



Valve Concepts, Inc.

ISO Registered Company

Model 1049

Secure-Gard Pilot Operated Vent Valve

SECTION I

I. DESCRIPTION AND SCOPE

The Model 1049 Secure-Gard is a pilot operated vent valve intended for installation on atmospheric and low pressure storage tanks, vapor recovery systems, and process systems.



WARNING

The Model 1049 is a low pressure pilot operated valve. In as such, does not supply vacuum relief. If vacuum relief is required, it should be provided by a separate device.



CAUTION

Follow your company's safety procedures to avoid injury to personnel or damage to equipment.

SECTION II

II. PRIOR TO INSTALLATION

Remove all packing material inside and outside of the valve prior to installation.

SAFETY WARNING: In addition to your company's safety procedures, this section includes guidelines that should be followed during the installation, operation, and maintenance of Valve Concepts, Inc's Pilot Operated Vent Valve. It is necessary to completely read and understand these guidelines.

Tank or system over pressure protection is the primary function of pilot operated vent valves. It must be selected to meet the total pressure flow requirements within the Maximum Allowable Working Pressure of the system on which it is installed. Consult API Standard 2000 for tank protection sizing procedures. Improperly specified vent valves may result in structural damage to the tank or system, and may cause severe personal injury or death.

Valves are pre-set at the factory per customer purchase specifications. DO NOT change the set pressure without consulting the factory or your local VCI representative. Improper adjustment may cause the valve to malfunction.

DO NOT attempt to remove the valve from the tank or process vessel without first bleeding all pressure from the system. ALTERNATIVE MEANS OF PRESSURE VENTING MUST BE PROVIDED WHEN THE VALVE IS OUT OF SERVICE.

The valve has been exposed to process while in service. Observe all plant procedures and Material Safety Data Sheets (MSDS) for the products in the system while inspecting, adjusting, or servicing the valve. Take appropriate safety precautions regarding eye protection, respiration and skin contact.

SECTION III

III. INSTALLATION

The inlet and outlet flanges are normally standard ANSI 150 lbs. class flanges unless otherwise indicated and should be connected following accepted piping practices.

NOTE: At installation, the vent valve should be carefully lifted into position using the lifting brackets on the body.



CAUTION

The lifting brackets should only be used for lifting the vent valve into place and should NOT be used for any other purpose.

The inlet is vertical and the outlet is horizontal. The valve should be installed in the normal upright position with the cap at the top of the valve and the valve inlet at the bottom. The outlet is to the side.

For valves using the remote sensing port connection, sense lines should be a 1/2" O.D. tube or larger and the length should not exceed fifteen feet. Longer lengths may be used with larger diameter sense lines. The sense line should slope downward from the sense port to the tank to allow condensate, if any, to drain back into the tank and not block the sensing capability.

VALVES WITH PURGE ROTAMETER

For valves with a rotameter mounted for purging either the pilot sense line only or both pilot sense and discharge lines, connect the purge gas source, usually dry nitrogen, to the 1/4" FNPT connection at the bottom of the rotameter. The pressure of the purge gas source must be higher than the set pressure of the vent valve,

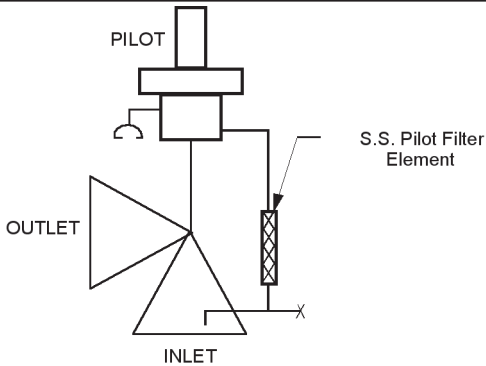
but not to exceed the maximum pressure rating of the rotameter. (Standard rotameter supplied by Valve Concepts is rated to 250 psig.) Once the gas source is connected, the purge flow can be adjusted by turning the knob at the top of the rotameter and observing the flow indicator. The purge mechanism is designed not to affect the set pressure of the vent valve.

When the tank pressure is below set pressure, the main valve seat will be closed. If the rotameter is mounted to purge both the pilot sense and discharge lines, there will be a very small flow to the valve outlet from the purge mechanism.

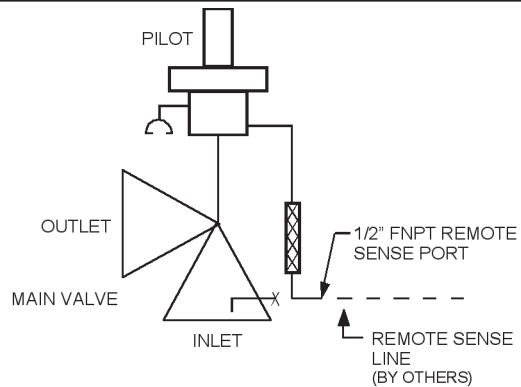
VALVE WITH AIR OR N2 ASSIST:

For valves with air or nitrogen assist pilot, connect the gas source to the 1/4" FNPT connection at the inlet of the filter regulator. The pressure must be a minimum of 5 psig, but not to exceed the maximum pressure rating of the filter regulator. (The standard filter regulator supplied by Valve Concepts is rated at 300 psig.)

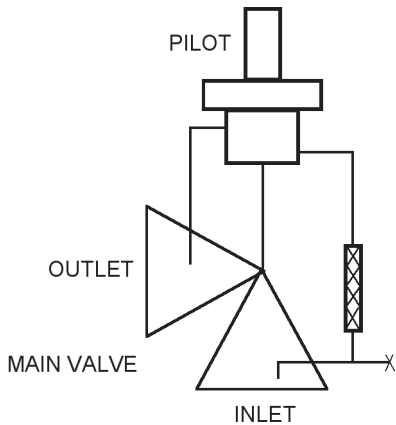
INSTALLATION DIAGRAMS FOR STANDARD ACCESSORIES & CONFIGURATIONS



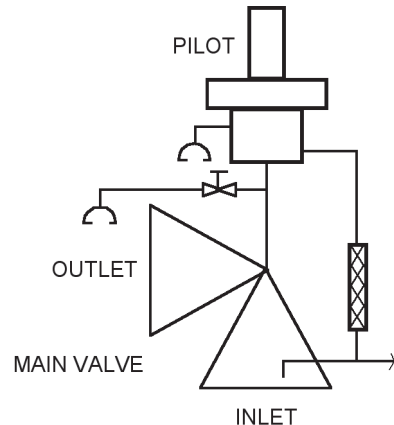
Standard Configuration
Internal Sensing, SS Pilot Filter Element and Pilot Exhaust to Atmosphere



Option 2
With Remote Sensing

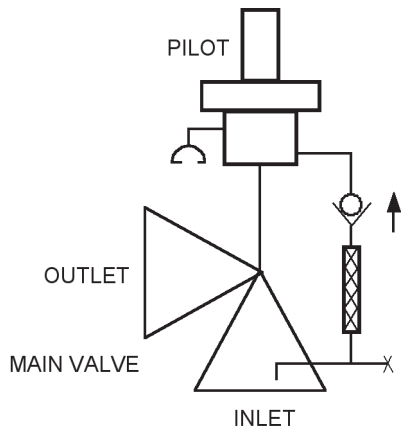


Option 1
With Pilot Exhaust Tubed to Main Valve Outlet

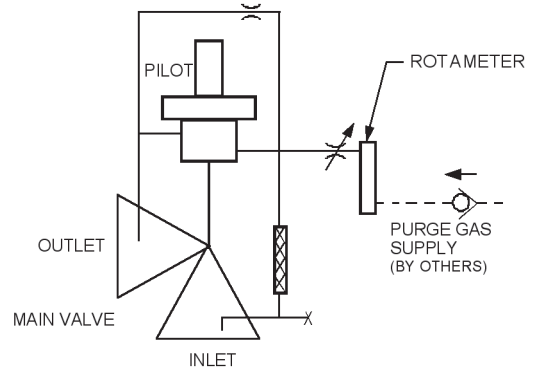


Option 3
With Manual Blowdown Valve

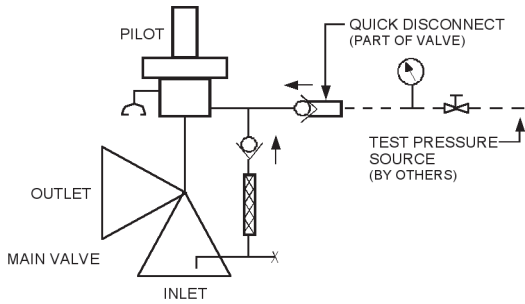
INSTALLATION DIAGRAMS FOR STANDARD ACCESSORIES & CONFIGURATIONS



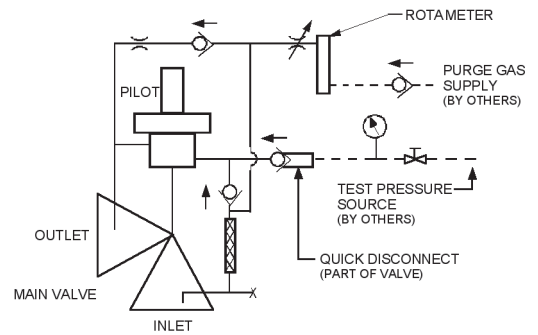
Option 4
With Back Flow Preventer to Prevent Back Flow through Main Valve and Pilot



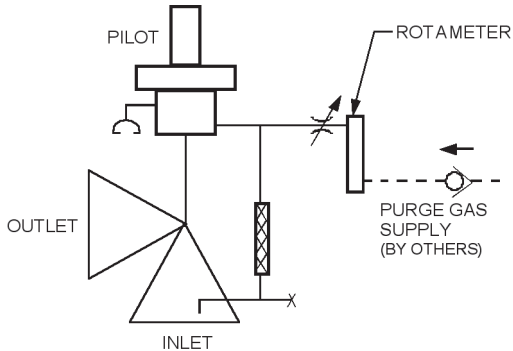
Option 7
With Rotameter to Purge Pilot Sense and Discharge Lines



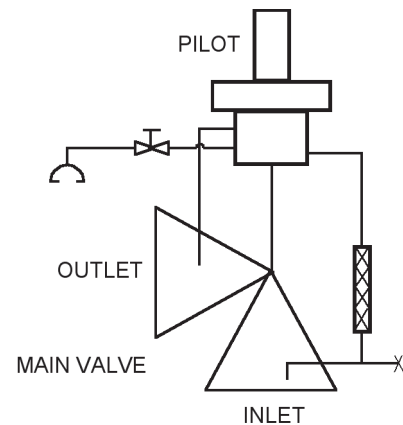
Option 5
With Field Test Connection (Back Flow Preventer Included)



Option 8
With Field Test Connection, Back Flow Preventer and Rotameter to Purge Pilot Sense and Discharge Lines



Option 6
With Rotameter to Purge Pilot Sense



Option A
Internal Sensing, SS Pilot Filter Element, Pilot Exhaust to Main Valve Outlet with Manual Blowdown Valve

SECTION IV

IV. START-UP

Operation of the Model 1049 is automatic once the set pressure has been set. (The set pressure is bench-set per the customer's specified setting at the factory prior to shipment.) **NOTE:** The set pressure is defined as the pressure at which the valve should start to open on increasing tank pressure.

To adjust the set pressure, remove the hex cap at the top of the valve and loosen the jam nut around the adjusting screw. Clockwise rotation of the adjusting screw will increase the set pressure. Counter clockwise rotation will decrease the set pressure. Do not adjust the set pressure beyond the nameplate range. Tighten the jam nut after adjustments are made and replace the hex cap.

For the valve to be in the closed position, tank pressure must reach the actuator through the pilot.

Upon initial start-up, the valve may be opened for a few seconds, but will close when the pressure in the actuator chamber reaches tank pressure.

For valves with air or nitrogen assist pilot, the gas source must be connected to the filter regulator before the valve will be in the closed position. (The filter regulator is pre-set at the factory to 5 psig, and the CA-1 back pressure regulator is pre-set at the factory to 10 psig.)

SECTION V

V. MAINTENANCE

It is strongly recommended that if the valve needs to be serviced, that it be sent to the factory or a factory authorized repair facility. Trained mechanics with specialized test equipment will ensure that the valve is accurately set.

The Model 1049 should be periodically checked to ensure proper operation. The frequency required depends on the severity of the service conditions. At least once a year is recommended.

Maintenance procedures hereinafter are based upon removal of the unit from the vessel where installed.

To disassemble the valve, refer to the appropriate drawings.

To replace soft goods of the pilot valve:

The pilot assembly may be removed by unscrewing the nipple (131) from the upper case weldment (201).

washers, and bolts (109, 110, 121 and 120) around the periphery can now be removed. Remove the bolts and lockwashers (120 and 110), holding the spring bonnet (104) and upper diaphragm case (102) together. Replace the round gasket (122) and reassemble items 102, 104, 110 and 120.

Remove the set pressure spring (115), spring button (112), and ring gasket (134) and set to the side. Hold the wrenching washers (128) with a wrench, and loosen and remove nut (109). Remove lockwashers (110), lower spring guide washers (111), wrenching washers (128), support plates (106), diaphragm (107), bolt gaskets (126), and spacer (127) and set to the side. Remove lock washers (110) and bolts (120) from the pilot body (101) and lower diaphragm case (103). Remove the seal diaphragm (124), the body gasket (125) and the spindle assembly (108). Take the o-ring seat (133) and the bolt gasket (126) off the spindle assembly (108) and replace with new parts.

Reinstall the spindle assembly (108) with o-ring (133) and bolt gasket (126). Set new seal diaphragm (124) over the stem of the spindle assembly and the body gasket (125) on top of the seal diaphragm (124). Then, reinstall the lower diaphragm case (103) to the pilot body (101) with lock washers (110) and bolts (120). Slide the spacer (127) over the stem of the spindle assembly and place another new bolt gasket (126) on top of the spacer. Place the first support plate (106) on the stem, then the new diaphragm (107), then the other bolt gasket (126), then the final support plate (106). Place the wrenching washers (128), lower



WARNING

SPRING UNDER COMPRESSION. Prior to removing diaphragm case bolts, relieve spring compression by backing out the adjusting screw. Failure to do so may result in flying parts that could cause personal injury.

To disassemble the diaphragm case, relax the compressed spring by first unscrewing the cap (105), then loosen the jam nut (114) and back off the adjusting screw (113). The ring of nuts, lockwashers,

spring guide washers (111), and lockwashers (110) on the stem. While holding the wrenching washers (128) with a wrench, (and making sure the bolt holes of the diaphragm and diaphragm case align) thread the nuts (109) and tighten. Place the set pressure spring (115) and the spring button (112) on the spindle assembly (108). Place a new ring gasket (134) on top of the diaphragm (107). Place the upper diaphragm case (102) on top of the lower diaphragm case (103). Install the washers (121), bolts (120), lockwashers (110), and nuts (109) and tighten.

Remove the nipple (131) from the pilot body (101). Loosen the jam nut (114). With needle nose pliers remove the c-ring (119) and unthread the blowdown needle (117). Remove the TFE o-ring (118). Place a new TFE o-ring (118) on the blowdown needle (117). Reinstall in reverse order.



CAUTION

DO NOT overtighten threaded connections since damage or breakage may result. Wrap all NPT threads with TFE tape. Apply anti-seize compound on bolt threads. Very lightly lubricate all o-rings with a lubricant that is compatible with the service, sealing surfaces of gaskets and diaphragms also.

Thread the blowdown needle (117) completely in, then back out 3 full turns, and lock the jam nut (114).

To replace soft goods of the main valve actuator:

Remove the washers (208), bolts (205), lockwashers (206), and nuts (207). Lift pilot assembly off and set to the side. Replace the actuator diaphragm (203). Reassemble in reverse order.

To replace soft goods of the main valve:

Remove the bolts (311) and the lockwashers (310) holding the cover/lower case weldment (202) to the main body. Carefully remove the lower case weldment (202) and the cover gasket (307). Remove the seat plate assembly (303) and the o-ring seat (305). Remove the bolts (308) and the lockwashers (309) holding the nozzle (304) to the body (301). Remove the nozzle (304). Replace the nozzle gasket (306). Reinstall the o-ring seat (305) into the nozzle (304). Be sure the o-ring is completely in the nozzle, and that the exposed surface is flat. Bolt nozzle (304) back into the body (301) with bolts (308) and lockwashers (309) and tighten. Install the seat plate assembly (303). Install a new cover gasket (307) and reinstall the cover/lower case weldment (202) with the bolts (310) and the lockwashers (311).

TABLE 1
Soft Goods Kit Part Numbers

Soft goods kits, consisting of all the non-metallic components (o-rings, sense diaphragm, gaskets, etc) are available. The drawings indicate which components are included in the kit. For other replacement parts, specify by item number and description plus material, if the part number is not known.

Always provide the model number, size if applicable, and the serial number when ordering kits/replacement parts.

Line Size	Spring Range	Soft Good Kit Numbers	
		O-RING MATERIAL	
		EPDM	Viton
2" x 3"	4" - 1.5 psig	31452055	31452044
	1.5 - 3 psig	31452955	31452944
	3.2 -14 psig	31452155	31452144
3" x 4"	4" - 1.5 psig	31453055	31453044
	1.5 - 3 psig	31453955	31453944
	3.2 -14 psig	31453155	31453144
4" x 6"	4" - 1.5 psig	31454055	31454044
	1.5 - 3 psig	31454955	31454944
	3.2 -14 psig	31454155	31454144
6" x 8"	4" - 1.5 psig	31456055	31456044
	1.5 - 3 psig	31456955	31456944
	3.2 -14 psig	31456155	31456144
8" x 10"	4" - 1.5 psig	31458055	31458044
	1.5 - 3 psig	31458955	31458944
	3.2 -14 psig	31458155	31458144
10" x 12"	4" - 1.5 psig	31451055	31451044
	1.5 - 3 psig	31451955	31451944
	3.2 -14 psig	31451155	31451144
12" x 16"	4" - 1.5 psig	31459055	31459044
	1.5 - 3 psig	31459955	31459944
	3.2 -14 psig	31459155	31459144
FKM Soft Goods are offered in place of Buna-N.			

SECTION VI

VII. TROUBLE SHOOTING GUIDE

1. Model 1049 opens below set point.

Possible Cause	Remedy
A. Sense line is clogged.	A1. Check sense line and sense port for blockage. Clean as needed
B. Incorrect set pressure.	B1. Adjust set pressure screw to proper set pressure.
C. Pilot or actuator diaphragm failure.	C1. Disassemble and check diaphragms. Replace if required.
D. Loss of external air/N2 source for air/N2 assist pilot.	D1. Check external source.

2. Model 1049 will not open.

Possible Cause	Remedy
A. Incorrect set pressure.	A1. Adjusting set pressure screw to proper set pressure.
B. Pilot exhaust plugged.	B1. Check pilot exhaust for blockage. Clean as needed.
C. Sense line clogged.	C1. Check sense line and sense port for blockage. Clean as needed.

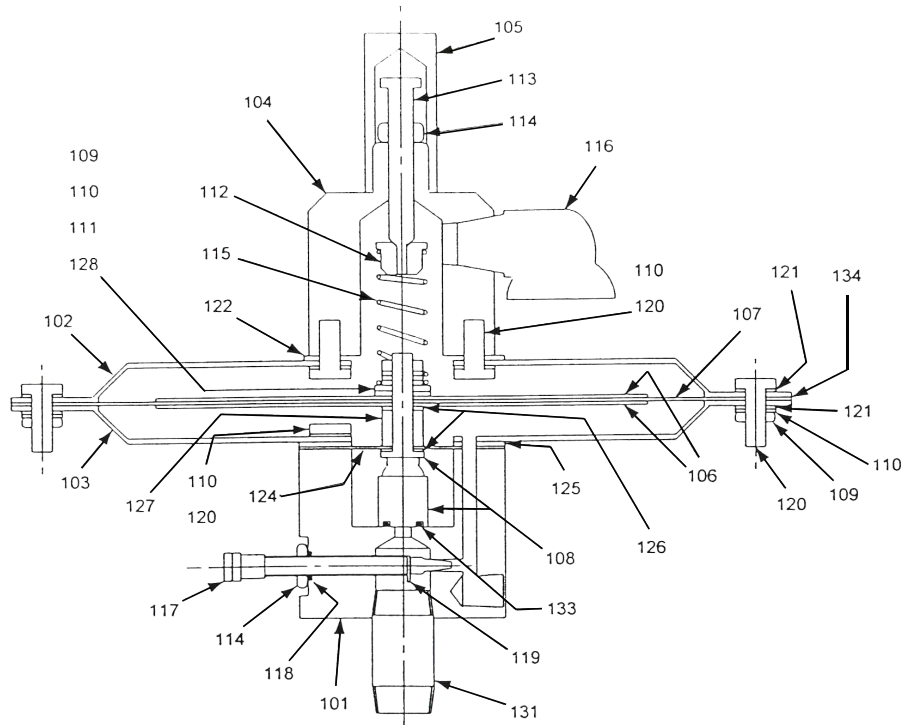
3. Vapor leaking from pilot spring bonnet.

Possible Cause	Remedy
A. Pilot diaphragm failure.	A1. Disassemble and check pilot diaphragm. Replace if required.

4. Seat Leakage

Possible Cause	Remedy
A. O-ring seat has failed.	A1. Disassemble and check o-ring seat. Replace if required.
B. Foreign particles trapped between seat and seat plate.	B1. Check and clean as needed.
C. Sense line clogged.	C1. Check sense line and sense port for blockage. Clean as needed
D. Back pressure higher than tank pressure.	D1. Vent operating properly.

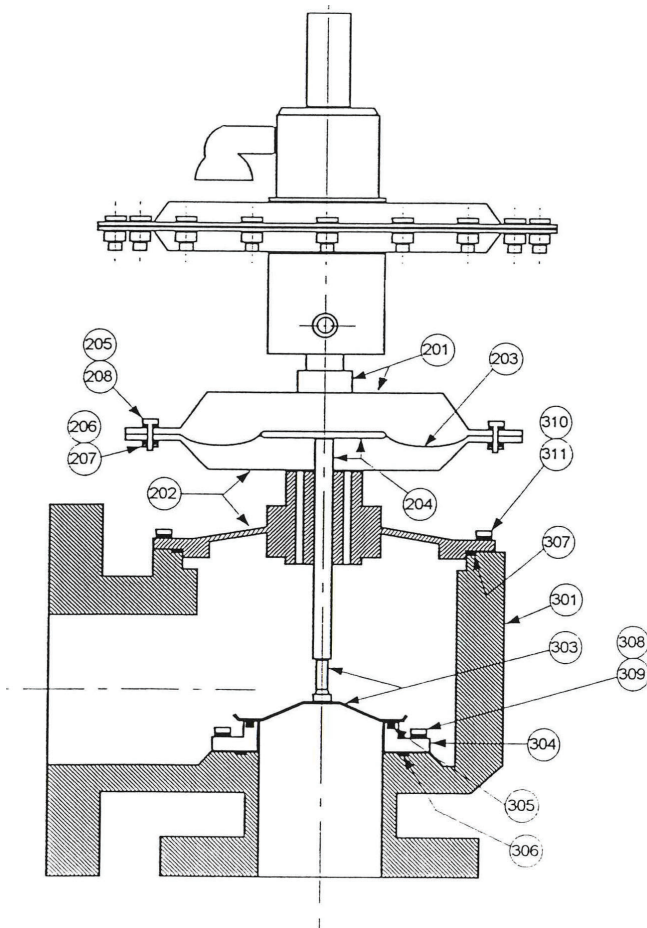
Model 1049 Pilot Assembly



<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>PART NAME</u>
101	1	Pilot Body
102	1	Upper Diaphragm Case
103	1	Lower Diaphragm Case
104	1	Spring Bonnet
105	1	Cap
106	2	Support Plate
107‡	1	Diaphragm
108	1	Spindle Assembly
109	17	Nut
110	20	Lockwasher
111	2	Lower Spring Guide Washer
112	1	Spring Button
113	1	Adjusting Screw
114	2	Jam Nut
115	1	Set Pressure Spring
116	1	Bug Screen Vent
117	1	Blowdown Needle
118‡	1	O-Ring - TFE
119	1	C-Ring
120	20	Bolt
121	16	Washer
122‡	1	Round Gasket
124‡	1	Seal Diaphragm
125‡	1	Body Gasket
126‡	3	Bolt Gasket
127	1	Spacer
128	2	Wrenching Washer
131	1	Nipple
133‡	1	O-Ring Seat
134‡	1	Ring Gasket

‡Parts are included in the Soft Goods Kit

Model 1049 Main Valve Body & Actuator



<u>ITEM NO.</u>	<u>QUANTITY</u>	<u>PART NAME</u>
201	1	Upper Case Weldment
202	1	Cover/Lower Case Weldment
203 ‡	1	Actuator Diaphragm
204	1	Support Plate Weldment
205	16	Bolt
206	16	Lockwasher
207	16	Nut
208	16	Washer
301	1	Body
303	1	Seat Plate Assembly
304	1	Nozzle
305 ‡	1	O-Ring Seat
306 ‡	1	Nozzle Gasket
307 ‡	1	Cover Gasket
308	6	Bolts
309	6	Lockwashers
		For 2" x 3" Size Only
310	6	Bolts
311	6	Lockwashers
		For 3" x 4" Size Only
310	8	Bolts
311	8	Lockwashers
		For 4" x 6" Size Only
310	8	Bolts
311	8	Lockwashers
		For 6" x 8" Size Only
310	8	Bolts
311	8	Lockwashers
		For 8" x 10" Size Only
310	12	Bolts
311	12	Lockwashers
		For 10" x 12" Size Only
310	16	Bolts
311	16	Lockwashers
		For 12" x 16" Size Only
310	16	Bolts
311	16	Lockwashers

‡Parts are included in the Soft Goods Kit

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IOM ADDENDUM:

ATEX DIRECTIVE 2014/34/EU and THE EQUIPMENT AND PROTECTIVE SYSTEMS INTENDED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES REGULATIONS 2016

Cashco, Inc. declares that the products listed in the table below has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II of the ATEX Directive 2014/34/EU and given in Schedule 1 of The Equipment and Protective Systems Indented for Use in Potentially Explosive Atmospheres Regulations 2016. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN ISO 80079-36:2016 and EN ISO 80079-37:2016. The product will be marked as follows:



The 'X' placed after the technical file number indicates that the product is subject to specific conditions of use as follows:

1. The maximum surface temperature depends entirely on the operating conditions and not the equipment itself. The combination of the maximum ambient and the maximum process medium temperature shall be used to determine the maximum surface temperature and corresponding temperature classification, considering the safety margins described prescribed in EN ISO 80079-36:2016, Clause 8.2. Additionally, the system designer and users must take precautions to prevent rapid system pressurization which may raise the surface temperature of system components and tubing due to adiabatic compression of the system gas. Furthermore, the Joule-Thomson effect may cause process gases to rise in temperature as they expand going through a regulator. This could raise the external surface temperature of the regulator body and the downstream piping creating a potential source of ignition. Whether the Joule-Thomson effect leads to heating or cooling of the process gas depends on the process gas and the inlet and outlet pressures. The system designer is responsible for determining whether the process gas temperature may raise under any operating conditions.
2. Where the process medium is a liquid or semi-solid material with a surface resistance in excess of $1G\Omega$, special precautions shall be taken to ensure the process does not generate electrostatic discharge.
3. Special consideration shall be made regarding the filtration of the process medium if there is a potential for the process medium to contain solid particles. Where particles are present, the process flow shall be $<1\text{m/s}$ ($<3.3\text{ft/s}$) in order to prevent friction between the process medium and internal surfaces.
4. Effective earthing (grounding) of the product shall be ensured during installation.
5. The valve body/housing shall be regularly cleaned to prevent build up of dust deposits.
6. Regulators must be ordered with the non-relieving option (instead of the self-relieving option) if the process gas they are to be used with is hazardous (flammable, toxic, etc.). The self-relieving option vents process gas through the regulator cap directly into the atmosphere while the non-relieving option does not. Using regulators with the self-relieving option in a flammable gas system could create an explosive atmosphere in the vicinity of the regulator.
7. Tied diaphragm regulators with outlet ranges greater than 7 barg (100 psig) should be preset to minimize the risk that improper operation might lead to an outboard leak and a potentially explosive atmosphere.
8. All equipment must only be fitted with manufacturer's original spare parts.
9. Ensure that only non-sparking tools are used, as per EN 1127-1, Annex A.

	PRODUCT
REGULATORS	31-B, 31-N
	1164, 1164(OPT-45)
	1171, 1171(OPT-45), 1171(CRYO)
	2171, 2171(OPT-45), 2171(CRYO), 3171
	1465, 3381, 3381(OPT-45), 3381(OPT-40)
	4381, 4381(OPT-37), 4381(CRYO), 4381(OPT-45), 5381
	MPRV-H, MPRV-L
	PBE, PBE-L, PBE-H
	CA-1, CA-2
	CA1, SA1, CA4, SA4, CA5, SA5
	DA2, DA4, DA5, DA6, DA8
	DA0, DA1, DAP, SAP
	SLR-1, SLR-2, PTR-1
	ALR-1, ULR-1, PGR-1
	BQ, BQ(OPT-45), BQ(CRYO)
	123, 123(CRYO), 123(OPT-45), 123(OPT-46G)
	123-1+6, 123-1+6(OPT-45), 123-1+6(OPT-46G), 123-1+6+S, 123-1+6+S(OPT-40)
	1000HP, 1000HP(OPT-37), 1000HP(OPT-45), 1000HP(OPT-45G), 1000HP(CRYO)
	1000HP-1+6, 1000HP-1+8, 1000LP, 1000LP(OPT-45), 1000LP(OPT-46G)
	6987
	8310HP, 8310HP-1+6, 8310HP-1+8, 8310LP, 8311HP, 8311LP
	345, 345(OPT-45)
	BA1/BL1, PA1/PL1
	C-BPV, C-PRV, C-CS
	D, D(CRYO), D(OPT-37), D(OPT-20), D(OPT-45)
	DL, DL(LCC), DL(OPT-45)
	BR, BR(CRYO)
	HP, HP(LCC), HP(OPT-45), HP(OPT46G), HP-1+6+S(OPT-40), HP-1+6+S
	P1, P2, P3, P4, P5, P7
	B2, B7
	POSR-1, POSR-2
	5200P, 5300P
	135
NW-PL, NW-SO	
CG-PILOT	
FG1	
CONTROL VALVES	RANGER, 987, PREMIER
	964, 521, 988, 988-MB, 989
	2296/2296HF
	SCV-30, SCV-S
TANK BLANKETING	8700, 8910, 8920, 8930, 8940
	2100, 2199
	3100, 3200, 3300, 3400, 3500, 3600, 3700
	1078, 1088, 1100, 1049
	5100, 5200, 5400, 5500
4100, 4200, 4300, 4400, 4500, 4600	
MISC	764P/PD, 764-37, 764T

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