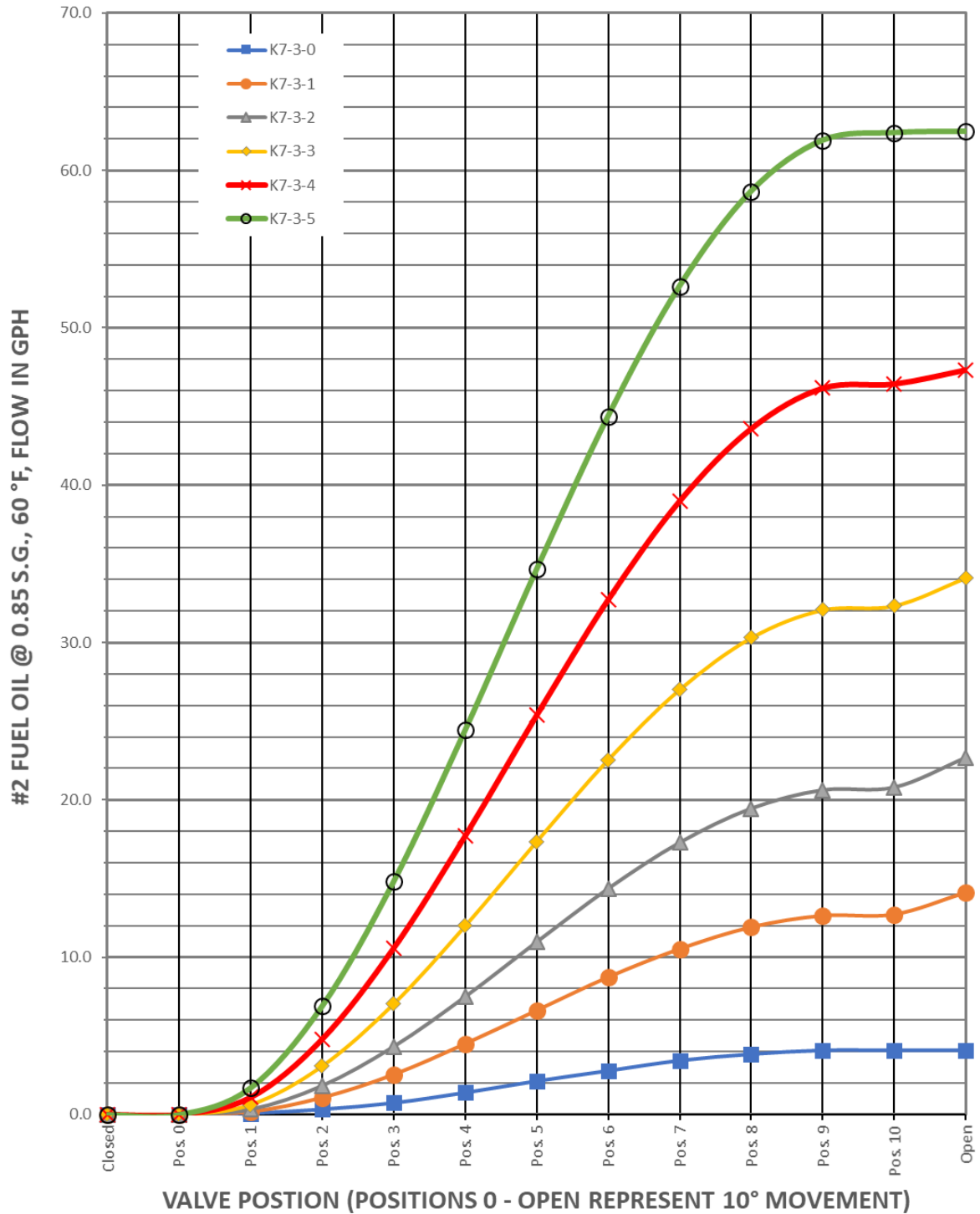
2.2 Valve Flow Curves

2.2.1 The following charts illustrate the flow at the noted valve positions.



Power Flame Fuel Metering Valve K7-3-X Series
#2 Oil (Diesel) 0.85 S.G., 60°F, 25 PSIG ΔP Across
the Valve

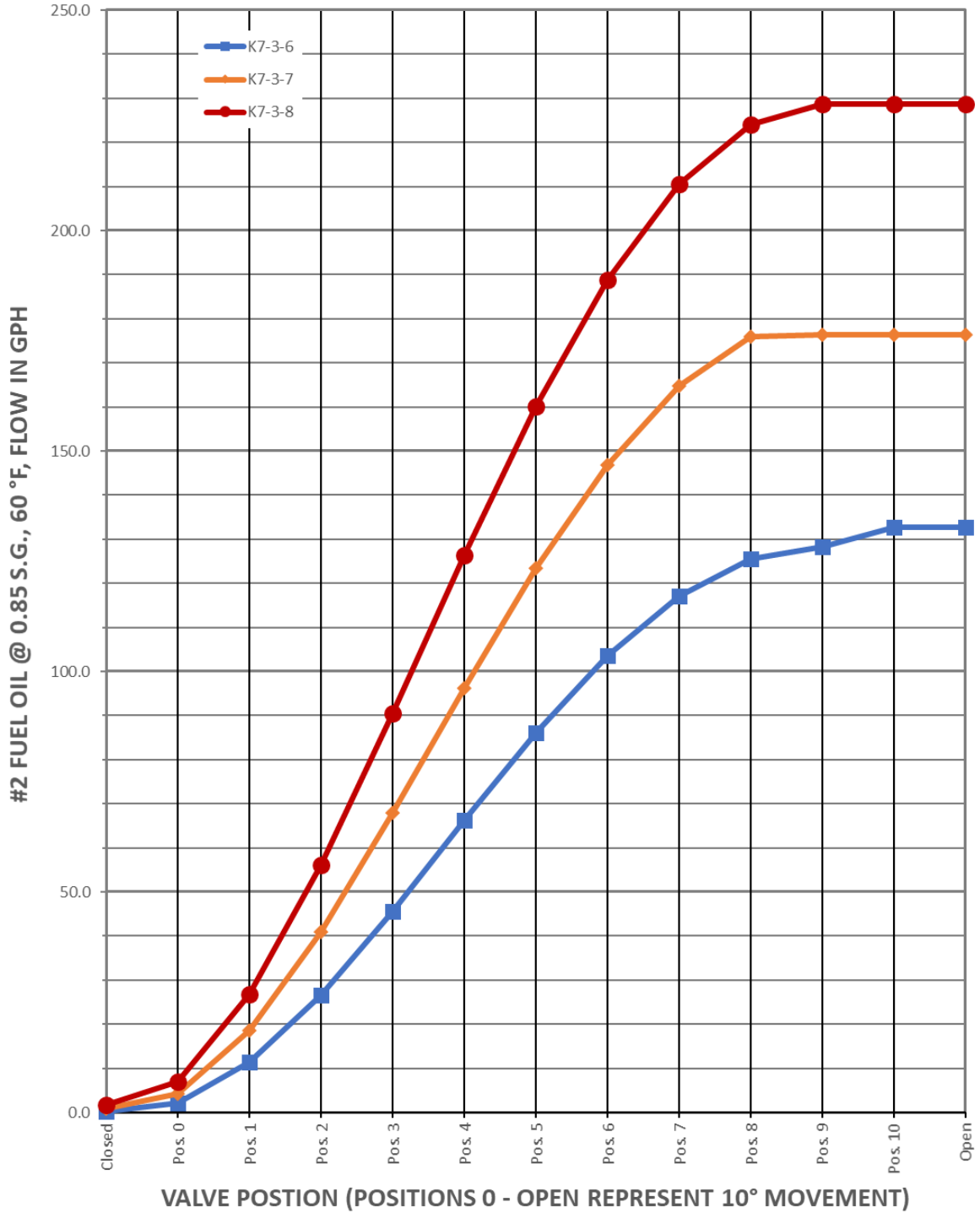
POWER FLAME
AN ASTEC INDUSTRIES
COMPANY





Power Flame Fuel Metering Valve K7-3-X Series
#2 Oil (Diesel) 0.85 S.G., 60°F, 25 PSIG ΔP Across
the Valve

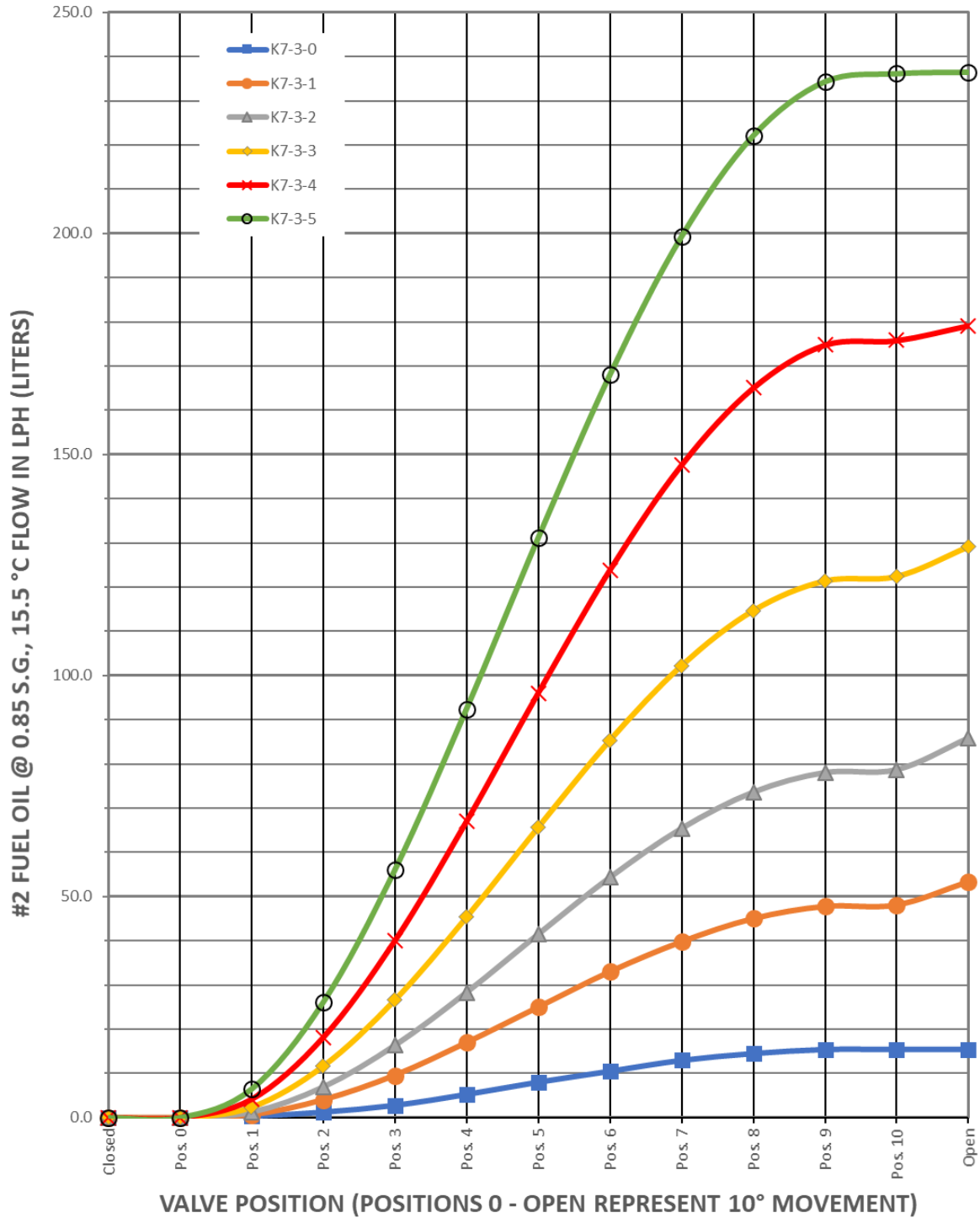
POWER FLAME
AN ASTEC INDUSTRIES
COMPANY





Power Flame Fuel Metering Valve K7-3-X Series
#2 Oil (Diesel) 0.85 S.G., 15.5°C, 172.4 kPa ΔP Across
the Valve

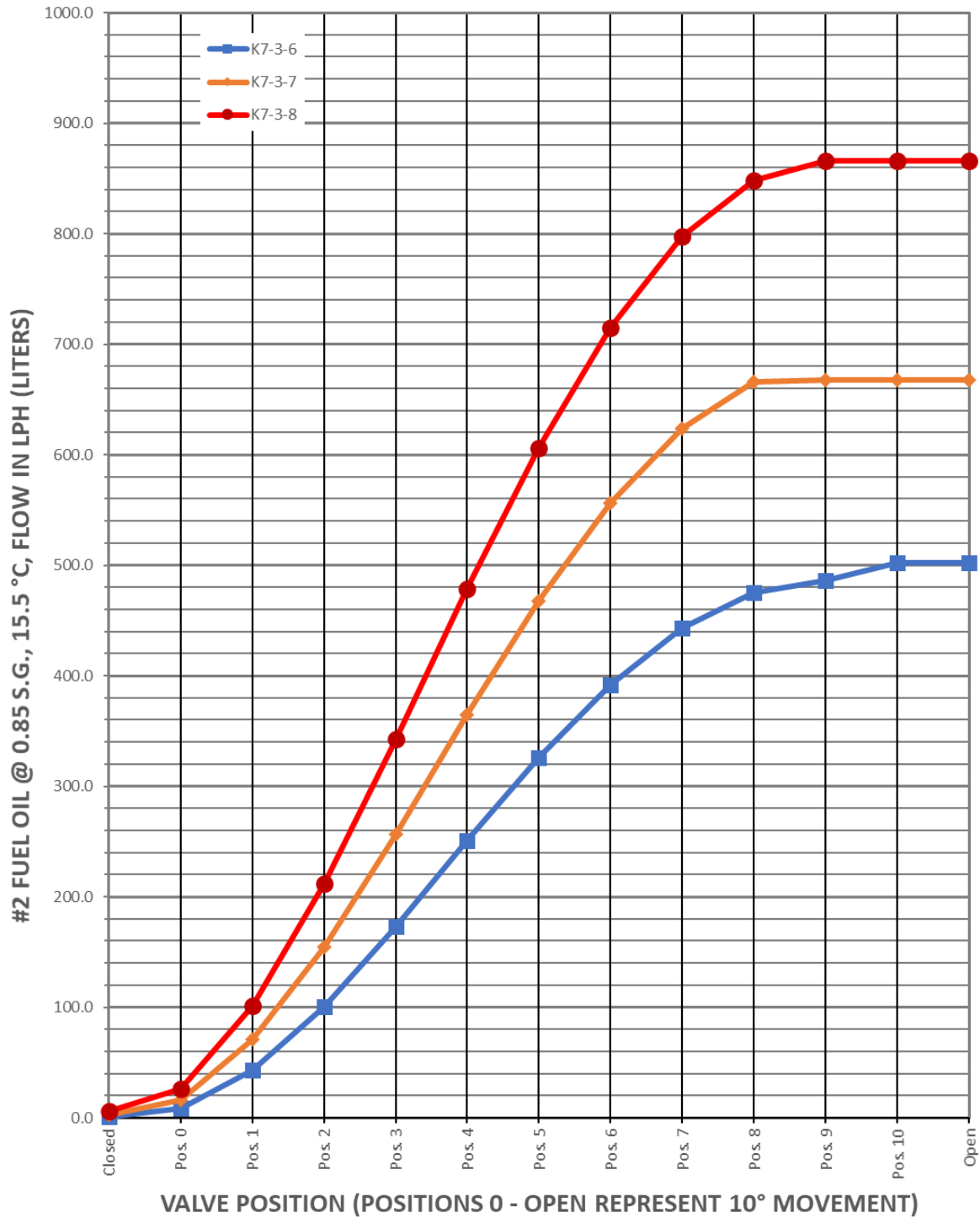
POWER FLAME
AN ASTEC INDUSTRIES
COMPANY





Power Flame Fuel Metering Valve K7-3-X Series
#2 Oil (Diesel) 0.85 S.G., 15.5°C, 172.4 kPa ΔP Across
the Valve

POWER FLAME
AN ASTEC INDUSTRIES
COMPANY



2.3 Selection

- 2.3.1 The most optimum valve selection is the one that has the desired high fire flow rate at the greatest valve position number, typically 9. Using the charts, find the curve that is closest to the desired flow rate at position 9. This would be the ideal valve choice. If your flow rate falls between 2 curves, the smaller model will typically give more control, but at a higher pressure drop than 25.

Example: If the desired flow rate is 26.0 GPH, the best choice would be the K7-3-2 valve, provided there is enough pressure available. To determine the pressure drop of this valve at 26 GPH, the following formula may be used:

$$\Delta P_{Unknown} = \Delta P_{CHART} \times \left(\frac{Q_{ACTUAL}}{Q_{CHART}} \right)^2$$

$$\Delta P_{Unknown} = 25_{PSIG} \times \left(\frac{26_{GPH}}{20.6_{GPH}} \right)^2$$

$$\Delta P_{Unknown} = 39.8_{PSIG}$$

- 2.3.2 The flow charts provided in this manual are at a 25 PSI/172.4 kPa drop. If a different pressure drop is required, the flow rates will change. The following formula may be used to convert the chart's flow rates (Q_{chart}) to the actual flow (Q_{actual}).

$$Q_{Actual (GPH)} = Q_{Chart (GPH)} \times \sqrt{\frac{\Delta P_{PSIG}}{25_{Chart PSIG}}}$$

3.0 INSTALLATION AND MOUNTING

3.1 Dimensions

3.1.1 The below illustration shows the dimensional details of the K7-3-X valve. A variety of mounting brackets, servo coupling kits and linkage arms are available from Power Flame separately. Please contact the factory for additional information.

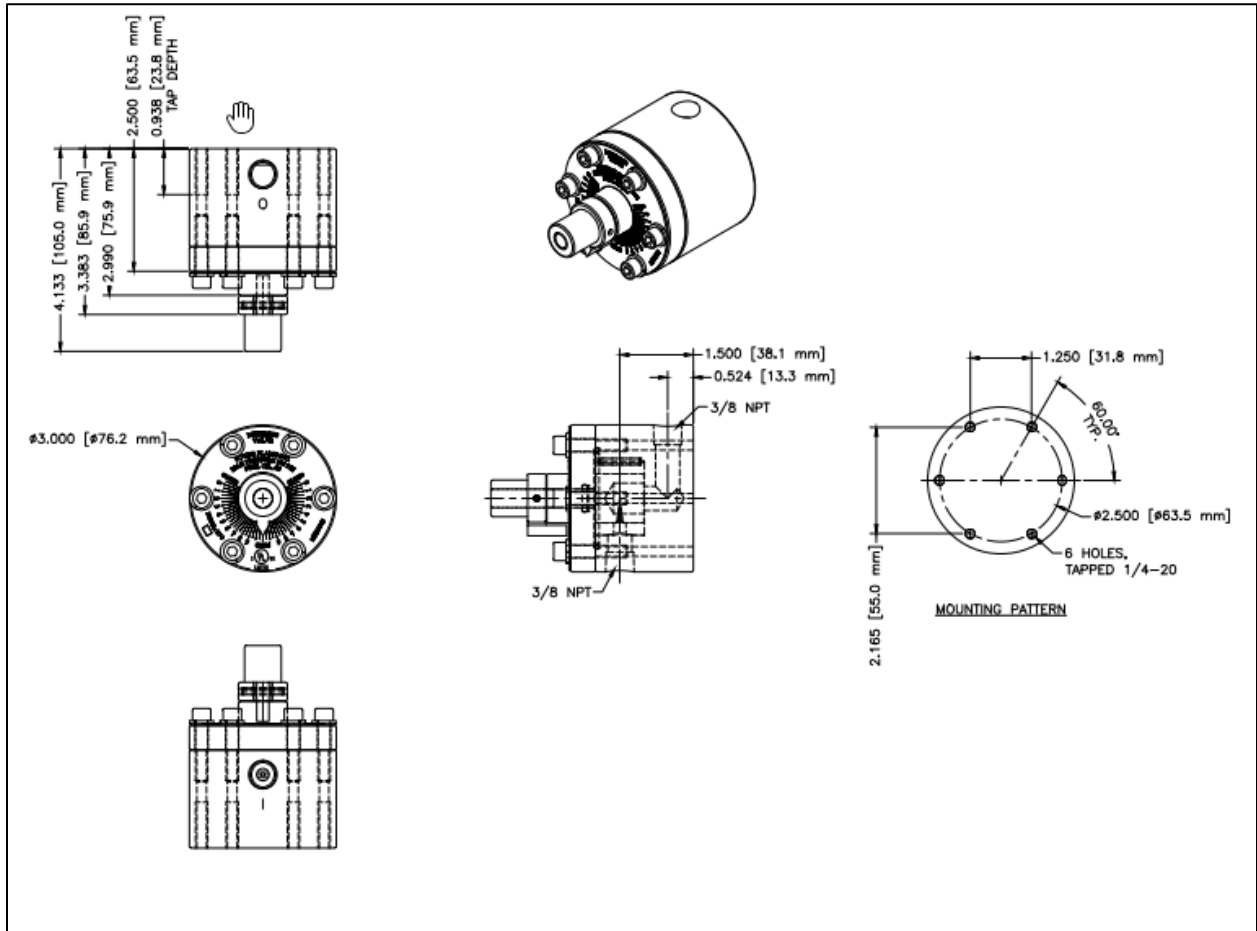


Figure 1: Valve Dimensions

3.2 Installation and Mounting

- 3.2.1 Please examine the metering valve upon to ensure that it has arrived in good condition and that no damage occurred during transit.
- 3.2.2 Bolt the metering valve to the desired mounting bracket as required. Placement should be such that an operator can easily view the position indicator on the front of the valve. It is necessary on linkage-type installations that the valve's shaft is parallel to the actuator's shaft to ensure the linkage will not bind. This is not required on servo-driven installations; however, the installer must leave adequate clearance to remove the actuator cover.
- 3.2.3 The inlet of the valve is denoted with an "I" stamped into the valve body. The outlet is denoted with an "O" stamped into the valve body. All piping should be installed with high quality thread sealant. Teflon tape is not allowable and shall never be used. Piping connections to the valve are 3/8" NPT female and shall be torqued per ANSI standards for aluminum body connections. A large crescent wrench or smooth-jawed pipe wrench must be placed across the body of the valve as near as possible to the inlet/outlet opening that is being connected to avoid damaging the valve body and internal valve components.
- 3.2.4 With the valve connected to the bracket, connect the linkage arm or actuator coupling to the valve as required for your installation. Refer to the manual of the burner model the valve is installed on for additional information.

4.0 OPERATION

- 4.0.1 The K7-3-X valve is rated for #2 fuel oil with a maximum fluid temperature of 125 °F (52 °C) up to 300 PSI (2068 kPa).

5.0 MAINTENANCE

- 5.0.1 Power Flame K7 metering valve is designed for maintenance free service. There is no need to disassemble the valve, and attempting to do so will void the warrantee.
- 5.0.2 A 300 micron or better strainer shall be used upstream of the burner oil components, as close as possible to the burner. This will ensure that large debris will not plug the valve.

Power Flame Incorporated Limited Warranty

Power Flame Incorporated, hereinafter called the Seller, of 2001 South 21st Street, Parsons, Kansas, hereby warrants its equipment manufactured by it and bearing its nameplate (hereinafter called Warranted Equipment) in the respects and exclusively for the benefit of those users, described herein. THIS LIMITED WARRANTY SHALL EXTEND SOLELY TO THOSE PERSONS WHO ARE OWNERS OF THE WARRANTED EQUIPMENT DURING THE WARRANTY PERIOD HEREINAFTER DEFINED AND WHO USE SUCH WARRANTED EQUIPMENT IN THE PROJECT AND FOR THE PURPOSES FOR WHICH SUCH WARRANTED EQUIPMENT WAS ACQUIRED FROM THE SELLER. The Seller warrants its equipment to be free from defects in the material and workmanship under normal use and service for fifteen (15) months from date of shipment. Burner blast tube is warranted a full five (5) years. EXCLUDED FROM ANY COVERAGE UNDER THIS WARRANTY ARE DEFECTS IN WARRANTED EQUIPMENT FROM DAMAGE IN SHIPMENT, FAULTY INSTALLATION, LACK OF PROPER MAINTENANCE, CLOGGED OR DAMAGED FILTERS, MISUSE OR NEGLIGENCE. If any person becomes entitled to a claim under this warranty, such person shall, as a condition precedent to securing warranty performance, return the Warranted Equipment to the Seller's plant, 2001 South 21st Street, Parsons, Kansas, transportation prepaid. If the Warranted Equipment thus returned is found by the Seller to be defective for a cause and within a time covered by this Warranty, such equipment shall be repaired or replaced without charge; and returned to its owner or job site at the Seller's cost for transportation and handling. If inspection of the Warranted Equipment discloses defects not covered by this Warranty, the Seller shall notify the owner. Said equipment, at the owner's option (to be determined thirty (30) days from the date of notification), may be repaired or replaced at the expense of the owner and Seller's regular charges shall apply. Owner shall assume the cost for transportation and handling.

Equipment, which is repaired or replaced, shall carry a warranty equal to the unexpired portion of the original warranty. The Seller will commence inspection of any Warranted Equipment returned to it for warranty claim within seven (7) working days after the arrival of such Warranty Equipment at Seller's plant, and shall complete any repairs required under this warranty within sixty (60) days after such arrival, unless Seller shall sooner notify said owner of reasonable cause for delay beyond control of Seller. Warranty obligations hereunder will be performed only between the hours of 9:00 a.m. and 4:00 p.m. Monday through Friday and excluding holidays. Any person believing himself entitled to warranty performance hereunder is required to notify the Quality Assurance or Service Department of Power Flame Incorporated, 2001 South 21st Street, Parsons, Kansas, prior to return of any Warranted Equipment for repair hereunder. IN ALL EVENTS, SELLER WILL NOT BE LIABLE FOR AND WILL NOT REIMBURSE ANY LABOR, MATERIAL, OR OTHER REPAIR CHARGES INCURRED BY ANYONE OTHER THAN SELLER ON ANY WARRANTY EQUIPMENT, UNLESS SUCH CHARGES HAVE BEEN SPECIFICALLY AUTHORIZED IN ADVANCE IN WRITING BY SELLER. ANY WARRANTY IMPLIED BY LAW WITH RESPECT TO THE MERCHANTABILITY OR FITNESS OF THE WARRANTED EQUIPMENT IS HEREBY LIMITED TO THE DURATION OF THE WARRANTY PERIOD HEREUNDER. THE SELLER WILL NOT IN ANY EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES ATTRIBUTABLE TO THE WARRANTED EQUIPMENT.



Power Flame Incorporated

*The Power to Manage
Energy*

2001 South 21st Street, Parsons, KS 67357
Telephone: 620-421-0480 FAX: 620-421-0948
Website: <http://www.powerflame.com>
e-mail: CSD@powerflame.com