

KOBELT

3329 Relay Valve

Owner's Operation, Installation & Maintenance Manual

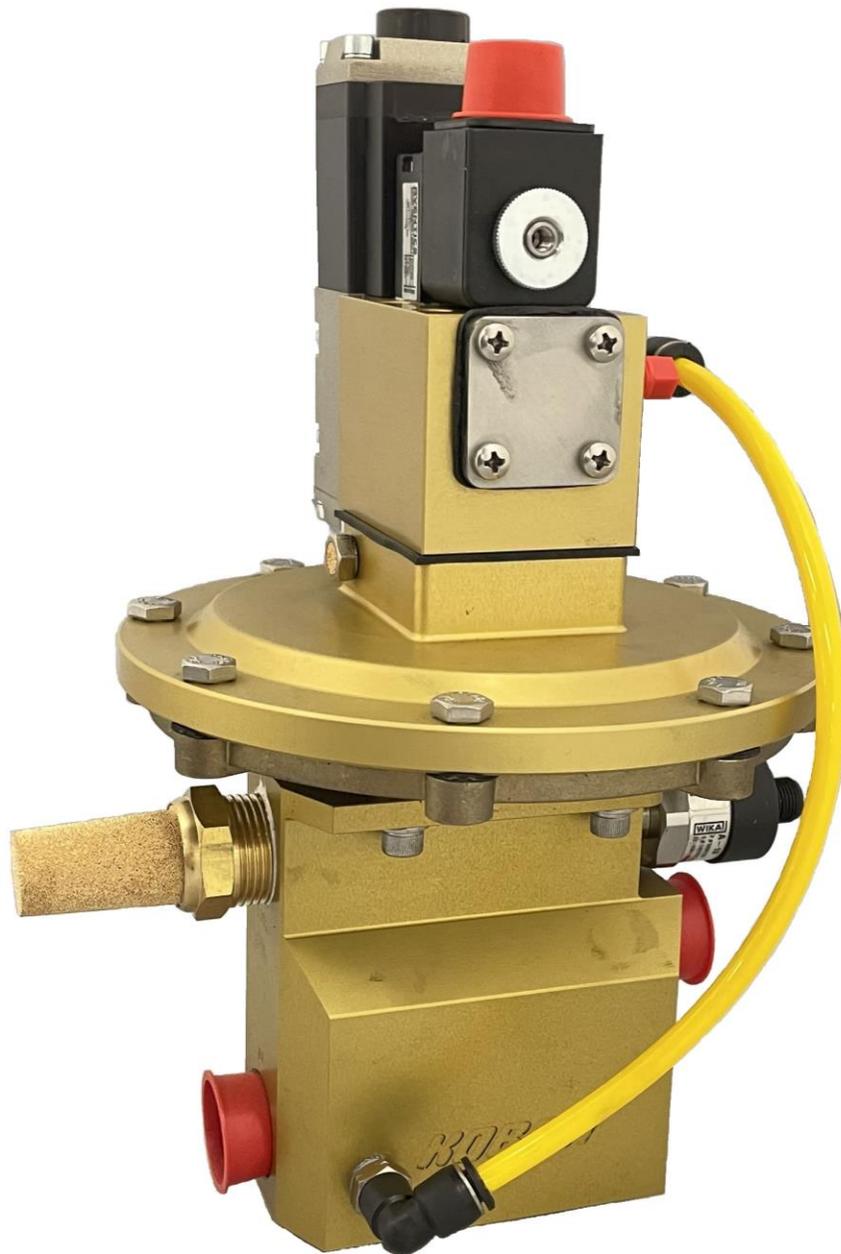


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1 INTRODUCTION

1.1 CONTACT

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This document is intended to clearly present comprehensive product data and provide technical information to assist the end user in design applications. Kobelt reserves the right, without notice, to change the design, or construction, of any products and to discontinue or limit distribution of any products. Kobelt also reserves the right to change, or update, without notice, any technical information contained within this document.

Kobelt recommends that customers visit our website to check for updates to this Manual. Once a product has been selected for use, it should be tested by the user to ensure proper function in all possible applications. For further instructions, please contact our distributors or visit our website.

1.2 SAFETY

1.2.1 Safety Alerts

Throughout this manual, the following symbols, and their accompanying explanation, are used to alert the user to special instructions concerning a service or operation that may be hazardous if performed incorrectly or carelessly. The associated risk levels are stated below.

| | |
|--|---|
|  DANGER | This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
|  WARNING | This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
|  CAUTION | This symbol indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. |
| NOTICE | This symbol informs the reader of events not related to personal injury but which there is a risk of damage to property or equipment. |
| SAFETY INSTRUCTIONS | This symbol informs the reader of safety-related instructions or procedures. |

1.2.2 Notice to Installer

Disregarding the following safety measures can result in an accident causing severe injury to personnel and damage to material assets.

- Only use the product as directed in this manual.
- Never put the product into service if there is evidence of visible damage.
- Never put the product into service before fully completing installation and commissioning.
- Do not carry out any modifications to the product.

- Only use authentic Kobelt spare parts.
- Observe all local regulations, directives and laws during the installation of this product.
- All installation, commissioning, and maintenance work must only be conducted by qualified personnel. (For the purpose of this manual, qualified personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.)
- Observe all specifications in this manual. If these guidelines are not followed and damage occurs, the warranty will be voided.

1.2.3 Product Hazards

| | |
|---|--|
|  DANGER | Equipment Starts Automatically: The connected brakes may activate suddenly while servicing this product, causing bodily harm. Ensure that all power sources are locked out prior to performing work. |
|---|--|

| | |
|--|---|
|  WARNING | High Pressure Fluids: The 3329 relay valve uses compressed air. Ensure all pressure is exhausted and the pressure source locked out prior to performing work. |
|--|---|

| | |
|--|---|
|  WARNING | Noise Pollution: The 3329 relay valve exhausts high velocity air. Ensure hearing protection is worn when working near this product. |
|--|---|

2 PRODUCT DESCRIPTION

2.1 OVERVIEW

The Kobelt 3329 relay valve permits proportional control of air applied brakes. The pressure output is directly regulated by the pilot pressure.

These units are available in three versions: remotely piloted, electro-proportional control and electro-proportional with safety bypass functionality.

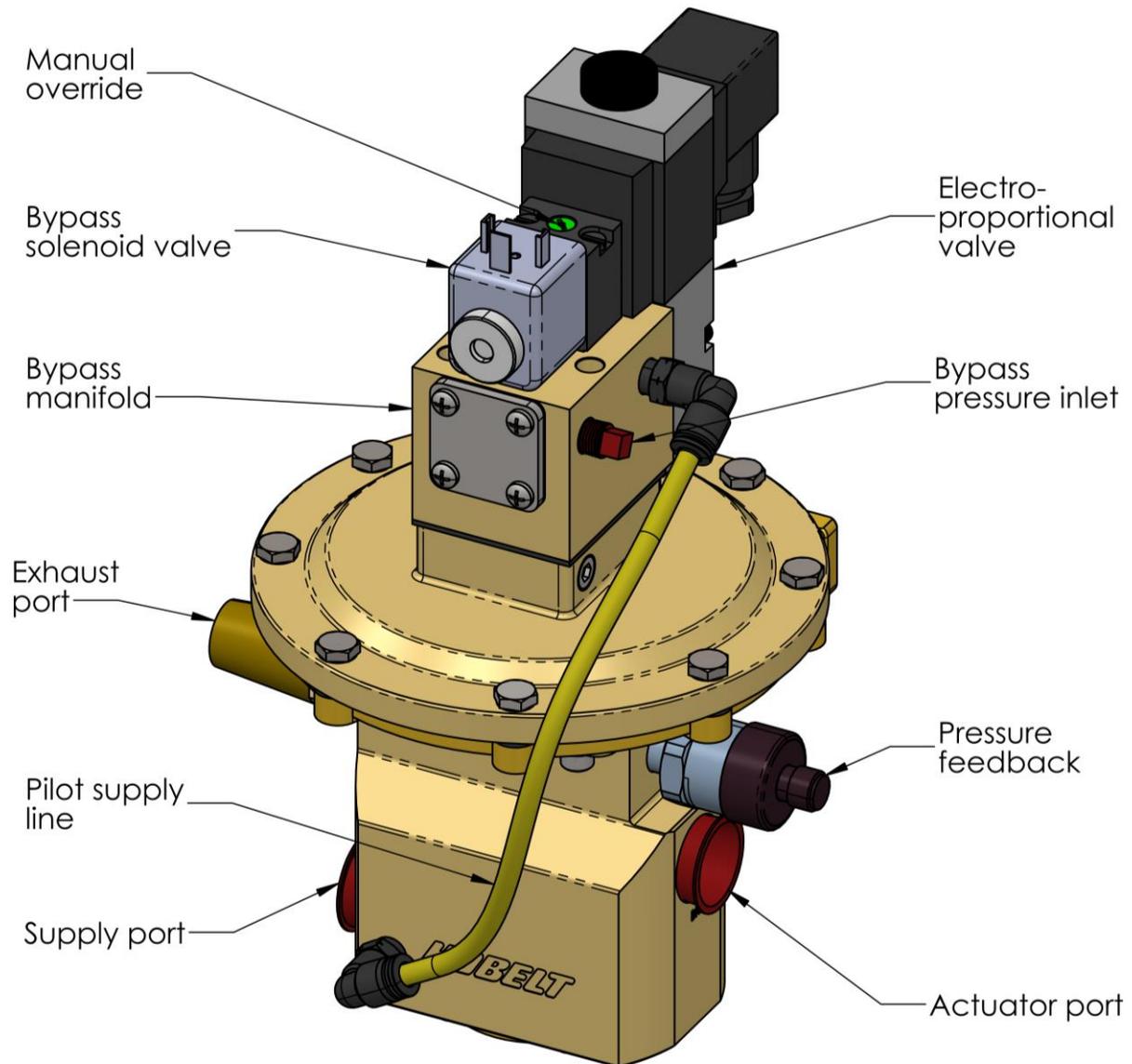


Figure 1: Valve Nomenclature

2.2 BASIC OPERATING PRINCIPLE

The purpose of the 3329 relay valve is to amplify the volume of air from a variable pressure source while following the pilot pressure signal with minimal error. The valve uses a large diaphragm to maintain balance between the pilot pressure and sensed actuator pressure. The diaphragm makes these valves very accurate due to the low friction.

The pilot pressure entering the pilot port applies a force on the diaphragm and spool assembly. When this force exceeds the cracking pressure, the spool moves downward and opens the inlet poppet thus allowing air to flow to the "OUT" port (see Fig. 2).

Air pressure goes to the "OUT" port and via an orifice, also to the pilot chamber. The air accumulating on the underside of the diaphragm until such a point that the pressures on both sides of the diaphragm are equal and the spool moves back to its neutral position and the inlet poppet closes again. This will cause an equilibrium point whereby no air flow will take place.

Reducing the pilot pressure to a value less than the outlet pressure will cause the spool to move upwards and lift itself from the inlet poppet seat and permit exhaust of air to atmosphere. This will permit the outlet air to also exhaust until the valve is in a balanced position again.

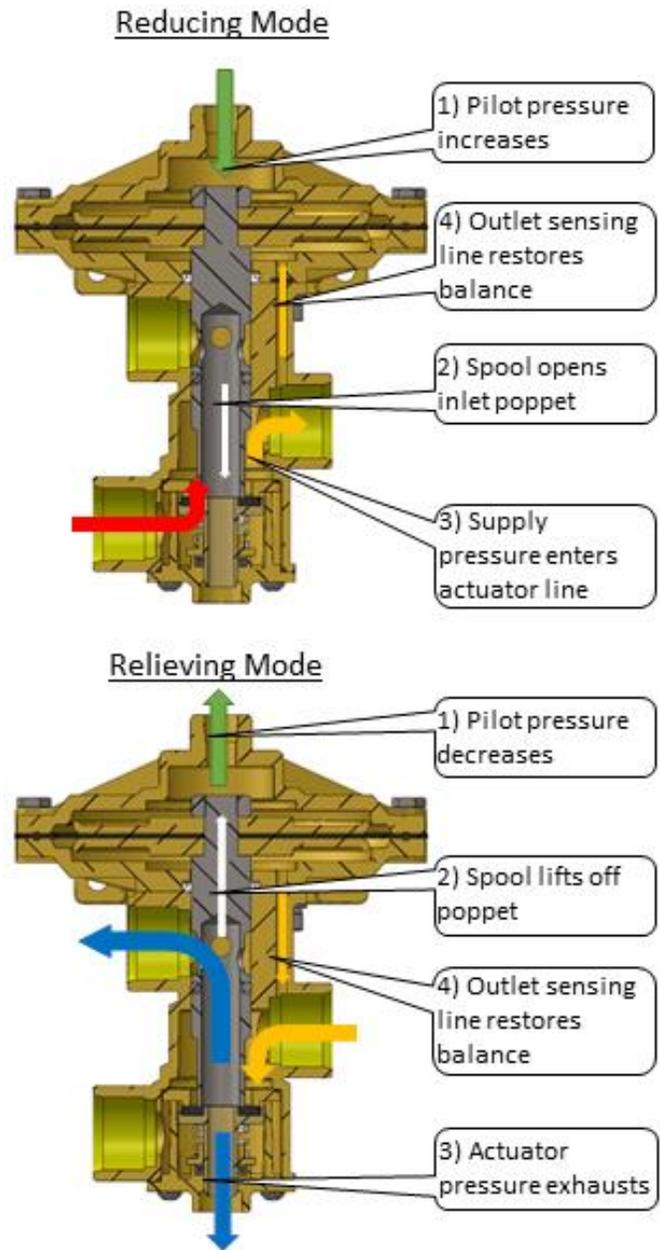


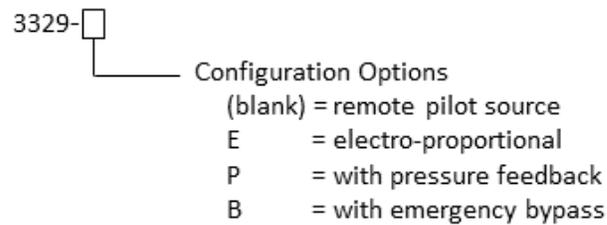
Figure 2: Principle of Operation

2.3 TECHNICAL DATA

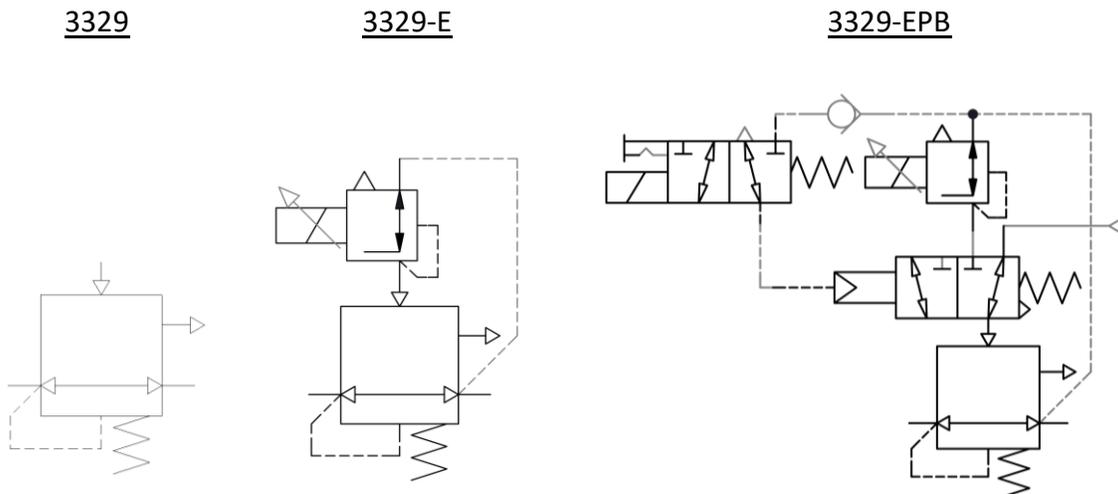
| | | |
|--------------------------|----------------|---------------------|
| Maximum supply pressure: | 150 psi | [10.3 bar] |
| Minimum pilot pressure: | 5 psi | [.3 bar] |
| Pressure output: | 0-100 psi | [0-6.9 bar] |
| Hysteresis: | 2 psi | [.14 bar] |
| Port sizes: | 3/4 NPT | |
| Ambient temperature: | -40°F...+140°F | [-40 °C... + 60 °C] |
| Weight: | 9.4 lbs | [4.3 kg] |

2.4 MODEL CODE KEY

The 3329 relay valve can be configured to have various features. Below is a key defining the letter code options:



2.5 SCHEMATIC SYMBOL



3 INSTALLATION

3.1 MECHANICAL

The relay valve must be mounted on a flat surface with adequate strength and stiffness to withstand the system vibrations and flow forces. Choose a location that is as close as possible to the brakes.

The valve is equipped with (2) two clearance holes for ¼ [M6] screws or bolts inserted from the front. Ensure the unit is securely fastened, preferably with an anaerobic thread locker such as Loctite 243. Reference [Appendix A: Installation Dimensions](#) at the back of this manual.

3.2 PIPING

To make the proper piping connections at the control valve, refer to the diagram below.

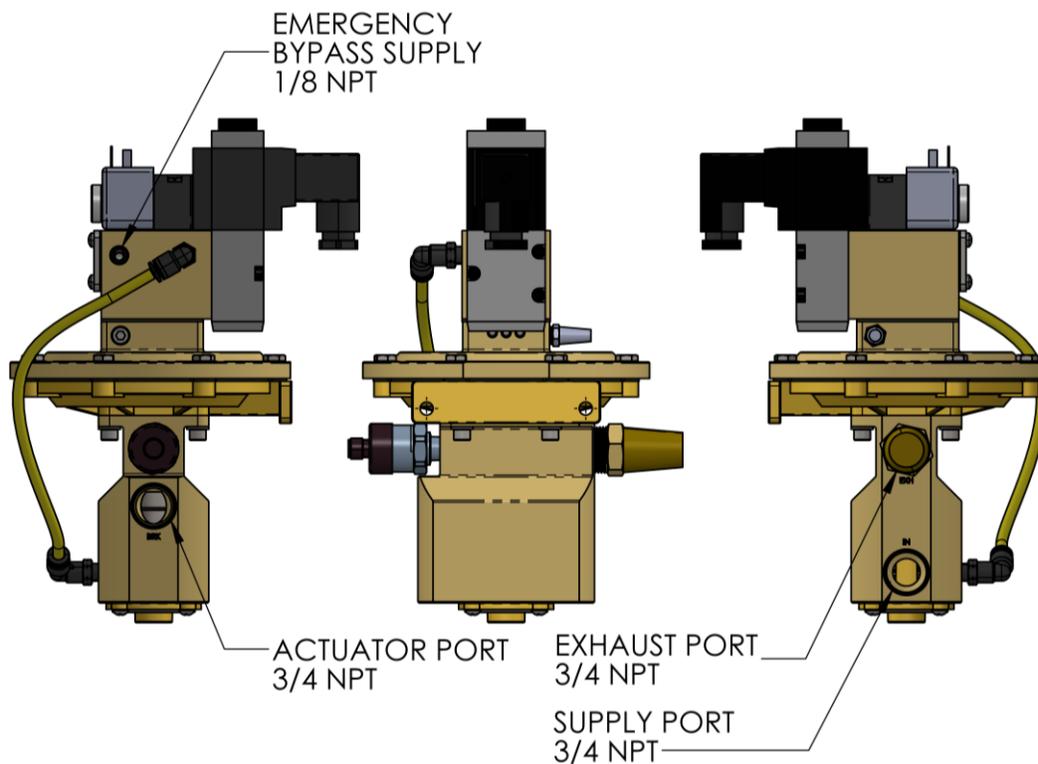


Figure 3: Piping Connections

The 3329-EP relay valve is equipped with a 1/8 NPT emergency bypass port. Ensure that 100 psi regulated air is supplied to this port for lifting applications. If the electro-proportional valve fails, this supply pressure will override and set the relay valve to maximum output.



Loss of braking:

Failure of the electro-proportional solenoid valve may result in a sudden loss of braking and result in an accident. Ensure that 100 psi regulated air is supplied to the emergency bypass port for lifting applications.

The exhaust ports do not need to be connected.

Install the port fittings using Loctite 567 thread sealant or equivalent and tighten to 2 - 3 turns from finger tight.

NOTICE

Do not over tighten the fittings as damage to the valve may occur.

The piping to the relay valves must be adequately sized to ensure adequate response times. The piping must be selected to safely withstand the pressures required to operate the system. Secure the piping against vibration with pipe clamps per the schedule in the table below.

Table 1: Pipe Clamp Table

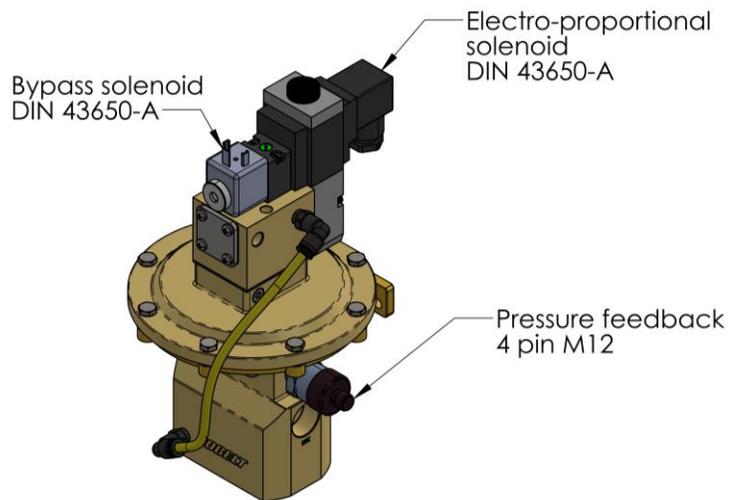
| PIPE CLAMP TABLE | | | | |
|------------------|-------------------------|--|--------------------------------------|---------------------------------|
| PIPE SCHEDULE | 3/8"-1/2" tube [DN6] | 1/4" - 1/2" pipe 1/2"-3/4" tube [DN8-DN15] | 3/4" pipe 1"-1.25" tube [DN20] | 1" pipe 1.50" tube [DN25] |
| CLAMP SPACING | 3 ft [914 mm] | 4 ft [1219 mm] | 5 ft [1524 mm] | 6.5 ft [1981 mm] |

All piping must be cleaned prior to connection to the actuators. Welded carbon steel piping must be pickled to remove the scale produced by welding.

3.3 ELECTRICAL CONNECTIONS

The 3329-EP relay valve is equipped with three connection points as follows:

1. Electro-proportional solenoid:
 - a. 2 pole + PE, DIN 43650-A
2. Bypass solenoid:
 - a. 2 pole + PE, DIN 43650-A
3. Pressure Feedback:
 - a. 4 pin – M12
 - Pin 1: Vin
 - Pin 2: not used
 - Pin 3: Output
 - Pin 4: GND



Ensure that the mating cables are securely fastened to their respective receptacles.

3.4 BRAKE SYSTEM PLAN

Below is a piping diagram depicting how to utilize the Kobelt 3329-E relay valve in a hoist braking system.

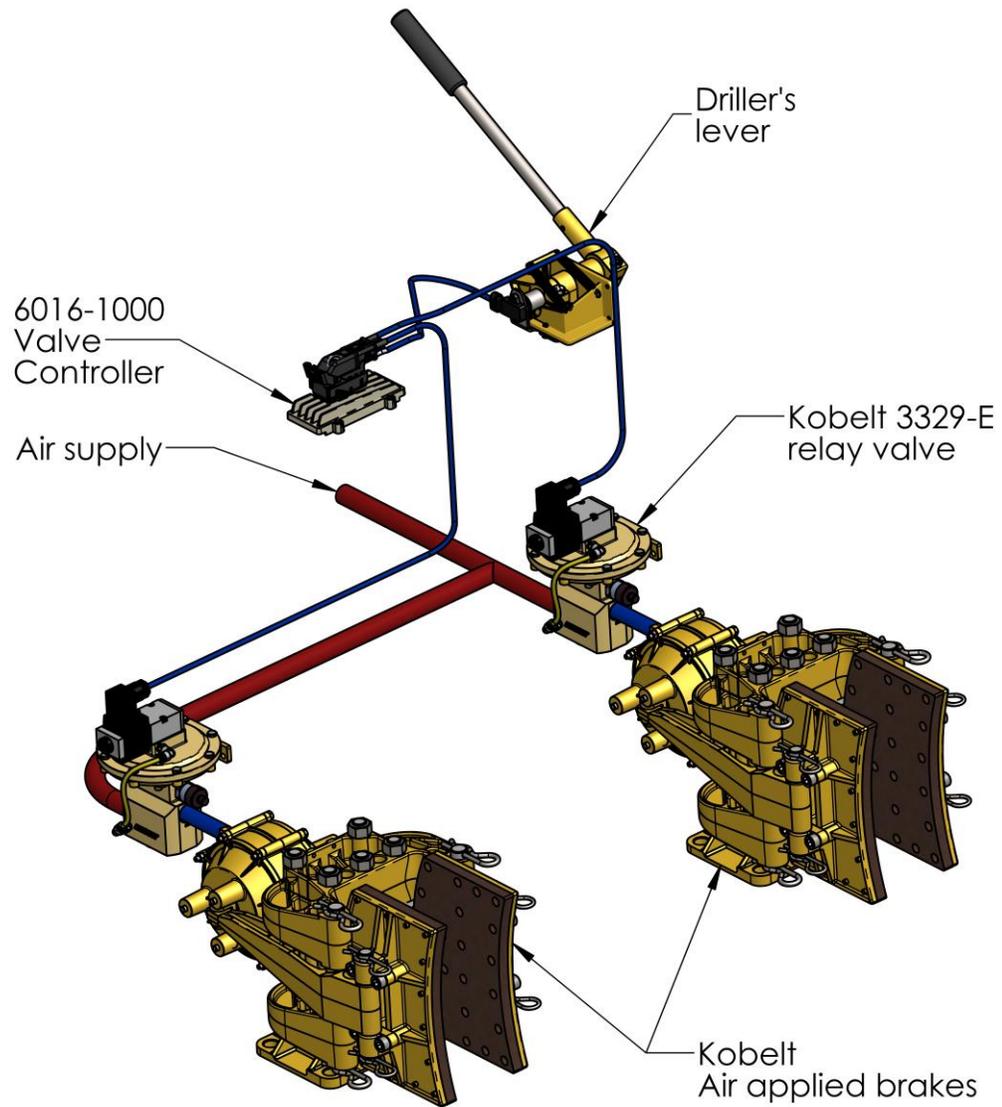


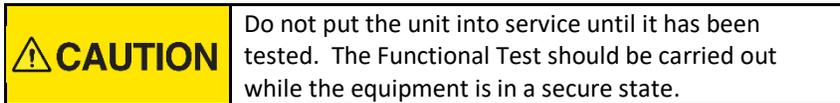
Figure 4: 3329-E System Arrangement

4 COMMISSIONING

4.1 ADJUSTMENT

The valve is adjusted at the factory and, as such, will not require any further adjustment after installation.

4.2 FUNCTIONAL TEST



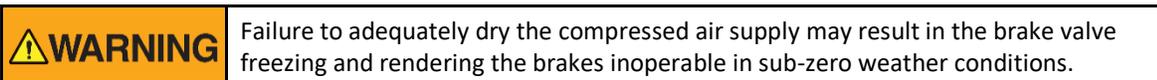
After installation, test the control valve and verify that it operates the brakes over the full pressure range. Cycle the pressure to maximum and back to zero. Verify that the pressure to the brakes follows the handle command gradually without jumps or delays.

5 OPERATION

5.1 PRESSURE SUPPLY

It is necessary to size air compressors and storage tanks to provide sufficient air for the intended duty of the valve.

For operation in sub-zero temperatures down to a minimum of 0°F [-20°C] the air must be dried to a dew point of -50°F [-44°F]



Kobelt 3329 relay valves are equipped with “U” cups and “O” rings and therefore require lubrication in order to provide long service life. Unlubricated seals will have excessive friction and wear. The oil that is required for the lubricator should be a hydraulic type with a viscosity grade of 10 to 32 centistokes. Heavy oils do not work well for lubricators.

The main supply line to the control head should be equipped with a filter, regulator and lubricator. The filter’s function is to remove moisture and dirt in the system, and the regulator will provide a constant air pressure to the control system. The filter and lubricator should have the following properties:

1. Filter micron rating: 5 micrometers maximum
2. Lubricator setting: 5 mg/m³ maximum

5.2 BYPASS OVERRIDE

The 3329-EP version with emergency bypass functionality is provided with a manual override switch as shown in figure 5. This switch can be used to manually set the valve to the electro-proportional pilot source in the event that the bypass solenoid coil fails. Use a flat head screw driver and turn the red plastic screw ¼ turn clockwise to set to the 'Override' position.

Ensure that the bypass switch is only used in extreme cases and that it is reset to the normal position when complete.



Figure 5: Solenoid Override



DANGER

Loss of braking:

Failure to reset the manual override to the normal position may result in a sudden loss of braking and result in an accident.

6 MAINTENANCE

6.1 PREVENTATIVE MAINTENANCE

- Quarterly (4 times per year)
 - Inspect unit for air leaks
- Bi-annually (once every two years)
 - Lubricate seals

6.2 SEAL SERVICE

All sliding seals should be lubricated with oring grease once every two years. When replacing seals, ensure both U-cups are oriented correctly (refer to fig6 below).

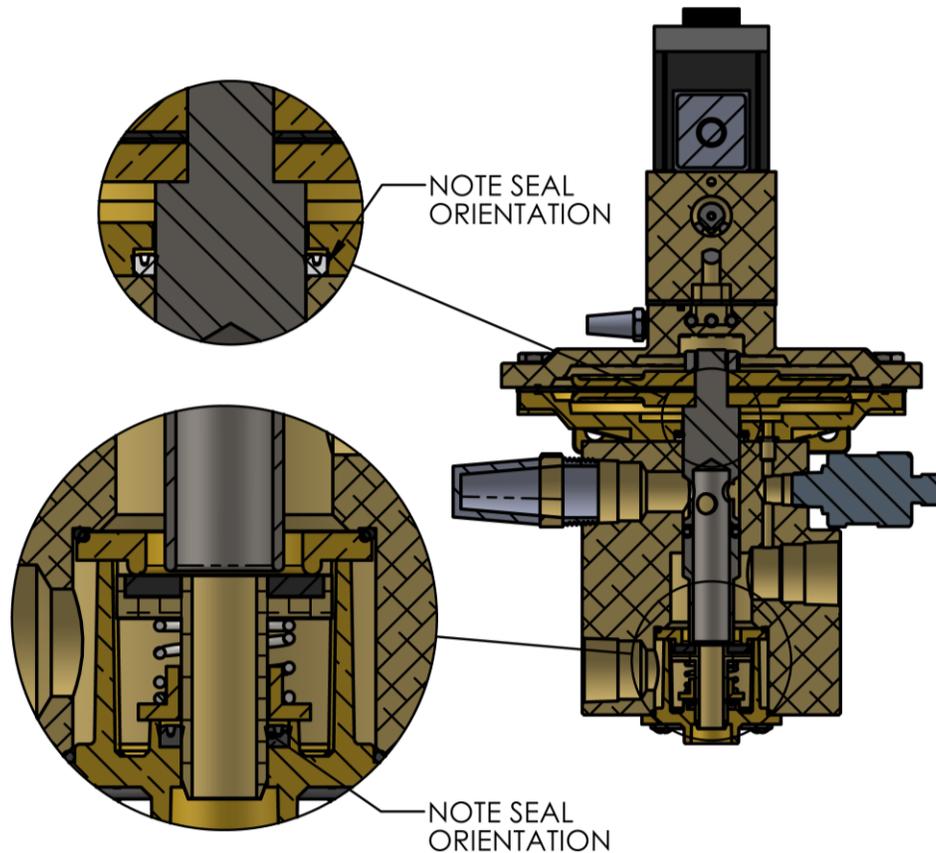


Figure 6: Seal Orientation

6.3 RECOMMENDED SPARE PARTS AND KITS

The spare parts kept on hand will depend on the severity of the service. The User should monitor the condition of their control head to predict necessary spare parts and ensure they are on hand when needed. As a minimum Kobelt recommends keeping the following parts for each unit in service:

1. One **3329-RK** repair kit
2. One solenoid for 7048-0019 valve
3. One solenoid for 7048-0020 valve

Refer to the parts list drawings in [Appendix B](#) for a complete list of parts. When purchasing spare parts refer to

NOTICE

It is recommended that any required service work on a Kobelt unit be performed by a factory authorized service representative. Please contact the nearest Kobelt authorized distributor for assistance.

Appendix B: Parts List at the back of this manual for Kobelt component Part Numbers.

7 WARRANTY

Kobelt Manufacturing Co. Ltd. (“Kobelt”) warrants the Products and Parts manufactured by Kobelt to be free from defects in workmanship or material and that said products are designed mechanically and functionally to perform to specifications.

This warranty is effective providing:

- The equipment is used within the intended operating conditions and in accordance with Kobelt recommendations
- The equipment is installed according to equipment diagrams, specifications and recommendations which Kobelt has provided

This warranty becomes invalid if the factory supplied serial number has been removed or altered on the product. This warranty does not cover cosmetic damage or damage caused by an act of God, accident, misuse, abuse, negligence or modification of any part of the product. This warranty does not cover damage due to improper operation or maintenance, connection to inappropriate equipment or attempted repair by anyone other than an authorized Kobelt representative.

Upon identification of a potential issue or defect with a Kobelt Product or Part, the Warranty Applicant (“Applicant”) must immediately contact Kobelt and describe the issue in writing, by letter, fax, email or other electronic conveyance. Kobelt will then assess the cause of the defect and determine warranty applicability and appropriate remediation.

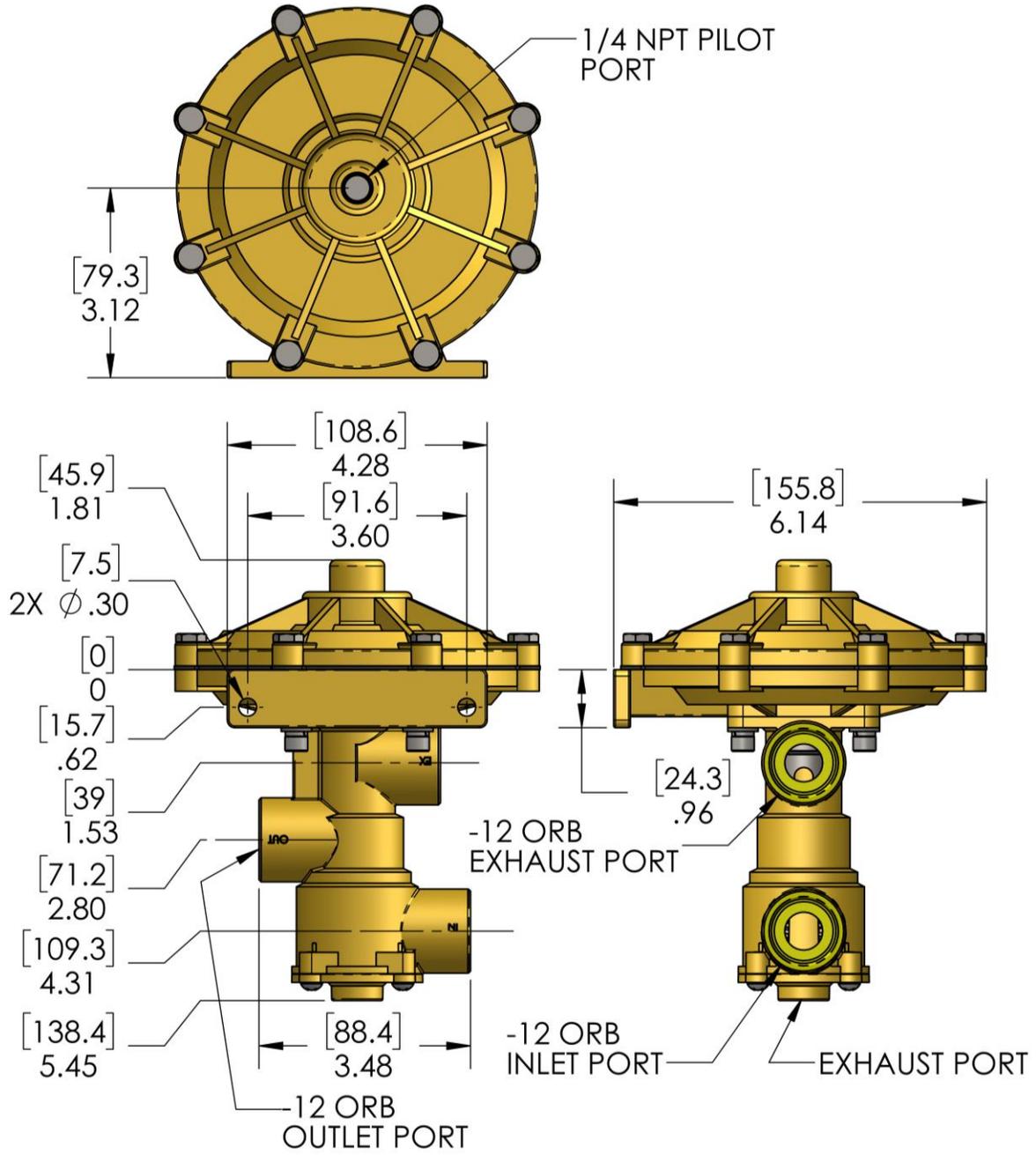
If any part is found to be defective, Kobelt will replace said part FOB the Kobelt factory provided that any such defective part is returned by the Buyer with freight and applicable forwarding charges prepaid by the Buyer. Kobelt’s sole obligation to the Applicant will be to repair or replace the defective part with same or similar product, to a maximum value of the list price of the product or part. The Kobelt warranty does not cover labour charges, travel or any other associated expenses.

All Products and Parts manufactured by Kobelt, are subject to a warranty against manufacturer’s defects in materials or workmanship for a period of two (2) years from the date of purchase.

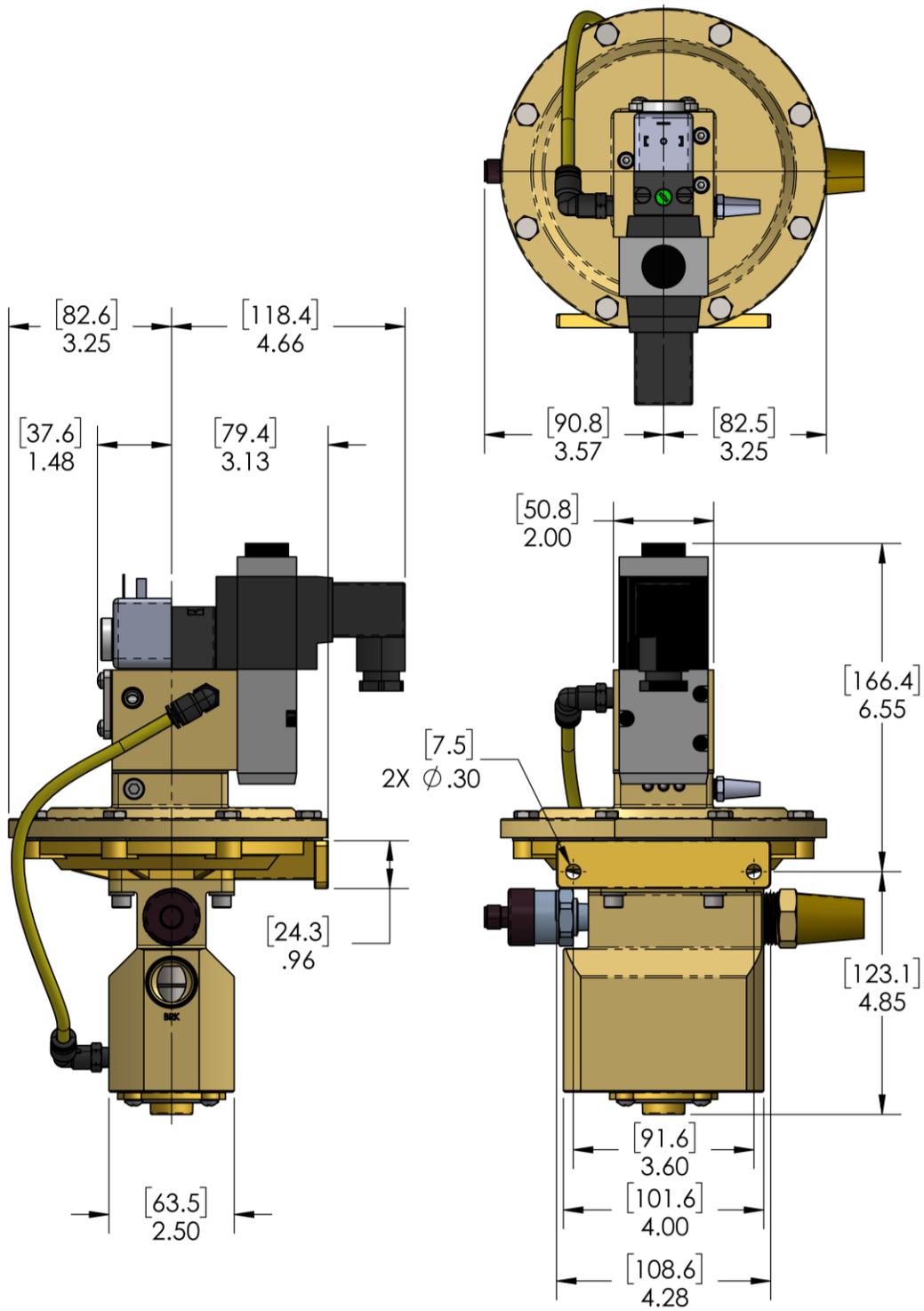
Kobelt will be responsible for all Products or Parts sold by Kobelt but manufactured by 3rd party manufacturing companies. However, these products and parts are subject to applicable 3rd party warranties and may not be the same as the Kobelt warranty.

8 APPENDIX A: INSTALLATION DIMENSIONS

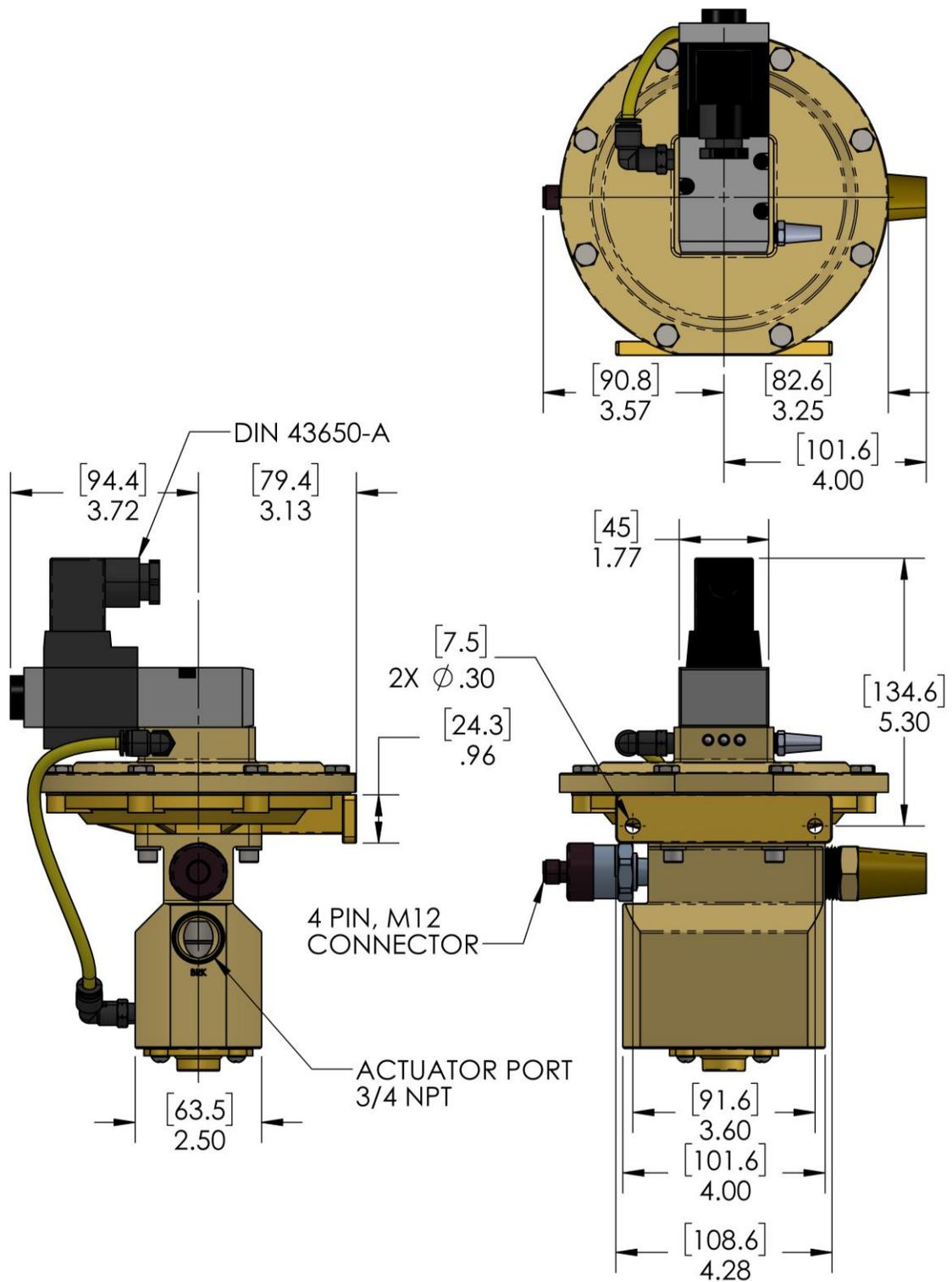
3329



3329-EPB

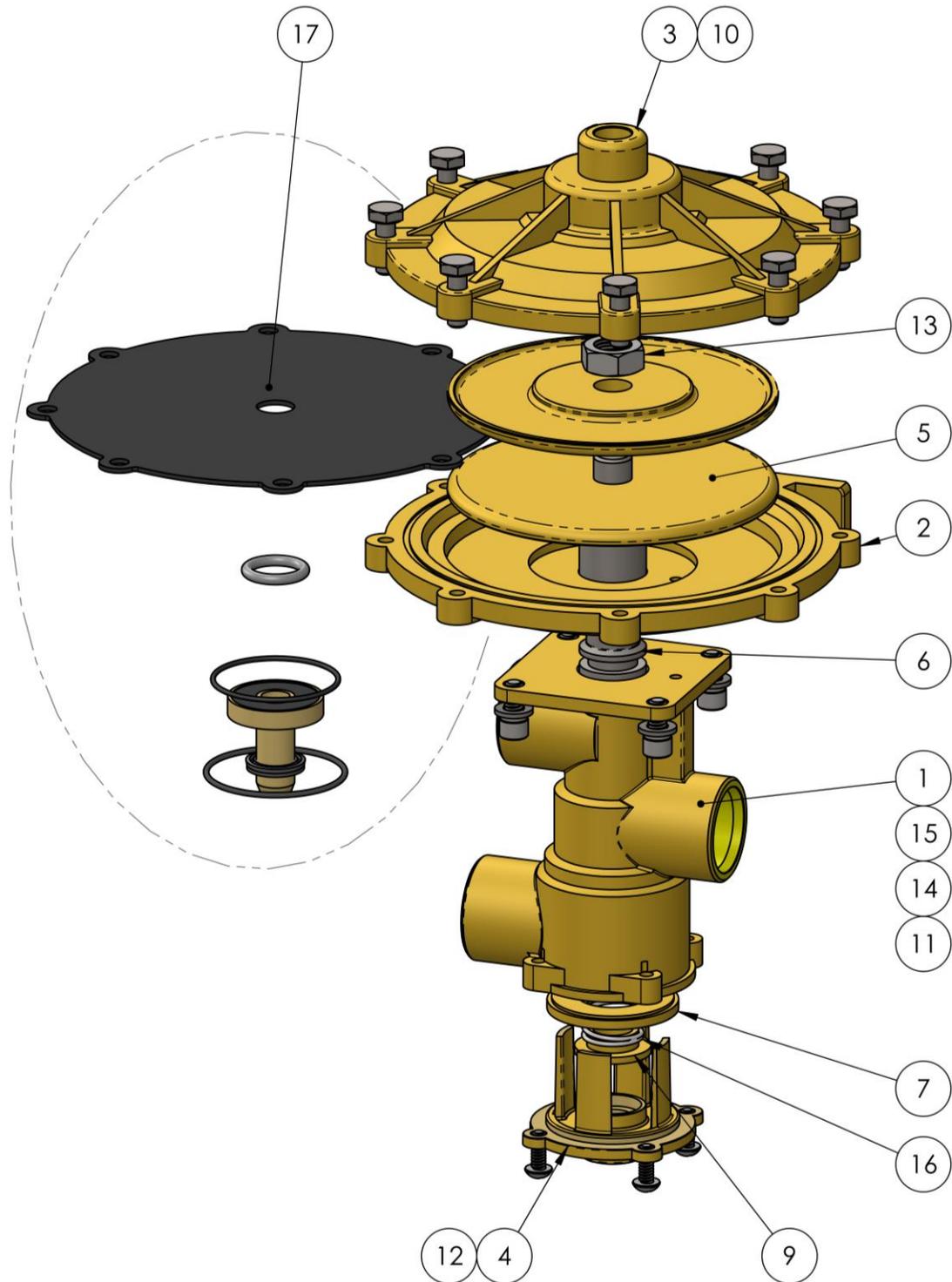


3329-EPB



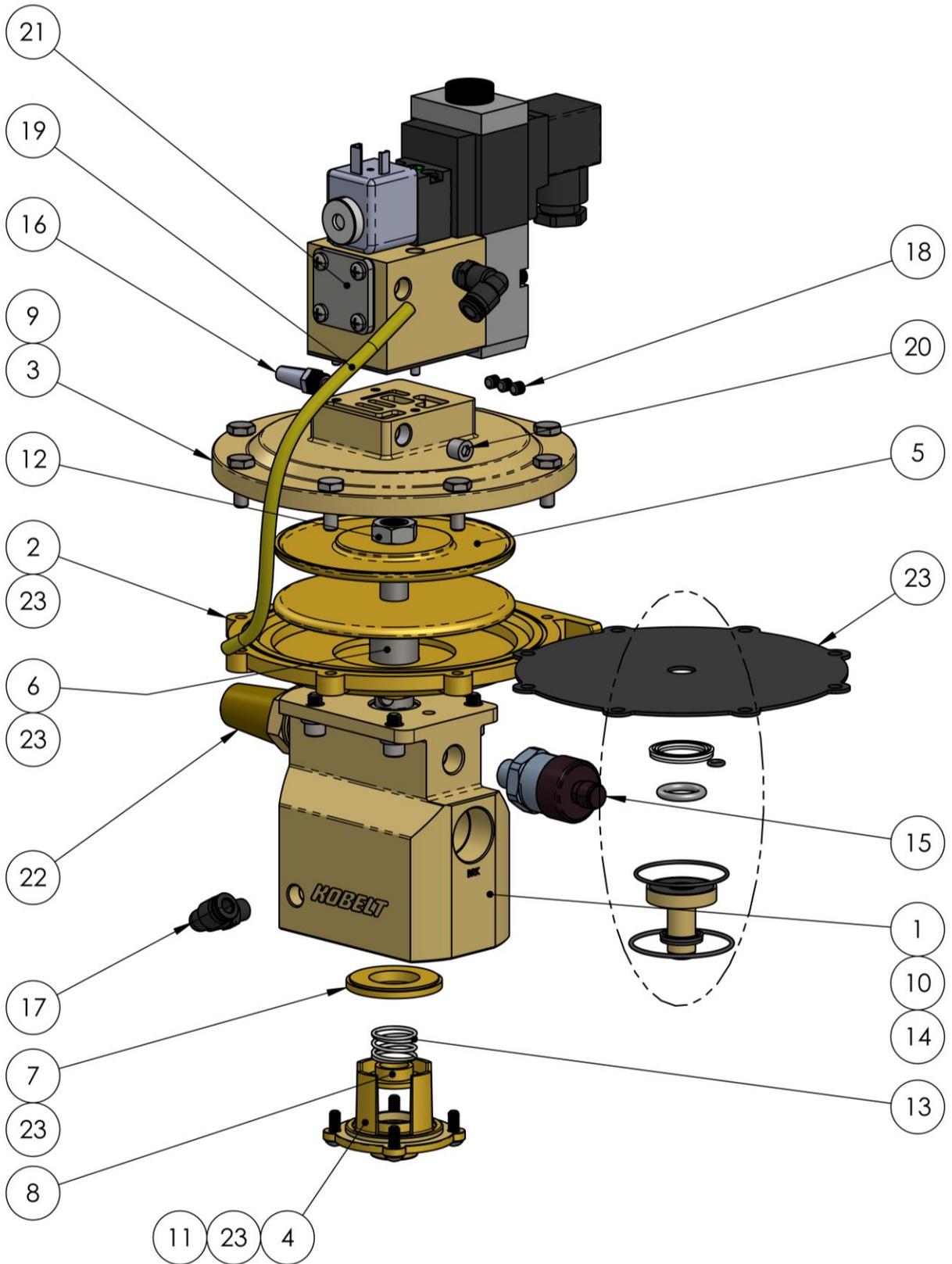
9 APPENDIX B: PARTS LIST

3329

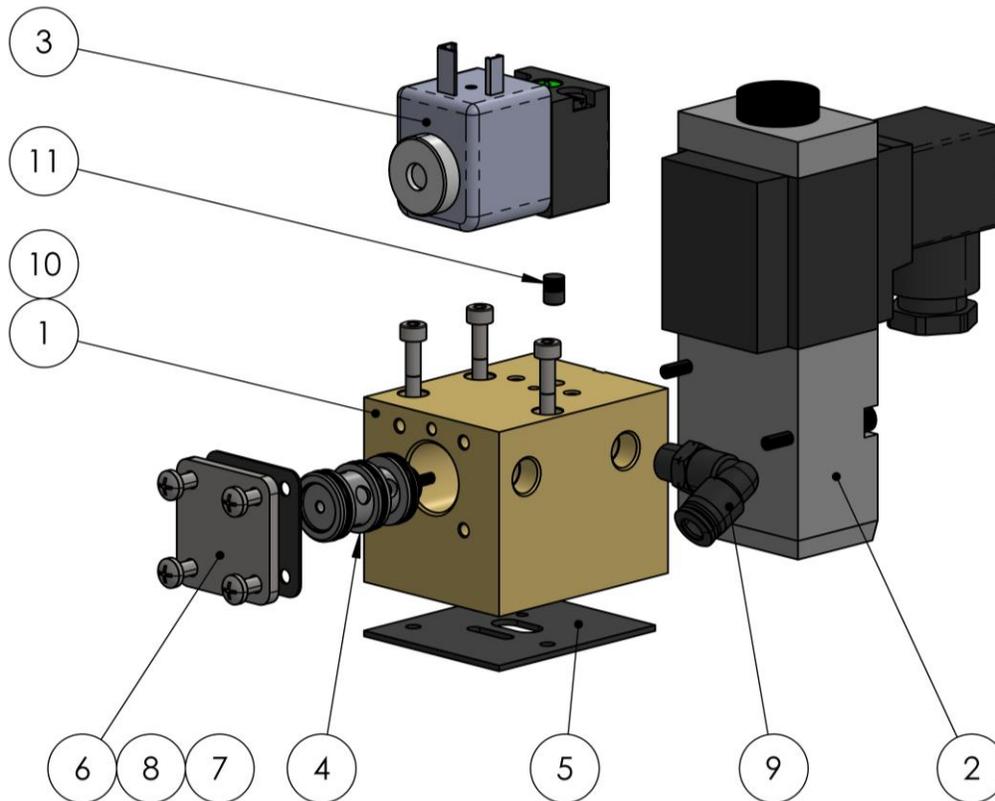


| ITEM | QTY. | PART NUMBER | DESCRIPTION |
|-------------|-------------|--------------------|--|
| 1 | 1 | 3329-0001 | MAIN BODY |
| 2 | 1 | 3329-0002 | DIAPHRAGM HOUSING BOTTOM |
| 3 | 1 | 3329-0003 | DIAPHRAGM HOUSING, TOP, 3329 |
| 4 | 1 | 3329-0004 | POPPET COVER; 3329 RELAY VALVE |
| 5 | 2 | 3329-0005 | DIAPHRAGM WASHER, 3329 |
| 6 | 1 | 3329-0006 | VALVE STEM; 3329 RELAY VALVE |
| 7 | 1 | 3329-0007 | VALVE SEAT |
| 8 | 1 | 3329-0008 | VALVE POPPET; 3329 RELAY VALVE |
| 9 | 1 | 3329-0009 | SEAL RETAINER, 3329 |
| 10 | 8 | 1001-1012 | SCREW - HEX HD; 1/4-20 X 3/4 UNC; 18-8 SS |
| 11 | 4 | 1002-1008 | CAP SCREW - SKT HD; 1/4 UNC X 1/2 LG, 18-8 |
| 12 | 4 | 1010-0808 | SCREW, RND HD PHIL, #10-24 X 1/2, 18-8 SS |
| 13 | 1 | 1022-0264 | NUT, JAM, 1/2-20 |
| 14 | 4 | 1023-0216 | FLAT WASHER, 1/4, TYPE B, NARROW, 18-8 SS |
| 15 | 4 | 1023-0410 | HIGH COLLAR LOCK WASHER, 1/4" SS |
| 16 | 1 | 1201-0108 | SPRING, COMPRESSION, .8125 X .0625 X 1.00 |
| 17 | 1 | 3329-RK | REPAIR KIT, RELAY VALVE |

3329-EPB



| ITEM | QTY. | PART NUMBER | DESCRIPTION |
|------|------|-------------|--|
| 1 | 1 | 3329-0101 | MAIN BODY |
| 2 | 1 | 3329-0002 | DIAPHRAGM HOUSING BOTTOM |
| 3 | 1 | 3329-0103 | VALVE MANIFOLD; ELECTROPROPORTIONAL PRESSURE VALVE |
| 4 | 1 | 3329-0004 | POPPET COVER; 3329 RELAY VALVE |
| 5 | 2 | 3329-0005 | DIAPHRAGM WASHER, 3329 |
| 6 | 1 | 3329-0006 | VALVE STEM; 3329 RELAY VALVE |
| 7 | 1 | 3329-0007 | VALVE SEAT |
| 8 | 1 | 3329-0009 | SEAL RETAINER, 3329 |
| 9 | 8 | 1001-1012 | SCREW - HEX HD; 1/4-20 X 3/4 UNC; 18-8 SS |
| 10 | 4 | 1002-1008 | CAP SCREW - SKT HD; 1/4 UNC X 1/2 LG, 18-8 |
| 11 | 4 | 1010-0808 | SCREW, RND HD PHIL, #10-24 X 1/2, 18-8 SS |
| 12 | 1 | 1022-0264 | NUT, JAM, 1/2-20 |
| 13 | 1 | 1201-0108 | SPRING, COMPRESSION, .8125 X .0625 X 1.00 |
| 14 | 4 | 1023-0216 | FLAT WASHER, 1/4, TYPE B, NARROW, 18-8 SS |
| 15 | 1 | 6011-0013 | PRESSURE TRANSMITTER; 10 BAR / 0.5-4.5V/ 1/4 NPT / M12 |
| 16 | 1 | 1061-0001 | SINTERED BREATHER; 1/8 NPT |
| 17 | 1 | 7039-7105 | ADAPTER - ELBOW; 90, 1/8 MPT X 1/4 TUBE, PTC |
| 18 | 3 | 7039-3054 | EXPANSION PLUG, CV173-218S |
| 19 | 1 | 7039-0076 | TUBE; 1/4 OD DOT, YELLOW |
| 20 | 1 | 7039-5671 | PLUG, 1/8 NPT, SKT HD, S/S |
| 21 | 1 | 3329-1000 | MANIFOLD ASSEMBLY; PROPORTIONAL PRESSURE VALVE |
| 22 | 1 | 1061-0005 | MUFFLER; SINTERED BRONZE / 3/4 MPT |
| 23 | 1 | 3329-RK | REPAIR KIT, RELAY VALVE |

3329-1000

| ITEM | QTY. | PART NUMBER | DESCRIPTION |
|------|------|-------------|---|
| 1 | 1 | 3329-0110 | VALVE MANIFOLD; DUAL INPUT |
| 2 | 1 | 7048-0019 | SOLENOID VALVE - PNEUMATIC; PROPORTIONAL, 7- 95 PSI, SUBPLATE |
| 3 | 1 | 7048-0020 | SOLENOID VALVE - PNEUMATIC; 2/3 WAY NC, 30 MM CNOMO, 24VDC |
| 4 | 1 | 7036-0022 | CARTRIDGE VALVE - PNEUMATIC; 2/3 NC, .25 ORIFICE |
| 5 | 1 | 3329-0111 | GASKET; BY-PASS MANIFOLD |
| 6 | 1 | 3329-0112 | COVER; 3329 CARTRIDGE VALVE |
| 7 | 4 | 1012-3410 | SCREW, PAN HD PHIL, M4-0.7 X 10mm, A4 |
| 8 | 1 | 3329-0113 | GASKET; SPOOL VALVE COVER |
| 9 | 1 | 7039-7105 | ADAPTER - ELBOW; 90, 1/8 MPT X 1/4 TUBE, PTC |
| 10 | 3 | 1002-6004 | CAP SCREW, SKT HD, M4X.07X30, A2-70 |
| 11 | 1 | 7049-0023 | CHECK VALVE; REVERSE FLOW / 5.5 MM INSERT |



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