FUELLING

Fuelling the Military Worldwide

CLA-VAL Europe
AUTOMATIC CONTROL VALVES

CLA-VAL™

Leading the Innovation

Cla-Val control valves, refuelling nozzles, couplers and other ground fuelling equipment play a vital role in fuel handling systems for both civilian and military aviation.

Applications include control of fuel at receiving facilities, storage tanks, fuel/water separation stations, distribution/circulation systems and mobile refuellers and aircraft hot refuelling.

WWW.CLA-VAL.CH

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Company Overview

Company Overview

Since 1936, CLA-VAL has been a leading manufacturer of automatic control valves, serving waterworks, industrial, fire protection, aviation fuelling and marine customers throughout the world. Our commitment to excellence and continuous improvement shows in each valve we produce and in the many new products we introduce to the marketplace each year.

CLA-VAL is a global company with headquarters and a 20-acre manufacturing/foundry complex in Newport Beach, California, in addition to production facilities in Canada, Switzerland, France and the United Kingdom.

CLA-VAL's long history of manufacturing and industry excellence also enables us to provide the industry's most comprehensive program of hands-on, personalized technical/product training at our in-house training facilities in the US, Canada, Switzerland, the UK and France.

CLA-VAL Automatic Control Valves are renowned for their quality and superior performance. The company is also known for consistently excellent customer service as well as innovation, specifically related to products that help to conserve water and energy.

Our company website at www.cla-val.ch or www.cla-val.com offers a comprehensive overview of our extensive product lineand field service capabilities as well as access to hundreds of technical documents.

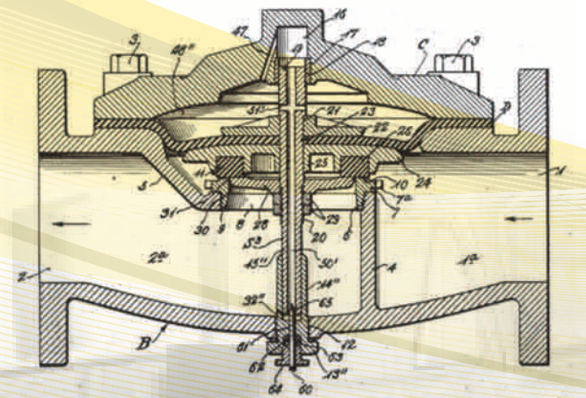
Onsite foundries

- Soundcast Company - Sand casting foundry
- Griswold Castings - Investment foundry, lost wax process

By having two on-site foundries, CLA-VAL is able to provide castings in over 50 different alloys, making our product offering one of the most extensive in the valve industry. It also allows us to respond more quickly to our customers' unique requirements. A small sample of the many materials our foundries produce include the following alloys:

- Ductile Iron
- Cast Steel
- Stainless Steel
- Monel
- Nickel Aluminum Bronze
- Naval Bronze
- Super Austenitic Stainless Steel
- Super Duplex Stainless Steel
- Titanium
- And many more ....

Inventor and producer of the hytrol control valve



Original Filed May 1, 1940

Global manufacturing facilities overview

- State-of-the art manufacturing equipment:
  Multiple Mazak Multi-Task Milling & Turning; CNC Lathe & Milling machines
  Many more manual machine cells including Vertical Turret Lathes
- Large inventory of products on the shelf and ready to ship to meet customers' immediate needs

Product range

CLA-VAL offers an extensive range of products from basic hydraulic valves to SCADA compatible electronic control valves to perform the following functions in waterworks, water savings, industrial, fire protection, marine and aviation fuelling applications.

Pressure
Pressure Relief
Pressure Management
Pressure Increasing
Cavitation Prevention
Surge Control
Metering
Reducing Pump Control Fire
Rate of Flow/Flow Limiting
Level Control
Tank Filling
Blending
Flushing
Reclaimed Water
Suppression Deluge
Air Release
Vacuum Breaking
Flow Reversal Prevention
Fuelling High-Level Shut-Off
Fuelling Back Pressure Control
Contamination Monitoring

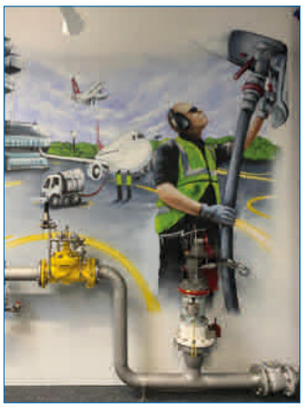
From the Smallest: 3/8 inch

To the Largest: 56 inch (DN 1400)

Company Overview

Training capabilities and facilities

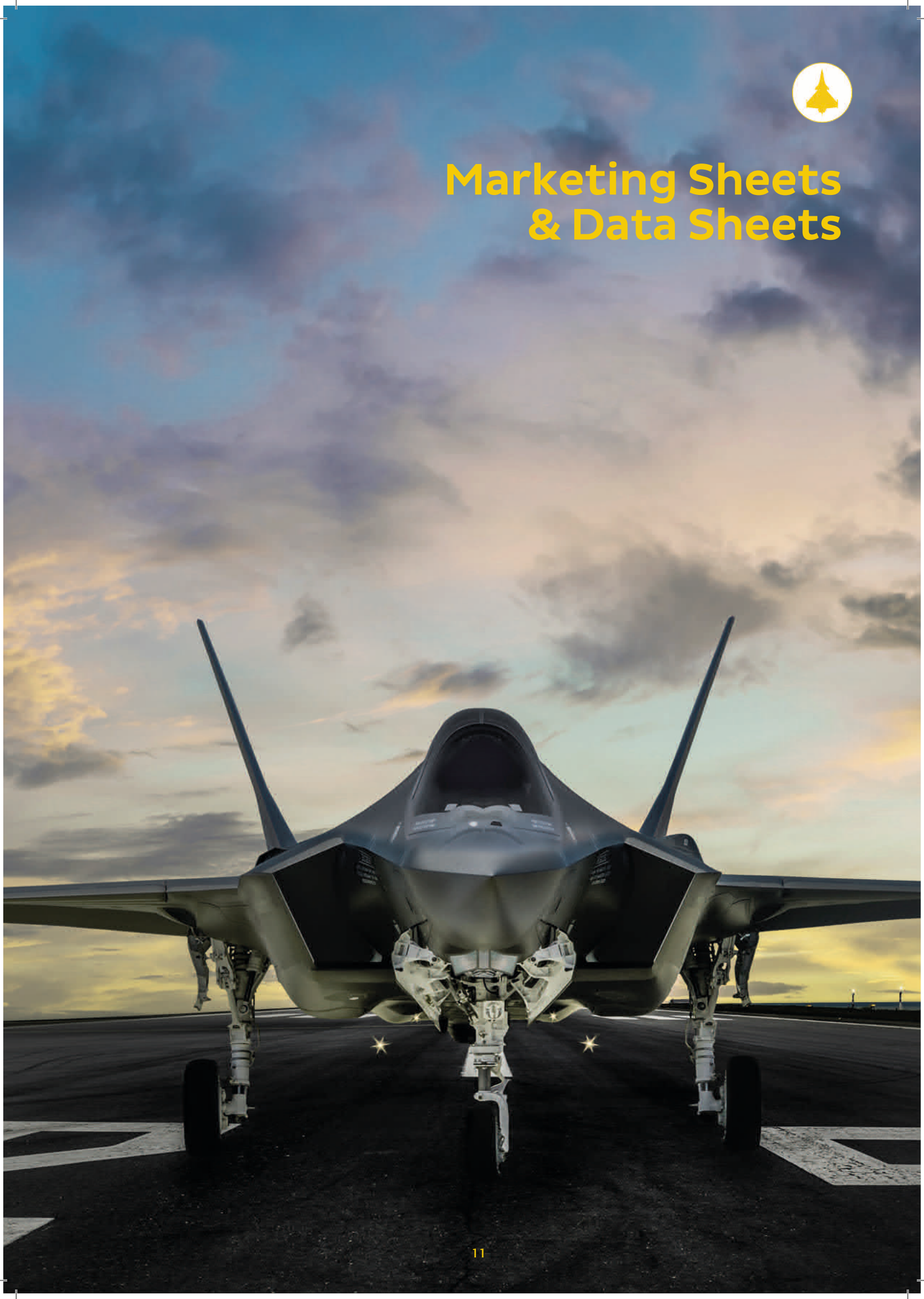
CLA-VAL offers personalized technical assistance, maintenance support, and end-user training programs, including comprehensive engineering, service training and application seminars at the factory and on-site. This, in turn, helps our customers to achieve optimal performance of CLA-VAL products during start-up, after installation and through decades of reliable trouble-free service.



Approvals and certifications

CLA-VAL's fuelling, waterworks and fire protection products meet all applicable standards and specifications prescribed by miltary and civil industry organizations such as AWWA, FDA, NSF, UL, and FM International. Along with ISO 9001 certifications for our production facilities in Switzerland and the UK, and ISO 9002 for our manufacturing facility in Canada, CLA-VAL also currently holds many other certifications, listings and approvals in North America and around the world :

- American Petroleum Institute
- Department of the Navy
- Soundcast Foundry: TUV Approval
- Underwriter's Laboratory Canada (ULC)
- Underwriter's Laboratory (UL)
- Factory Mutual (FM)
- National Sanitary Foundation
- American Society of Sanitary Engineers (ASSE)
- Canadian Standards Association (CSA)
- Water Regulations Advisory Scheme (WRAS)
- International Organization for Standardization (ISO)
- Attestation de conformité sanitaire (ACS)
- Association Suisse Eau & Gaz (SVWG)
- Assemblée Plénière des Sociétés d'Assurance Dommage (APSAD)
- Austrian Association for Gas and Water Industries (OVGW)
- NYC Material and Equipment Acceptance Division (MEA)
- Public Utilities Board Singapore (PUB)
- Technical Standards & Safety Authority (TSSA)



Marketing Sheets & Data Sheets

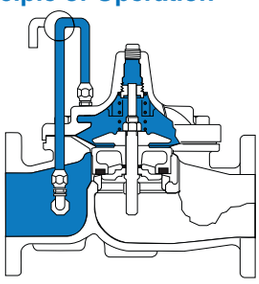
CLA-VAL 100-34

Hytrol valve

- **Accurate Repeatable High Level Shut-off**
- **"Fail-Safe" Construction**
- **No Packing Glands Assure Leak-Proof Service**

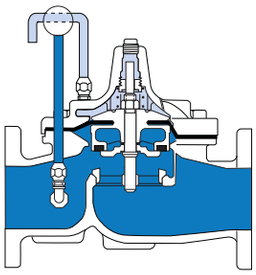
The Cla-Val Model 100-34 Hytrol Valve is used as the basic unit in almost all Cla-Val automatic control valves for petroleum applications. The 100-34 is a hydraulically-operated, diaphragm actuated, globe or angle pattern valve. It is available in various materials and full range of sizes. It consists of three major components: body, diaphragm assembly and cover. The diaphragm assembly is the only moving part. The rugged simplicity of design and packless construction assure a long life of dependable, trouble-free operation. Should the diaphragm become damaged the valve will close tight, providing "fail safe" operation. The 100-34 Hytrol Valve is used in many types of piping system requiring remote control, pressure regulation, solenoid operation, rate of flow control, liquid level control, or check valve operation.

Principle of Operation



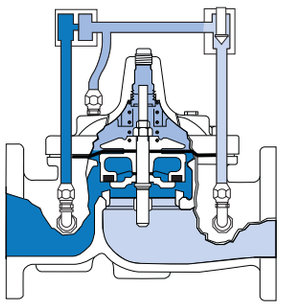
Tight Closing Operation

When pressure from the valve inlet (or an equivalent independent operating pressure) is applied to the diaphragm chamber, the valve closes drip-tight.



Full Open Operation

When pressure in the diaphragm chamber is relieved to zone of lower pressure under the valve. Flow in either direction is permitted.



Modulating Action

The main valve modulates when diaphragm chamber pressure is held at an intermediate point between inlet and discharge pressure changes. Pressure above the diaphragm is varied, allowing the valve to modulate and compensate for the changes.

Specifications

Pressure Ratings (Recommended Maximum Pressure - psi)

Valve Body & Cover		Pressure Class				
		Flanged			Grooved	Threaded
Grade	Material	ANSI Standards*	150 Class	300 Class	300 Class	End‡ Details
ASTM A536	Ductile Iron	B16.42	250	400	400	400
ASTM A216-WCB	Cast Steel	B16.5	285	400	400	400
ASTM B62	Bronze	B16.24	225	400	400	400
356-T6	Aluminum	B16.3	275	- - -	- - -	- - -

Sizes: *Globe:* 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

Valve trim:
Bronze ASTM B61
Cast Stainless Steel 300 Series

Rubber parts:
Buna-N® Synthetic Rubber
Viton

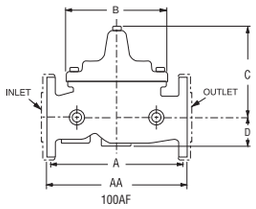
Other Materials
Available on Special Order

Note: * ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled.
‡ End Details machined to ANSI B2.1 specifications. • ***Valves for higher pressure are available; consult factory for details***

CLA-VAL 100-34

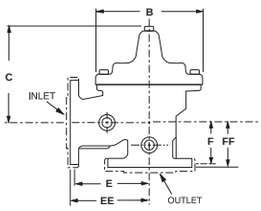
Hytrol valve

SIZE	1 1/2	2	2 1/2	3	4	6	8	10	12	14	16
A 125 & 150 ANSI	8.50	9.38	11.00	12.00	15.00	20.00	25.38	29.75	34.00	39.00	41.38
AA 250 & 300 ANSI	9.00	10.00	11.62	13.25	15.62	21.00	26.38	31.12	35.50	40.50	43.50
B DIAMETER	5.62	6.62	8.00	9.12	11.50	15.75	20.00	23.62	28.00	32.75	35.50
C MAX.	5.50	6.50	7.56	8.19	10.62	13.38	16.00	17.12	20.88	24.19	25.00
D	1.12	1.50	1.69	2.06	3.19	4.31	5.31	9.25	10.75	12.62	15.50
E 125 & 150 ANSI		4.75	5.00	6.00	7.50	10.00	12.75	14.88	17.00	19.50	20.81
EE 250 & 150 ANSI		5.00	5.88	6.38	7.88	10.50	13.25	15.56	17.75	20.25	21.62
F 125 & 150 ANSI		3.25	4.00	4.00	5.00	6.00	8.00	8.62	13.75	14.88	15.69
FF 250 & 300 ANSI		3.50	4.31	4.38	5.31	6.50	8.50	9.31	14.50	15.62	16.50



C_V Factor

VALVE SIZE	1 1/2	2	2 1/2	3	4	6	8	10	12
100-34 GLOBE PATTERN	26	49	80	107	200	440	771	1151	1600
100-34 ANGLE PATTERN	30	62	100	137					



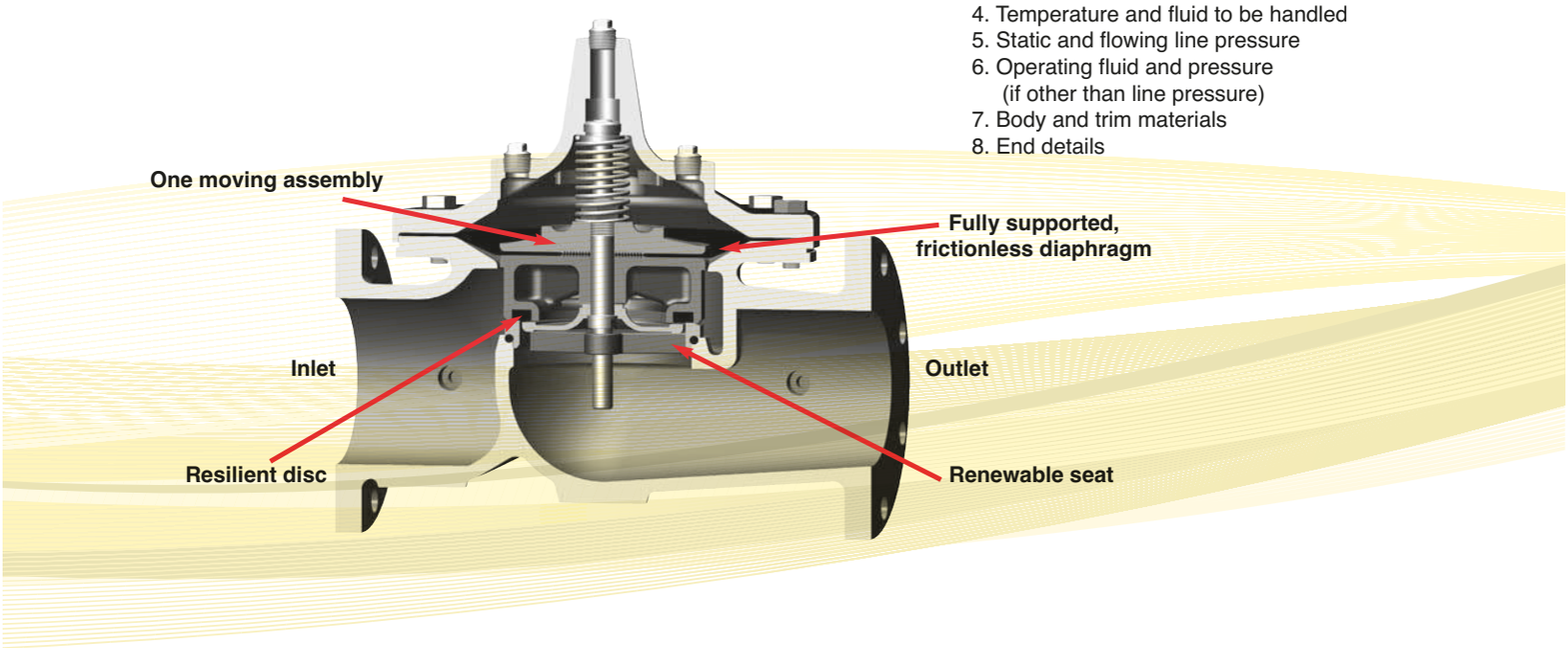
C_V factor is defined as the number of gallons per minute of water at 60°F that will flow with a 1 psi pressure differential across the valve.

Purchase Specifications

The valve shall be hydraulically-operated, diaphragm-actuated, globe or angle pattern valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross section, contained on three and on-half sides by a disc retainer and disc guide, forming a tight seal against a single renewable seat. The valve stem shall be guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve. All necessary repairs shall be possible without removing the valve from the line. If the diaphragm becomes damaged the valve shall close tight. This valve shall be a Model 100-34 (globe pattern or angle pattern) Hytrol Valve as manufactured by Cla-Val. Newport Beach, California.

Specify When Ordering

1. Size
2. Model 100-34 Globe or Angle
3. Pressure Class
4. Temperature and fluid to be handled
5. Static and flowing line pressure
6. Operating fluid and pressure (if other than line pressure)
7. Body and trim materials
8. End details



CLA-VAL 40-32

Rate of flow control valve

- **Accurately Limits Flow Rate**
- **Protects Pumps against reverse flow**
- **Surge-Free Operation**
- **Adjustable opening & closing rates**
- **Fail Safe operation**
- **Easy to Maintain**

The Cla-Val Model 40-32 Rate of Flow Non-Surge Check Valve is a hydraulically operated, pilot controlled, diaphragm actuated control valve that limits flow to a preselected maximum rate, regardless of changing line pressure. The pilot control responds to the differential pressure produced across an orifice plate installed downstream of the valve. Accurate control is assured as very small changes in the controlling differential pressure produce immediate corrective action of the main valve. The orifice bore is factory sized based on flow rate to ensure proper control valve performance. Flow rate adjustments can be made by turning an adjusting screw on the pilot control. The integrated check feature protects upstream equipment like pumps by admitting downstream pressure into the main valve cover chamber, closing the main valve upon pressure reversal.

Purchase Specifications

Pilot Control System

The 40-32 Rate of Flow Non-Surge Check Valve shall limit flow to a preselected maximum rate regardless of changing line pressure. The hydraulic control valve pilot system shall consist of a direct acting diaphragm valve designed to close when the controlling differential exceeds the adjustable spring setting. The pilot control is normally held open by the force of the compression on the spring above the diaphragm and it closes when the pressure acting on the underside of the diaphragm exceeds the spring setting. The pilot control system shall contain a fixed orifice. No variable orifices shall be permitted. A flanged orifice plate assembly shall be included and mounted to the downstream (outlet) flange. Optional pilot system features shall include (A) Flow Clean Strainer, (B) CK2 Isolation Ball Valves, (C) CV Closing Speed Control, (G) Check Feature, (Q) Quick Connect Assembly, (S) CV Opening Speed Control, (T) 55F Thermal Pressure Relief Control, (Y) X43 "Y" Strainer.

Main Valve

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. It shall contain a resilient, synthetic disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consists of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface. The valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions.

Specifications

Sizes

Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details

Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range

Light Petroleum Product -40° to+140°F

Pressure Ratings

150 class 175-PSI Max.
150 class 275-PSI Max.
250 class 300-PSI Max.
300 class 400-PSI Max.

Material

Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

Valve trim:
Bronze ASTM B61
Stainless Steel 303

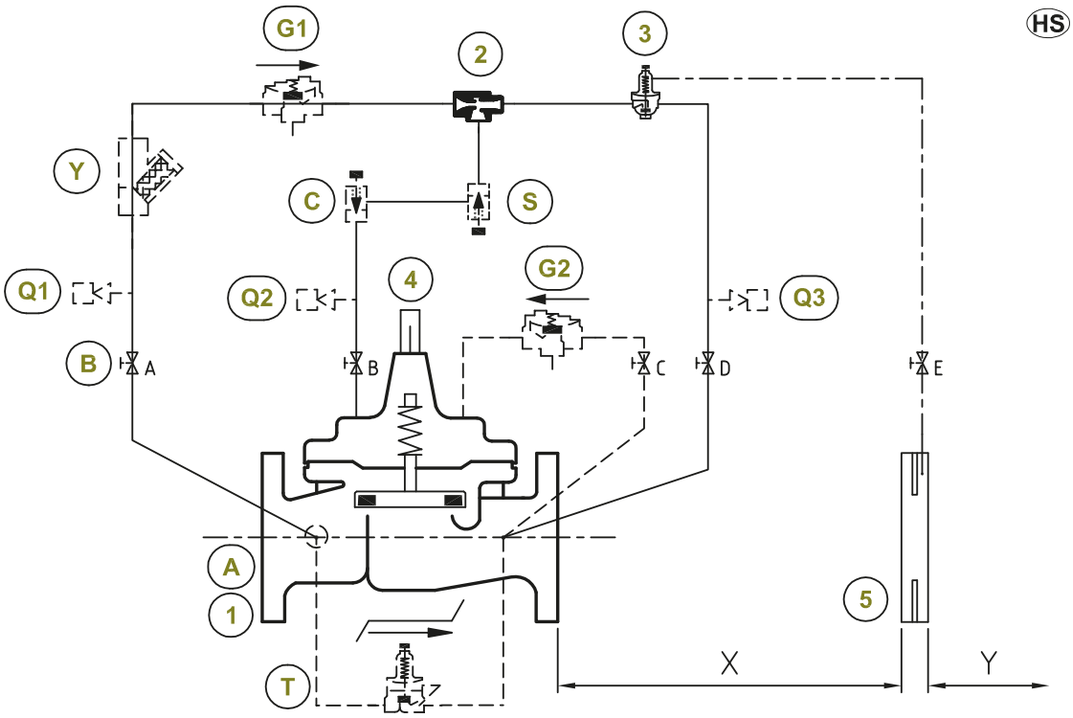
Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials

Available on Special Order

CLA-VAL 40-32

Rate of flow control valve



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34/KR *
2	EJECTOR	1	X47-A
3	DIFFERENTIAL PRESSURE CONTROL	1	CDHS-18
4	VALVE POSITION INDICATOR	1	X101
5	ORIFICE PLATE ASSEMBLY	1	X52-A

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B	ISOLATION BALL VALVE	5	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F **
Y	STRAINER	1	X43

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600

(#) = According to valve size this feature type could change

OPTIONAL FEATURES : —— —— —— ——

NOT FURNISHED BY CLA-VAL : —— – —— – ——

NOTE :

Orifice plate assembly X52-A (5) may be fixed directly to the main valve outlet flange, however, better control is obtained, if it is mounted according to the following recommendation : distance X = 5x pipe diameter, distance Y = 3x pipe diameter.

* Main Valve Option : 9HS999

CLA-VAL 40-36

Rate of flow control and fuel shut-off valve

- **Accurately Limits Flow Rate**
- **Remote Shutoff Feature**
- **Protects Filter Separators Against Reverse Flow**
- **Adjustable opening & closing rates**
- **Fail Safe operation**
- **Easy to Maintain**

The Cla-Val Model 40-36 Rate of Flow and Fuel Shutoff Check Valve is a hydraulically operated, pilot controlled, diaphragm actuated control valve that limits flow to a preselected maximum rate, regardless of changing line pressure. The pilot control responds to the differential pressure produced across an orifice plate installed downstream of the valve. Accurate control is assured as very small changes in the controlling differential pressure produce immediate corrective action of the main valve. The orifice bore is factory sized based on flow rate to ensure proper control valve performance. Flow rate adjustments can be made by turning an adjusting screw on the pilot control. The fuel shutoff feature closes the main valve when remote pressure from a Cla-Val Model CFF18T-H2 or CFF21-H2 flanged float control is admitted into the cover of an auxiliary Hytrol. The integrated check feature protects upstream equipment like filter separators by admitting downstream pressure into the main valve cover chamber, closing the main valve upon pressure reversal.

Purchase Specifications

Pilot Control System

The 40-36 Rate of Flow Non-Surge Check Valve shall limit flow to a preselected maximum rate regardless of changing line pressure. The hydraulic control valve pilot system shall consist be a direct acting diaphragm valve designed to close when the controlling differential exceeds the adjustable spring setting. The pilot control is normally held open by the force of the compression on the spring above the diaphragm and it closes when the pressure acting on the underside of the diaphragm exceeds the spring setting. The pilot control system shall contain a fixed orifice. No variable orifices shall be permitted. A flanged orifice plate assembly shall be included and mounted to the downstream (outlet) flange. The fuel shutoff feature shall close the main valve when remote pressure is introduced into the cover of an auxiliary Hytrol incorporated into the pilot control system. Optional pilot system features shall include (A) Flow Clean Strainer, (B) CK2 Isolation Ball Valves, (C) CV Closing Speed Control, (G) Check Feature, (Q) Quick Connect Assembly, (S) CV Opening Speed Control, (T) 55F Thermal Pressure Relief Control, (Y) X43 "Y" Strainer.

Main Valve

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. It shall contain a resilient, synthetic disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consists of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface. The valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions.

Specifications

Sizes
Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details
Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range
Light Petroleum Product -40° to+140°F

Pressure Ratings
150 class 175-PSI Max.
150 class 275-PSI Max.
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Material
Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

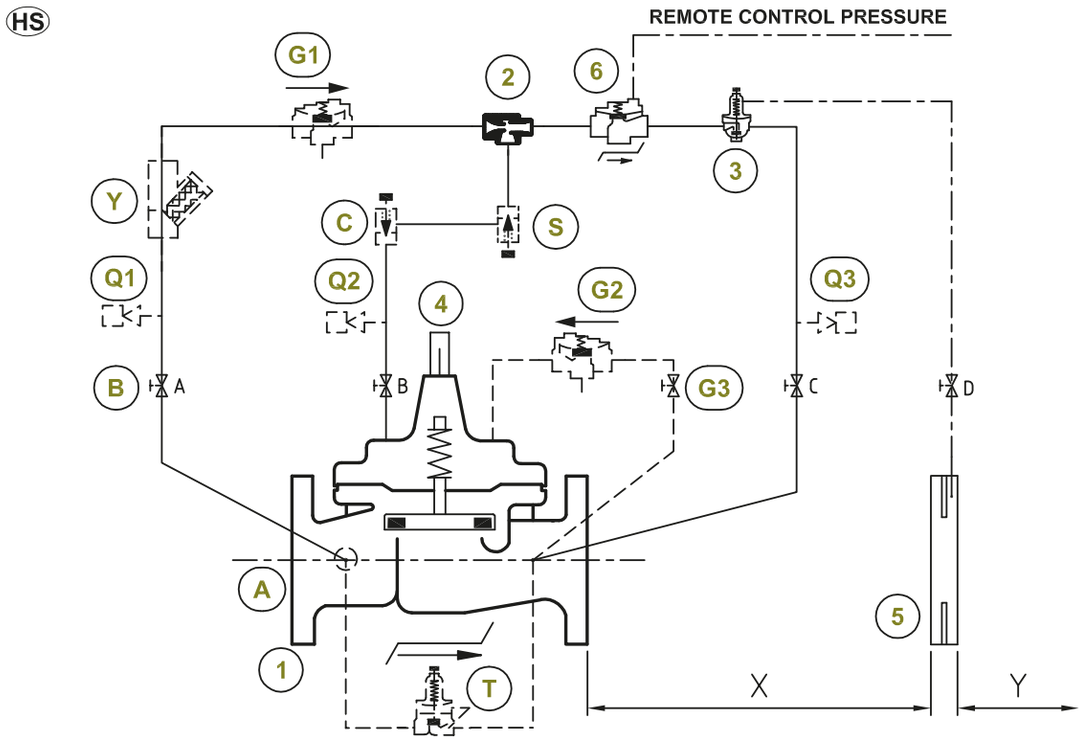
Valve trim:
Bronze ASTM B61
Stainless Steel 303

Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials
Available on Special Order

CLA-VAL 40-36

Rate of flow control and fuel shut-off valve



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34/KR *
2	EJECTOR	1	X47-A
3	DIFFERENTIAL PRESSURE CONTROL	1	CDHS-18
4	VALVE POSITION INDICATOR	1	X101
5	ORIFICE PLATE ASSEMBLY	1	X52-A
6	AUXILIARY VALVE HYTROL	1	100-KHR

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B	ISOLATION BALL VALVE	5	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F **
Y	STRAINER	1	X43

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600

(#) = According to valve size this feature type could change

* Main Valve Option: 9HS999

** 55F (Option T) is used only with option (G)

OPTIONAL FEATURES : —— —— —— ——

NOT FURNISHED BY CLA-VAL : —— – —— – ——

Orifice plate assembly X52-A (5) may be fixed directly to the main valve outlet flange, however, better control is obtained, if it is mounted according to the following recommendation : distance X = 5x pipe diameter, distance Y = 3x pipe diameter.

CFF18T-H2

Flanged float control for fuel-water separators

- **Fully automatic operation**
- **Conforms to rigid military specifications**
- **No packing glands; requires no lubrication**
- **Compact and simple to install**
- **No mechanical linkage or electrical connections**
- **No exposed moving parts or stuffing boxes**

The Cla-Val Model CFF18T-H2 Fuel-Water Separator Control automatically operates the fuel discharge valve and the water drain valve of fuel-water filter separators. It is mounted to a flange on the side of the separator vessel in the sump. The float responds to changes in level of the interface surface of the water and fuel inside the sump area. The pilot valve is a precision-lapped rotary disc, plate type valve. The CFF18T-H2 Control automatically performs the following functions:

1. Opens the water drain valve (Model 100AF) to remove accumulated water that exceeds the safe level in sump area.

2. Closes the fuel discharge valve (Model 413-01 or 40-28 AGS) should the water level rise to the upper float level. The water drain valve remains open.

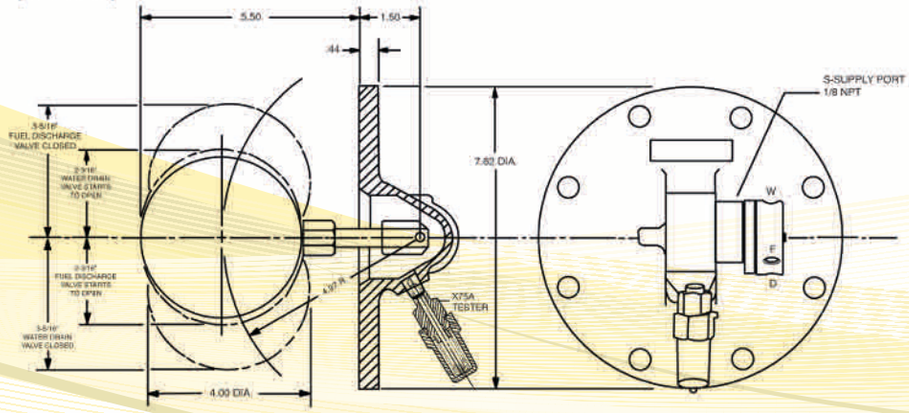
3. Re-opens the fuel discharge valve when the water in the sump lowers to a safe level.

4. Closes the water drain valve when the level reaches a low point in the sump.

5. Provides easy manual testing of fuel-water separator control function with simple plunger-type mechanism spring loaded to return to normal operating position.

The CFF18T-H2 Control is used with aviation gasoline, jet fuels, motor fuels, diesel, solvents and other petroleum products. This control has a variable pressure rating depending on lever arm length and is suitable for handling liquids with a specific gravity of 0.90 or less.

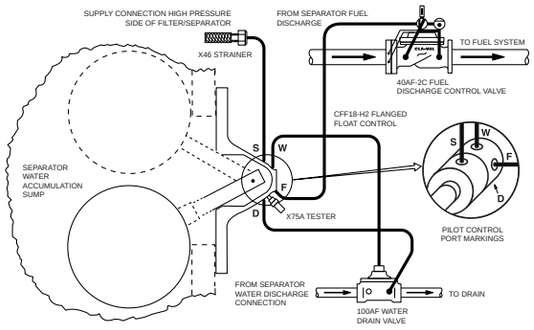
DIMENSIONS (In Inches)



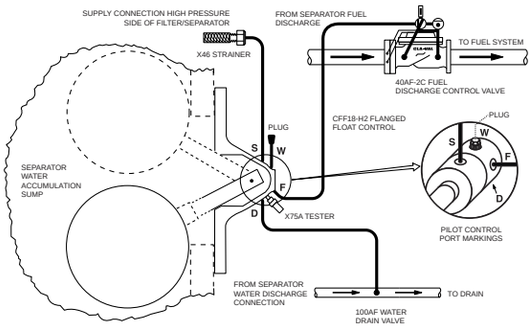
CFF18T-H2

Flanged float control for fuel-water separators

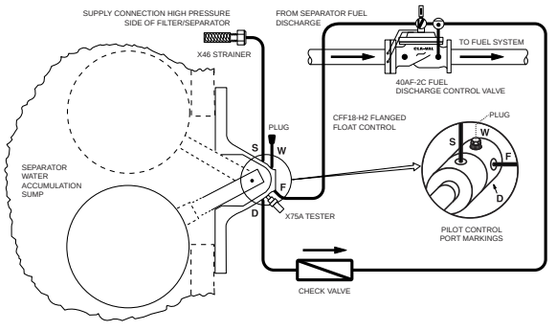
WITH WATER DRAIN VALVE, WITH PRODUCT RECOVERY TANK



WITHOUT WATER DRAIN VALVE, WITH PRODUCT RECOVERY TANK



WITHOUT WATER DRAIN VALVE OR PRODUCT RECOVERY TANK



FLOAT POSITION	WATER DRAIN VALVE	FUEL DISCHARGE VALVE
DOWN	CLOSED	OPEN
CENTER	OPEN	OPEN
UP	OPEN	CLOSED

SPECIFICATIONS

MILITARY	MIL-F-254, MIL-F-15618 and MIL-F-27629B (USAF)
TEMPERATURE RANGE	32°F to 180°F
FLUIDS	Water and light petroleum products, MIL-F-5572, MIL-J-5624 and MIL-F-5616
PRESSURE RATING	225 psi maximum
MATERIALS	*Flange:* Stainless Steel ASTM A296 Aluminum 356T6 *Pilot Housing:* Stainless Steel Type 303 ASTM A296 *Pilot Valve:* Stainless Steel Bar AISI 303 *Float and Float Arm:* Stainless Steel AISI 303
CONTROL PORT CONNECTION SIZE	1/8" N.P.T.

Note: Available without X75A Tester as Model CFF18-H2.

PURCHASE SPECIFICATIONS

This control shall be specifically designed to respond to changes in level of the interface surface of the water and fuel inside the water sump of fuel-water separator and shall operate the diaphragm actuated water drain valve and fuel discharge valve. The actuating fluids on the diaphragms of both the water drain valve and the fuel discharge valve shall be relieved through the pilot valve to the water drain valve.

The float control shall consist of a pilot valve mounting flange and float assembly. The float shall be designed to sink in fuel and float in water. The pilot shall be a precision-lapped, rotary disc plate type valve. Porting arrangement shall permit control of a water drain valve and a fuel discharge valve. A manual plunger-type actuator shall be supplied to activate float mechanism for testing.

This control shall be similar in all respects to the Model CFF18T-H2 Flanged Float Control as manufactured by Cla-Val, Newport Beach, California, or approved equal.

CLA-VAL CFF21

Flanged float control for fuel-water separators

- **Completely automatic operation**
- **No lubrication required**
- **No adjustments required**
- **Compact and easy to install**
- **Built-in float ball and control tester**
- **Conforms to rigid military specifications**

The Cla-Val Model CFF21 Flanged Float Control is a float operated pilot control installed in the water accumulation sump of a fuel filter/separator. It is designed to automatically actuate a water drain valve (Model 100AF) and to sense a rapid accumulation of water in the sump in excess of the capacity of the drain valve. If the water level cannot be reduced by the drain valve, the float control signals the fuel discharge valve to close until the water has been drained.

The Model CFF21 Flanged Float Control features an integral tester which allows in-service testing of the pilot operation and the integrity of the float ball. Conventional testers only test the operation of the control pilot mechanism, they do not check the integrity of the float ball itself. A simple ballasting method is used in the Model CFF21 making it possible to test the operation of the control pilot and to determine if the float is sound and buoyant without the costly and time consuming process of removing the control from the separator or injecting water into the sump.

SPECIFICATIONS

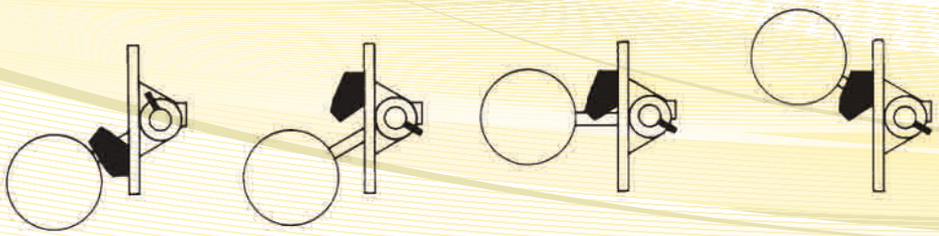
MIL-F-8901, MIL-F-15618, MIL-F-52694C and MIL-F-27629D (USAF)
-40°F to 180°F
Light petroleum products; M 1 L-G -5572, M 1 L- T -5624L and MIL-T-83133A
Aluminum - 7 lbs.
Stainless - 14 lbs.
225 PSI
Flange and Pilot Housing:
Stainless Steel ASTM A 296
Aluminum 356T6
Pilot Valve:
Stainless Steel 303
Float Ball & arm:
Stainless Steel 303

Purchase Specifications

This control shall be specifically designed to respond to changes in level of the interface surface of the water and fuel inside the water sump and shall operate the diaphragm actuated water drain valve and fuel discharge valve. The actuating fluids on the diaphragms of both the water drain valve and the fuel discharge valve shall be relieved through the pilot valve to the outlet of the water drain valve.
The float control shall consist of a mounting flange with integral pilot valve and float ball assembly. By actuation of an external lever the float ball ballast may be removed.
This action permits the float to rise in fuel verifying its buoyancy. The pilot shall be a precision-lapped, rotary disc plate type valve. Porting arrangement shall permit control of a water drain valve and a fuel discharge valve.
This control shall be the Model
CFF21 Flanged Float Control as manufactured by Cla-Val Newport Beach, California.

Integral Tester Feature (Patent Pending)

In normal operating position (1) the float ball ballast is fixed to the float for automatic water level control. Removing the ballast from the float (2) allows the float ball to float in fuel (3 & 4). The sequential operation of the water drain valve and the fuel discharge valve verifies the integrity of the float ball and the proper functioning of the pilot control mechanism. This unique approach i, the only positive means of totally checking the control function while the filter/separator is in service.

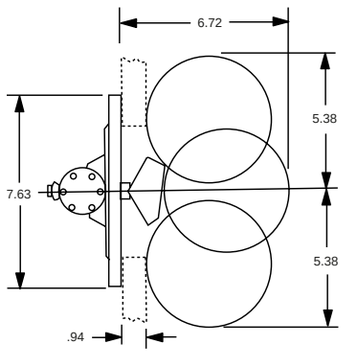


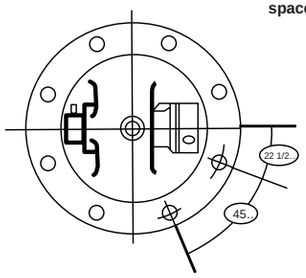
1. 2. 3. 4.

CLA-VAL CFF21

Flanged float control for fuel-water separators

Dimensions (in inches)



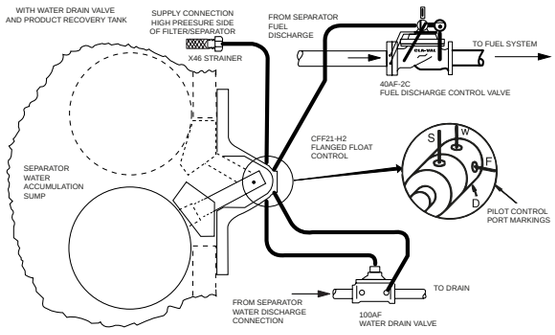


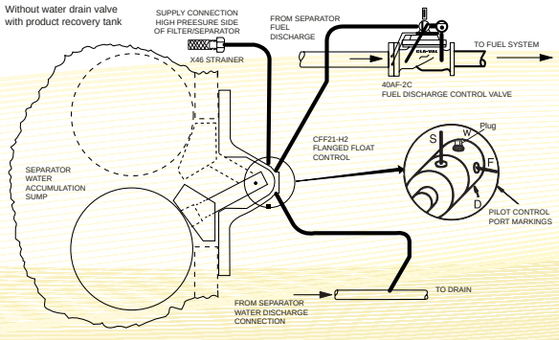
8 holes 1/2" diam. spaced on 6.625 BCD

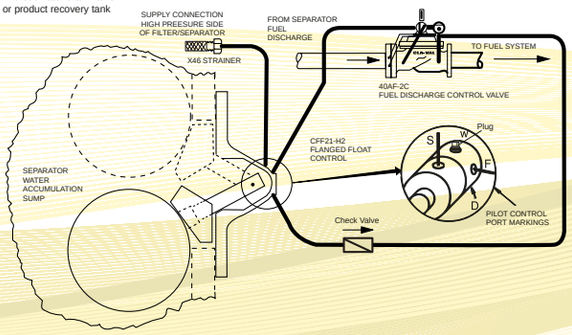
Note:
Float Ball and Arm Dimensions will increase if operating pressure exceeds 225psi and/or specific gravity of fuel is greater than .8 (consult factory).

1. Flange and Pilot Materials
2. Specific Gravity of fuel
3. Operating Pressure

Typical Applications







CLA-VAL 40-30

Rate of flow control valve

- **Accurately Limits Flow Rate**
- **Protects Pumps against reverse flow**
- **Surge-Free Operation**
- **Adjustable opening & closing rates**
- **Fail Safe operation**
- **Easy to Maintain**

The Cla-Val Model 40-30 Rate of Flow Non-Surge Check Valve is a hydraulically operated, pilot controlled, diaphragm actuated control valve that limits flow to a preselected maximum rate, regardless of changing line pressure. The pilot control responds to the differential pressure produced across an orifice plate installed upstream of the valve. Accurate control is assured as very small changes in the controlling differential pressure produce immediate corrective action of the main valve. The orifice bore is factory sized based on flow rate to ensure proper control valve performance. Flow rate adjustments can be made by turning an adjusting screw on the pilot control. The integrated check feature protects upstream equipment like pumps by admitting downstream pressure into the main valve cover chamber, closing the main valve upon pressure reversal.

Purchase Specifications

Pilot Control System

The 40-32 Rate of Flow Non-Surge Check Valve shall limit flow to a preselected maximum rate regardless of changing line pressure. The hydraulic control valve pilot system shall consist of a direct acting diaphragm valve designed to close when the controlling differential exceeds the adjustable spring setting. The pilot control is normally held open by the force of the compression on the spring above the diaphragm and it closes when the pressure acting on the underside of the diaphragm exceeds the spring setting. The pilot control system shall contain a fixed orifice. No variable orifices shall be permitted. A flanged orifice plate assembly shall be included and mounted to the upstream (inlet) flange. Optional pilot system features shall include (A) Flow Clean Strainer, (B) CK2 Isolation Ball Valves, (C) CV Closing Speed Control, (G) Check Feature, (Q) Quick Connect Assembly, (S) CV Opening Speed Control, (T) 55F Thermal Pressure Relief Control, (Y) X43 "Y" Strainer

Main Valve

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. It shall contain a resilient, synthetic disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consists of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface. The valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions.

Specifications

Sizes

Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details

Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range

Light Petroleum Product -40˚ to + 140˚F

Pressure Ratings

150 class 175-PSI Max
150 class 275-PSI Max
250 class 300-PSI Max
300 class 400-PSI Max

Material

Body & cover:
Cast Aluminum, 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

Materials (continued)

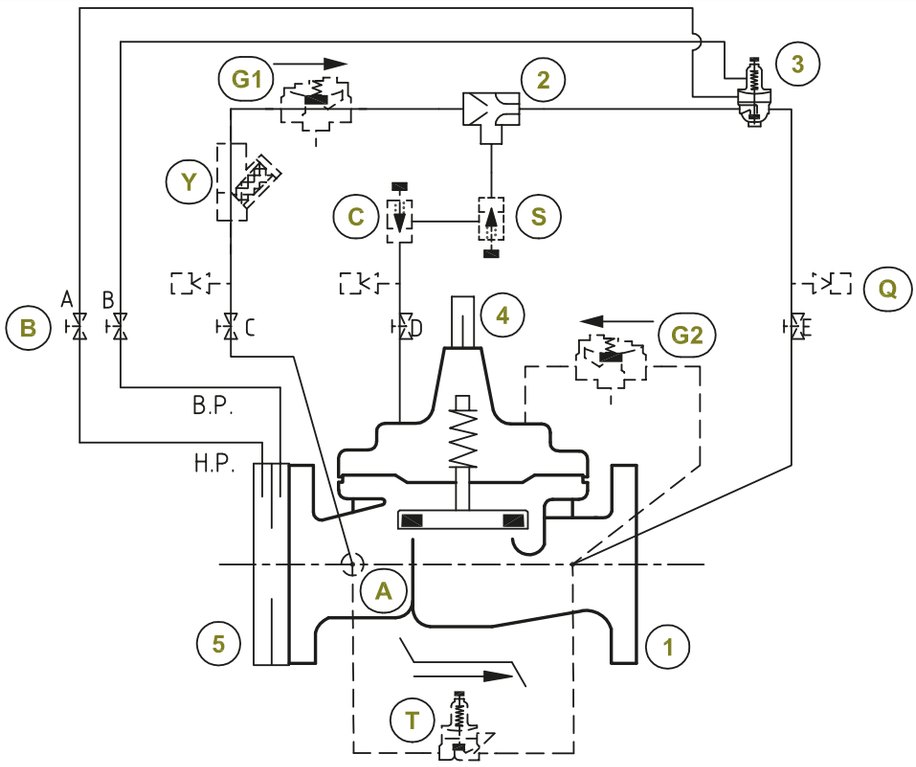
Valve trim:
Bronze ASTM B61
Stainless Steel 303
Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials

Available on Special Order

CLA-VAL 40-30

Rate of flow control valve



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34/KR *
2	EJECTOR	1	X47A
3	DIFFERENTIAL PRESSURE CONTROL	1	CDHS-2B
4	VALVE POSITION INDICATOR	1	X101
5	ORIFICE PLATE ASSEMBLY	1	X52-B

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B	ISOLATION BALL VALVE	5	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F **
Y	STRAINER	1	X43

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600

(#) = According to valve size this feature type could change

OPTIONAL FEATURES : ____ ____ ____ ____

NOT FURNISHED BY CLA-VAL : ____ __ ____ __ ____

NOTE :

Orifice plate assembly X52-A (5) may be fixed directly to the main valve outlet flange, however, better control is obtained, if it is mounted according to the following recommendation : distance X = 5x pipe diameter, distance Y = 3x pipe diameter.

* Main Valve Option : 9HS999

CLA-VAL 43-37

Combinaison rate of flow and solenoid shut-off valve

- **Accurately Limits Flow Rate**
- **Remote Shutoff Feature**
- **Adjustable opening & closing rates**
- **Fail Safe operation**
- **Easy to Maintain**

The Cla-Val Model 43-37 Rate of Flow and Solenoid Shutoff Valve is a hydraulically operated, pilot controlled, diaphragm actuated control valve that limits flow to a preselected maximum rate, regardless of changing line pressure. The pilot control responds to the differential pressure produced across an orifice plate installed downstream of the valve. Accurate control is assured as very small changes in the controlling differential pressure produce immediate corrective action of the main valve. The orifice bore is factory sized based on flow rate to ensure proper control valve performance. Flow rate adjustments can be made by turning an adjusting screw on the pilot control. A solenoid control is provided to intercept the operation of the differential control and close the main valve. The integrated check feature protects upstream equipment like pumps or filter separators by admitting downstream pressure into the main valve cover chamber, closing the main valve upon pressure reversal.

Purchase Specifications

Pilot Control System

The 43-37 Combination Rate of Flow Control and Solenoid Shut-off Valve shall limit flow to the preselected maximum rate regardless of changing line pressure when activated by a solenoid control. The pilot system shall consist of a direct acting diaphragm valve designed to close when the controlling differential exceeds the adjustable spring setting. The pilot control is normally held open by the force of the compression on the spring above the diaphragm and it closes when the pressure acting on the underside of the diaphragm exceeds the spring setting. The pilot control system shall contain a fixed orifice. No variable orifices shall be permitted. A flanged orifice plate assembly shall be included and mounted to the downstream (outlet) flange. Optional pilot system features shall include (A) Flow Clean Strainer, (B) CK2 Isolation Ball Valves, (C) CV Closing Speed Control, (G) Check Feature, (Q) Quick Connect Assembly, (S) CV Opening Speed Control, (T) 55F Thermal Pressure Relief Control, (Y) X43 "Y" Strainer.

Main Valve

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. It shall contain a resilient, synthetic disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consists of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface. The valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions.

Specifications

Sizes
Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details
Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range
Light Petroleum Product -40° to+140°F

Pressure Ratings
150 class 175-PSI Max.
150 class 275-PSI Max.
250 class 300-PSI Max.
300 class 400-PSI Max.

Material
Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

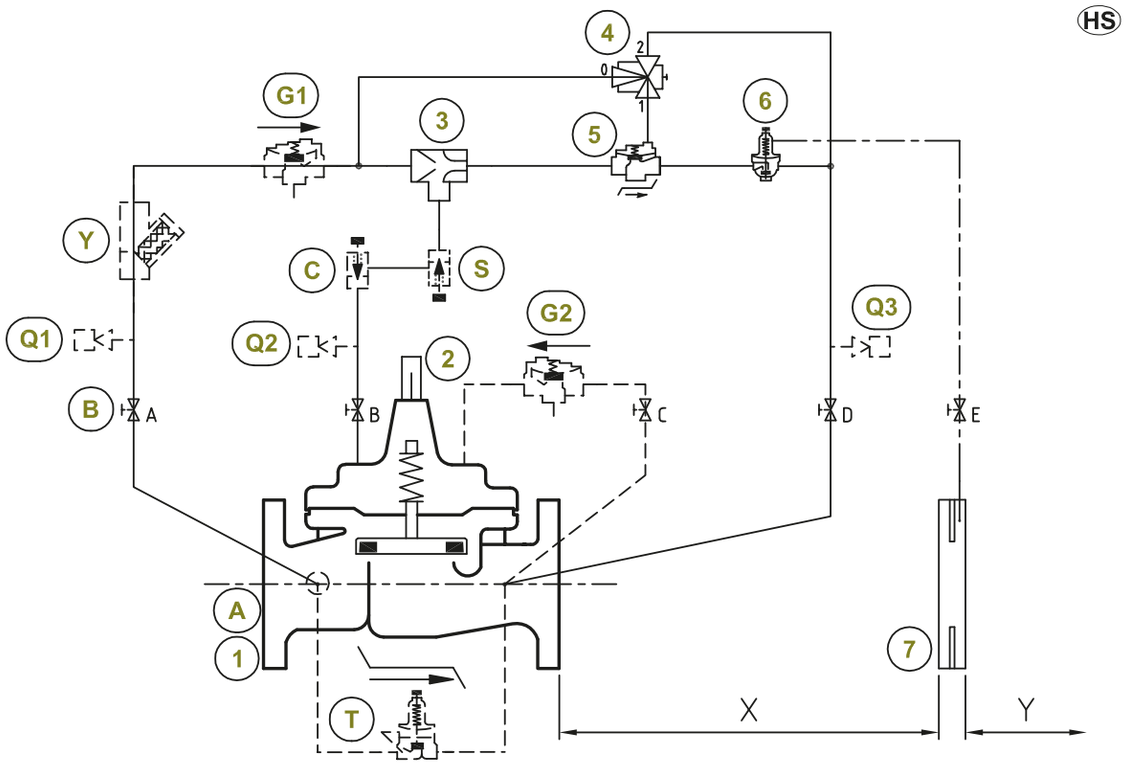
Valve trim:
Bronze ASTM B61
Stainless Steel 303

Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials
Available on Special Order

CLA-VAL 43-37

Combinaison rate of flow and solenoid shut-off valve



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34 */KR
2	VALVE POSITION INDICATOR	1	X101
3	EJECTOR	1	X47A
4	3-WAY SOLENOID VALVE (NO)	1	311-D
5	AUXILIARY VALVE HYTROL	1	100-KHR
6	DIFFERENTIAL PRESSURE CONTROL	1	CDHS-18
7	ORIFICE PLATE ASSEMBLY	1	X52-A

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B		5	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F **
Y	STRAINER	1	X43

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600
(#) = According to valve size this feature type could change

OPTIONAL FEATURES : —— —— —— ——
NOT FURNISHED BY CLA-VAL : —— – —— – ——

CLA-VAL 50-48

Back pressure control valve

- **Rapid Opening to relieve excess pressure**
- **Modulates to maintain constant back pressure**
- **Slow, adjustable closing speed prevents system surges**
- **Optional check feature to prevent reverse flow**

The Cla-Val Model 50-48 Pressure Relief & Back Pressure Valve is a hydraulically operated, pilot-controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system. In relief applications, the valve opens fast to prevent upstream pressure from exceeding the maximum pressure setting while closing gradually to prevent a surge in the system. In back pressure control applications, the valve modulates to maintain constant upstream pressure, regardless of changes in demand, preventing the upstream pressure from falling below the minimum pressure setting. Operation is completely automatic and pressure setting is easily adjusted. If a check feature is added and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber, closing the valve to prevent return flow.

Purchase Specifications

The valve shall be hydraulically operated, diaphragm-actuated, globe or angle pattern valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross section, contained on three and on-half sides by a disc retainer and disc guide, forming a tight seal against a single renewable seat. The valve stem shall be guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve. All necessary repairs shall be possible without removing the valve from the line. If the diaphragm becomes damaged the valve shall open. This valve shall be a Model 100-34 (globe pattern or angle pattern) Hytrol Valve as manufactured by Cla-Val. Newport Beach, California.

Specify When Ordering

1. Size
2. Model 50-48 Globe or Angle
3. Pressure Class
4. Temperature and fluid to be handled
5. Static and flowing line pressure
6. Operating fluid and pressure (if other than line pressure)
7. Body and trim materials
8. End details

Specifications

Sizes
Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details
Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range
Light Petroleum Product -40° to+140°F

Pressure Ratings
150 class 175-PSI Max.
150 class 275-PSI Max.
250 class 300-PSI Max.
300 class 400-PSI Max.

Material
Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

Valve trim:
Bronze ASTM B61
Stainless Steel 303

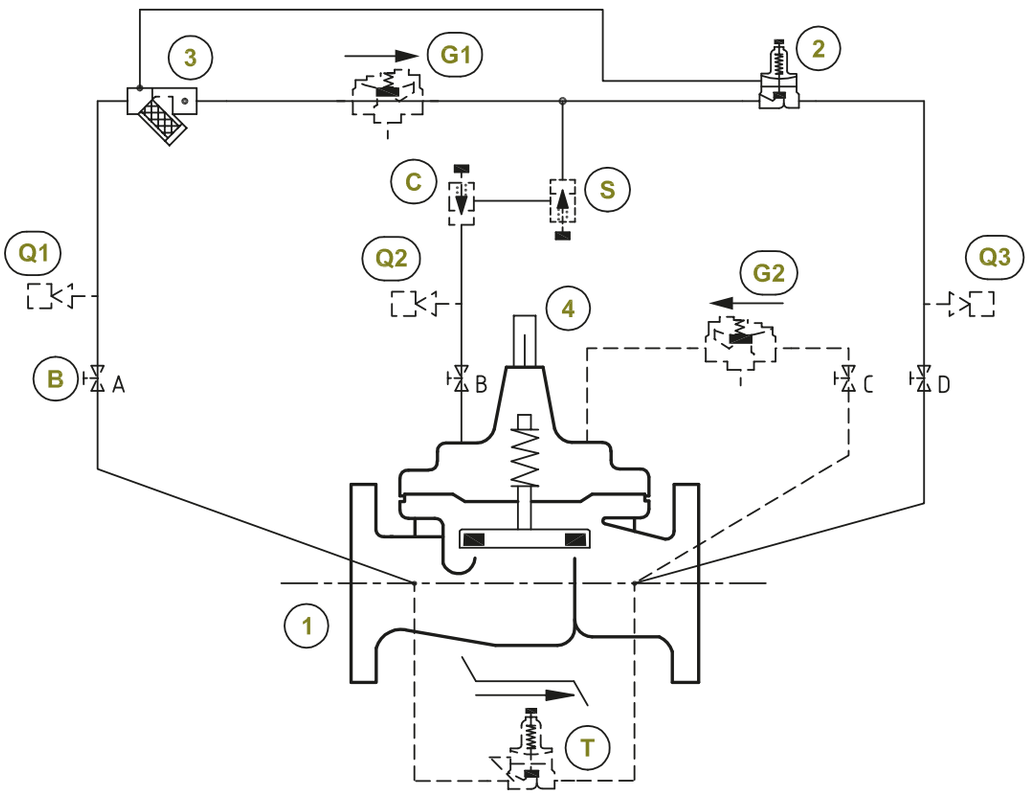
Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials
Available on Special Order

CLA-VAL 50-48

Back pressure control valve

HS



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34 *
2	PRESSURE RELIEF CONTROL	1	CRL
3	STRAINER WITH INCORPORATED ORIFICE	1	X44-A
4	VALVE POSITION INDICATOR	1	X101

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
B	ISOLATION BALL VALVE	4	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600
* Main Valve option : 9HS999

OPTIONAL FEATURES : —— —— —— ——
NOT FURNISHED BY CLA-VAL : —— – —— – ——

CLA-VAL 129-26

High level shut-off valve

- **Installed in the fill line to either underground or above ground fuel storage tanks**
- **Pilot control and hydraulically operated by line pressure, closing fully when tank is full**
- **Provides accurate, repeatable high level shut-off**
- **Can be serviced without removal of valve from line**
- **Fail-safe operation**
- **Position indicator is standard**
- **Available in aluminum, cast steel, stainless steel or ductile iron**

The Cla-Val Model 129-26 Hytrol Valve is used as the basic unit in almost all Cla-Val automatic control valves for petroleum applications. The 129-26 is a hydaulically-operated, diaphragm actuated, globe or angle pattern valve. It is available in various materials and full range of sizes. It consists of three major components: body, diaphragm assembly and cover. The diaphragm assembly is the only moving part. The rugged simplicity of design and packless construction assure a long life dependable, trouble-free operation. Should the diaphragm become damaged the valve will close tight, providing "fail safe" operation. The 129-26 Hytrol Valve is used in many types of piping system requiring control, flow regulation, rate of flow control, or check valve operation.

Purchase Specifications

The valve shall be hydraulically-operated, diaphragm-actuated, globe or angle pattern valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross section, contained on three and on-half sides by a disc retainer and disc guide, forming a tight seal against a single renewable seat. The valve stem shall be guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve. All necessary repairs shall be possible without removing the valve from the line. If the diaphragm becomes damaged the valve shall close tight. This valve shall be a Model 100-34 (globe pattern or angle pattern) Hytrol Valve as manufactured by Cla-Val. Newport Beach, California.

Specify When Ordering

1. Size
2. Model 129-26 Globe or Angle
3. Pressure Class
4. Temperature and fluid to be handled
5. Static and flowing line pressure
6. Operating fluid and pressure (if other than line pressure)
7. Body and trim materials
8. End details

Specifications

Sizes
Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details
Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range
Light Petroleum Product -40° to+140°F

Pressure Ratings
150 class 175-PSI Max.
150 class 275-PSI Max.
250 class 300-PSI Max.
300 class 400-PSI Max.

Material
Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

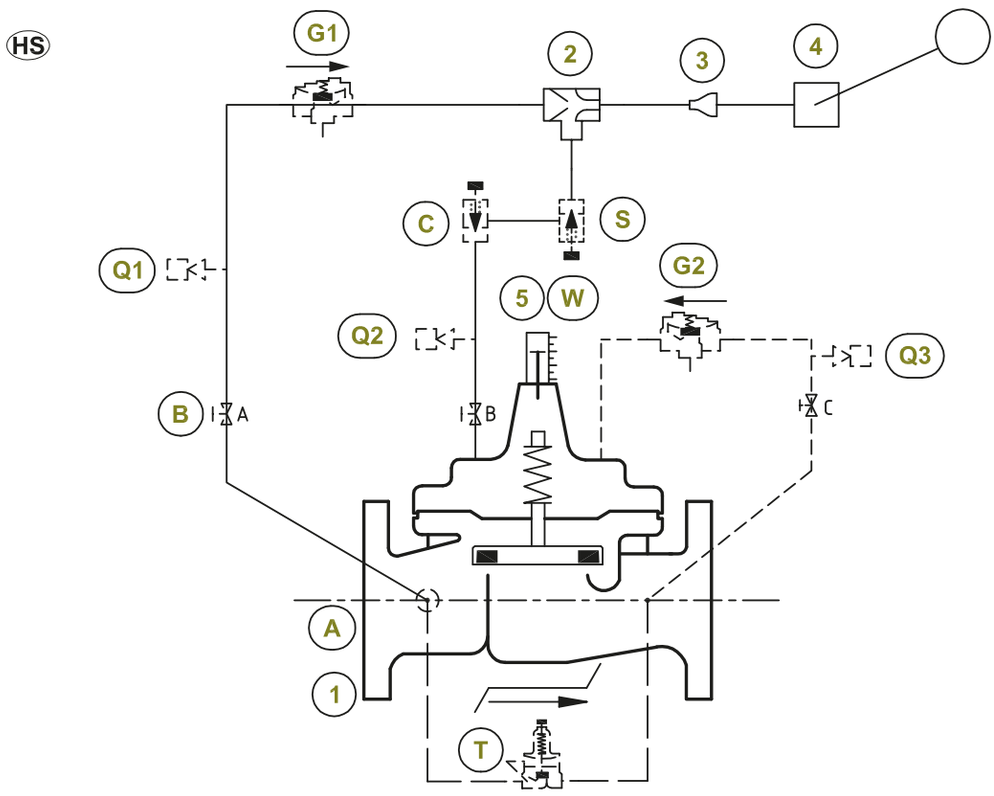
Valve trim:
Bronze ASTM B61
Stainless Steel 303

Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials
Available on Special Order

CLA-VAL 129-26

High level shut-off valve



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34
2	EJECTOR	1	X47A
3	BELL REDUCER	1	
4	2-WAY MODULATING FLOAT LEVEL CONTROL	1	CFM2
5	VALVE POSITION INDICATOR	1	X101

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B	ISOLATION BALL VALVE	2	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
T	PRESSURE RELIEF VALVE	1	55F
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
W	SWITCH ASSEMBLY	1	X105-L

NOTES

AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600

(#) = According to valve size this feature type could change

OPTIONAL FEATURES : —— —— —— ——

NOT FURNISHED BY CLA-VAL : —— – —— – ——

CLA-VAL 131-CP

Electronic interface control valve

- **Ideal for loading or process control applications**
- **Simple Proven Design**
- **Multi-Function Capability**
- **Hydraulic Override Features Available**
- **Easy to Maintain**

The Model 131-CP Electronic Interface Control Valve is designed for applications where remote electronic control is required. It is a hydraulically operated, pilot controlled, diaphragm actuated control valve. These valves are regularly used to provide process control, flow control, and / or pressure control in two-stage loading, bypass, pressure sustaining, or pressure reducing applications. The valve is equipped with two direct-acting two-way solenoids. Upon actuation by a Cla-Val Electronic Controller or other PLC, the solenoid pilot controls either add or relieve line pressure to / from the cover chamber of the valve, causing it to close or open. The 131-CP valve is a fail-safe valve equipped with a manual bypass feature and can also incorporate hydraulic override features.

Purchase Specifications

Pilot Control System

The 131-CP hydraulic control valve pilot system shall consist of dual solenoids which alternately apply or relieve pressure to the diaphragm chamber to position the main valve. The closing solenoid (inlet) shall be normally open (energized to close) while the opening solenoid (outlet) shall be normally closed (energized to open). A manual system to bypass the solenoids shall also be provided. Optional pilot system features shall include (A) Flow Clean Strainer, (B) CK2 Isolation Ball Valves, (C) CV Closing Speed Control, (G) Check Feature, (Q) Quick Connect Assembly, (S) CV Opening Speed Control, (T) 55F Thermal Pressure Relief Control, (Y) X43 "Y" Strainer.

Main Valve

The valve shall be hydraulically operated, single diaphragm-actuated, globe or angle pattern. It shall contain a resilient, synthetic disc with a rectangular cross-section contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm consists of nylon fabric bonded with synthetic rubber and shall not be used as the seating surface. The valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. To insure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of three years from date of shipment, provided the valve is installed and used in accordance with all applicable instructions. Electrical components shall have a one-year warranty.

Specifications

Sizes
Globe: 1 1/2" - 16" flanged
Angle: 2" - 16" flanged

End Details
Flanged:
Cast Aluminum, 150 ANSI B16.1
Cast Bronze, 150 & 300 ANSI B16.24
Ductile Iron, 150 & 300 ANSI B16.42
Cast Steel, 150 & 300 ANSI B16.5

Temperature Range
Light Petroleum Product -40° to+140°F

Pressure Ratings
150 class 175-PSI Max.
150 class 275-PSI Max.
250 class 300-PSI Max.
300 class 400-PSI Max.

Material
Body & cover:
Cast Aluminum 356-T6
Cast Bronze ASTM B62
Ductile Iron ASTM A-536
Cast Stainless Steel 303
Cast Steel ASTM A216-WCB

Valve trim:
Bronze ASTM B61
Stainless Steel 303

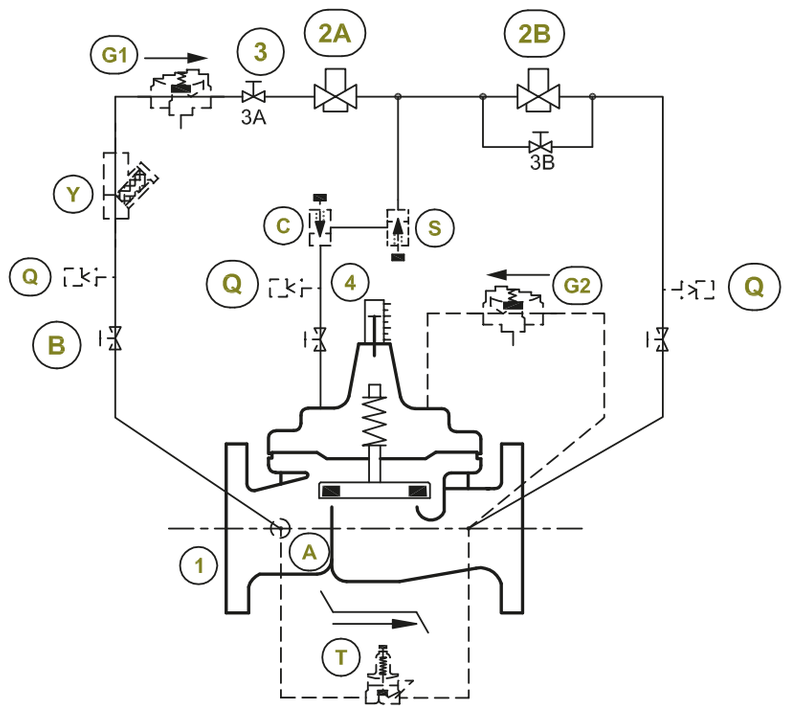
Rubber parts:
Buna-N® Synthetic Rubber
Viton

Other Materials
Available on Special Order

CLA-VAL 131-CP

Electronic interface control valve

HS



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34/KR
2A	3-WAY SOLENOID VALVE (NO)	1	122V
2B	3-WAY SOLENOID VALVE (NC)	1	121V
3	ISOLATION BALL VALVE (3B LOCKABLE)	2	RB-117
4	VALVE POSITION INDICATOR	1	X101

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**
A	FLOW CLEAN STRAINER	1	X46A
B	ISOLATION BALL VALVE	3	RB-117
C	ONE-WAY FLOW CONTROL (CLOSING SPEED)	1	CV
G	CHECK VALVE	2	81-01
Q	QUICK CONNECT ASSEMBLY	3	-
S	ONE-WAY FLOW CONTROL (OPENING SPEED)	1	CV
T	PRESSURE RELIEF VALVE	1	55F **
Y	STRAINER	1	X43

NOTES

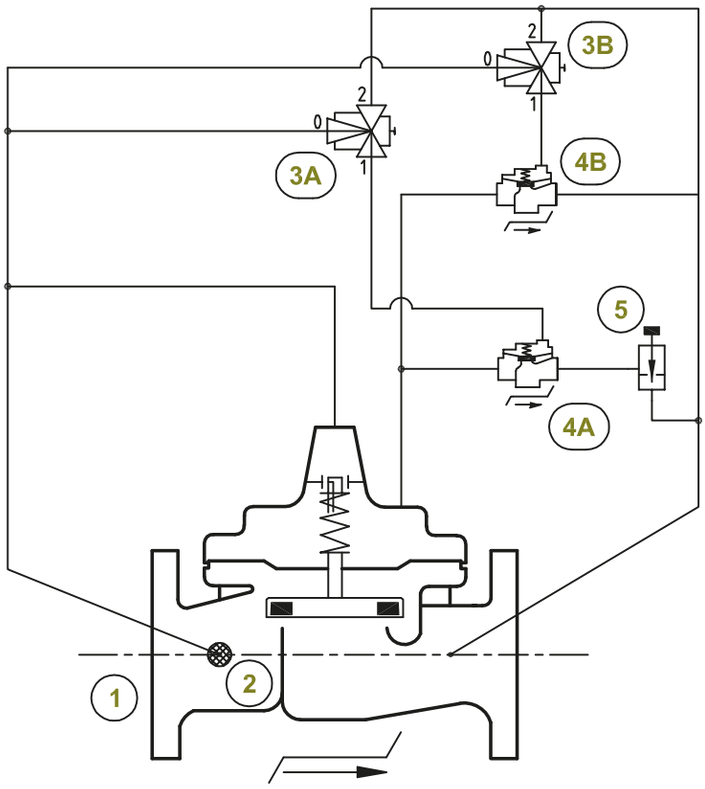
AE/GE : DN 32 - DN 400 / NGE : DN 50 - DN 600
*MAIN VALVE OPTIONS = 9HS999

OPTIONAL FEATURES : —— —— —— ——
NOT FURNISHED BY CLA-VAL : —— – ——— – ——

CLA-VAL 72-401

Two stage set stop valve

HS



STANDARD EQUIPMENT			
No	**Description**	**Qty**	**Type**
1	MAIN VALVE HYTROL AE/GE/NGE	1	100-34/X743KR*
2	FLOW CLEAN STRAINER	1	X46A
3	3-WAY SOLENOID VALVE (NO)	2	311-D
4	AUXILIARY VALVE HYTROL	2	100-KHR
5	NEEDLE VALVE	1	6120

OPTIONAL FEATURES			
No	**Description**	**Qty**	**Type**

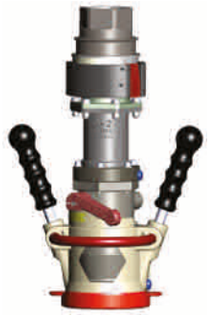
NOTES

AE/GE : DN 50 - DN 100 / NGE : DN 65 - DN 150
(1) 100-34/X143KR = 9HS999
(#) = According to valve size this feature type could change

OPTIONAL FEATURES : —— —— —— ——
NOT FURNISHED BY CLA-VAL : —— – —— – ——

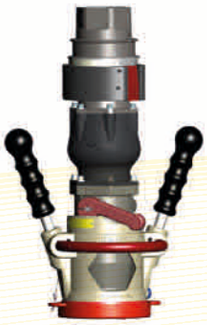
CLA-VAL 341 GF

Heavy Duty Refueling Nozzle



341GF Nozzle with D2 & Dry Break

341GF Nozzle with HEPCV & Strainer Ball Valve



341GF Nozzle with HEPCV & Dry Break

341GF Nozzle Connection View

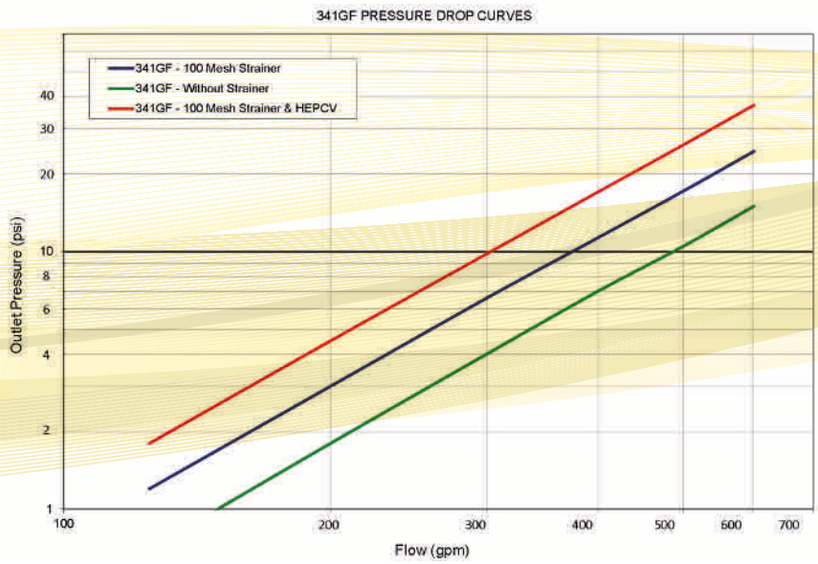
- **Conforms to SAE-AS5877**
- **Connects to MS24484 Single Point Adapter**
- **Low Pressure Drop**
- **All Aluminum and Stainless Steel Construction**
- **Safety Interlock with Square Pins**
- **Convenient Guard Bar Hand Grip**
- **Guard Bar Protects Operating Handle**

The Cla-Val Model 341GF Nozzle is a refueling nozzle for pressure fuel servicing of aircraft, and for bottom loading of tank trucks.

To ensure maximum safety during refueling, the Cla-Val 341GF Nozzle has primary and secondary interlock systems. The primary interlock ensures that the nozzle cannot be opened when it is not connected to an aircraft adapter. The secondary interlock protects the 341GF Series Nozzle from hazards of interfacing with badly worn aircraft adapters. Even when used with a badly worn adapter, the nozzle is safer because it uses square register pins that provide positive alignment with the square slots in the adapter. In addition, the nozzle cannot be removed from the adapter until the operating lever is rotated to the fully-closed position.

To achieve maximum strength and durability, the Cla-Val 341GF Nozzle uses a stainless steel bayonet ring cast within the aluminum collar of the nozzle. The crank shaft of the nozzle extends across the entire width of the interior flow path and is supported from end-to-end by a structural wall that splits the flow path. This wall supports the crank shaft while straightening the flow and keeping flow resistance as low as possible. To reduce aircraft refueling times, the flow resistance though the Cla-Val 341GF Nozzle has the lowest head loss, which means it can fill an aircraft faster than any other nozzle.

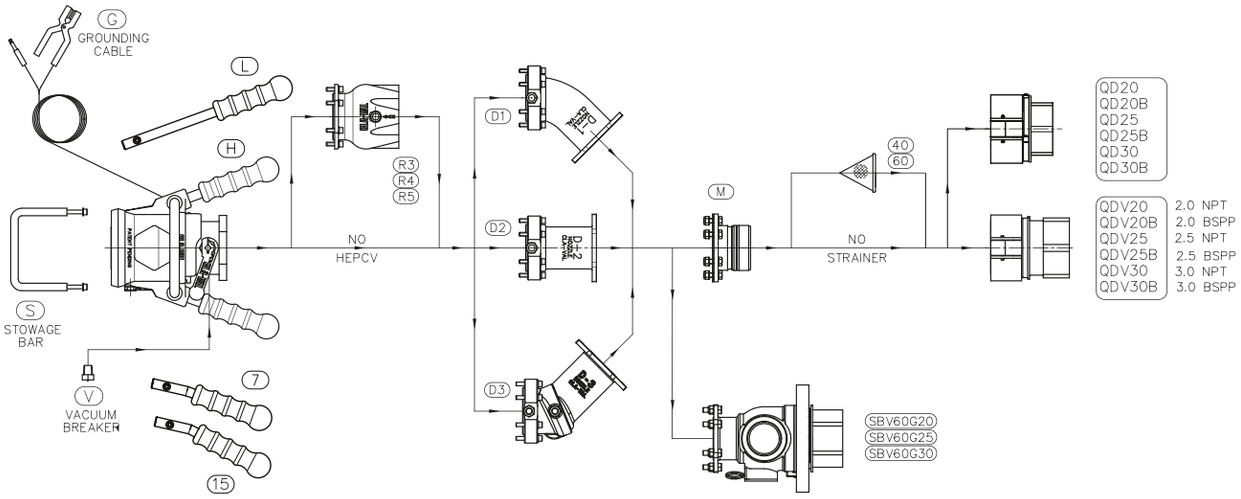
Pressure Drop Data



CLA-VAL 341 GF

Heavy Duty Refueling Nozzle

Model Numbering Scheme



Create Complete Model Numbers for Various Applications

It is easy to customize a 341GF Refueling Nozzle to special requirements. Complete model numbers always begin with “341GF”. Add your option selections to this base model number, following the flow chart above from left to right. See example below.

341GF- G V D3 M 60 QDV25

- 2.5 INCH NPT FEMALE DRY BREAK QD ASSY.
- 60 MESH STRAINER
- MALE QD ADAPTER (W/MIL. STAR FLANGE)
- D-3 VARIABLE SWIVEL INLET
- VACUUM BREAKER
- GROUNDING CABLE ASSEMBLY

341GF-R5 D3 100 SBV 30

- 3-INCH NPT THREADS
- STRAINER BALL VALVE
- 100 MESH STRAINER
- D-3 VARIABLE SWIVEL INLET
- 55 PSI HOSE END PRESSURE CONTROL VALVE

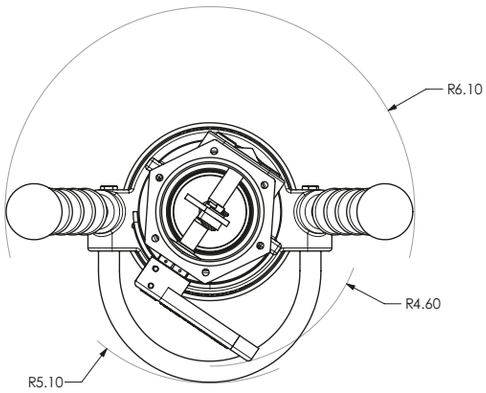
Available Options for Model 341GF

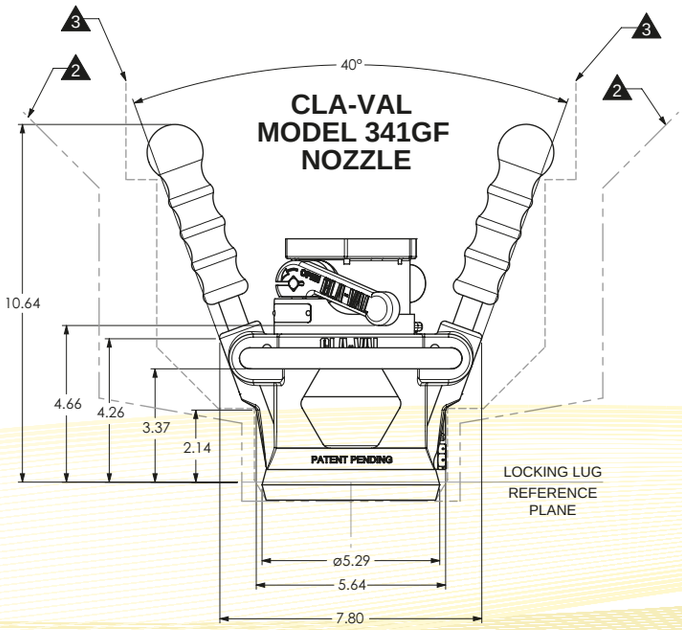
H	STANDARD HANDLES	**40**	40 MESH STRAINER
L	LONG HANDLES	**60**	60 MESH STRAINER
7	STANDARD HANDLES WITH 7° BEND	**100**	100 MESH STRAINER
15	STANDARD HANDLES WITH 15° BEND	**QD**	STANDARD QUICK DISCONNECT
G	GROUNDING CABLE	**QDV**	DRY BREAK QUICK DISCONNECT
V	VACUUM BREAKE	**SBV**	349GF STRAINER BALL VALVE
S	STOWAGE BAR	**B**	BLANK SBV INSPECTION COVER
R3	35 PSIG HEPCV WITH FLANGED OUTLET	**G**	GLASS SBV INSPECTION COVER
R4	45 PSIG HEPCV WITH FLANGED OUTLET	**20**	2-INCH NPT THREADS
R5	55 PSIG HEPCV WITH FLANGED OUTLET	**20B**	2-INCH BSPP THREADS
D-1	D-1 ELBOW SWIVEL INLET	**25**	2.5-INCH NPT THREADS
D-2	D-2 STRAIGHT SWIVEL INLET	**25B**	2.5-INCH BSPP THREADS
D-3	D-3 VARIABLE SWIVEL INLET	**30**	3-INCH NPT THREADS
M	MALE QUICK DISCONNECT ADAPTER	**30B**	3-INCH BSPP THREADS

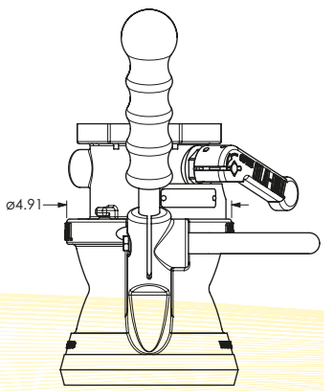
CLA-VAL 341 GF

Heavy Duty Refueling Nozzle

Envelope Dimensions







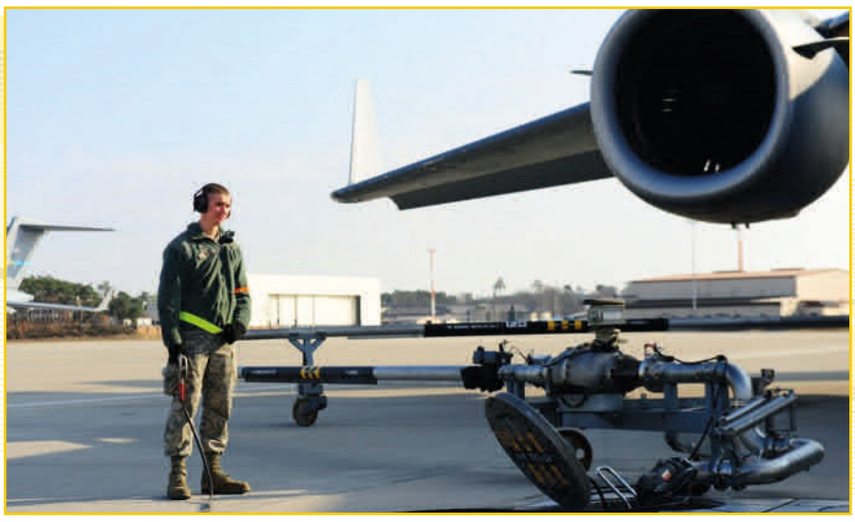
CLA-VAL 351 GF-14

Hydrant Coupler

- Large Radius Elbow Provides Lower Pressure Loss
- Rugged Carrying Handles
- Available with either 4" NPT threaded, Swivel, or Flanged connections
- Coupler can Swivel 360° After Connection to Adapter
- Aluminum/Stainless Steel Internals
- Temperature Range -40° to +180° F

The Cla-Val Model 351GF-14 Hydrant Coupler connects to DOD style hydrant pit adapters or hydrant pit valves to allow pressurized delivery of fuel to aircraft. Constructed of high strength stainless steel and aluminium for optimum durability.
To maximize safe refueling, the operating handle of the Cla-Val 351GF-14 Hydrant Coupler cannot be rotated when the coupler is not connected to an adapter.

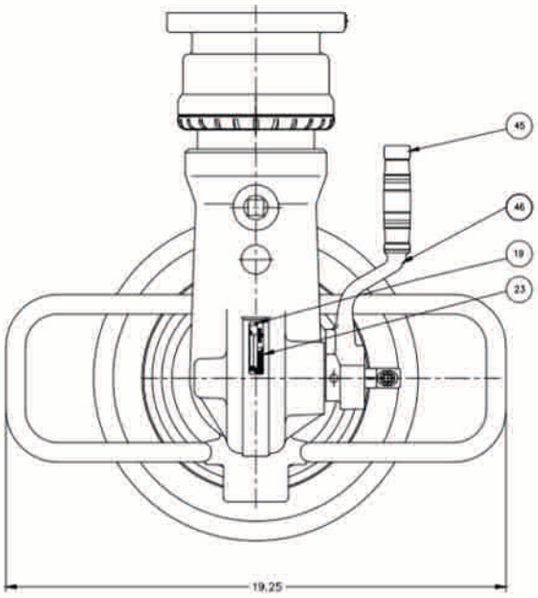
When the coupler is connected to an adapter, the operating handle must be in the fully closed position to remove the coupler. To reduce overall pressure loss, the Cla-Val 351GF-14 Hydrant Coupler features a large radius elbow. Lower head loss means faster refueling times. The coupler has a 4" NPT threaded connection, supplied either with or without a 4" Quick Disconnect Swivel Assembly. The elbows also includes rugged carrying handles.

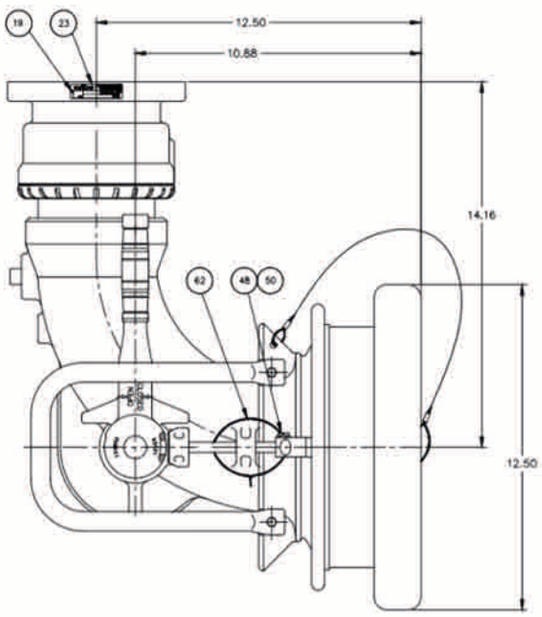


CLA-VAL 351 GF-14

Hydrant Coupler

Dimensions (inches)





Complete model numbers always begin with “351GF-14”.
Add your own option selections to this base model number.
See examples below.

351GF-14-DOD

WITH 4" NPT THREADS
4 INCH ELBOW AND OUTLET

351GF-14S-DOD

FEMALE QD FITTING WITH 4" NPT THREADS

351GF-14F-DOD

FEMALE QD FITTING WITH FLANGED OUTLET

CLA-VAL 850 GF

Refueling/Defueling Pantograph

- **Maximum Protection Against Environmental Leakage**
- **Higher Flow Rates and Shorter Refuelling Times**
- **Stainless Steel Piping**
- **All Stainless Steel Non-Lubricated Swivel Joints**
- **Heavy Duty Wheels and Casters**
- **Galvanized Steel Support Structures**
- **Spring Tension Counterbalances**
- **Low-Profile and High-Lift Designs Available**

The Cla-Val Model 850AF Pantograph is the ultimate aviation fuelling device. Hard-piped to eliminate the liabilities associated with rubber hose, the Cla-Val 850AF Pantograph sets the industry standard for maintenance-free operation, higher flow rates, and design versatility in refuelling systems.

The structural integrity of the Cla-Val 850AF Pantograph ensures maximum service life and maintenance-free operation. It is constructed of stainless steel piping and valves connected by rugged, multi-axis swivel joints for easy maneuvering. These high-performance swivels require no lubrication and retain their integrity during the most demanding applications, including towing the pantograph from site to site.

The Cla-Val 850AF Pantograph achieves higher flow rates and shorter refueling times than refueling systems that utilise hoses or hose reels. The lower internal flow resistance of pipe allows the pantograph to deliver fuel with a lower overall drop in pressure.

The Cla-Val 850AF Pantograph offers designs for small loading racks, low-wing or fuselage refuelling, and even high-lift designs for refuelling the largest aircraft flying today. The pantograph extends to reach remote delivery points and then retracts for compact storage. It can be located above ground or mounted in below-grade pits. It can be configured for permanent installation or as a tow rig for portable applications. Portability is enhanced by the use of heavy-duty casters and wheels, making the Cla-Val 850AF Pantograph easy to maneuver for fast refuelling or defuelling of fixed-wing aircraft, helicopters, or tank trucks.

Specifications

Diameter: 3"(DN 80), 4"(DN 100), 6"(DN 150)
Pressure class: PN 10, 125 lbs
Pipe material: Stainless steel,
Total length: 9' (3,0 m)

Materials

Stainless steel

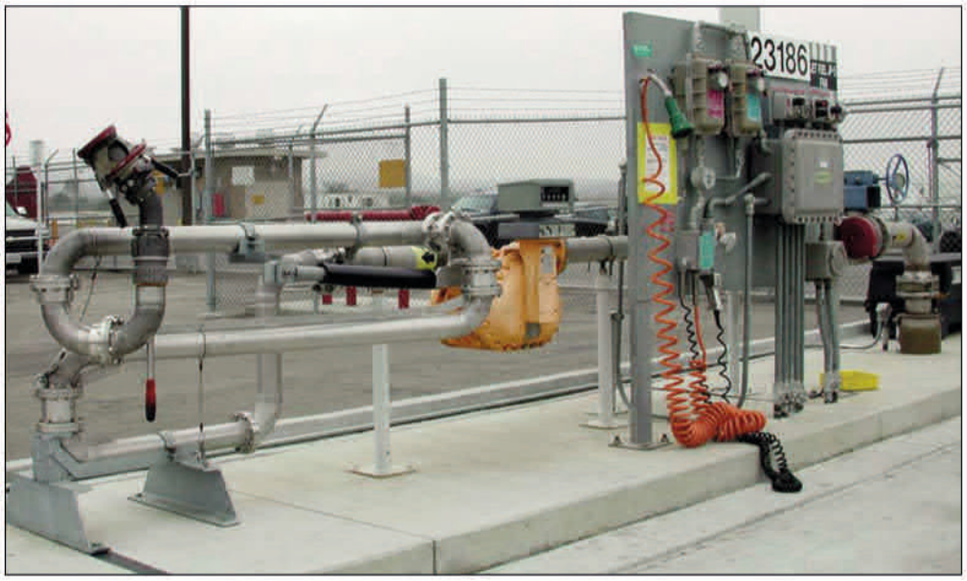
Equipment

Combination of Flanged Swivel Joints type C-GE-3F, 3"(DN80), 3 bearings, double sealed, made of stainless steel, non-lubricated and maintenance free, Type C-GE-3F/M, 4 bearings, double sealed, made of stainless steel, non-lubricated.

- 3-year leakage free warranty
- Cla-Val Refueling Nozzle - Conforms to SAE-AS5877
- Connects to an MS24484 Single Point Adaptor
- Counterbalance unit
- Locking device

CLA-VAL 850 GF

Bottom Loader Pantograph



For the refuelling of tank trucks with bottom loading connection

The Cla-Val PANTOGRAPH Model "Bottom Loader" is designed for bottom loading of all refuelling trucks without using hoses.

Description

The Pantograph is used for bottom loading of refuelling trucks. In conjunction with a Cla-Val Control Valve and Cla-Val Fuelling Nozzle, the Pantograph has the capability to fill refuelling units at flow rates up to 600 GPM. The Pantograph consists of several sections, which are connected to each other by CLA-VAL Flanged Swivel Joints. The dispensing end consists of a swivel joint/pipe combination, which is counterbalanced by an adjustable spring device, and can be coupled to a tank truck with heights adjustable from of 1 ft. (0,3m) 4 ft (1,2 m) above street level.

In the stored position the Pantograph is retracted in order to save space. The CLA-VAL Pantographs is a modular design.

Specifications

Diameter: 3"(DN 80), 4"(DN 100), 6"(DN 150)
Pressure class: PN 10, 125 lbs
Pipe material: Stainless steel,
Total length: 9' (3,0 m)

Materials

Stainless steel

Equipment

Combination of Flanged Swivel Joints type C-GE-3F, 3"(DN80), 3 bearings, double sealed, made of stainless steel, non-lubricated and maintenance free, Type C-GE-3F/M, 4 bearings, double sealed, made of stainless steel, non-lubricated.

- 3-year leakage free warranty
- Cla-Val Refueling Nozzle - Conforms to SAE-AS5877
- Connects to an MS24484 Single Point Adaptor
- Counterbalance unit
- Locking device

CLA-VAL 380 GF

Sexless Coupling

- **Created for tactical US Army Fuel Systems**
- **Interchangeable with similar 2 and 3 inch couplings manufactured by other suppliers**
- **Sexless configuration is designed to mate with any two couplings, allowing for the connection of hose assemblies, regardless of the end fitting**
- **Available with or without Integral Ball Valve**
- **Safety Interlock Design**
- **Flat MS Flanges, Camlok Fittings, NPT and BSPP Adapter Connections Available**
- **Convenient Lift-and-Turn Folding Operating Lever**
- **Ball Race Swivel Joint with Low Friction Seal**
- **2 inch and 3 inch Sizes Available**

Technical Information

- Designed per A-A-59377A
- Pressure Drop - 3 psi/.206 bar maximum for size 2-inch unit at 200 gpm (757 l/min)
- Operating Pressure - 100 psi (6.895 bar)
- Burst pressure - 300psi (20.684 bar)
- Hose Swivel Torque - 240 in-lb maximum at 100 psi (6.894 bar)
- Operating Temperatures - 25°F to + 155°F (-31.7°C to +68.3°C)

The Cla-Val Model 380GF Sexless Coupling meets all the design and performance requirements of government specification A-A-59377 Revision A, “Commercial Item Description – Coupling Assembly, Quick Disconnect, Sexless Type”.

The Cla-Val Model 380GF Sexless Coupling provides a means of coupling two hoses, or other components, together without the need to match up male and female features. When connected, face seals ensure a drip-tight connection with the mating coupling. When connected, couplings with ball valve shut off features cannot be disconnected when the ball valve(s) are in the open position.

The Cla-Val Model 380GF Sexless Coupling provides a very simple means of connecting two flow conduits together without regard to coupling type. There is no male or female variant, making it possible to connect any two identical couplings. This is especially valuable in environments where visibility is restricted by weather conditions or by darkness. The Model 380GF Sexless Coupling is used whenever there is a need to make quick assembly of system components with speed and in extreme conditions.

The Cla-Val Model 380GF Sexless Coupling will safely interface and work with interlock features of most commonly used couplings and components.

The 380GF Sexless Coupling can be configured either with or without an integral ball valve. This ball valve can be opened after connection to a mating coupling to allow for the flow of fuel, but must be fully closed before disconnection can be accomplished. This interlock feature ensures that fuel will not be accidentally spilled.

Coupling assemblies are available with a variety of adapter connections including flat MS flanges, Camlok fittings or NPT and BSPP connections - all of which are capable of mating with different hose sizes and a variety of other components. Consult factory if other end connection types are desired.

The 380GF Sexless Coupling features a lift-and-turn folding operating lever. This convenient design makes it easy to open and close the integral ball valve even when wearing thick arctic mittens. The folding operating lever handle locks in both open and closed positions.

The Cla-Val Model 380GF Sexless Coupling is constructed of aircraft-grade Aluminum and Stainless Steel. This very rugged design can withstand a high level of abuse and still reliably function in critical applications. Each coupling features a swivel joint with a ball bearing race and a low friction seal. This swivel joint is easy to rotate even in extreme environments or when left to stand for many months in storage.

CLA-VAL 380 GF

Sexless Coupling

MODEL NUMBER SCHEME
380GF- __ -__ __ __

ADAPTER ASSEMBLY			
ADAPTER	**DESCRIPTION**	**2" NOZZLE**	**3" NOZZLE**
15H	1 1/2" HOSE BARB	✓	N/A
20H	2" HOSE BARB	✓	N/A
30H	3" HOSE BARB	N/A	✓
MIL	MILITARY NOZZLE FLANGE	✓	✓
COM	COMMERCIAL NOZZLE FLANGE	✓	N/A
380GF	380GF ADAPTER (SAME SIZE) W/ SAMPLE PORT	✓	✓
30T	3" TTMA FLANGE	✓	✓
HIFR	2" HOSE BARB FOR HIFR CABLE	✓	N/A
10M	1" MALE NPT	✓	N/A
15M	1 1/2" MALE NPT	✓	N/A
15F	1 1/2" FEMALE NPT	✓	N/A
15MB	1 1/2" MALE BSPP	✓	N/A
15FB	1 1/2" FEMALE BSPP	✓	N/A
20M	2" MALE NPT	✓	N/A
20F	2" FEMALE NPT	✓	✓
20MB	2" MALE BSPP	✓	N/A
20FB	2" FEMALE BSPP	✓	N/A
25M	2 1/2" MALE NPT	✓	✓
25F	2 1/2" FEMALE NPT	N/A	✓
25MB	2 1/2" MALE BSPP	✓	N/A
25FB	2 1/2" FEMALE BSPP	✓	N/A
30M	3" MALE NPT	N/A	✓

COUPLER SCREEN			
	MESH	**2" COUPLER**	**3" COUPLER**
	NONE	-	-
40	40 MESH	✓	✓
60	60 MESH	✓	✓
100	100 MESH	✓	✓

VALVED			
		2" COUPLER	**3" COUPLER**
V	VALVED	✓	✓
NB	NON-VALVED	✓	N/A

COUPLER SIZE	
SIZE	
2	2" COUPLER
3	3" COUPLER

ASSEMBLY HARDWARE			
		2" COUPLER	**3" COUPLER**
V	VALVED	✓	✓
NB	NON-VALVED	✓	N/A

CLA-VAL 346 GF

Emergency Breakaway Coupling

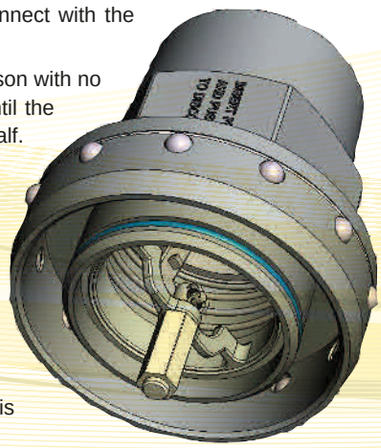
- **Double Shut-Off Design**
- **Lowest Possible Pressure Drop**
- **Twin Stainless Steel Butterfly Valves**
- **Pulls apart with 200 lbs./425 lbs. Axial Force**
- **Pressure Balanced Design**
- **No Broken Pins to Replace**
- **Re-coupled by One Person with no Tools**
- **Robust Design for Long Life**
- **Large Aluminum Drag Ring**

The Model 346GF Emergency Breakaway Coupling (EBC) cleanly comes apart and closes both separated halves when an axial load of 200 - 250 lbs.(346GF-250), 425 - 450 lbs. (346GF-500) at 0 to 450 gpm is applied. It is used by the US Navy at ground-based refueling facilities so that a pilot can drive/fly away from the refueling facility in case of emergency.

The Model 346GF Emergency Breakaway Coupling responds to an axial pull force to separate and close both halves to prevent the loss of fuel.

The Coupling incorporates the closure elements utilized in the Cla-Val Model 344GF Hose End Quick Disconnects that are well proven to close tightly and have the strength to withstand high pressures. When open, these closure elements (resembling butterfly valves) are turned to allow the flow of fuel. Because of this unique design, the resistance to flow is significantly lower than any competing product today. The 346GF Emergency Breakaway Coupling has the lowest pressure drop and, therefore, reduces refueling times.

There are no pins or screws broken during disconnection. The Model 346GF Emergency Breakaway Coupling incorporates a unique pressure balance configuration that causes the Coupling to disconnect with the same force regardless of internal pressure levels.



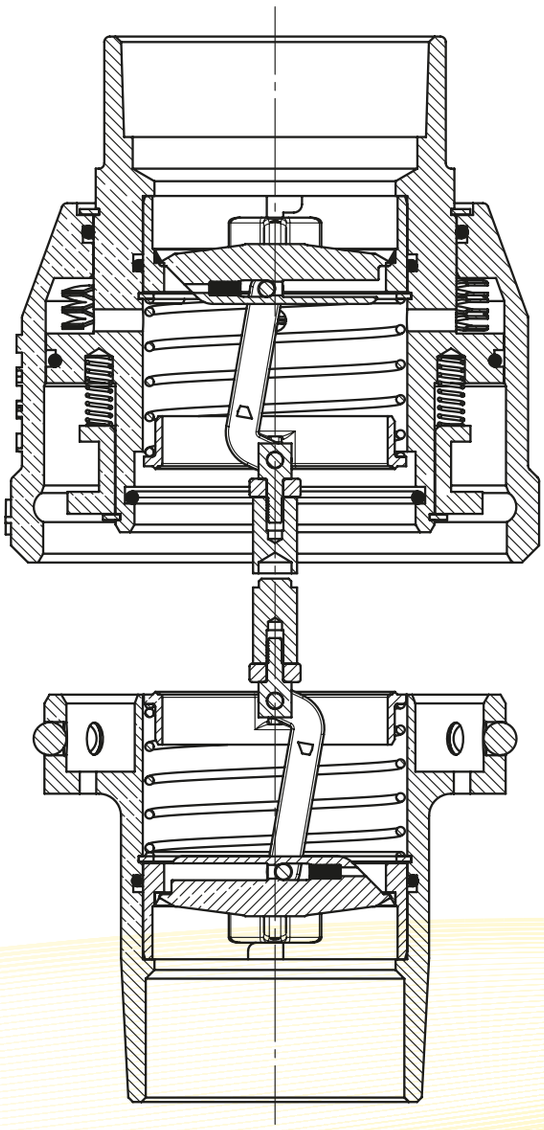
The Model 346GF Emergency Breakaway Coupling is very easily reconnected by one person with no tools required. When disconnected, just align the two halves and press them together until the grey flat face of the inlet half becomes flush with the end of the black sleeve on the outlet half. This visual check confirms that the Coupling is fully engaged and is ready and safe for use. When connected, the Model 346GF Emergency Breakaway Coupling performs as a swivel joint allowing the outlet end to turn as required.

The coupling can be easily disconnected manually to give access to the swivel joint O-ring. Simply insert two 1/8” dia. pins into the two holes provided thru the flat face of the inlet half. Push in the two pins to depress the latch ring and pull the two halves apart.

The pressure balanced design of the Cla-Val Model 346GF Emergency Breakaway Coupling incorporates a number of springs and o-rings that limit fuel leakage. The main swivel o-ring, which is located on the Inlet Half can be easily changed with the Coupling is disconnected. This o-ring can be changed on the flight line.

CLA-VAL 346 GF

Emergency Breakaway Coupling



THREAD SIZE	
346GF-250	**346GF-500**
3"-8 NPT (Male X Female)	3"-8 NPT (Male X Female)
2.5"-8 NPT (Male X Female)	2.5"-8 NPT (Male X Female)
3"-8 Npt X 2.5"-8 NPT (Male X Female)	3"-8 Npt X 2.5"-8 NPT (Male X Female)
2.5"-8 NPT (Female X Female)	2.5"-8 NPT (Female X Female)

NOTE: If an event has occurred involving the emergency separation of the 346GF, Cla-Val recommends that the coupling be immediately removed from service for a complete rebuild. In certain operational situations, removing the 346GF may not be possible and can be re-coupled in the field very easily.

If the leading edge of the sleeve is not flush with the flat face of the mating part then the 346GF is not fully connected and should not be put back into service.

After a second event the 346GF should be replaced.

Notes

Terms and Conditions of Sale and Warranty

Terms and Conditions of Sale and Warranty

I GENERAL

Until otherwise agreed, in writing, the following conditions are valid. The Buyer, as referred into the terms of sale, is a CLA-VAL Europe customer.

II PRICE

1. Our prices are net, ex works and subject to packing and carriage charges. The prices are exclusive of any applicable VAT.

2. VAT is charged extra at the rate applicable at the time of invoicing.

3. Freight and packaging (wooden crates, pallets etc) will be charged at cost for each shipment.

4. Orders with a net value of less than CHF 150 (EUR 100) will be subject to a CHF 150 (EUR 100) handling fee.

5. All order modifications made 48 hours after order acknowledgement will be subject to a CHF 150 (EUR 100) handling fee. CLA-VAL Europe reserves to charge additional costs depending on production processing status of the order as well as modification cost consequences on open order.

6. No handling fee will be applied to orders placed through the CLA-VAL Europe internet ordering system (www.cla-val.ch).

7. We reserve the right to make partial deliveries, which can be invoiced separately.

8. We reserve the right, if freight was quoted, to charge fuel increase at time of shipment.

9. If not quoted, tests, certificates, special documents, legalisation, installation and commissioning are not included in our prices and will be charged according the CLA-VAL Europe IT421 price list.

10. Quotation validity 3 months from the date of issue.

III PAYMENT

1. For any national order (territories: Switzerland, France, UK and Ireland) we request 30 days net payment due from the shipment date (or dispatch date) from one of our Euro locations.

2. For any national signed framework agreements (territories: Switzerland, France, UK and Ireland) where business volume is granted, payment terms could be adapted but must be approved by the Managing Director in charge of the said CLA-VAL Euro location.

3. For any international order CLA-VAL Europe can request, on a case by case basis, a L/C (Letter of Credit) opened with a CLA-VAL Europe approved bank and referring to CLA-VAL Europe L/C standards.

4. For day to day international business below EUR 10'000 with established European Distributors we request 30 days net payment due from the shipment date (or dispatch date) from one of our Euro locations.

5. For day to day international business below EUR 10'000 with non European Distributors we request maximum 90 days net payment due from the shipment date (or dispatch date) from one of our Euro locations.

6. For all new international customers advance payment or Letter of Credit is requested.

7. Advanced payment is considered to be 100%.

8. CLA-VAL Europe does not accept any liquidated damages, penalties or retention.

IV TITLE AND RISK

The Buyer becomes owner of the goods as per Incoterms.
The Buyer is responsible for cover against all risks of loss, damage or destruction of goods until full payment has been made to CLA-VAL Europe.
The Buyer shall store and label all goods belonging to CLA-VAL Europe for which payment has not been made so that the goods shall be identified as such.

V DAMAGE OR LOSS IN TRANSIT

CLA-VAL Europe assumes no liability for damage or loss of shipment. All shipments should be unpacked and examined immediately upon receipt. Any external evidence or loss or damage must be noted on the freight bill or carrier's receipt and signed by the carrier's agent at the time of delivery. Failure to do so will result in the carrier's refusal to honour the claim. Buyer should then notify CLA-VAL Europe with a copy of the freight bill or damage report so that CLA-VAL Europe then can file a claim for loss or damage in transit with the carrier. If damage does not become apparent until shipment is unpacked, customer must make a request for inspection by the carrier's agent and file with the carrier within 15 days after receipt of product and notify CLA-VAL Europe. CLA-VAL Europe is not liable for consequential damages resulting from the installation of damaged product.

VI DELIVERY

Any dates for delivery, although quoted in good faith, are estimates only and CLA-VAL Europe shall not be liable for any delay in delivery of the goods however caused.
CLA-VAL Europe undertakes to match its delivery estimate but does not accept cancellation of order or liability for any direct or indirect losses which may arise, for any reason whatsoever, from our failure to match to such estimate.

VII ORDER CANCELLATION

Orders are not subject to cancellation or change in specifications, shipping schedules or other conditions originally agreed upon without CLA-VAL's written consent and then only upon agreement to compensate the CLA-VAL Europe for loss caused by such cancellation or changes.
In the event that the buyer cancels all or parts of an order, once confirmed, the buyer is subject to a 50% cancellation fee of the amount as stipulated in the Order Acknowledgement.
The buyer is obligated to accept and pay for any product build and ordered as non-standard product or solution product.

VIII RETURN OF GOODS

1. Buyer must obtain written approval from CLA-VAL Europe prior returning any material.

2. CLA-VAL Europe reserves the right to refuse the return of any product.

3. Only goods in original packaging can be accepted. Goods returned must be in condition for resale as new equipment to qualify for credit.

4. Products more than **six (6) months** old cannot be returned for credit.

5. Specially produced, non-standard models cannot be returned for credit.

6. Rubber goods such as diaphragms, discs, o-rings, etc..., cannot be returned for credit.

7. Goods authorized for return are subject to a **50% (min. 100 Euro / 150 CHF) restocking charge and a service charge** for inspection, replacement of rubber parts, retesting, repainting and repackaging.
Authorized returned goods must be packaged and shipped prepaid to CLA-VAL Europe - Switzerland.

I WARRANTY

1. Automatic valves and controls manufactured by CLA-VAL Europe are warranted for three (3) years from date of shipment against manufacturing defects in material and workmanship which develop in the service for which they are designed, provided the products are installed and used in accordance with all applicable instructions and limitations issued by CLA-VAL Europe. Normal wear is not covered by this warranty.

2. We will repair or replace defective material, free of charge which is returned to our factory, transportation charges prepaid, provided that after inspection the material is found to have been defective at time of shipment.

3. This warranty is expressly conditioned on the Buyer's giving CLA-VAL Europe immediate written notice upon discovery of the defect.

4. Electronic components manufactured by CLA-VAL Europe are warranted for one (1) year from the date of shipment.
5. Rechargeable lead batteries and super capacitors are warranted for six (6) months from the date of shipment.

6. CLA-VAL Europe warranty does not cover dry batteries and rechargeable Li-Ion or Ni-Mh batteries.

7. Components used by CLA-VAL Europe, but manufactured by others, are warranted only to the extent of that manufacturer's guarantee.

8. This warranty shall not apply if the product has been altered, repaired, adjusted or modified by non CLA-VAL Europe employees or specially CLA-VAL Europe trained technicians, and CLA-VAL Europe shall make no allowance or credit for such repairs or alterations unless authorized in writing by CLA-VAL Europe.

9. Repaired, replaced or exchanged product will be warranted for the repair warranty period which comes into effect as of the date the repaired, exchanged or replaced product is shipped by CLA-VAL Europe, or the remainder of the original warranty, whichever is longer.

10. Products found to be defective for which warranty is applicable will be replaced or repaired at CLA-VAL's discretion. CLA-VAL Europe is not responsible for charges resulting from the removal and/or replacement of product.

11. Before removing a product from the installation we suggest contact an AUTHORIZED CLA-VAL Europe technical support technician.

12. The CLA-VAL Europe specialist will work with the field technician to troubleshoot the problem. (Many problems are site-related and can be solved over the phone.)

13. New products ordered in an attempt to circumvent the warranty process may not be reimbursed if, upon receipt of a returned product, it is determined that the product defect is actually field related, or product has been returned for cosmetic reasons only.

14. Due to vibration in shipping CLA-VAL Europe products, we strongly recommend checking all tubing, fittings and cover bolts prior to system start up.

II DISCLAIMER OF WARRANTIES & LIMITATION OF LIABILITY

The foregoing warranty is exclusive and in lieu of all other warranties and representations whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

CLA-VAL Europe shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product.

CLA-VAL Europe shall not be liable for any damages or charges for labour or expense in making repairs or adjustments to the product. CLA-VAL Europe shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data and services.
No representative of CLA-VAL Europe may change any of the foregoing or assume any additional liability or responsibility in connection with the product. The liability of CLA-VAL Europe is limited to material replacements, Ex-Works CLA-VAL Europe.

The liability of the CLA-VAL Europe is defined conclusively in section X. Any other buyer claims towards CLA-VAL Europe, irrespective upon which legal basis these are made, especially those concerning price reduction or cancellation, are excluded and expressly dismissed.

III FORCE MAJEURE

Neither CLA-VAL Europe nor the Buyer accept liability for damage of any kind if obstacles occur which they are unable to prevent despite all due care, irrespective of whether these occur at the site of CLA-VAL Europe, the Buyer or a third party. Such obstacles as for example, epidemics, mobilization, war, uprisings, serious operational problems, accidents, labour disputes, delayed faulty delivery of the required raw materials, semi-finished finished goods, off-spec rejection of important work piece institutional measures or injunctions, natural hazards or other circumstances which are, to a large extent, not within the scope of control of the CLA-VAL Europe or the Buyer. However, payment may not be retained or delayed for product(s) delivered to Buyer with reference to such circumstances. In such case both parties shall undertake all effective measures, which can be expected of them to prevent damage, or if damage occurs to minimize the scope of this damage as far as possible.

IV NON-STOCK AND NON-CATALOGUE ITEMS

Products not listed in the current price list or catalogues are considered to be special order items and subject to minimum order quantities, special handling charges, and/or other condition stipulated to us by suppliers. Such items normally are subject to longer delivery times. Special order items may carry cancelation charges once an order is placed and may also be subject to a restricted return policy.

V PROPER LAW AND JURISDICTION

The contract of sale and the respective rights and obligations of the Buyers and CLA-VAL Europe with regard thereto shall be governed by and construed according the laws of Switzerland. **The jurisdiction place is Lausanne (Switzerland).**

The implementation of the UN agreement on contracts for international sale of goods of 11 April 1980 (Viennese right to purchase) is expressly excluded.

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