# Warnings



### Purpose

In its continuing quest for safety, RegO publishes a series of bulletins explaining the hazards associated with the use, misuse, and aging of LP-Gas valves and regulators. It is hoped that these factual bulletins will make clear to LP-Gas dealer managers and service personnel, that the utmost care and attention must be used in the installation, inspection, and maintenance of these products, or problems could occur which would result in injuries and property damage.

The National Fire Protection Association NFPA 58 Liquified Petroleum Gas Code - 2017 Edition states in Section 4.4 Qualification of Personnel; "Persons whose duties fall within the scope of this code shall be provided with training that is consistent with the scope of their job activities and that includes proper handling and emergency response procedures... Refresher training shall be provided at least every 3 years, initial and subsequent training shall be documented". These "RegO Safety Warnings" may be useful in training new employees and reminding older employees of hazards that can occur. It is recommended that all employees complete the Propane Education Research Council's Certified Employee Training Program.'

Nature of Warnings

It is recognized that warnings should be as brief as possible, but the factors involved in internal valve and excess flow valve failures to perform are not simple. They need to be fully understood. If there is a simple warning, it would be:

Make sure that the internal valve's excess flow feature really closes when the flow exceeds rated closing flow, and that the valve will shut-off.

This bulletin is not intended to be an exhaustive treatment of internal valves, and certainly does not cover all safety practices that should be followed in installation, operation and maintenance of LP-Gas systems, which include internal valves.

Internal valves must be closed on Cargo Vehicles when traveling on public roads and highways. The valve should only be open when pumping. Per MC 330 or 331, internal valves must also be equipped with remote closure system when used on transports or bobtails.

There are two types of internal valves being used on storage tanks, transports and bobtails — spring loaded internal valves and differential pressure internal valves. They both provide positive shut-off when product is not being withdrawn and may include excess flow protection for the system during transfer operations.

### Spring Loaded Internal Valves

Spring loaded internal valves are manually opened by levers, by means of fuse linked cable mechanisms or pneumatic or hydraulic actuators. They incorporate an excess flow feature that will close the valve when the flow through the valve exceeds its rate of flow. These valves should never be locked open by means of wires, chains, pegs or other devices.

### Testing

### Testing should be completed on a periodic basis.

1. To check operation of a spring loaded valve, activate the remote control to close the valve while unit is pumping. If the meter indicator flow continues, the valve should be repaired immediately.

2. Testing excess flow feature.

The National Propane Gas Association Safety Bulletin #113-78 states: "In order to test an excess flow valve in a piping system, the flow through the valve must be made to exceed the valve's closing rating."

This testing should only be attempted by trained personnel familiar with the process. If no one at the facility has experience in proper testing, outside expert help should be obtained.

The exact procedure used may vary with the installation, advisability of gas discharge and availability of equipment.

In general, most testing makes use of the fact that the excess flow valves are "surge sensitive" and will close quicker under a sudden flow surge than under steady flow. A sufficient surge can often be created by using a quick open/close valve to control sudden, momentary flow into a tank or piping section containing very low pressure. An audible click from the excess flow valve (and corresponding stoppage of flow) indicates its closure.

A test involving venting gas to the atmosphere is hazardous and may be impractical, or illegal.

Any test of any excess flow valve will not prove that the valve will close in an emergency situation, due to reasons cited before. This test will only check the valves condition, and the flow rate sizing for those test conditions.

3. Tight Shut-Off — A test should be made to ensure the internal valve will give a gas tight seal when the valve is in the closed position. This will require removal of all product downstream from the internal valve, to ensure the valve will give 100% seal when in the closed position. If the internal valve does not give 100% seal the valve should be repaired immediately.

# **Pressure Differential Internal Valves (Flomatics®)**

Pressure differential valves (Flomatics®) open by pump pressure and close when the pump stops. These valves must never be locked open by means of wires, chains, pegs or other devices.

### Testing

### Testing should be completed on a periodic basis.

1. To check operation of a differential pressure internal valve activate the remote control shut-off valve while the unit is pumping. If the meter indicates that flow continues the valve should be repaired immediately.

2. Since the differential pressure internal valve requires at least 18 psi to open and 8 psi over container pressure to keep open, a test may be performed to check for closure. With the PTO disengaged, connect delivery hose to a container with very low pressure. Then with hose end valve open, engage PTO. The internal valve should remain closed, no flow should be detected through the meter. If flow continues through the meter the valve should be repaired immediately.

3. Tight Shut-Off — A test should be made to ensure the internal valve will give a gas tight seal when the valve is in the closed position. First ensure the pump prime valve is closed by turning clockwise until it seats. Then with the valve closed (PTO disengaged) the product downstream from the internal valve will have to be safely removed. If the internal valve does not give 100% seal, the valve should be repaired immediately.

### **General Warning**

All RegO Products are mechanical devices that will eventually become inoperative due to wear, contaminants, corrosion and aging of components made of materials such as metal and rubber.

The environment and conditions of use will determine the safe service life of these products. Periodic testing at least once a year when tank pressures are low and maintenance, as required, are essential.

Because RegO products have a long and proven record of quality and service, LP-Gas dealers may forget the hazards that can occur because an excess flow valve is used beyond its safe service life. Life of an excess flow valve is determined by the environment in which it "lives". The LP-Gas dealer knows better than anyone what this environment is.

**NOTE:** There is a developing trend in state legislation and in proposed national legislation to make the owners of products responsible for replacing products before they reach the end of their safe useful life. LP-Gas dealers should be aware of legislation which could effect them.



# **Manual Internal Valves**

### A3200 Series

### **General Information**

Manual Internal Valves are designed for a variety of uses in LP-Gas and anhydrous ammonia service. In addition, accessories allow most of them to be actuated manually, by cable or with air.

Installation, usage and maintenance of this product must be in compliance with all RegO instructions, as well as requirements and provisions of NFPA # 58, DOT, ANSI, and all applicable federal, state, provincial, and local standards, codes, regulations and laws.

### How The Valves Work

Refer to the drawings. View "A" shows the valve held closed without leakage by tank pressure and the valve's closing spring. Actuation of the operating handle alone does not open the valve, it only allows pressure to equalize between the inlet and outlet of the valve by rapid bleeding of the product downstream. This equalized pressure then allows the valve to open via the internal spring.

The valve opens by moving the handle to mid-point, see view "B". This position allows the actuator to put the equalizing portion of the valve stem in the pilot opening, allowing more product to bleed downstream than if the handle was fully open.

In a few seconds, the tank and downstream pressure will be nearly equal. The excess flow spring will push the main poppet to the open position, see view "C", the handle should then be moved to the fully open position.

If at first, the handle is quickly moved to the fully opened position, the pilot valve allows a small amount of bleed downstream, but much less than during rapid bleed (view "B"). This results in a longer pressure equalizing time before the main valve can open.

**NOTE:** The main poppet will not open until outlet pressure approximates tank pressure!

Once the main poppet is open, flow greater than the excess flow rating, or a sufficient surge in flow, forces the main poppet closed against the excess flow spring, as seen in view "D". The pilot valve in this position is open and allows a small amount of bleed downstream, but much less than during rapid bleed (view "B").

When the operating handle is moved to the closed position, the valve closes and a leak-tight seal is re-established as seen in view "A".

**NOTE:** To provide excess flow protection, the flow rating of the pump, piping, valves, fittings, and hose on the inlet and outlet sides of the valve must be greater than the flow rating of the valve. Any restrictions that reduce the flow to less than the excess flow valve rating will result in the excess flow valve not operating when required.

Valve Operation and Precautions

1. Valve must be opened before starting pump, and before opening valve on pump outlet.

2. Leave pumping system "wet" to avoid drying of seals and to reduce time involved in opening valve. Drain piping only when required by codes or safe operating practices.

3. When piping is dry or at lower pressure than the tank, open valve half-way for a few seconds to allow line pressure to equalize before fully opening the valve handle. The main poppet may not open immediately if the handle is placed in the open position too quickly.

4. Flow surges may close the built-in excess flow valve and should be avoided. If the valve slams shut, immediately stop the pump, close the nearest downstream valve, and move handle to midpoint position to equalize pressure until valve reopens with a click, then restart pump and open downstream valve slowly. These valves must remain in the closed position except during product transfer. A line break downstream of the pump may fail to actuate the excess flow valve as the pump may limit flow. If break occurs in the system, or the excess flow closes, immediately shut down the system.

Inspection and maintenance on a periodic basis is essential. Installation and maintenance must be performed only by qualified personnel.

Be sure all instructions are read and understood before installation and operation of these valves.

5. Always keep valve closed except during product transfer.

6. Completely open all valves during pumping. Partially closed or throttle type valves may prevent excess flow valve from closing when required, even in a properly designed piping system.

7. All personnel must be aware of remote closure locations and their operation in case of emergency. They must also be aware of the equalizing opening through which bleeding can occur after the excess flow valve closes. If this bleed is not stopped by closing a downstream valve, a hazard may occur.

8. Never, under any circumstances, permanently wire open the operating handle of the internal valve.

### Cable Control System

The cable control system employed must meet the requirements and be in accordance with the provisions of NFPA #58, DOT, ANSI, and all applicable federal, state, provincial and local codes.

### Troubleshooting

**1. Internal Valve Will Not Open.** Causes may be excess leakage downstream, pump engaged too quickly, excessive wear of valve, or ice freezing of poppet.

When there is excessive volume downstream, a greater amount of time is required to equalize tank and downstream pressure.

To determine if the pilot seat is opening, install a pressure gauge downstream of valve outlet, open any hand valves between valve and pressure gauge, and open valve. Pilot seat is not opening if pressure does not build up to tank pressure. Perform this test with pump off. A broken internal part may cause pilot seat not to open.

If operating handle rotates past the full open position, there is internal malfunctioning, and the valve must be disassembled and repaired.

### 2. Premature Valve Closure.

First, check to see that operating lever is properly connected and fully opens valve. Premature closure may also be a result of engaging pump too quickly, sudden line surges, an underrated excess flow spring or an obstructed inlet port.

### 3. Valve Will Not Close.

Usually a result of faulty or sticking actuator. First, check the actuator to see that it works freely by disconnecting it from valve handle and cycling it several times. Also, operate valve handle manually. If it sticks in the open position, replace the packing and bushings. This should free the operating mechanism providing the valve has no internal damage.

#### 4. Low Flow Capacity

Downstream piping may be too small and/or long, screen or strainer may be plugged, possible restriction downstream, or a bypass valve stuck in the open position are causes of low flow. Also, the bypass valve may be set too low and prematurely opening. Check for high differential pressure across the bypass valve. If bypass valve is open, the differential across the valve should not exceed 5 to 6 psig.

# Maintenance

Potential problems may be eliminated with preventive internal valve maintenance. Perform the following steps once a month:

1. Check to see that the operating lever moves freely and smoothly. There should be no leakage around the lower stem or seal housing. Leakage requires replacement of the seal housing packing. A sticking lever indicates trapped foreign material or mechanism wear.

2. Check both seat discs for tight closure. Close valve and exhaust downstream pressure. Be sure piping is warmed to an ambient temperature. Close the first downstream valve and note pressure buildup between the closed valves with a pressure gauge. If leakage occurs, replace both seat discs.

A3209D Series, 1-1/4" Straight A3209DT Series, 1-1/4" Straight A3211D Series 1-1/2 Straight A3212R Series, 2" Straight A3212R T Series 2" Tee Body A3213D Series, 3" Straight A3213DT Series 3" Tee Body 3. Inspect, clean and oil all operating controls. Check controls to see that they open fully, but do not overtravel the valve operating lever. See that they work freely to close the valve. Worn parts should be replaced.

4. Remove valve if the tank is to be steam cleaned. Heat may damage the valve's seals.

5. Valve is not designed for water service. After tank is hydrostatically tested, immediately remove all water and allow tank to thoroughly dry out before installing valve.



A3219FA Series, 4" Flanged



# 1-1/4" Threaded Internal Valve for Small Capacity Pumping Systems and Bobtail Vapor Equalization A3209D & A3209DT Series

Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on small capacity pumping systems, NH3 nurse tanks and in-line installations. It may also be installed in the vapor equalizing opening on bobtail delivery trucks. Installation is quick and easy, and it fits in both full and half couplings, as well as, in-line applications. The valve may be actuated manually by hand or cable.





A3209TL

# **Ordering Information**

Dent #	Inlet Outlet		Closing Flow		LP-Gas	Vapor Capacity** (SCFH/Propane)	Accessories		
Part #	M. NPT	NPT	LP-Gas	NH3	25 PSIG	100 PSIG	Thermal Latch	Pneumatic Actuators	
A3209D050	1-1/4"	1-1/4"	50	45	13,300	22,900			
A3209D080	1-1/4"	1-1/4"	80	72	15,700	26,700	A2200TI	A3209PA A3209PAF	
A3209DT050*	1-1/4"	1-1/4"	50	45	13,300	22,900	ASZUGIL		
A3209DT080*	1-1/4"	1-1/4"	80	72	15,700	26,700			

\* T-Body Design

# Threaded Internal Valve with Electric Actuator for Small Capacity Pumping Systems and Bobtail Vapor Equalization EA3209 Series

Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on small capacity pumping systems, NH3 nurse tanks and in-line installations. It may also be installed in the vapor equalizing opening on bobtail delivery trucks. Installation is quick and easy, and it fits in both full and half couplings, as well as, in-line applications. The valve may be actuated manually by hand or cable.



# **Ordering Information**

Part #	Inlet Connection	Outlet Connection F.	Voltages	Closin	g Flow	LP-Gas Vapor C Pro	Capacity** (SCFH/ pane)
	M. NPT	NPT		LP-Gas	NH3	25 PSIG	100 PSIG
EA3209D050				50	45	13 300	22 000
EA3209DT050*	1-1/4"	1 1///"	12/24 \/DC	50	45	15,500	22,900
EA3209D080		1-1/4	12/24 000	80	72	15 700	26 700
EA3209DT080*				00	12	13,700	20,700
EA3211D080	1-1/2"	1-1/2"	12/24 VDC	80	72	15,700	26,700
EA3211D110	1-1/2	1-1/2	12/24 000	110	99	N/A	N/A
EA3212R105				105	95	42 975	73 048
EA3212RT105*						42,010	70,040
EA3212R175	2"	2"	12/24 VDC	175	158	48 169	81 876
EA3212RT175*	<u>_</u>	-			100	40,100	01,070
EA3212R250				250	225	57 067	97 001
EA3212RT250*				200		01,001	01,001
EA3213D150				150	135	26 900	45 900
EA3213DT150*						20,000	10,000
EA3213D200				200	180	32 300	55 100
EA3213DT200*	3"	3"	12/24 VDC			02,000	00,100
EA3213D300	Ŭ	3 3		300	270	50.500	86.500
EA3213DT300*							
EA3213D400				400	360	71 400	121 300
EA3213DT400*						,100	,000

\* T-Body Design \*\*Data for full flow in half coupling.

# Straight Through 1-1/2" Internal Valve A3211D Series

Designed primarily for use with LP-Gas and anhydrous ammonia as a main valve on pumping systems, and in-line installations. Installation is quick and easy and it fits in both full and half couplings, as well as, in-line applications. The valve may be opened manually by hand or pneumatic actuator.



### Ordering Information

				Closing F	Flow GPM		LP-Gas Vap (SCFH/P	or Capacity ropane)	Accessories	
Part			Half Co	oupling	Full Co	oupling		100 PSIG		Pneumatic
Number	Inlet M.NPT	Outlet F.NPT	LP-Gas	NH <sub>3</sub>	LP-Gas	NH <sub>3</sub>	25 PSIG Inlet	Inlet	Latch	Actuator
A3211D080	1-1/2"	1-1/2"	80	72	63	67	15,700	26,700	A 2200TI	A2200DAE
A3211D110	1-1/2"	1-1/2"	110	99	84	76	N/A	N/A	ASZUFIL	AJZUJFAF

# 3" Flanged Internal Valves for Bobtail Delivery Trucks, Transports and Large Stationary Storage Containers A3217A & A3217DA

Designed primarily for LP-Gas and anhydrous ammonia filling and/ or withdrawal on MC331 bobtail delivery trucks, transports and stationary storage tanks with flanged pumps or piping. Installation is quick and easy, and the valve may be operated manually by cable or pneumatically. Lever available on right or left side to allow for installation without the use of an extra pulley.



### A3217ARPA and A3217ALPA Pneumatic Actuators

These Pneumatic Actuators are designed specifically for use with the A3217 Series 3" Internal Valves. The diaphragm design provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen.

### **Ordering Information**

					Closing GPN	Flow I	Accessories Pneumatic Actuator	
		Operating						
Pa Nun	art nber	Lever Position	Inlet Connection	Outlet Connection	LP-Gas	NH3	Right Operation	Left Operation
Single Flange								
A3217AR160	A3217AL160				160	145		
A3217AR210	A3217AL210	]	3" 300#	3" 300#	210	190	A3217ARPA A3217RA	A3217AL DA
A3217AR260	A3217AL260	Right or Left	ANSI RF Modified	ANSI RF	260	236		A321/ALPA A3217LA
A3217AR410	A3217AL410	]	Flange*	Flange	410	372	A321/10A	
A3217AR510	A3217AL510		5		510	459		
Double Flange								
A3217DAR160	A3217DAL160				160	145		
A3217DAR210	A3217DAL210		3" 300#	3" 300#	210	190	A 2247A DDA	A 2047AL DA
A3217DAR260	A3217DAL260	Right or Left	ANSI RF Modified	ANSI RF	260	236	A321/ARPA	A321/ALPA A3217LA
A3217DAR410	A3217DAL410	]	Flange*	Flange	410	372	A3217KA	AJZITLA
A3217DAR510	A3217DAL510		3-		510	459		

\* Valve supplied with 16 nuts and 8 studs for mounting.

\*\*Modified bore=4-5/8" diameter with 5-3/4" diameter raised face.

# 4" Flanged Internal Valve for Transports and Large Stationary Storage Tanks A3219 Series

Designed primarily for LP-Gas and anhydrous ammonia service on MC331 transport pressure vessels and large stationary storage tanks. Installation is quick and easy, and it fits in most existing tank flanges. The valve may be actuated manually or pneumatically.

Use of the A3219RT Remote Thermal Release with this valve is suggested to provide a remote means of mechanical closure along with thermal protection, as required by DOT.





A3219FPA Pneumatic Actuator

The A3219FPA Pneumatic Actuator is designed especially for use with the A3219FA Series Flanged Internal Valves. The diaphragm type A3219FPA provides a convenient means of opening and closing the valve from a remote location, using either air or nitrogen, on LP-Gas and NH3 transport trailers and stationary tanks.



A3219RA

### **Ordering Information**

			Closing Fl	ow GPM***	Accessories		
Part #* Inlet Connection		Outlet Connection	LP-Gas	NH3	Pneumatic Actuator	Remote Thermal Release	
A3219FA400L			400	360	A3219FPA	A2240DT (2)	
A3219FA600L	4" 300# ANSI RF	4" 300# ANSI RF Flange	<u> </u>	540	A3219RA	A3219R1 (2)	
A3219FA600W	Modified Flange**		600	540		A 2210\A/	
A3219FA400W			400	360	-	A3219W	

\* Valve supplied with 16 nuts and 8 studs for mounting.

\*\* Modified bore = 5 7/8" diameter with 7" diameter raised face.

\*\*\* Other closing flows available

# Remote Thermal Release for DOT MC331 Pressure Vessel A3219RT

Designed especially for use with Internal Valves installed in DOT MC331 pressure vessels. The A3219RT provides a remote means of mechanical closure along with thermal protection, as required by DOT MC331.

The A3219RT is connected by cable to the internal valve(s) on the vessel. In the event of extreme heat (over 212° F.), the fuse link will melt, causing the spring to contract and pull the cable. When properly installed the cable will trip the internal valve release lever(s) allowing the connected handle(s) to move to the closed position.

### **Ordering Information**

			Spring Load		Minimum
Part #	For Use With	Release Temperature	Fully Extended	After 4" Travel	Required By MC331
A3219RT	Internal Valves	212° F.	≈100 lbs.	≈50 lbs.	2





# **Remote Cable Controls for Internal Valves** 3200C and 3200L

The 3200C Remote Cable Kit is designed especially for use with the 3200L Remote Operating Lever to operate internal valves from a remote location.

The internal valve is opened by pulling back the remote operation lever and closed by returning the lever to its original position. A remote release is provided to close the internal valve from a different remote location.

### **Ordering Information**

Part #	Description	Contents
3200C	Remote Cable Kit	100 Foot Cable, 6 Cable Clamps, Quick Link, Sign, Fuse Link, Steel Nut and Bolt
3200L	Operating Lever	Lever Assembly



# Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks A3213D Series

Designed primarily for use with LP-Gas and anhydrous ammonia for liquid withdrawal; vapor transfer or vapor equalization of bobtail delivery trucks, transports, stationary storage tanks, and in-line installations. The valve may be operated manually by cable or pneumatically.



A3213RA

U<sub>l</sub>



A3213TL

### **Ordering Information**

Bort #	Inlet	Outlet	Closing Flow Half Coupling (GPM)		Closing Flow Full Coupling (GPM)		Vapor Closing Flow (SCFH)		Accessories		
M.NF	M.NPT	F.NPT	LPG	NH3	LPG	NH3	25 PSIG Inlet	100 PSIG Inlet	Pneumatic Actuator	Rotary Actuator	Thermal Latch
A3213D150			150	135	125	113	26,900	45,900		A2212DA	
A3213D200			200	180	160	144	32,300	55,100			A2242TI
A3213D300			300	270	250	225	50,500	86,500			
A3213D400	2"	2"	400	360	325	293	71,400	121,300	A2212DA		
A3213DT150*	5	5	150	135	125	113	26,900	45,900	AJZIJFA	AJZIJKA	ASZISIL
A3213DT200*			200	180	160	144	32,300	55,100			
A3213DT300*	]		300	250	250	225	50,500	86,500			
A3213DT400*			400	325	325	293	71,400	121,300			

\* T-body design

# **Pneumatic Operating Pressures**

Part Number	Min. PSI	Max. PSI	Inlet Connection
A3209PA	60#	250#	
A3209PAF	50#	125#	
A3212PA	35#	100#	
A3212RA	25#	125#	1/4"
A3213PA	35#	100#	1/1
A3213RA	25#	125#	
6016-60C	20#	250#	
6016-60D	40#	80#	
6016-60D		125#	1/8"
RSA-M3820602	N/A	450%	1/4"
RSA-PTSAE		150#	N/A

# Threaded Internal Valves For Bobtail Delivery Trucks, Transports and Stationary Storage Tanks

## A3212 Series

Designed primarily for use with LP-Gas and anhydrous ammonia for liquid withdrawal; vapor transfer or vapor equalization of bobtail delivery trucks, transports, stationary storage tanks, and in-line installations. The valve may be operated manually by cable or pneumatically.



## **Ordering Information**

Part #	Inlet Outlet		Closing Flow (GPM) Half Coupling		Closing Flow (GPM) Full Coupling		•	R	C	Accessories		
Fall#	M. NPT	F. NPT	LP-Gas	NH3	LP-Gas	NH3	~	B	Ŭ	Thermal Latch	Pneumatic Actuator	Rotary Actuator
A3212R 105		2"	105	05	6F	50		4-11/16"				
A3212R T105		2" T-body	105 95	05	59		4-15/16"					
A3212R 175	0"	2"	175	150	100	00	1 0/16"	4-11/16"	2 45/64"	A 2042TI	*4224204	A2212DA
A3212R T175	2	2" T-body	175	100	100	90	1-9/10	4-15/16"	3-45/04	AJZIJIL	AJZIJPA	A3212KA
A3212R 250		2"	250	225	120	117		4-11/16"				
A3212R T250		2" T-body	200	225	130	130   117		4-15/16"				

\* For the old A3212A Series please use the A3212PA Pneumatic Actuator

# Flomatic® Internal Valves for Bobtail Delivery Trucks, Transports and Large Stationary Storage Tanks

Designed primarily for LP-Gas and anhydrous ammonia liquid withdrawal on MC331 bobtail delivery trucks, transports and large stationary storage containers with flanged connections. The valve is fully automatic, opening and closing as the pump is turned on or off.



A7883FK

### **Ordering Information**

	Inlet Connection	Outlet Connection	Strainer	Baso	Overall Height	Height from Indicator	Accessories (in along with st	cluded with Flomatic® uds, nuts & gaskets)
Part #	ANSI Flange	ANSI Flange	Width	Width	(Approx.)	to Base	Filter	3-Way Valve
A7883FK	3"-300#*	3"-300#	4-3/4"	8-1/4"	10-7/8"	4-13/16"	A7884-201	A7853A

\* With 4-13/16" diameter bore.

# 1/4"Three-Way Quick-Acting Valve A7853A





A7853A 1/4" Three-Way Quick-Acting Valve

EA7853A 1/4" Three-Way Quick-Acting Valve with Electric Actuator

# **Ordering Information**

						Ļ	Accessories
Part #	Flange Type	A	в	с	D	Pneumatic Actuator	Electric Actuator (Ships with Valve)
A7853A	T-1 Steel	4 12/16"	5 2/4"	6 5/0"	Q 1/4"	A7853PAF	-
EA7853A	Carbon Steel	4-13/10	5-3/4	6-5/8"	0-1/4	-	12/24 VDC Voltage

# Flomatic® Internal Valve Operation



### 1. Normally Closed

When the valve is closed, liquid flows into the INLET PORTS, through a channel in the PISTON, and into area A. It also flows down through the PRIMING CHANNEL in the valve body, into area B beneath the valve seat, and into area C to prime the PUMP.



### 2. Pump On - Valve Opening

When the pump is started, differential pressure transmits through the 1/4" piping into chamber D. lifting the PILOT STEM. This opens the seat between the stem and piston at E. Pump suction then evacuates the tank pressure in area A, which becomes equal to the pump suction pressure.



### **General Information**

RegO piston type Flomatic Internal Valves are normally closed and use pressure differential to provide completely automatic service. Mounted directly between the tank body and pump, the Flomatic® uses the pressure differential developed by the pump to open the valve and it closes automatically when the differential no longer exists.

This means the RegO Flomatic opens when the pump is on and closes when the pump is shut off – fully automatic.

### 3. Pump On – Valve Open

The force below the pilot stem forces the piston up to open the valve; rotating the INDICATOR SLOT to its vertical (valve open) position. Pump differential pressure in area D holds the PILOT STEM and PISTON open. Approximately 20 psig pump differential pressure is required to open the valve; approximately 8 psig differential pressure will hold the valve open.



### 4. Pump Off - Valve Closes

With the pump shut off, the pressure in area D which holds the valve open, bleeds out through the #60 DRILL ORIFICE. This loss of pressure permits the SPRING to push the PILOT STEM down to reseat at point E. Since pressures are equal above and below the PISTON, with no sustaining pressure in area D, the SPRING forces the valve closed. The INDICATOR SLOT rotates to the horizontal (valve closed) position.



### Introduction

Efficient, profitable transport and delivery truck operations depend on keeping the equipment working safely and efficiently under changing conditions. It is important to know how to eliminate expensive delays by handling unloading problems as they arise.

The purpose of this technical guide is to provide basic information on the Flomatic® valve, along with simple, appropriate steps to follow in the event things go wrong.

The Flomatic® valve is mounted on the bottom of your transport or delivery truck tank, with the pump mounted immediately downstream. When the pump starts to push the liquid down the piping, the Flomatic® Valve opens automatically, allowing you to unload the tank, and closes when the pump stops pushing. It takes at least 20 pounds per square inch of "push" at the pump to open the valve.

Your flanged Flomatic® valve has an indicating shaft on it that shows whether it's open or closed (Figure 1). If the indicating shaft is horizontal, the valve is closed. If it's vertical, the valve is open.

A threaded type, diaphragm-operated Flomatic® valve has an indicating shaft on the bottom, covered by a clear plastic hood. The indicating shaft projects down when the valve is closed and is concealed when the valve is open (Figure 2).

#### Important Facts About Pressure

When handling propane or anhydrous ammonia, storage and transport tank pressures vary from about 20 pounds per square inch or less when it's cold to 200 pounds per square inch or more in hot weather (Figure 3). If you're hauling butane, tank pressures will be 50 pounds per square inch or less.

The transport or delivery truck tank pressure may be higher than the storage tank pressure when you are ready to unload (Figure 4). This is because your rig may have been freshly loaded at the terminal or bulk plant without a vapor equalizing line and hasn't had time to get back to normal. Also, the storage tank pressure tends to drop when a lot of LP-Gas is being used.

#### Troubleshooting on the Job

O.K. So you follow your procedures, hook up your hoses, open the required valves and start your pump. The indicating shaft on the Flomatic® valve moves to the open position and the liquid goes in to storage. Great! You're happy and so is the boss, and so are we.

But, let's say you do these things, start the pump and the liquid doesn't move. Now, how do you find out what is wrong?



Figure 1. Flanged Flomatic Valve







Figure 3. Weather Conditions Affect Pressure



Figure 4. Unloading Conditions Affect Pressure

#### Step 1

Immediately shut down the pump so you don't cause possible damage to the seals or valves. Next:

1. Check all manual valves in the system to make certain they are open or closed as required for proper operation.

2. Check the liquid level in the transport or delivery tank. If the level is low, it may slow the transfer rate.

3. Check to ensure that the pump rotates normally when power is applied. If not, inspect and repair as needed the power takeoff, universal joints, drive shaft and clutch, etc.

4. Make sure the lever is straight out on the 1/4" operating valve in the line between the pump discharge line and the Flomatic® valve (Figure 5). If it isn't, the Flomatic® valve will remain closed.

5. Make certain the priming valve on the side of the Flomatic® valve is open (Figure 6).

6. Ice in the system may prevent proper operation, as will a collapsed or kinked sensing line or a clogged sensing line filter. If you found the trouble within STEP 1, just start the pump and continue unloading, If not, proceed accordingly.

a. New Models with T-handle: To adjust to the proper position, push in the end of the valve stem and tighten the needle valve clockwise until it seats. Then, turn counterclockwise 1-1/2 turns.

b. Old Models with Plug: To adjust to the proper position, carefully remove the plug. A small amount of liquid LP-Gas may be discharged when plug is loosened. Insert a small screwdriver and tighten the needle valve clockwise until it seats. Then turn it counterclockwise 1 turn only. **CAUTION: Do not open needle valve more than 1 turn as it might blow out!** 

c. Threaded Models with Internal Priming Channel. The internal priming channel normally self-actuates. To be sure the system is primed, remove the plastic hood and push the travel indicator up about 1/8" and hold for at least 15 seconds.



Figure 5. Operating Lever Positions

#### Step 2



#### Figure 7a. Unloading Diagram of Transport Trailer Truck

The liquid flows out of the transport tank through the Flomatic® valve, into the pump and through the delivery hose to the storage tank. The vapor line allows vapor to flow from storage back to the transport so that the storage tank pressure won't build up too much and make the pump work harder than necessary.

Figure 6. Priming Procedures

For Transport Trailer Trucks Only (Figure 7a)

1. Check the difference between the pressure in your transport and the storage tank. If there's 15 or 20 pounds per square inch more pressure in the transport tank than in the storage tank, chances are the Flomatic® valve won't open. This is because the pump can't develop enough "push."

If you have a good bypass valve on your rig to send the extra liquid back into the tank, you can merely close the liquid shut-off valve in the discharge line and restart your pump (Figure 8a). Now, the Flomatic® indicating shaft should move to the open position (see Figures 1 and 2).

2. Slowly open the liquid shut-off valve in the discharge line and the liquid will start to move out of the transport. If the Flomatic® valve indicating shaft starts to move toward the closed position once you've opened this liquid shut-off valve all the way, throttle the valve for a while until the transport tank pressure drops to where the Flomatic® valve indicating shaft will stay open. Then, open the liquid shut-off valve all the way until you finish unloading.

3. If your pump system doesn't have a bypass valve, the liquid shut-off valve in the discharge line should be left partially open when you restart the pump. Just be sure that the pump is pushing at least 20 pounds per square inch, so the Flomatic® valve can open.

Don't worry about how much it may slow up your loading speed when you pinch down the liquid shut-off valve to get the Flomatic® valve open. Your pump is running at constant RPM and will move liquid at almost the same rate, even when pushing harder. (It's a lot like using engine braking on a downhill grade, except, in this case, the pump keeps the liquid moving at a constant flow rate.)



**Figure 8a. Unloading Diagram of Transport Trailer Truck with Back-to-tank Bypass Valve** You must have a separate back-to-tank bypass valve if the pump is to be run with the liquid shut-off valve closed.

### For Delivery Trucks Only (Figure 7b)

1. Check the pump bypass piping. If your truck is equipped with a manual bypass valve, close it and try the pump again. (Figure 8b). If the Flomatic® valve indicating shaft moves to the open position, the problem is that the pump can't develop 20 pounds per square inch or more to "push" open the Flomatic® valve with the bypass valve open. You can prevent this in the future by not opening the manual bypass valve too wide.

2. If the delivery truck is not equipped with a manual bypass valve, merely start the pump. Slowly close the shut-off valve between the back-to-tank bypass valve and tank. If the Flomatic® valve indicating shaft moves to the open position as you close the valve, the back-to-tank bypass valve may be stuck open, adjusted too low, or the spring may be broken. CAUTION: Don't close the shut-off valve all the way, because excessive pressures and pump damage may occur.

3. If the Flomatic® valve indicating shaft remains in the closed position, the problem is either in the pump or the Flomatic® valve.



#### Figure 7b. Unloading Diagram of Delivery Truck

The liquid flows out of the truck tank, through the Flomatic® valve and into the pump, where it is then pushed through the meter and delivery hose into the storage tank. The liquid normally enters the vapor space of the storage tank to minimize pressure buildup, so a vapor equalizing line is usually not needed. The back-to-tank bypass valve opens to divert excess pump capacity back to the truck tank, preventing the pump from creating too much pressure.



Figure 8b. Unloading Diagram of Delivery Truck with Manual Bypass Valve

USE EXTREME CARE AT ALL TIMES WHEN WORKING AROUND YOUR VEHICLE! Watch out for drive shafts and moving parts. It is common knowledge that serious injury can result if any part of one's body or clothing is caught in moving machinery.

If you manually open the Flomatic® valve, you are responsible for safely unloading the liquid and closing the valve when you're through. If this procedure is being followed, under no circumstances must the valve be left unattended. The valve must never be permanently held in the open position.

If you are not able to cause the Flomatic® valve indicating shaft to move to the open position after completing the preceding steps, a complete detailed diagnosis will have to be made.

In the meantime, you can actuate the flanged Flomatic® valve by using a special wrench and attempt to unload manually (Figure 9).

If you still can't unload by following the preceding steps, it is suggested that you unload by an alternate method, such as through the valve normally used for liquid filling.

In any event, if you haven't solved the problem and the unit still doesn't operate properly, immediately take it out of service, have a complete analysis made and repair as needed.

Be sure to obtain and keep available for quick referral the Manufacturers' Operation and Service Manuals for the valves, pump, meter and all operating equipment in the system.

