

# TRANSPORT SYSTEM SOLUTION

Franklin Fueling Systems offers a complete line of tank transport systems for applications involving fuel and vapor transfer management solutions. A broad line of adapters, elbows and valves makes connecting to loading terminals and underground storage tanks easy. Preventing overfills at the loading rack is a top priority to any transport, and the optic control overfill protection system (OCS) ensures a safe delivery and compatibility with all existing racks and monitors. FFS has a solution to handle any product drop or vapor recovery situation, including a full line of delivery elbows and bottom loading adapters.



## BOTTOM LOADING

### API Adapters:

Free floating API poppet and 3.5" sight glass maximize terminal and UST fuel transfers.



## DELIVERY ELBOWS

### Dual Point and Coaxial:

The lightweight, robust design of FFS delivery elbows ensures a true connection with minimal strain to the delivery driver.



## OVERFILL PREVENTION

### OCS Electronic Overfill Prevention:

Unparalleled diagnostics confirm transport and terminal overfill integrity before the truck is permitted to load fuel.



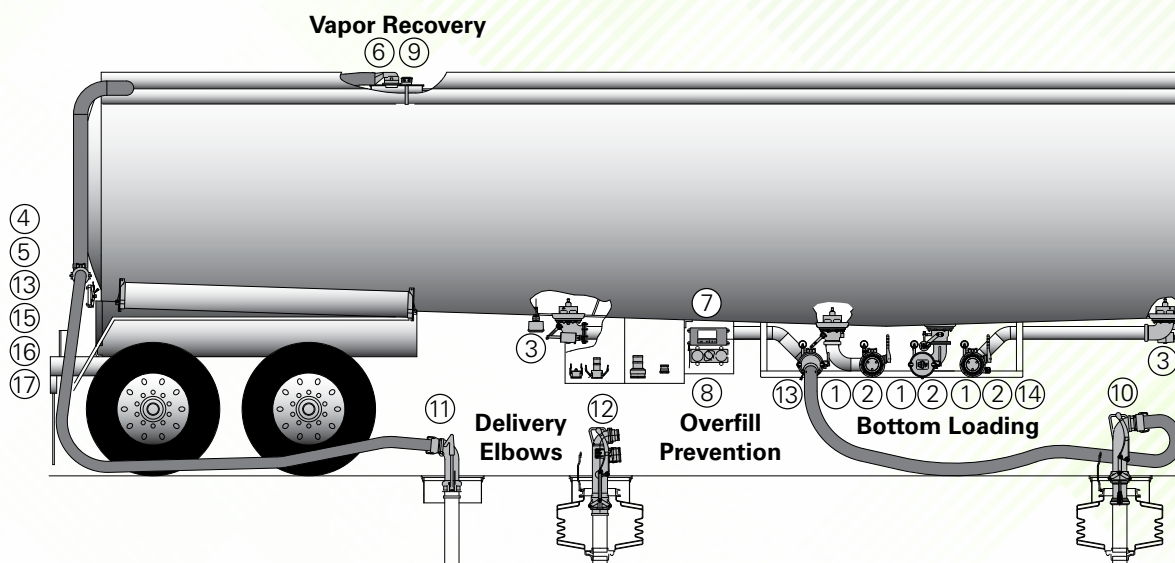
## VAPOR RECOVERY

### Vapor Vent Valves:

FFS vapor vent valves can be serviced in place by removing the head, saving time and money.



# FUEL AND VAPOR TRANSFER SOLUTIONS



## BOTTOM LOADING

No.	Model	Description
1	88050002	API adapter, short stroke three position, no sight glass
1	88050004	API adapter, short stroke three position, 3" bubbled sight glass
1	88050005	API adapter, short stroke three position, 3" bubbled sight glass, no handle
1	88050007	API adapter, short stroke three position, no sight glass, removable handle
2	88033001	Female gravity drop adapter
2	88041101	Male gravity drop adapter
3	88043001	Mechanically-operated 90 degree emergency valve (Victaulic™)
3	88043201	Air assisted 90 degree emergency valve (Victaulic™)

## VAPOR RECOVERY

No.	Model	Description
4	30130001	3" N.P.S.M. vapor recovery adapter with poppet
4	30344404	4" N.P.S.M. vapor recovery adapter, no poppet
5	30230011	Flanged vapor check valve
6	88034301	Air-operated sequential vapor valve

## OVERFILL PREVENTION

No.	Model	Description
7	89040002	2-wire controller
8	90822101	Optic socket
9	89011001	Optic probe, 2-wire, 8"

## PRODUCT DROP ELBOWS

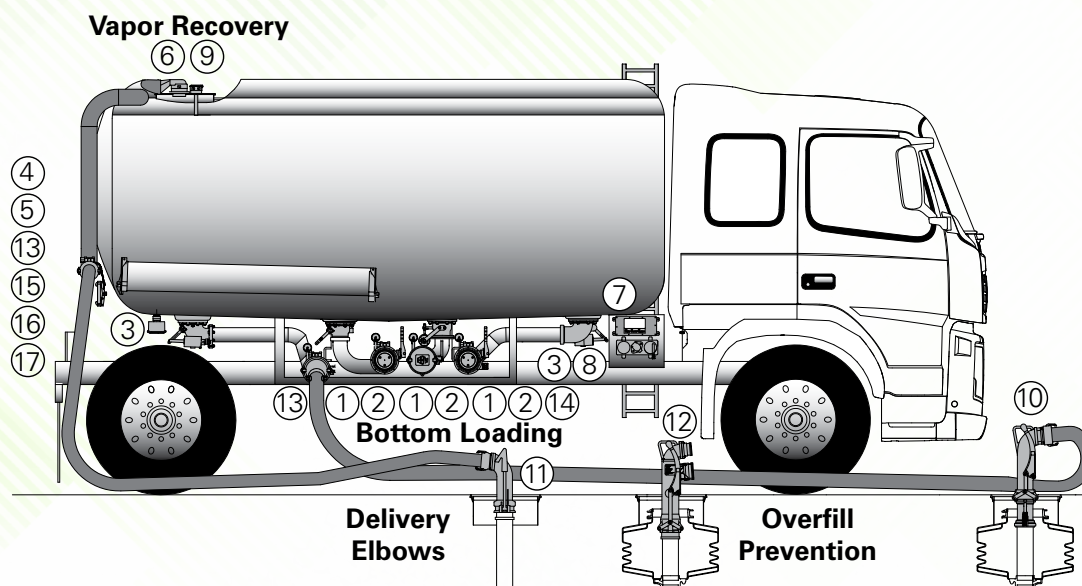
No.	Model	Description
10	88049302	Product drop elbow with cam and groove adapter and sight glass
10	88045501	Product drop elbow with sight glass
11	88046501	Dual point vapor recovery elbow
12	88049001	Coaxial delivery elbow

## ACCESSORIES

No.	Model	Description
13	88015001	Three-way air interlock valve
13	88015002	Three-way air interlock valve with roller top
13	88015003	Three-way air interlock valve with offset actuator
14	88040301	API adapter dust cap
15	30420005	Vapor cap with chain-chevroned gasket
16	77432002	Vapor return hose coupler
17	78430003	Hose tube door



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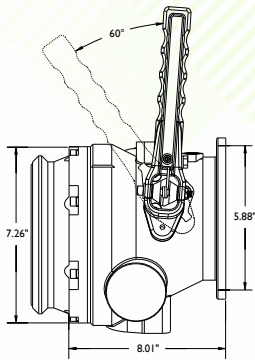
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17	78430003	Hose tube door





Short Stroke, 3.5" Sight Glass  
88050004



88050002

## API BOTTOM-LOADING ADAPTERS

Loading and off-loading fuel from a transport truck is easier than ever with the bottom loading adapters from Franklin Fueling Systems. While loading, the free-floating poppet opens under pressure, allowing the handle to remain in the closed position. This minimizes spillage caused by leaving the handle in the open position when disconnected from the bottom loader. The adapter handle is offered in aluminum or nylon and provides two open positions of flow, allowing the delivery driver to manage the flow rate while off-loading fuel from the truck.

The lightweight, heavy-duty adapter is engineered and tested to meet API RP 1004 specifications. The outer end is made of hard coated aluminum and rotates seven times to maximize the product's life and prevent wear that can be caused by terminal off-loading couplings. The inner wall of the adapter is fully tapered, minimizing product retention inside of the valve when off loading is complete. Each model is compatible with all API dry disconnect couplers and are constructed with a standard TTMA 4" tank truck flange and mounting lugs for FFS air interlock valves. Sight glass options are mounted on the side of the valve to maximize visibility during fuel transfer and are available in 3.5" sizes. Fuel-loading and off-loading management has never been easier, safer or more efficient.

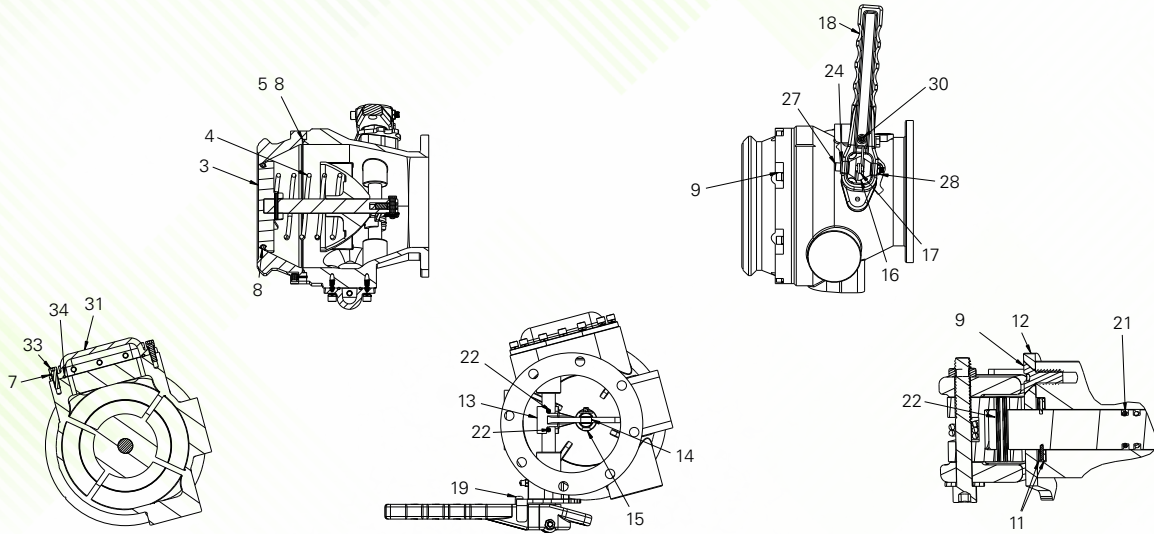
### HIGHLIGHTS

- Long Life**  
 Front API head may be rotated up to seven times to maximize the life of the adapter.  
  
 Enhanced 3.5" sight glass provides greater impact strength and is compatible with biofuels including E85 and Biodiesel.
- Safety**  
 Free-floating poppet is opened by pressure from the terminal adapter probe to minimize spills during loading.
- Speed of Delivery**  
 The cam design utilized to retract the adapter poppet minimizes product flow restriction during off-loading and loading.

Model	Description
88050002	Short stroke, three position, no sight glass
88050004	Short stroke, three position, 3.5" sight glass
88050005	Short stroke, three position, no handle, 3" sight glass
88050007	Short stroke, removable handle, no sight glass
88012001	Dust boot air cylinder
88050701	Replacement poppet kit with handles
88050702	Replacement poppet kit for bottom loaders with handles



# API BOTTOM- LOADING ADAPTER SPARE PARTS



Item	Description	Part Number	880-500 Model
3	Poppet head	88050901	-02, -04, -07
4	Spring, poppet	88012701	-02, -04, -07
5	O-ring	1103938	-02, -04, -07
11	Washer, flat, 5/8" ID	88019101	-02, -04, -07
12	Latch dual	88050601	-02, -04, -07
13	Cam, loading arm	88021501	-02, -04, -07
14	Roller, cam	88019001	-02, -04, -07
15	Pin, roller cam	88018901	-02, -04, -07
16	Hex, permanent handle	88019801	-02, -04
17	Spring, handle	88010201	-02, -04
18	Handle, dual latching	88050501	-02, -04
	Handle, dual latching (Canada)	88050503	-07
19	Pin, latch	88019201	-02, -04, -07
21	O-ring, cross shaft	1103912	-02, -04, -07
22	Pin, 3/16", spiral	1108604	-02, -04, -07
27	Cap screw, socket head 1/4-20 x 2"	1117016	-02, -04
28	Locknut, 1/4-20	1104105	-02, -04
30	Cap screw, socket head, 10-24 x 5/8"	1103010	-02, -04, -07
31	Sight glass, 3.5" bubble	88051201	-04
33	Cap screw, socket head, 1/4-20 x 3/4"	1117017	-04
	O-ring, sight glass, 3.5" bubble	1103937	-04
	Replacement anodized adapter face	88050101AN	-02, -04, -05, -07





88040301

## DUST CAP

This lightweight API dust cap shields valuable bottom-loading valves from destructive outside elements. The cap easily couples on all EBW API bottom-loading adapters using a reliable Buna-N gasket. The corrosion-resistant cap comes with forged brass cam arms and a heavy-duty attachment chain. This dust cap also meets API RP 1004 specifications.

Model Unit	88040301	88020601
Description	Dust Cap	Gasket
Inches	4.00	4.00
Millimeters	101.6	101.6
Pounds	3.06	—
Kilograms	1.39	—

Part Number	Description
88040301	API bottom-loading adapter dust cap
88020601	API bottom-loading adapter gasket

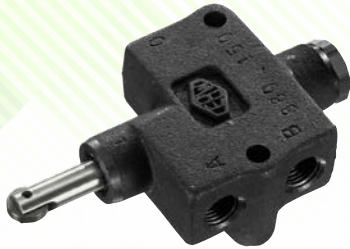
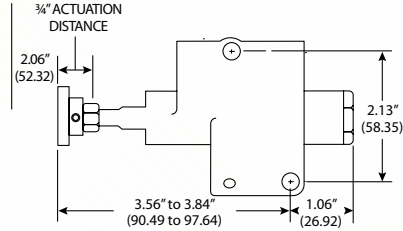


# THREE-WAY AIR VALVES

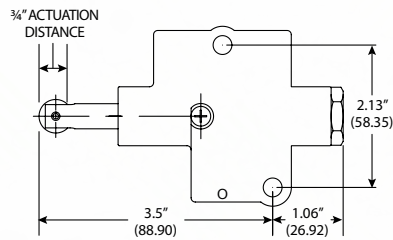
Play it safe with this lightweight valve that locks up the brakes on the trailer, preventing it from leaving the loading rack while connected to the loading arm. This three-way air valve can be used normally open or normally closed, has an adjustable stem, and comes with standardized TTMA and API mounting holes. The anodized aluminum valve is used on all API bottom-loading adapters and all vapor check valves.



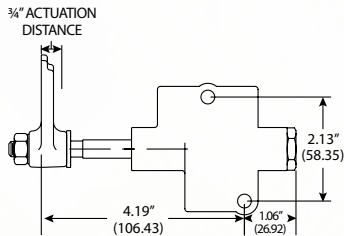
88015001



88015002



88015003



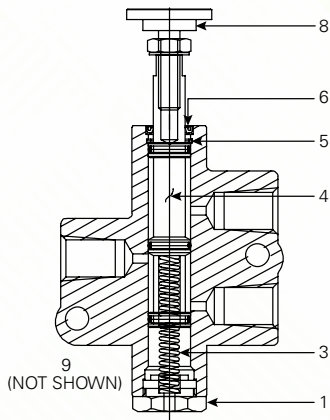
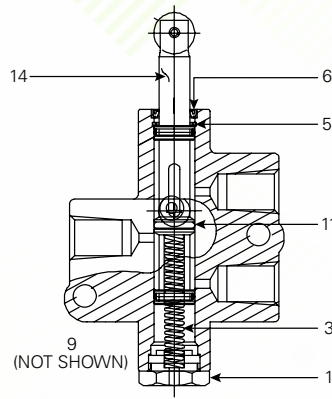
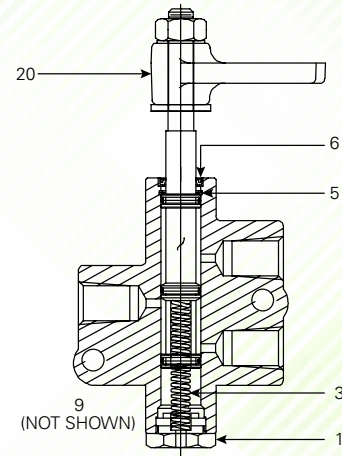
## HIGHLIGHTS

- Heat-treated, anodized aluminum construction.
- 1/4" NPT connection ports.
- Field serviceable.
- Adjustable stem button.

Model Unit	88015001	88015002	88015003
Width (Inches/Millimeters)	3.00/76.2	3.00/76.2	3.00/76.2
Length (Inches/Millimeters)	4.25/107.96	4.25/107.96	4.25/107.95
Pounds	0.69	0.69	0.69
Kilograms	0.31	0.31	0.31



# THREE-WAY AIR INTERLOCK VALVES PARTS LIST

**-01 MODEL****-02 MODEL****-03 MODEL**

#	Part Name	Qty. Req.			Part Number
		-01	-02	-03	
1	Plug - nut	1	1	1	88014501
3	Spring	1	1	1	88014801
4	Spool and O-ring assembly	1	0	1	88017101
5	Retaining ring	1	1	1	1109004
6	Dust Seal	1	1	1	88014201
8	Screw adjuster 1.0"	1	0	0	88014401
9	Screw ¼-20 × 1.75" Hex head	2	2	2	1106307
14	Spool and O-ring assembly, roller tip	0	1	0	88017102

Part Number	Description
88011301	Screw adjuster assembly 1.5" button
88015001	Three-way air interlock valve
88015002	Three-way air interlock valve, roller tip
88015003	Three-way air interlock valve, offset actuator

#	Part Name	Qty. Req.			Part Number
		-01	-02	-03	
20	Actuator - offset	0	0	1	88112001
	88015001 Service kit*	1	0	0	90012
	88015002 Service kit**	0	1	0	90055
	88015003 Service kit***	0	0	1	90056

\*Note: Service Kit includes: (1) #3, (1) #4, (1) #5, (1) #6, (1) #7, (1) #8, (1) #12

\*\*Note: Service Kit includes: (1) #3, (1) #5, (1) #6, (1) #14, (1) #15, (1) #16, (1) #17

\*\*\*Note: Service Kit includes: (1) #3, (1) #5, (1) #6, (1) #18, (1) #19, (1) #20, (1) #21, (1) #22

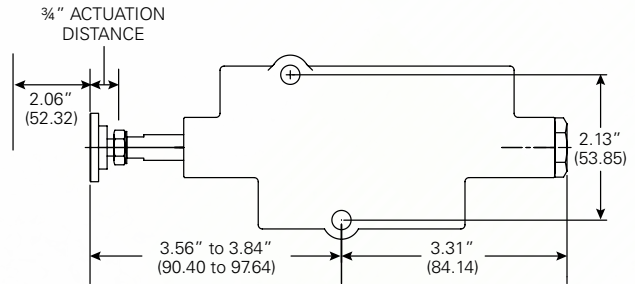


# SIX-WAY AIR VALVES

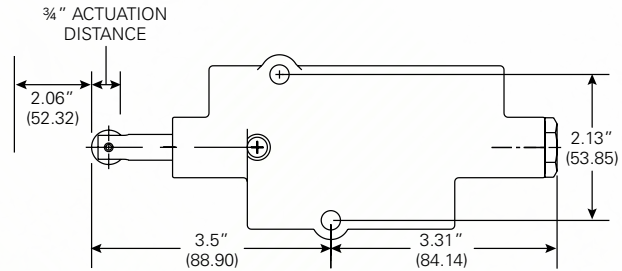
These air interlock valves were designed to operate two different air systems at the same time. The lightweight valves are designed to lock the trailer brakes and open the air-operated vapor valve at the same time. These six-way air valves can be used in the normally open (N/O) and normally closed (N/C) configurations of N/O, N/C, or N/O, N/O, or N/C, N/C positions. They have an adjustable stem and come standard with TTMA and API mounting holes.



88025601



88025602



## HIGHLIGHTS

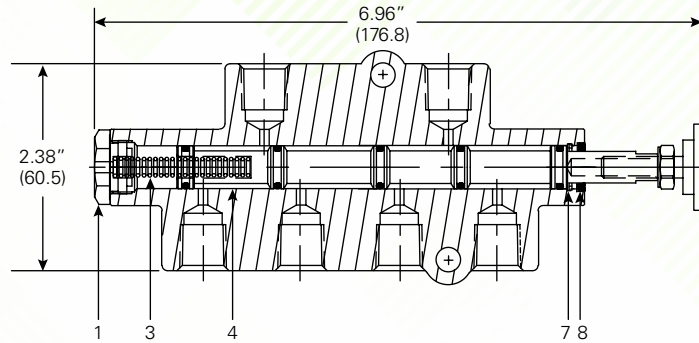
- Heat-treated, anodized aluminum construction.
- 1/4" NPT connection ports.
- Field serviceable.
- Adjustable stem button.

Model Unit	88025601	88025602	88025603
Width (Inches/Millimeters)	3.00/76.2	3.00/76.2	3.00/76.2
Pounds	0.69	0.69	0.69
Kilograms	0.31	0.31	0.31



# SIX-WAY AIR INTERLOCK VALVES

## PARTS LIST

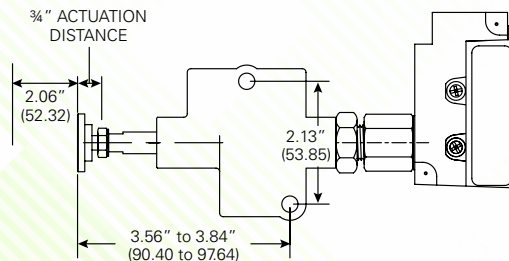


#	Part Name	Part Number	Part Number	Description
1	Plug - nut	88014501	88025601	¼" - 1" Button six-way air valve
3	Spring	88014801	88025602	¼" - 1" Roller tip six-way air Valve
4	Spool and O-ring assembly	88025801	88025603	¼" - 1" Duckfoot six-Way air Valve
7	Retaining ring	1109004	90020	Service kit for 880-256-01
8	Dust seal	88014201	90059	Service kit for 880-256-02





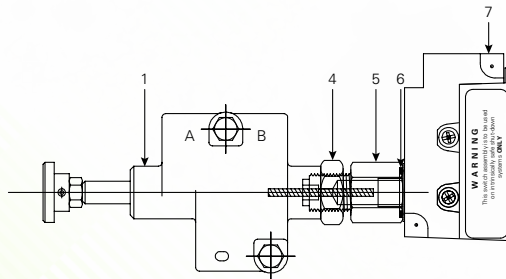
88015501



## AIR INTERLOCK WITH LIMIT SWITCH

Ensure proper vapor recovery every time by using the air interlock with limit switch. With the limit switch, bottom-loading cannot begin until a vapor recovery hose is connected to the vapor check valve. The switch does its job by breaking a connection in the secondary over-fill prevention system, thus preventing the rack monitor from giving a green light to the transport. Once a vapor line is connected, loading can begin. The coupler first depresses the plunger button of the interlock, which then locks the trailer brake system and completes the connection to the rack monitor. The vapor hose must be disconnected before the brakes will release, allowing the truck to be driven away.

Model Unit	88015501	88015502
Pounds	1.25	1.25
Kilograms	0.57	0.57



## AIR INTERLOCK WITH LIMIT SWITCH PARTS LIST

#	Part Name	Part Number
1	Air valve assembly	88115601
4	*Nut - Hex jam	1102104
5	*Adapter - valve to switch	88115501
6	O-ring	1100325
7	Limit switch	1121902
	Service kit for 880-155-01	90012

Part Number	Description
88015501	1/4" - 1" Button with limit switch
88015502	1/4" - 1" Roller Tip with limit switch

\* Note: These items are components of Air Valve Assembly 881-156-01





88033001

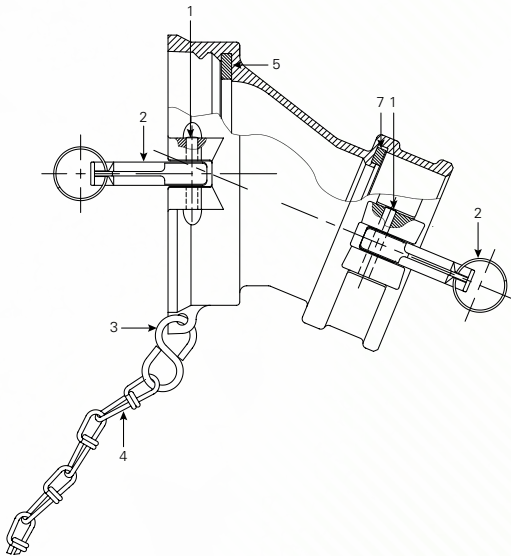
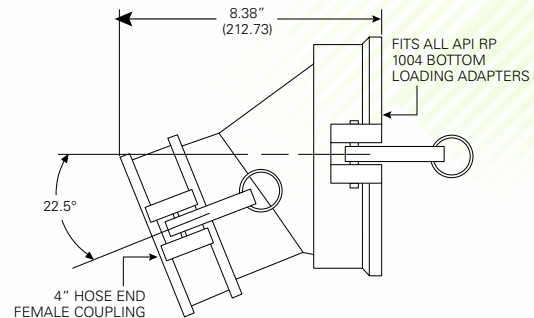
## FEMALE GRAVITY DROP ADAPTER

Let gravity do all the work with these high strength, corrosion-resistant adapters. A 22.5 degree angle makes service station drops a breeze with easy hose coupling and fast, unrestricted off-loading. Engineered to mate with API RP 1004 bottom-loading adapters, each adapter comes with a heavy-duty attachment chain and uses a large, resilient gasket that guarantees minimum product loss. The lightweight adapters are available in 3" male NPT or male cam and groove; 4" male NPT, male cam and groove or female cam and groove.

### HIGHLIGHTS

- Heat-treated, anodized alloy body.
- Buna-N gaskets.
- Forged bronze cams and stainless steel pins.
- Meets API RP 1004 specifications.

Model Unit	88033001
Size (inches/millimeters)	4.00/101.6
Weight (pounds/kilograms)	6.06/2.75



## FEMALE GRAVITY DROP ADAPTER PARTS LIST

#	Part Name	Part Number
1	Groove pin	1112507
2	Cam arm and ring assembly	77411603
3	S-Hook	1111001
4	Double loop chain	88011502
5	Gasket	88020601
7	Gasket	77420204

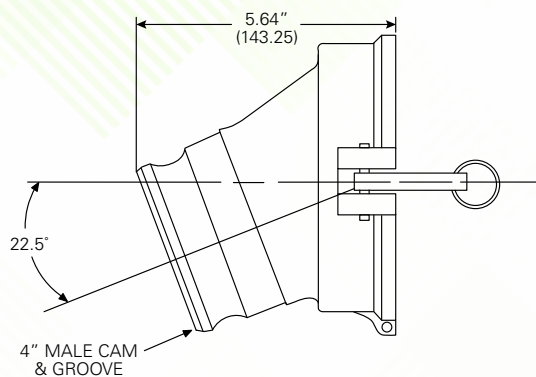
Part Number	Description
88033001	Female gravity drop adapter
88020601	Gasket - API end
77420204	Gasket - hose end



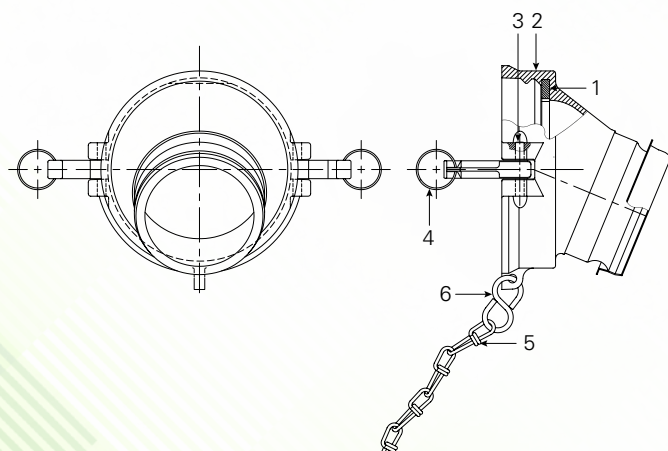
# MALE GRAVITY DROP ADAPTER



88041101



Model Unit	88041001	88041101
Size (inches/millimeters)	3.00/76.2	4.00/101.6
Weight (pounds/kilograms)	4.00/1.81	5.00/2.27



## MALE GRAVITY DROP ADAPTER PART LIST

#	Part Name	Part Number
1	Rubber gasket	88020601
2	4" Drop adapter - body only	88041201
3	Groove pin	1112507
4	Cam arm and pull ring assembly	77411603
5	Double loop chain	88011502
6	S-Hook	1111001

Part Number	Description
88041001	3" Male cam and groove
88041101	4" Male cam and groove
88020601	Gasket - API end

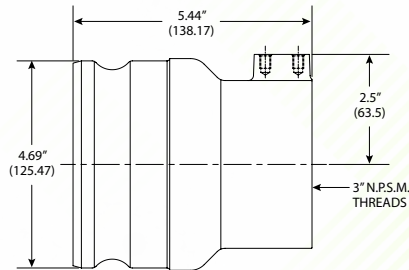


# THREADED VAPOR CHECK VALVE

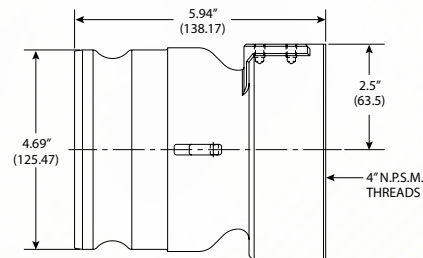
Use this vapor check valve to return vapor to the truck during terminal loading and service station drops. The 3" poppet opens when coupled and closes when disconnected, preventing the vapors from escaping into the atmosphere. The valve has 3" or 4" female NPSM threads, a 4" cam and groove, and tapped mounting holes for the EBW air interlock brake. The 303 Sseries is available without a poppet to serve as a male quick coupler with an air interlock valve mounting pad.



30130001



30344404



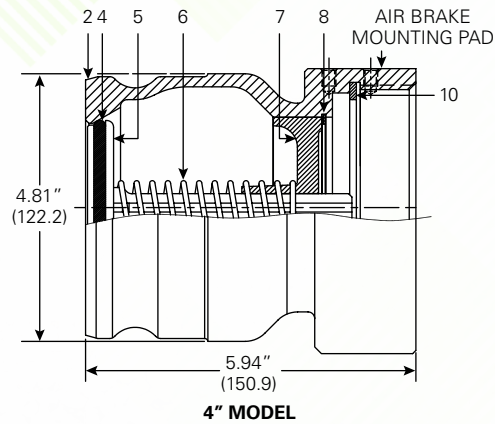
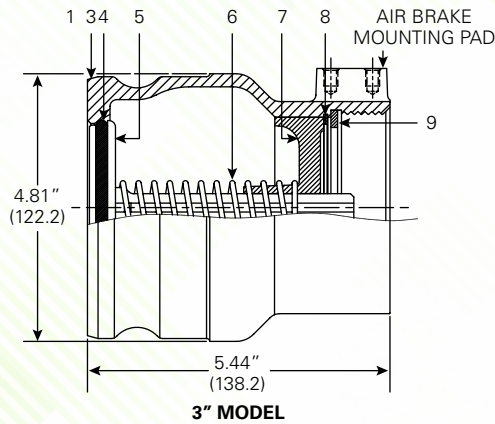
## HIGHLIGHTS

- Anodized aluminum construction.
- Stainless steel stem and spring.
- Buna-N gasket.
- Aluminum guide.

Model Unit	30130001	30130002	30130003	30333303	30344404
Poppet	Yes	Yes	Yes	No	No
Thread size	3.00-NPSM	4.00-NPSM	3.00-BSP	3.00-NPSM	4.00-NPSM
Weight (lbs/kg)	4.50/2.04	4.81/2.18	2.55/1.16	3.81/1.73	4.31/1.96



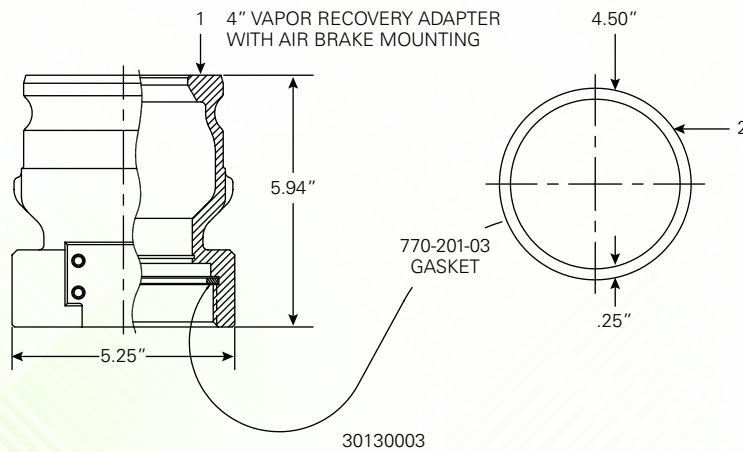
# THREADED VAPOR CHECK VALVE PARTS LIST



30130001/30130002

#	Part Name	Part Number
1	Vapor recovery adapter - 3" N.P.S.M.	30030502
2	Vapor recovery adapter - 4" N.P.S.M.	30030202
3	Vapor recovery adapter - 3" B.S.P.P.	30030532
4	O-ring	1103915
5	Poppet	30020301

#	Part Name	Part Number
6	Spring - poppet	30010501
7	Guide - poppet stem	30020501
8	Retaining ring	1109002
9	3" Gasket cover	77020102
10	4" Gasket cover	77020103



Part Name	Part Number
3" N.P.S.M. vapor recovery adapter, with poppet	30130001
3" BSPP vapor recovery adapter, with poppet	30130003
4" N.P.S.M. vapor recovery adapter, with poppet	30130002
3" N.P.S.M. vapor recovery adapter, no poppet	30333303
4" N.P.S.M. vapor recovery adapter, no poppet	30344404

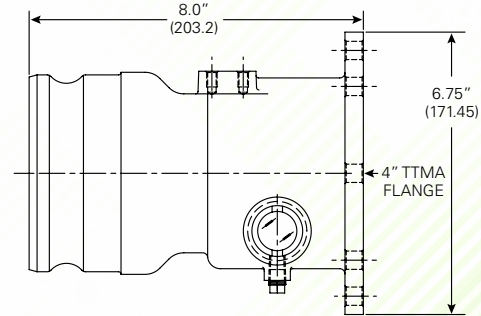


# FLANGED VAPOR CHECK VALVE

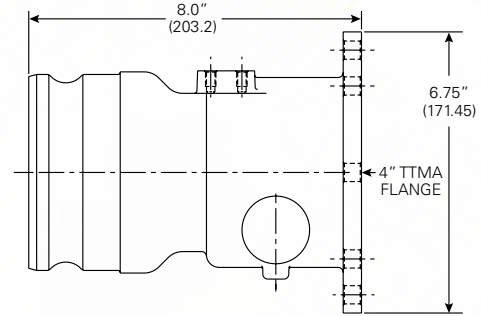
The sight glasses featured on this vapor recovery fitting can help detect liquid accumulation in the vapor manifold of a transport. A drain plug lets any extra fuel drain out, and the poppet prevents vapors from escaping when disconnected from the hose. A low pressure drop makes flow rates faster and vapor recovery safer. The adapter is constructed with a standard 4" TTMA flange, a 4" cam and groove, and a mounting pad for the air interlock valve.



30230011



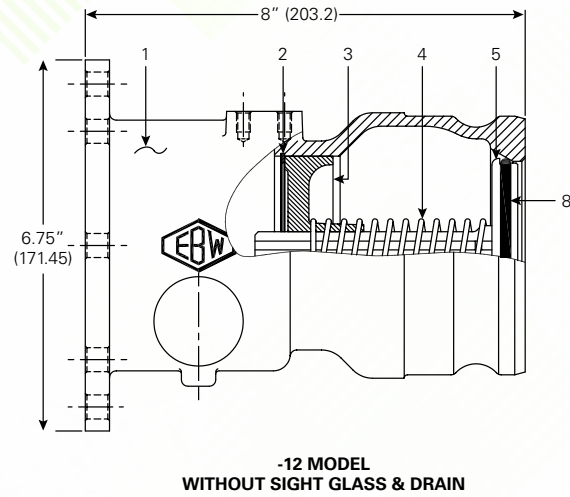
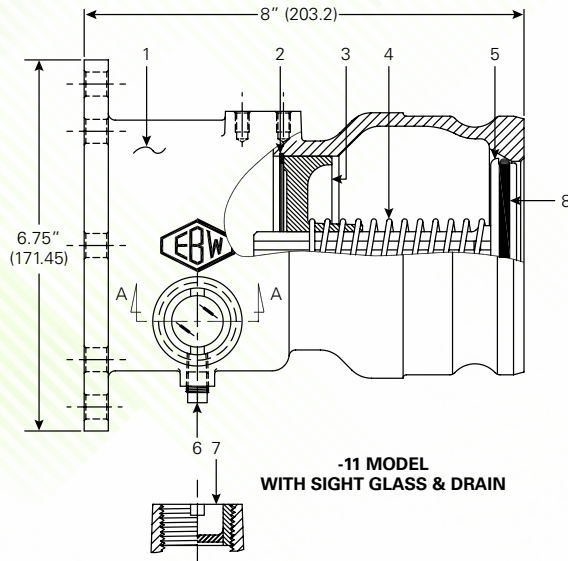
30230012



Model Unit	30230011	30230012
Size (inches/millimeters)	4.00/101.6	4.00/101.6
Weight (pounds/kilograms)	6.00/2.72	6.00/2.72



# FLANGED VAPOR CHECK VALVE PARTS LIST



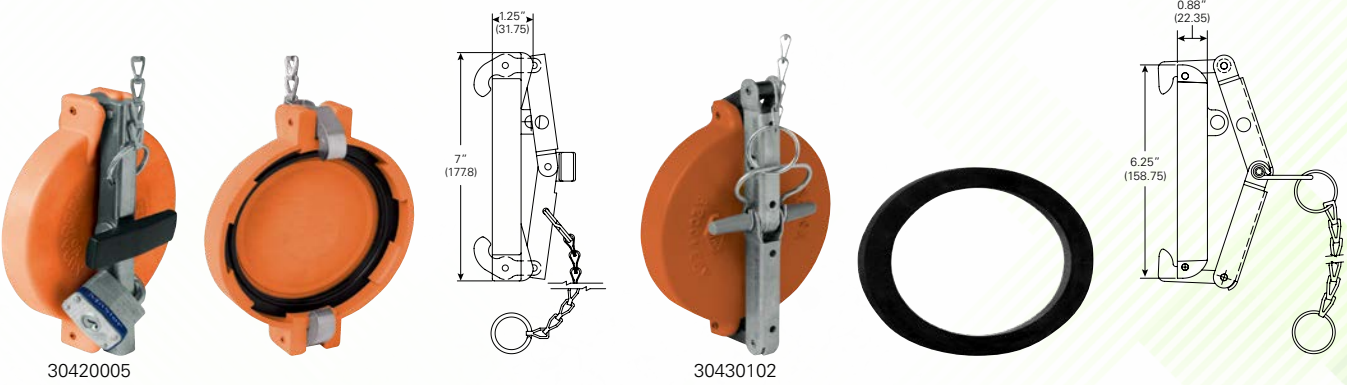
#	Part Name	Part Number
2	Retaining ring	1109002
3	Poppet stem guide	30020501
4	Poppet spring	30010501
5	4" Poppet vapor recovery adapter	30020301
6	Pipe Plug	1101002
7	Sight glass	1121504
8	O-ring	1103915

Part Number	Description
30230011	Flanged vapor check valve with sight glass
30230012	Flanged vapor check valve without sight glass



# VAPOR CAPS

These lockable vapor caps act like dust covers, but won't activate the air interlock valve when used on vapor check valves and adapters. Iron-copper infiltrated cams create a solid push-down-and-pull-up movement for quick, easy removal and replacement; steel latches hold the caps secure. Orange in color to indicate vapor recovery, the caps can be used with any 4" male cam and groove. Caps also available with finger ring and chains.



## HIGHLIGHTS

- Meets API RP 1004 standard.
- Aluminum- or glass-filled nylon construction.
- Iron-copper infiltrated cams and steel latches.
- Lockable.

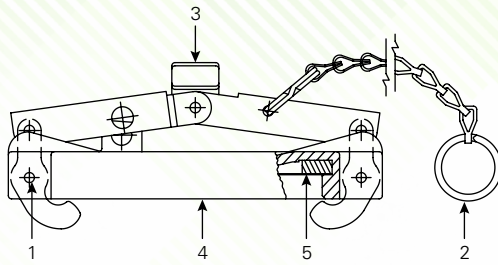
Model Unit	30420001	30420002	30420004
Size (inches/millimeters)	4.00/101.6	4.00/101.6	4.00/101.6
Weight (pounds/kilograms)	1.19/54	1.19/54	1.19/54
Gasket No.	77711101	77711102	30410501

Model Unit	30420005	30430101	30430102
Size (inches/millimeters)	4.00/101.6	4.00/101.6	4.00/101.6
Weight (pounds/kilograms)	1.19/54	1.19/54	1.19/54
Gasket No.	30410501	77711004	77711004

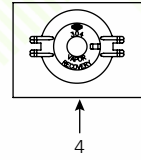




# VAPOR CAPS PARTS LIST



30420001/30420002/30420004/30420005



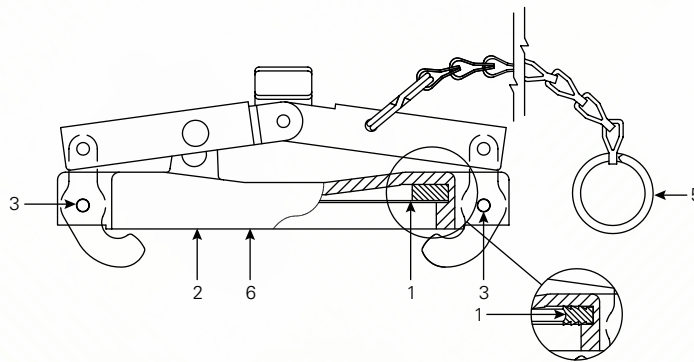
**MODEL -04 & -05 ONLY**  
CHEVRONS THIS SIDE



0.06 R. THIS SIDE

#	Part Name	Part Number
1	Spiral pin	1102409
3	Handle assembly	30411201

#	Part Name	Part Number
4	Vapor recovery cover	30430501



30430102

#	Part Name	Part Number
1	Gasket	95021501
2	Aluminum body cover	30430601

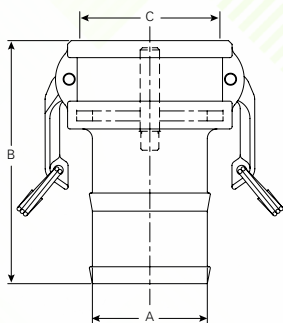
#	Part Name	Part Number
3	Spiral pin	1102403
4	Cover assembly	30430101

Part Number	Description
304-200-01	Nylon vapor cap without chain
304-200-02	Nylon vapor cap with chain
304-200-04	Nylon vapor cap without chain-chevrons gasket
304-200-05	Nylon vapor cap with chain-chevrons gasket
304-301-01	Aluminum vapor cap without chain
304-301-02	Aluminum vapor cap with chain





774-320-02



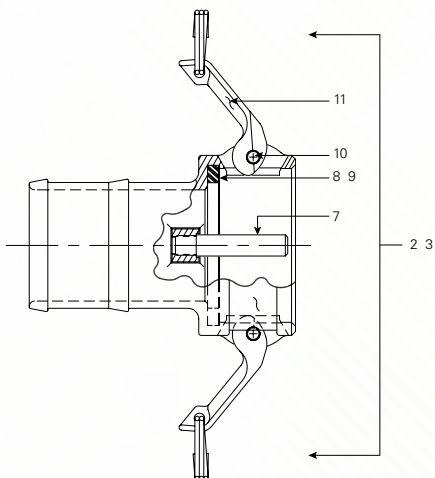
## VAPOR RETURN HOSE COUPLERS

Fast, safe vapor recovery is easy with probed hose couplers. Hose shank end bands to a vapor recovery hose and the probe automatically opens the poppet of the vapor check valve when coupled. The coupler comes in three sizes for use with most vapor check valves and hose configurations. The poppetted vapor return hose coupler design prevents vapor from escaping when disconnected. The probe automatically opens the vapor check valve when connected properly. The design also offers low restrictive vapor passage. The body and probe are made of heat-treated anodized aluminum with forged bronze cams and stainless steel pins, and the poppet has a replaceable fluorocarbon seal.

### HIGHLIGHTS

- Meets API RP 1004 standard.
- Heat-treated, aluminum alloy body and brass probe.
- Forged bronze cams and stainless steel pins.
- Used with probe for opening vapor check valve.

Model Unit	77432002	77432003
Dim. A (inches/millimeters)	3.00/76.2	4.00/101.6
Dim. B (inches/millimeters)	6.62/168.15	6.62/168.15
Dim. C (inches/millimeters)	4.75/120.65	4.75/120.65
Weight (pounds/kilograms)	3.00/1.36	3.38/1.53



## VAPOR RETURN HOSE COUPLERS PARTS LIST

#	Part Name	Part Number
2	774-CV 4" x 3" assembly	77432002
3	774-CV 4" x 4" assembly	77432003
7	Probe	77411201
8	3" gasket	77420203
9	4" gasket	77420204
10	Groove pin	1112507
11	Cam and ring assembly	77411603



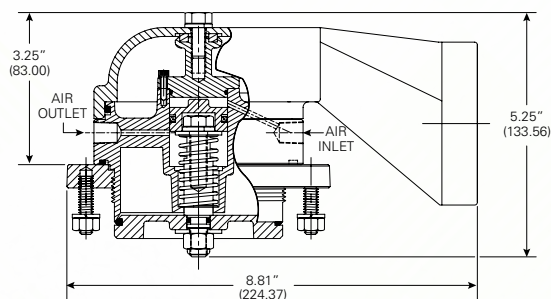


# AIR-OPERATED SEQUENTIAL VAPOR VALVES

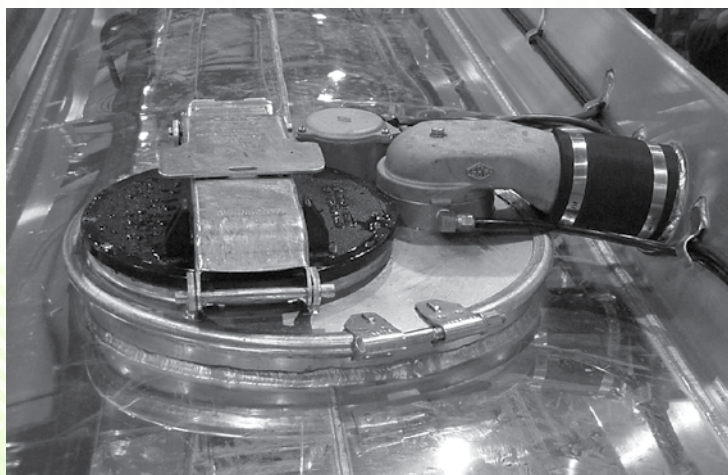
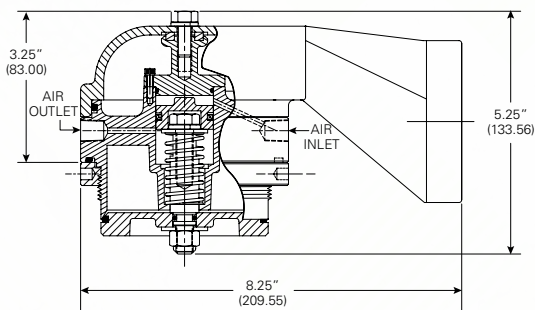
Handle fuel vapors safely and efficiently with this lightweight aluminum vapor valve. The air-operated valve allows fast vapor flow during loading and unloading. The poppet is designed to open into the tank, preventing accidental leakage from product surges or from a tank truck rollover. Easy-to-use air line connections are located outside the compartment for convenient installation and maintenance. The 3.5" vapor valve comes with male NPT threads or a TTMA flange for installation in conventional 16" or 20" manholes.



88034301



88034501

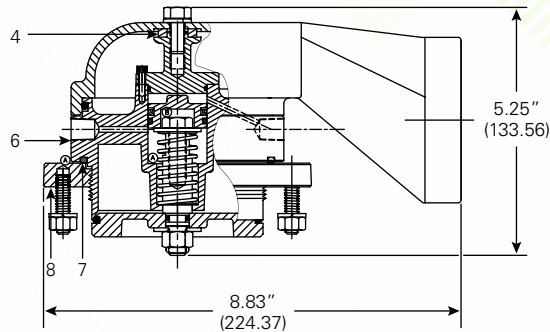


## HIGHLIGHTS

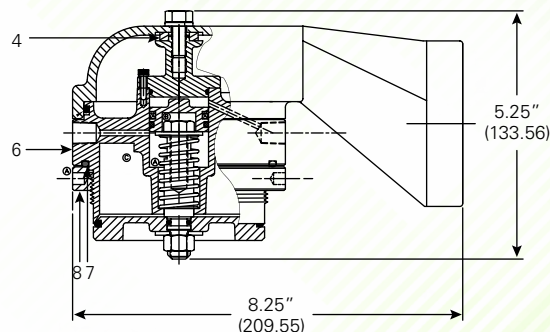
- Lightweight aluminum body and hood.
- Fluorocarbon seal.
- TTMA specifications.



# AIR-OPERATED SEQUENTIAL VAPOR VALVE PARTS LIST



88034301



88034501

#	Part Name	Part Number
4	Square cut seal ring	1103403
6	Sequential vapor valve body assembly	88034401
7	O-ring	1100326
8	Mounting assembly flange	88026701

Part Number	Description
88034101	Flanged without hood
88034201	Threaded without hood
88034301	Flanged with hood
88034401	Vent valve only
88034501	Threaded with hood







784-300-03

## HOSE TUBE DOORS

Total protection from the elements is what you get with the heavy-duty hose tube door. Beyond durable, this door withstands rusting, rugged use, and continuous road wear. The cap closes securely and can be used with a padlock for theft protection.

### HIGHLIGHTS

- Cast aluminum frame and cap.
- Spring steel, chrome, and plated hardware.
- Nylon bushing.
- Name embossed upon request.

Model Unit	78430003	78440003
Style	Plain	Plain
Size (inches/millimeters)	6.00/152.4	8.00/203.2
Weight (pounds/kilograms)	3.00/1.36	4.00/1.81

Part Number	Description
78430003	6" plain door
78440003	8" plain door

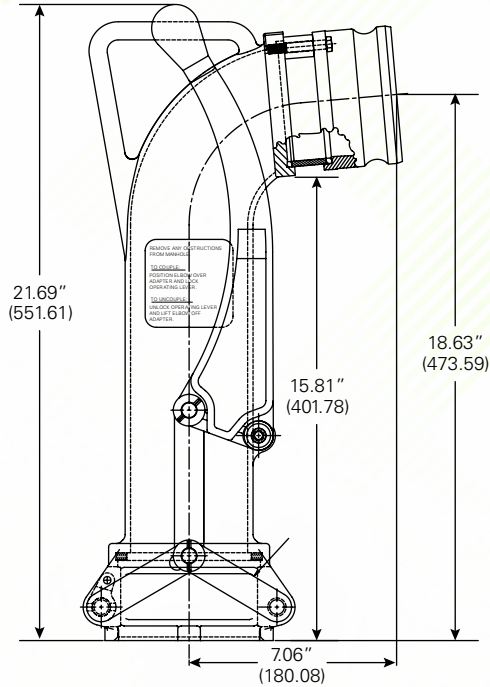


# PRODUCT DROP ELBOWS

This durable 22" tall product elbow was designed for those deep tank burial applications and has a high flow rate as a result of the unrestricted flow pattern. It fits all 4-inch top seal adapters and can also be ordered with a variety of different adapters to meet any requirement. The single four bolt flange design allows for easy replacement of adapters over competitive threaded styles and is designed for extremely easy on- and off-coupling as a result of aluminum bronze alloy docking.



88049302



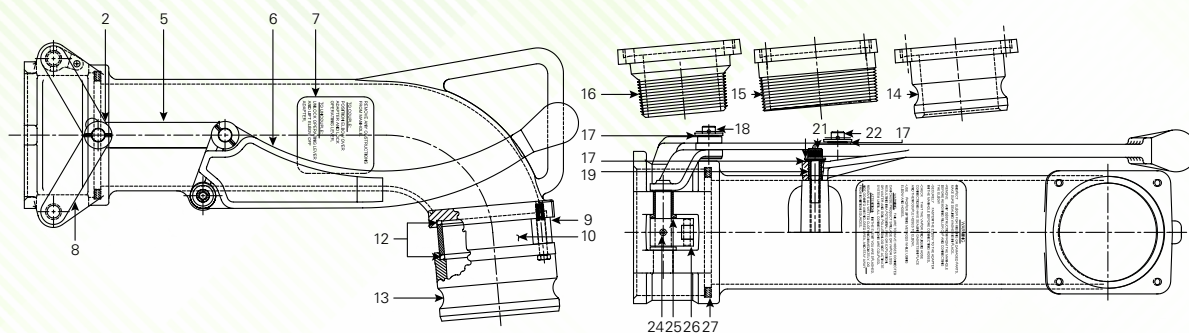
## HIGHLIGHTS

- Lightweight cast aluminum.
- Four bolt flange pattern fits all 4" seal adapters.
- Protective base shield.
- Unique cam locking handle for easy on/off coupling.
- 22" tall for deep tank burial applications.

Model Unit	88049301	88049302	88049303	88049304	88049305
Weight (pounds/kilograms)	12.3/5.58	13/5.9	14.5/6.59	14.5-6.59	14.5/6.59
Size (inches/millimeters)	—	4.00/101.6	3.00/76.2	4.00/101.6	3.00/76.2



# PRODUCT DROP ELBOW PARTS LIST



#	Part Name	Part Number
2	Rear arm assembly	88013601
5	Connecting link	88013901
6	Operating handle	88048201
7	Operational instruction	
8	Front arm assembly	88013501
9	Sight tube spacer	88015101
10	Sight tube	88016201
12	Sight glass seal	88014001
13	4" Dia. coupling adapter	88028401
14	3" Cam and groove adapter	88039601

Part Number	Description
88049301	Product elbow dual point - no adapter
88049302	4" Cam and groove adapter with sight glass 21" tall
88049303	3" Cam and groove adapter with sight glass
88049304	4" NPT adapter with sight glass
88049305	3" NPT adapter with sight glass

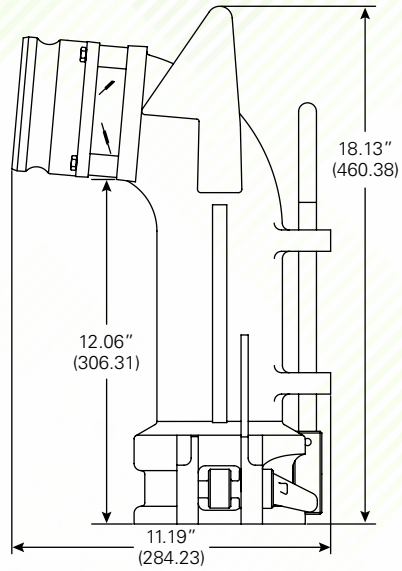
#	Part Name	Part Number
15	4" NPT adapter	88028901
16	3" NPT adapter	88039701
17	Wave spring	1119001
18	Connecting pin	88013801
19	Shoulder spacer	88014901
21	Screw - 3/8-16 x 1.5" Hex socket	1119601
22	Connecting pin	88013802
24	High alloy groove pin	1118801
25	Flanged bushing	1118601
26	Cam assembly insert	88012101
27	Seal	88014101



# PRODUCT DROP ELBOWS



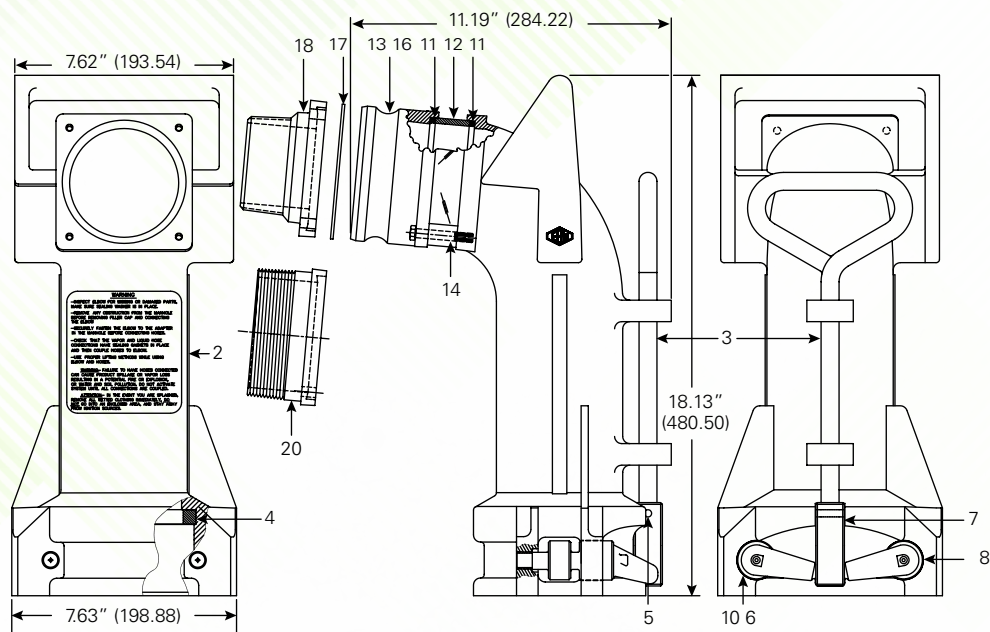
88045501



Model Unit	88045001	88045501	88045502	88045504	88045505
Weight (pounds/kilograms)	13.75/6.24	16/7.26	18/8.18	18/8.18	18/8.18
Size (inches/millimeters)	—	4.00/101.6	3.00/76.2	3.00/76.2	4.00/101.6



# PRODUCT DROP ELBOW PARTS LIST



#	Part Name	Part Number
2	Product elbow body	88045901
3	Product elbow handle	88023701
4	Product elbow seal	1130801
5	Pin spiral	1108605
6	Locking "right" cam	88031001
7	Handle block	88023801
8	Locking "left" cam	88031002

#	Part Name	Part Number
11	Sight tube seal	88014001
12	Sight tube	88016201
13	4" Cam and groove adapter	88028401
14	Sight tube spacer	88015101
16	3" Cam and groove adapter	88039601
17	Adapter flange gasket	88024701
18	3" NPT adapter	88039701

Part Number	Description
88045001	Body only
88045501	4" Male cam and groove with S.G.
88045502	3" Male cam and groove with S.G.
88045504	3" Male NPT with S.G.
88045505	4" Male NPT with S.G.

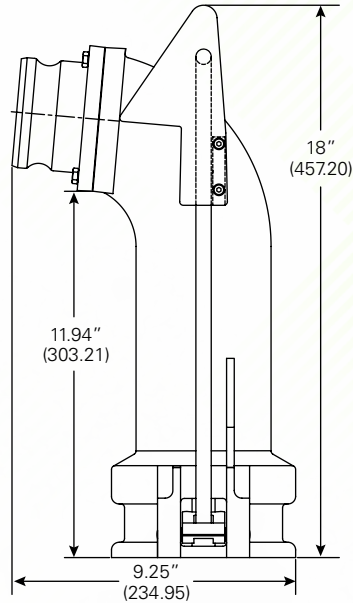


# DUAL POINT VAPOR RECOVERY ELBOW

This durable cast aluminum elbow ensures complete vapor recovery for dual point systems and can be ordered with a variety of different adapters to meet any requirement. The simple four bolt flange design allows for easy replacement of adapters over competitive threaded styles. Its low profile design allows for convenient storage and the specially designed quick grip one hand operation handle allows for easy on and off attachments.



88046501



## HIGHLIGHTS

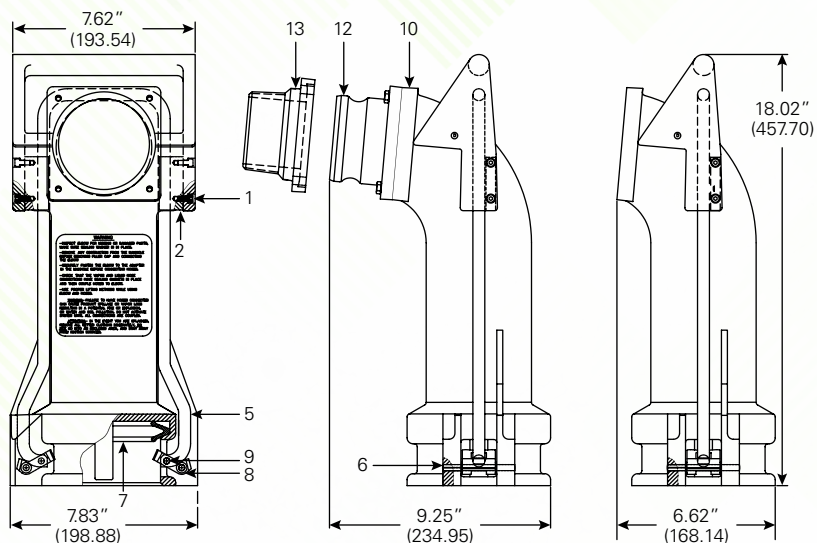
- Cast aluminum.
- Compact, low profile design.
- Four bolt flange pattern.
- Protective base shield.

Model Unit	880460	88046501	88046502
Size (inches/millimeters)	—	3/76.2	3/76.2
Weight (pounds/kilograms)	11/4.99	12.38/5.62	12.38/5.62





# DUAL POINT VAPOR RECOVERY ELBOW PARTS LIST



#	Part Name	Part Number
1	#10 - 24 x 1/2" socket head cap screw	1117012
2	Handle retainer block	88024601
5	Vapor elbow locking bar	88039101
6	Grooved (straight) pin	1112607
7	Elbow seal	87020001

#	Part Name	Part Number
8	Locking cam	88024501
9	Grooved (straight) pin	1112601
10	Adapter flange gasket	88024701
12	3" Coupling adapter	88039601
13	3" NPT adapter	88039701

Part Number	Description
88046001	Body only
88046501	3" Male cam and groove adapter
88046502	3" Male NPT adapter

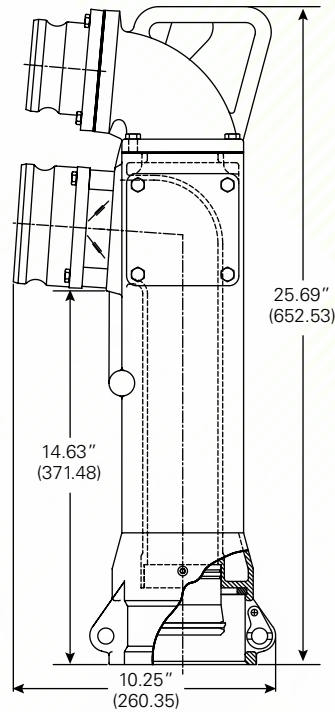


# COAXIAL DELIVERY ELBOW

This longer Coaxial Delivery Elbow is designed to accommodate the needs of the tank truck industry. The longer elbow is made of durable lightweight cast aluminum. The elbow connects to the product line and vapor recovery line at the same time, allowing for single point drop and vapor recovery. This elbow meets Stage I and II vapor recovery standards.



88049001



## HIGHLIGHTS

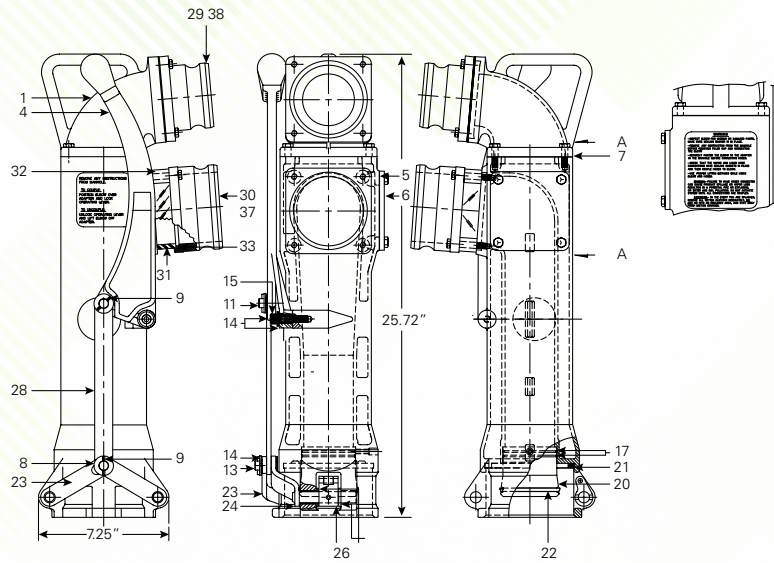
- Cast aluminum.
- 4" product line inlet (male cam and groove adapter).
- 3" vapor line outlet (male cam and groove adapter).
- Unique cam locking handle for easy on/off coupling.
- Accommodates all coaxial drop tube adapters.
- Four bolt flange pattern vs. threaded.

Model Unit	88049001	88049003
Size (inches)	4 × 3	4 × 3
Weight (pounds/kilograms)	22.0/9.98	22.0/9.98





# COAXIAL DELIVERY ELBOW PARTS LIST



#	Part Name	Part Number
1	Flanged, coaxial elbow	88038001
4	Operating handle	88048201
5	Gasket	88028101
6	Vapor outlet block off plate	88022901
7	Top gasket	88028201
9	Rollpin - 1/8" x 1"	1100403
11	Connecting pin	88013802
13	Connecting pin	88013801
14	Wave spring	1119001
15	Screw - 3/8", 16 x 1/2" Hex socket	1119601
17	O-ring seal	88014701
20	Fuel connection adapter	88028501

#	Part Name	Part Number
21	Coaxial elbow seal	88014101
22	Fuel connection seal	88014601
23	Rear arm assembly	88013601
24	Front arm assembly	88013501
26	Cam assembly insert	88012101
28	Long connecting link	88013902
29	Cam and groove 3" adapter	88039601
30	Cam and groove 4" adapter	88028401
31	Sight tube	88016201
32	Sight tube spacer	88015101
33	Sight tube seal	88014001
37	4" NPT adapter	88028901
38	3" NPT adapter	88039701

Part Number	Description
88049001	Over and under tall 4" x 3" cam and groove
88049003	Over and under tall 4" NPT x 3" cam and groove



## GASKET KIT\*

Model Unit	88024801
Weight (pounds/kilograms)	6.0/0.17



88024801

## SIGHT GLASS KIT\*

Model Unit	88024901
Weight (pounds/kilograms)	13.0/0.37



88024901

\*All items are optional and must be ordered separately.





## 3" CAM AND GROOVE ADAPTER

Model Unit	88039601
Weight (pounds/kilograms)	1.19/0.45



88039601

## 4" CAM AND GROOVE ADAPTER

Model Unit	88028401
Weight (pounds/kilograms)	1.44/0.65



88028401

## 3" NPT MALE ADAPTER

Model Unit	88039701
Weight (pounds/kilograms)	1.44/0.65



88039701

## 4" NPT MALE ADAPTER

Model Unit	88028901
Weight (pounds/kilograms)	1.50/0.68



88028901





## CAM AND GROOVE ADAPTERS

Hose shank end bands to hose. The coupler comes in two sizes for use with most hose configurations.

### HIGHLIGHTS

- Heat-treated, aluminum alloy body and brass probe.
- Forged bronze cams and stainless steel pins.

Part Number	Description
77421220	2" Cam and groove dust cap
77421240	4" Cam and groove dust cap



# MECHANICALLY OPERATED 90 DEGREE EMERGENCY VALVE AND PARTS LIST

Emergency valves make product handling safer. These emergency valves have a shear groove that meets 49 CFR 178.345-8. The seat area of the valve is located inside the tank shell as required by DOT regulations.

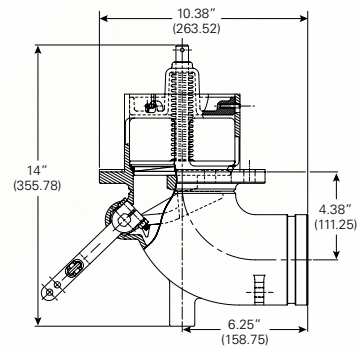
This valve gives you the advantage of a faster flow rate while fitting a standard 4" TTMA sump. The high flow rate is established by a full opening throat area. Emergency valves are available in 90 degree elbow type or straight type, 4" TTMA flanges or Victaulic™ outlet, and mechanical or air assisted.

## HIGHLIGHTS

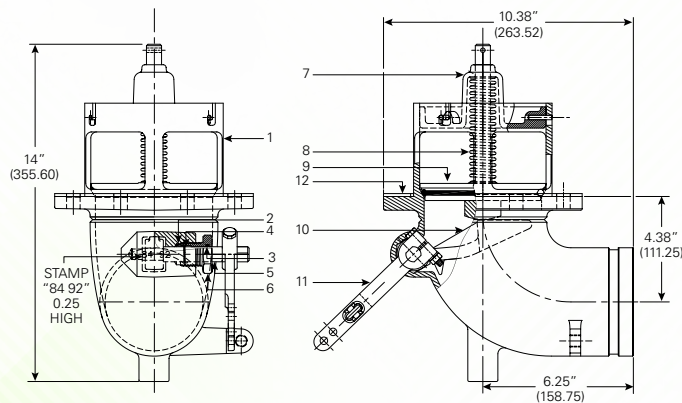
- High flow rate.
- Fits standard 4" TTMA sump.
- Shear section per TTMA, RP84-92 and meets DOT 49 CFR 178.345-8.
- Force ratings from TTMA RP86-92.
- Shear groove meets DOT 406 requirement.
- Optional external air cylinder available.
- Available in Victaulic™ or flanged version.
- Fluorocarbon O-ring.



88043001



Model Unit	88043001
Weight (pounds/kilograms)	11.0/4.99



#	Part Name	Part Number
1	Emergency valve Victaulic™ 4" body	88042801
2	3/16" SYN PTFE packing	1135801
3	O-ring FLC #2-114	1103920
4	Spiral retaining ring	1109008
5	Cam shaft	88024101
6	Stuffing box nut	88024201
7	Emergency valve retainer assembly	88026401

#	Part Name	Part Number
8	Poppet spring	1135701
9	Poppet assembly	88026301
10	Cam	88023301
11	Cam lever assembly	88026501
12	Emergency valve sump gasket	1138801
13	Anti-seize Lubricant	1114401

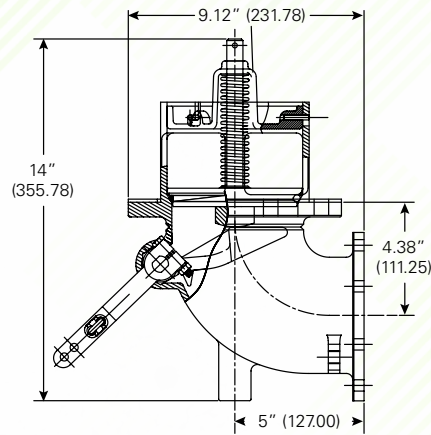
Part Number	Description
88043001	4" standard Victaulic™ outlet seal



# MECHANICALLY OPERATED 90 DEGREE EMERGENCY VALVE (FLANGED)

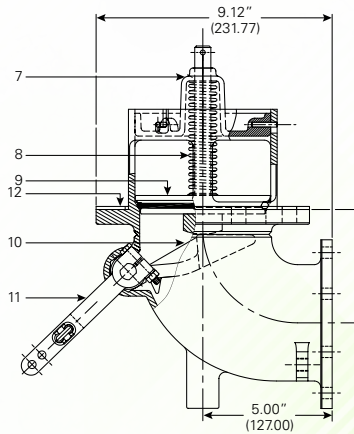
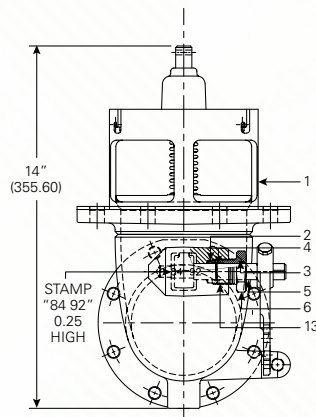


88043101



Model Unit	88043101
Weight (pounds/kilograms)	11.0/4.99

## MECHANICALLY OPERATED 90 DEGREE EMERGENCY VALVE (FLANGED) PARTS LIST



#	Part Name	Part Number
1	Emergency valve flanged 4" body	88042901
2	3/16" SYN PTFE packing	1135801
3	O-ring FLC #2-114	1103920
4	Spiral retaining ring	1109008
5	Cam shaft	88024101
6	Stuffing box nut	88024201
7	Emergency valve retainer assembly	88026401

#	Part Name	Part Number
8	Poppet spring	1135701
9	Poppet assembly	88026301
10	Cam	88023301
11	Cam lever assembly	88026501
12	Emergency valve sump gasket	1138801

Part Number	Description
88043101	4" Standard flanged outlet seal



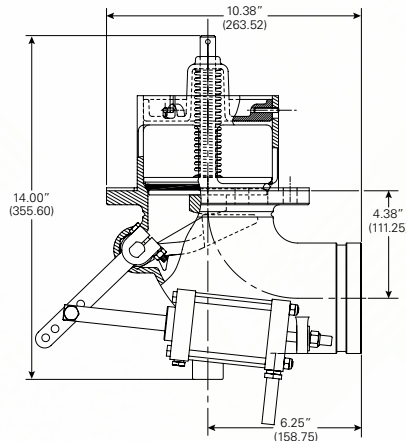


# AIR-ASSISTED 90 DEGREE EMERGENCY VALVE (VICTAULIC™) AND PARTS LIST

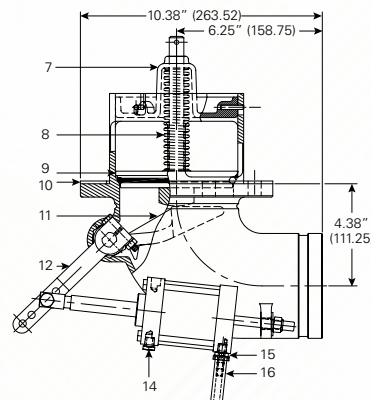
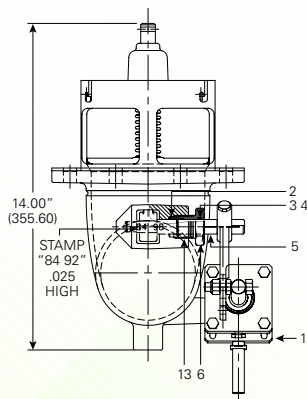
Air-assisted emergency valves make product handling safer and installation more convenient. The emergency valve has a shear groove that meets 49 CFR 179.345-7. The seat of the valve is located inside of the tank shell as required by DOT regulations. One valve has the capability to be converted to either right- or left-hand control.



88043201



Model Unit	88043201
Weight (pounds/kilograms)	13.0/5.9



#	Part Name	Part Number
1	Emergency valve air cylinder	88035002
2	4" Victaulic™ emergency valve body	88042901
3	3/16" SYN PTFE packing	1135801
4	O-ring FLC #2-114	1103920
5	Spiral retaining ring	1109008
6	Cam shaft	88024101
7	Stuffing box nut	88024201
8	Emergency valve retainer assembly	88026401

#	Part Name	Part Number
9	Poppet spring	1135701
10	Poppet assembly	88026301
11	Emergency valve sump gasket	1138801
13	Cam lever assembly	88026501
14	Fusible metal pipe plug, 1/8-27" NPT	1152601
15	Male push-on hose fitting	1149401
16	Rubber hose - push-on fitting	88015901

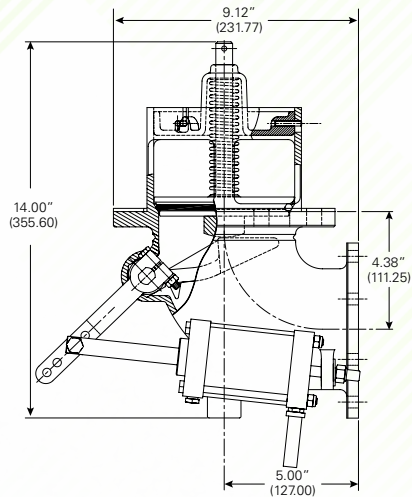
Part Number	Description
88043201	4" Standard Victaulic™ Outlet Seal with External Air Cylinder



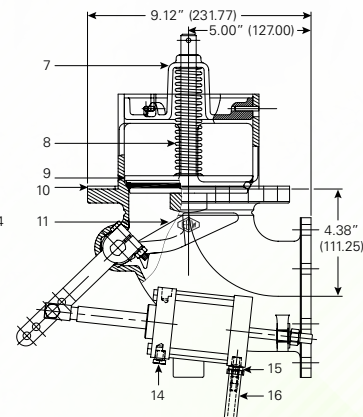
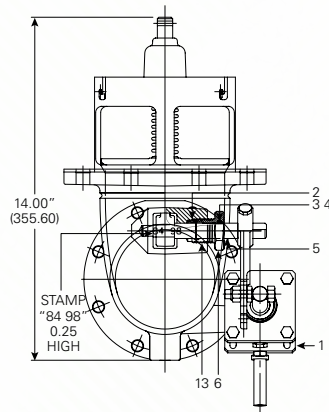
# AIR-ASSISTED 90 DEGREE EMERGENCY VALVE (FLANGED) AND PARTS LIST



88043301



Model Unit	88043301
Weight (pounds/kilograms)	13.0/5.9



#	Part Name	Part Number
1	Air cylinder	88035002
2	4" Flanged emergency valve body	88042801
3	3/16" SYN PTFE packing	1135801
4	O-ring FLC #2-114	1103920
5	Spiral retaining ring	1109008
6	Cam shaft	88024101
7	Stuffing box nut	88024201
8	Emergency valve retainer assembly	88026401

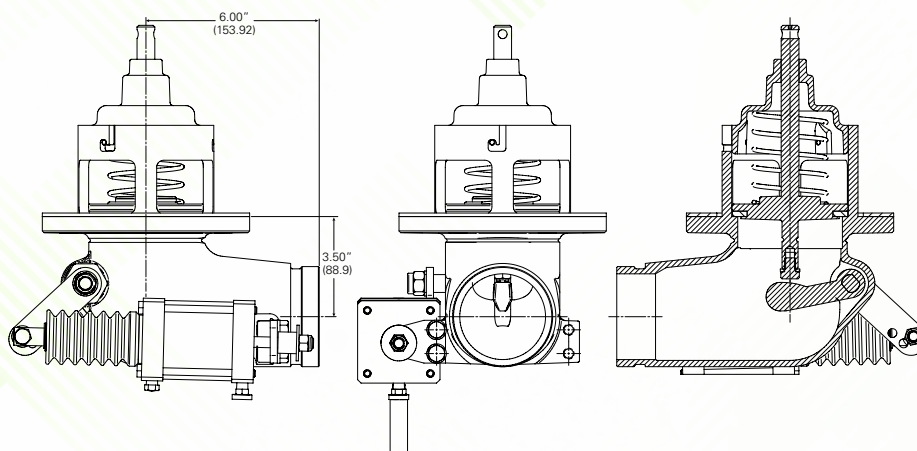
#	Part Name	Part Number
9	Poppet spring	1135701
10	Poppet assembly	88026301
11	Emergency valve sump gasket	1138801
13	Cam lever assembly	88026501
14	Fusible metal pipe plug, 1/8-27" NPT	1152601
15	Male push-on hose fitting	1149401
16	Rubber hose - push-on fitting	88015901

Part Number	Description
880-433-01	4" Standard flanged outlet seal with external air cylinder



# 3" EMERGENCY VALVE

Emergency valves make product handling safer and installation more convenient. The emergency valve has a shear groove that meets 49 CFR 179.345-7. The seat of the valve is located inside of the tank shell as required by DOT regulations. One valve has the capability to be converted to either right- or left-hand control.



## HIGHLIGHTS

- High flow rate.
- Fits standard TTMA sump.
- Cable operator can be mounted right-handed or left-handed.
- Optional external air cylinder available.
- Air cylinder can be mounted right-handed or left-handed.
- 3" Victaulic™ outlet only.

## CERTIFICATIONS/LISTINGS

- TTMA, RP84-92: shear section.
- DOT 49 CRF 178.345-8: shear section.
- DOT 406: shear groove.
- TTMA, RP86-92: force rating.

Part Number	Description	Size
88045601	Air operated valve	3" TTMA flanged × 3" Victaulic™ outlet
88044901	Cable operated valve	3" TTMA flanged × 3" Victaulic™ outlet



# SIDE SEAL ADAPTER

The side seal adapter is designed to give flexibility to top seal drop elbows. Your 4" top seal delivery elbow can now be used on a side 4" seal fill adapter. You don't have to bring a separate side seal elbow, which reduces cost and the number of fittings required on your truck.

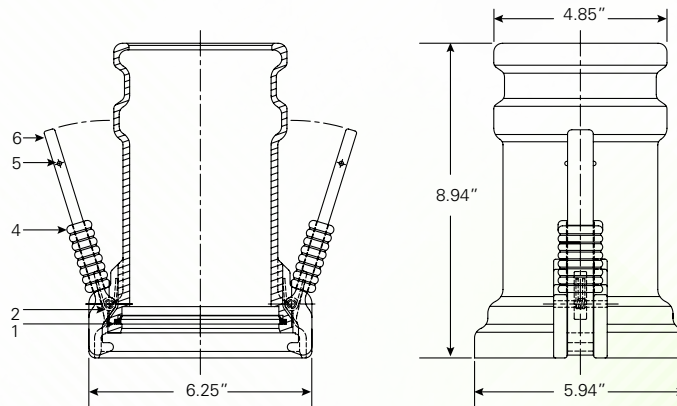
Two lever clamps secure the adapter to the station's side seal fitting and allow a 4" elbow to attach to the adapter. Special locking rings prevent accidental cam arm release during filling. Cast aluminum makes the side seal adapter light and strong. The specially designed seal gives you the added insurance that no leaks will occur.



880-445-01

MODEL UNIT	880-445-01
Weight (pounds/kilograms)	10.0/4.58

## SIDE SEAL ADAPTER PARTS LIST



#	Part Name	Part Number
1	Seal	88120201
2	Release lever spring	88110301
4	Release lever interlock	88120100

#	Part Name	Part Number
5	Pin, 0.125 x 0.875", groove type "E"	1145901
6	Release lever	88120001

Part Number	Description
88044501	Side seal adapter



# OCS OVERFILL PROTECTION SOLUTIONS

OCS optic control solutions excel where it counts: at the loading rack. The OCS control module is compatible with all existing rack monitors, designed for use with overfill probes and retained product probes, and has external contact input and relay output capabilities.

All OCS control modules continuously self-test probes for dry, wet, or fault conditions. All OCS control modules perform continuous self-testing of the wiring between the probes and controllers. All OCS control modules self-test for broken wires, shorted ground wires, shorted power wires, and shorted signal wires. Our control modules monitor for proper input signals and voltages from the rack monitor.

OCS control modules will permit to load only after the proper signals have been received.

All OCS control modules will monitor up to six overfill probes and six retained product probes; one input and one output are standard.

All OCS control modules are FMRC-approved for hazardous (classified) locations.



## HIGHLIGHTS

- Microprocessor base controller.
- Continuous self-testing of:
  - All probes attached
  - All probe and power wiring
  - Rack input signals for terminal
  - Proper input voltage
- Continuous self-diagnostics.
- Monitors external inputs.
- Internal relay outputs.
- Intrinsically safe inputs and outputs.
- Waterproof housing with clear viewing lens.
- Versatile mounting features.
- FMRC-approved for hazardous (classified) locations.

## Certifications FMRC

Class No. 3600 - Electrical Equipment for Use in Hazardous (Classified) Locations General Requirements.

Class No. 3610 - Intrinsically Safe Apparatus for Use in Class 1, II, and III Division 1 Hazardous (Classified) Locations.

Class No. 3611 - Electrical Equipment for Use in Class I, Division 2, Class II, Division 2 and Class III, Division 1 and 2 Hazardous Locations.





## TWO-WIRE CONTROLLER

The OCS two-wire controller (890-400-02) is designed with a large viewing window. The anodized aluminum housing is rated NEMA® 4 with ½" NPT openings for ease of wiring. The control module is a microprocessor-based controller that provides continuous self-testing of probes, wiring, rack inputs, input voltage, and memory settings. Inputs and outputs are intrinsically safe and FMRC/CSA-approved for hazardous locations.

### HIGHLIGHTS

- Microprocessor base controller.
- Continuous self-diagnostics.
- Internal relay outputs.
- FMRC approved for hazardous (classified) locations.
- Versatile mounting features.
- Continuous self-testing of:
  - All probes attached
  - All probe and power wiring
  - Rack input signals for terminal
  - Proper input voltage

Part Number	Description
89040002	Controller mounted in waterproof housing
89020002	Control module only



## TWO-WIRE OPTIC OVERFILL PROBES

OCS two-wire probes are manufactured with a leakproof aluminum body and anodized black aluminum tip to absorb stray light. For optimum performance, reliability, and accuracy a glass ground prism is standard for all styles of probes. Optic two-wire probes are thermistor compatible for connecting directly to the overfill monitor and require no dummy element.

### HIGHLIGHTS

- Probes feature surface mount military spec electronic components.
- Two-Wire Probes - thermistor compatible.
- Operating temperature -40 °F to +160 °F
- FMRC approved for hazardous (classified) locations.

Part Number	Description	Length
89011001	Two-wire optic overfill probe	8"





## OCS PROBE SOLUTIONS

All FFS optic probes are manufactured with surface mount, military spec. components and are compatible with all existing control modules. Probes are manufactured with a glass ground prism and black anodized tip for greater reliability and accuracy in operating temperatures from -40 °F to +160 °F. Overfill probes use a leakproof anodized aluminum tube with three seals that act as moisture and vapor barriers.

### HIGHLIGHTS

- All probes feature surface mount military spec electronic components.
- All probes are compatible with all existing EBW controllers.
- All probes are compatible with all existing rack monitors.
- Operating temperature -40 °F to +160 °F
- Optical sensor for quickest and most reliable product sensing
- Two-wire probes - thermistor compatible.
- Five-wire probes - optic compatible.
- FMRC-approved for hazardous (classified) locations.

## PROBE HOLDER SOLUTIONS

Probe holders are anodized aluminum with ½" NPT openings positioned for easy access and wiring. An O-ring seal is standard for short and tall caps. The three bolt locking ring prevents probe movement and seals the housing from product splash and vapors. Two styles are available: a 2" male NPT thread (90826201) or a cast lock nut (90826301).



89025702  
Two-Wire Probe



90826201



90826301



90820801

### HIGHLIGHTS

- Anodized aluminum construction.
- ½" NPT connection ports.
- 2" NPT male thread.
- 2" NPT cast lock nut.
- Tall or short cover.
- O-ring sealed.
- Three bolt locking ring.
- For use with all EBW and other manufacturers' probes.

Part Number	Description	Parts Included
90826202	Probe holder with 2" NPT male thread, tall cap	
90826301	Probe holder with 2" cast lock nut	
90820801	Tall probe holder cover	
89025702	Probe holder with probe kit	1 Probe holder (90826301) 1 Two-wire probe (89011001)





# SINGLE SOCKET SOLUTIONS

Single sockets are manufactured in accordance to API RP1004 and are compatible with all overfill monitor plugs. These sockets are moisture-proof and have stainless steel contact pins in a bakelite housing. Hard-coated aluminum faceplates and J-Slots are long-lasting and come standard with black plastic caps. Optic, thermistor, and float styles are available.

## HIGHLIGHTS

- Ease of installation.
- Moisture-proof.
- Stainless steel contact pins.
- Produced in accordance with API 1004.
- Available in all three API standard socket configurations.

Part Number	Description
90821101	Thermistor socket with plastic cap
90822101	Optic socket with plastic cap
90811901	Plastic cap only
90811001	Thermistor conversion kit
90812001	Optic conversion kit







## OCS INSTALLATION KITS

### HIGHLIGHTS

- Seven conductor oil-resistant cable included.
- Watertight connectors included.
- Controller included.
- Probes included.
- Probe holders included.

Part Number	Description	Parts Included
89016202	2 Compartment kit	(2) 89025702 probe w/ holder, (1) 89040002 2-wire controller, (6) 90813101 watertight bushing ½", (1) 90813203 7-CON cable 25'
89016203	3 Compartment kit	(3) 89025702 probe w/ holder, (1) 89040002 2-wire controller, (12) 90813101 watertight bushing, (1) 90813206 7-CON cable 100'
89016204	4 Compartment kit	(4) 89025702 probe w/ holder, (1) 89040002 2-wire controller, (16) 90813101 watertight bushing, (1) 90813206 7-LON wire 100'



908-315-01

## WIRING KITS

Part Number	Description	Parts Included
90831301	Three compartment wiring kit	100' Cable and 12 watertight fittings
90831401	Four compartment wiring kit	100' Cable and 16 watertight fittings
90831501	Five compartment wiring kit	100' Cable and 22 watertight fittings
90831601	Six compartment wiring kit	100' Cable and 30 watertight fittings
90813101	Watertight fitting only	N/A
90813206	100' Seven conductor cable only	N/A
90813203	25' 7-CON cable	N/A



# CROSS REFERENCE GUIDE

Description	EBW	Civacon	Emco Wheaton	Bayco
Bottom Loading Adapters				
Short stroke	88050002	861-0400	F-501-003	N/A
Short stroke with S.G.	88050003	861SG	N/A	N/A
Female Gravity Drop Adapters				
4" API	88033001	871-B	N/A	N/A
Buna-N gasket for hose end	77420204	H-8347-M	N/A	N/A
Male Gravity Drop Adapters				
3" Male cam groove	88041001	871-A	F459-006	N/A
4" Male cam groove	88041101	871-A-0074	F459-007	N/A
3" Male thread	N/A	N/A	N/A	N/A
Vapor Check Valves				
3" NPSM thread with poppet	30130001	633FPV	N/A	N/A
3" NPSM thread no poppet	30333303	N/A	N/A	N/A
4" NPSM thread with poppet	30130002	611-T-AL40-NPT	F529-001	N/A
4" NPSM thread no poppet	30344404	610-T-0610	F529-002	N/A
Flanged Vapor Check Valves				
Poppetted with sight glass	30230011	611FB	F530-010	N/A
Vapor Caps				
Nylon without chain	N/A	N/A	N/A	N/A
Nylon with chain	30420002	N/A	F532-001	N/A
Aluminum without chain	N/A	N/A	N/A	N/A
Air Interlock Valves				
¼" - 1" button	88015001	100-0001	F527-002	N/A
¼" Six-way 1" button	88025601	101-002	F-528-001	N/A
Dust Cap				
4" API dust cap	88040301	873-0070 874-0874	F499-001	5000-24
Air Operated Sequential Vapor Vent Valves				
Flanged without hood	88034101	N/A	N/A	N/A
Threaded without hood	88034201	N/A	N/A	N/A
Flanged with hood	88034301	1998	F592-001	N/A
Vent valve only	88034401	T1966SV	F592-001	N/A
Threaded with hood	N/A	T195SV	N/A	N/A
Vapor Return Hose Couplers				
4" × 3" with probe	77432002	633-CV-6070 633-CPP-6051 633-CPV-6053	F800-002	VR403CS
4" × 4" with probe	77432003	633-CV-6075 633-CPP-6051	N/A	N/A



# CROSS REFERENCE GUIDE

## 4" EMERGENCY VALVES

Description	EBW	Civacon	Emco Wheaton	Bayco
Cable Operated 90 Degree				
4" TTMA flange/4" Victaulic™ outlet	880-430-01	VA-1111	N/A	N/A
Cable Operated Straight				
4" TTMA flange/4" Victaulic™ outlet	880-451-01	VA-3111	N/A	N/A
Air Operated 90 Degree				
4" TTMA flange/4" Victaulic™ outlet	880-432-01	VA-1121	N/A	N/A
4" TTMA flange/4" TTMA flanged outlet	880-433-01	VA-2121	N/A	N/A
Air Operated Straight				
4" TTMA flange/4" Victaulic™ outlet	880-453-01	VA-3121	N/A	N/A
4" TTMA flange/4" TTMA flanged outlet	880-454-01	VA-4121	N/A	N/A
Product Delivery Elbow - Dual Point				
4" Grooved male cam with sight glass	880-455-01	60TT-0095	F523-006	N/A
Vapor Recovery Elbow - Dual Point				
3" Grooved male cam	880-465-01	1711-VL-0300	N/A	VR6200

## OVERFILL CONTROLLERS

Description	EBW	Civacon	Flotech	Scully
2-Wire OCS controller	890-400-02	3100	FT103	8687
Sockets and Caps				
Thermistor socket with plastic cap	908-211-01	4402	FT301	7720
Optic socket with plastic cap	908-221-01	4102	FT300	7974
7-Pin socket with cap	908-230-01	4600	FT302	8116
OCS Probes and Holders				
8" 2-Wire optic probe	890-110-01	1650	FT150	22389/09409
2-Wire optic probe with 908-263-01 holder	890-257-02	1550	FT151	8501
OCS Installation Kits and Parts				
Watertight fitting only	908-131-01	2510	FT402	N/A
100' Seven conductor cable 18AWG	908-132-06	2310	FT401	27382