



KAF 402 Solenoid Valve 264AY44.RBP R02

KAF 402 Solenoid Valve Naming Convention

Model

Type **KAF 402 – Single Valve, High Flow**

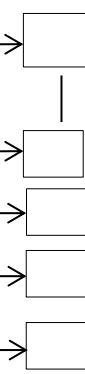
Option

Approvals **North America (CSA) – N
European (CE) – E**

Medium **Compressed Natural Gas (5,000 psi) – C**

Voltage **120V 60Hz – 1
240V 60Hz – 3**

Port Size **3/4-16 SAE (KAF 402) – 2**



Service & Product Support

This insert serves only as a reference; appropriate operation and maintenance must follow the local authorities having jurisdiction.

- Our Warranty Policy is stated on the Certificate of Conformance. No other warranty is implied or intended by this insert.
- All valves are function and pressure tested before leaving our factory to ensure proper and safe operation. Should you experience any difficulties with this valve and its operation, customer assistance is available. The procedure for receiving such assistance is as follows:

Document the following information:

- Valve dysfunction
- Corrective measures taken if any
- Valve model number
- Valve serial number
- Purchase order number
- Date of installation
- Equipment location (i.e. city, address, etc.)

Call or Fax our Product Service line at:

Kraus Service Number: 1-204-663-3601
Kraus Fax Number: 1-204-663-7112
One of our qualified personnel will provide assistance.

Safety

- Only qualified personnel may maintain CNG equipment. If in doubt, contact KRAUS technical personnel.
- Tighten and loosen the cap screws following the torque sequence.
- Always loosen the cap screws **slowly** in case pressure is trapped inside the valve body.
- Replace all defective parts.
- Do not clean parts with flammable solvents. Clean parts with a cleaning solvent, rinse with water and blow dry with compressed air.
- Never allow problems to go unreported, your own company and your suppliers want to know if you have any type of problem with their products.
- Valves must be pressure tested prior to being placed back in service as per CSA B51-M1995. Test the rebuilt valve to 1.2 times the working pressure.
- If questions arise which are not addressed by this document, contact KRAUS GLOBAL LTD. technical personnel.
- If a valve fails in service, inform KRAUS immediately.
- Valves must only be used under the specified operating conditions as indicated in the specifications section of this information sheet.

Installation & Maintenance Instructions

MOUNTING THE KAF 402 VALVE

Mounting of the valve to a bracket can be accomplished using the 5/16" UNC mounting holes on the body of the KAF402. When mounting the valve, the outlet port must be in the down position.

It is strongly recommended to mount a 6-micron aerosol and particulate filter upstream of this valve. This is a requirement for European applications using the KAF400 valve to meet CE approval. Foreign matter or water will greatly reduce the life expectancy of this valve and may make it inoperable. Warranty consideration will also be affected if particulate matter is found to be present in the valve.

RATING

This valve is rated electrically for use in an atmosphere that may contain natural gas or hydrogen gas and depending on the electrical approval, the valve coil electrical attachment to the electrical junction box can either be 1/2" NPT or DIN connection. Electrical connection of the coil should be done through rigid or an explosion-proof flexible conduit, when using NPT threads or through an approved cable gland with the European coil. Wiring in the junction box is to a hot and a neutral terminal and in the European model, a ground screw is provided on the coil casing.

REBUILD PROCEDURE & SCHEDULE

Rebuild schedule will be dependent on supply natural gas composition, compressor oil carry over and valve cycle frequency, it is recommended a rebuild be performed every 6 months. A rebuild kit that contains all the standard parts necessary to rebuild this valve is available from Kraus or the supplier of this valve. The rebuild procedure is in another section of this information sheet.

KAF VALVE FITTING INSTALLATION INSTRUCTIONS

Lubricate the O-ring with a small amount of valve lubricant. Never use tape on fittings with O-rings, as the tape could shred and enter the system. Insert the appropriate sized fitting into the valve inlet (and outlet) port and tighten the fitting clockwise finger-tight.

While holding the valve securely in place, use a wrench to turn the fitting into the straight thread inlet (or outlet) port, until the O-ring firmly contacts the face of the valve. This will force the O-ring into the tapered port, ensuring a tight seal.

Note that geometry of fitting is used, instead of torque, to ensure proper installation.

KAF 402 Valve Specifications

The Kraus Global KAF 402 Series high flow single solenoid valve is a normally closed high-pressure valve specifically designed for high flow, high pressure gas applications. The valve operates on the principle of pilot action, where the differential pressure across the internal piston controls the opening and closing of the valve. It is ideal for main flow control, sequencing, priority filling, or emergency shutdown (ESD) applications anywhere in a high flow CNG refueling station, such as a transit filling station.

The KAF 402 valve is approved by CSA and is designed to the ASME code. It is fully NFPA 52 compliant. Kraus Global is an ISO 9001:2008 Registered company.

Technical Data:

Operation: 2-Way Solenoid Valve, Normally Closed
Design Pressure: 5,000 psig (345 Bar)
Test Pressure: 6,000 psig (415 Bar)
Burst Pressure: >25,000 psig (1,700 Bar)
Flow: Cv = 3.3
Operating Temperature: -40°F to +150°F (-40°C to +66°C)
Material: Body – 7075 Aluminum, Anodized
Seat – 304 Stainless Steel
Piston – PEEK
Seals – Nitrile
Ports: SAE-8 (3/4-16)
Electrical Connection: Conduit 1/2" NPT
Power Consumption: 10 Watts (Average)

Rebuild Procedure – Equipment

- Cleaning solvent (Carburetor cleaner or Varsol)
- Dow Corning 111 Valve Lubricant and Sealant
- Removable thread locker (Loctite 242)
- Torque wrench (inch pounds) 3/8" drive
- 3/4" wrench or socket
- Kraus stem removal tool
- Small screwdriver
- 9/16" wrench
- 3/8" Allen wrench socket 3/8" drive
- 3/4" socket 3/8" drive
- Vise

NOTE: SPECIAL TOOLS AND SEALANT MAY BE PURCHASED FROM KRAUS GLOBAL LTD.

Rebuild Procedure Description

This procedure contains instructions for rebuilding the KAF 402 valve. Rebuilding the valve includes inspecting, cleaning and replacing parts as necessary.

It is recommended that all O-rings and seals be replaced during this procedure even if they do not appear to be damaged. Other components will be inspected during this procedure for signs of wear and may require replacing if they appear worn or are past their 100,000-cycle life.

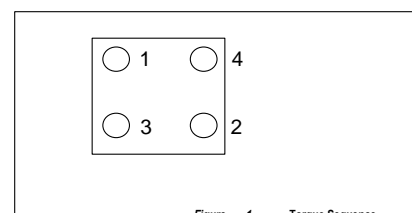
Refer to Drawing 264AY44.ASY and parts list on reverse side throughout this procedure.

KAF 402 Valve Rebuild Procedure

- Clamp the main body (Item #12) in a vice facing upwards. Remove the coil securing nut and washer (Item #16B & #16C) with a 9/16" wrench. Remove the coil (Item #16A).
- Remove the operator (Item #14C) using the stem removal tool.
- Remove and inspect the valve stem O-ring (Item #13). If it is extruded, the valve stem seating area may be damaged. It is recommended that the valve stem be replaced if the O-ring is extruded.
- Remove and inspect the armature (Item #14A) for surface smoothness. Replace armature if it shows signs of wear.
- Remove the piston pin (Item #15) and inspect the rubber tip. Replace the pin if the tip is broken in any way.
- Remove and inspect the spring (Item #14B). If it is bent or broken, replace it.
- Clean the valve stem, the spring and the armature by first soaking them in solvent for at least 15 minutes, and then rinse them off in water. Dry them thoroughly with pressurized air.
- Clamp main body (Item #12) upside down in a vice and **SLOWLY** loosen and remove the four cap screws (Item #1) with an appropriate torque sequence. See Figure 1 for an appropriate torque sequence. Remove the outlet block.

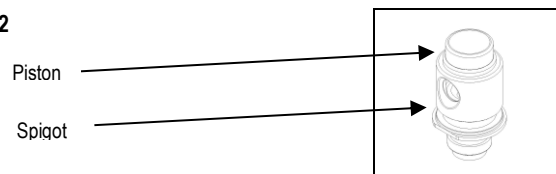


Slowly loosen the bolts and use extreme caution. If the main body and the manifold start to separate during this step, there is probably pressure trapped within the valve.



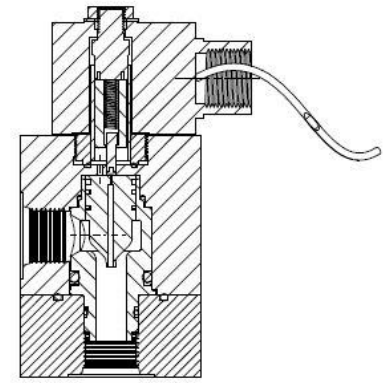
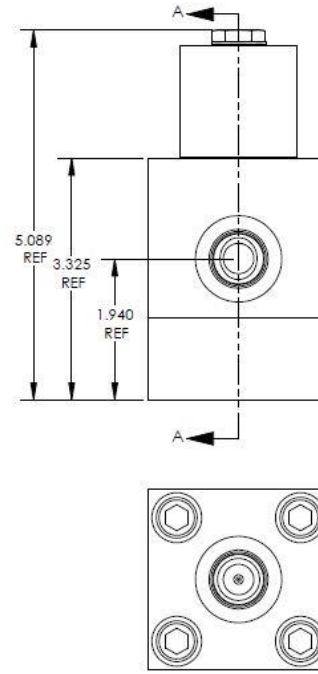
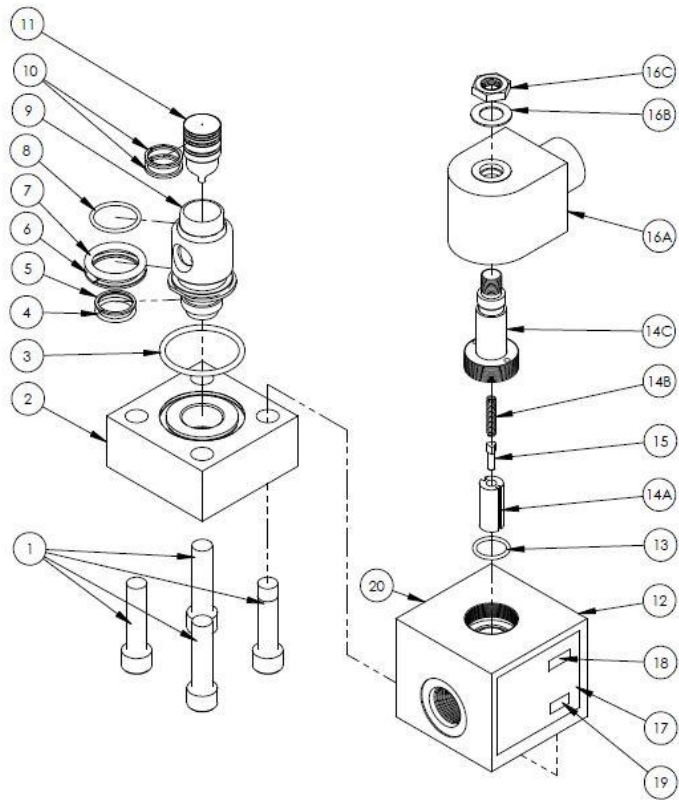
- With a small screwdriver, remove the spigot (Item #9) from inside the main body by prying under O-ring groove lip.
- Clean the surface and holes of the main body by first wiping them with a clean rag and then blowing out any particles with air.
- Remove all of the rings from the spigot (Items #4, 5, 6, 7, and 8). Clean the spigot with a clean cloth.
- Remove the piston (Item #11) from the spigot. Remove the piston rings (Item #10) and inspect the piston. If there are any particles embedded in the seat area, or if the seat area appears to be enlarged or out of round, replace the piston. If the spigot's seat area for the piston appears excessively worn, spigot replacement is recommended.
- Clean the main body by first soaking it in solvent for at least 15 minutes and then rinse it off in water. Dry it thoroughly with pressurized air.
- Clamp main body upside down in the vice and set a new output seal O-ring (Item #8) into the hole.
- Place a new large spigot backup ring (Item #6) and a new large spigot O-ring (Item #7) onto the spigot. The concave side of the backup ring must face the O-ring.
- Place a new small spigot backup ring (Item #5) and a new small spigot O-ring (Item #4) onto the spigot. The concave side of the backup ring must face the O-ring.
- Fit the piston rings into the grooves on the piston (Item #9). Press the ring tightly into the groove by holding one end with your thumb and running your finger around the piston to snugly insert the ring in the groove.
- Test fit the piston into the bore of the spigot (Item #17). If it does not fit in past the piston rings the piston rings will need to be trimmed. **Note:** If the piston falls out of the spigot when turned upside down the rings have been trimmed too much. This may prevent the valve from opening when activated. Ideally the piston should only slip out of the spigot with a slight flick of the wrist. If it does not, more of the ring will need to be trimmed.

Figure 2



- Rub a small amount of sealant along the outside of the spigot as shown in Figure 2.
- Check that the output seal O-ring (Item #8) inside the main body is seated properly and then place a spigot into the hole. Firmly push and turn the spigot into the hole.
- Springly cover the body seal O-ring (Item #3), the small spigot backup ring (Item #5) and the small spigot O-ring (Item #4) with sealant.
- Rub some sealant into the entrance of the hole on the mating side of the outlet block, and slowly lower the outlet block onto the main body. Take care that the outlet block is lowered **parallel** to the main body.
- Replace the cap screws using a proper torque sequence, as shown in Figure 1. First hand-tighten each cap screw. Next tighten the screws to 400 inches per pound. Finally, tighten the screws to 500 inches per pound.
- Clamp the valve upright in the vice. Coat the valve stem O-ring (Item #13) with sealant and place them into the valve stem O-ring groove.
- Insert the piston pin and the spring inside the armature. Place the assembly into the main body.
- Screw the valve stem into the main body by hand and tighten it with the torque wrench to 400 inches per pound.
- Mount the coil onto the valve stem. Place coil washer and nut onto the valve stem and tighten.

REV#	ENR#	YYYY-MM-DD	DESCRIPTION	BY
04	15782	2015-05-25	UPDATED COMPANY NAME AND ASME CODE REVISION	PD



SECTION A-A
SCALE 1 : 1.5

SPECIFICATIONS
CODE OF CONSTRUCTION:
 ASME B31.3-2014
DESIGN PRESSURE:
 5,000 PSIG
DESIGN TEMPERATURE:
 -40°F TO 150°F
CORROSION ALLOWANCE:
 0
PORT SPECIFICATION:
 SAE J1926-1
THREAD SPECIFICATION:
 ASME B1.1

NOTES

1. SERVICE: COMPRESSED NATURAL GAS VALVE
2. MAXIMUM ALLOWABLE WORKING PRESSURE: 5000 PSIG
3. MEDIA: SWEET, DRY NATURAL GAS (AS PER SAE J1616, ISO 11439)
4. TEMPERATURE RATING: -40°F TO 150°F (-40°C TO +65°C)
5. VALVE SHALL BE CONSTRUCTED TO CONFORM WITH ASME B31.3-2014
6. VALVE SHALL BE PNEUMATICALLY PRESSURE TESTED TO 1.2 TIMES THE MAWP AND HELD FOR 10 MINUTES, ENSURING THAT NO LEAKS ARE DETECTED.

MATERIAL:	N/A
FINISH:	N/A
TOLERANCES (U.O.B):	±0.005 GENERAL ±0.010 ON HOLE CENTERS ±0.010 ON ACCUMULATIVE ±5° ON ANGLES
NEXT ASSY:	N/A
PARTS LIST:	264AY44.PRT ASSOCIATED FLW/SCH No. N/A SIZE B

		KAF VALVES	
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KAF402 SOLENOID VALVE ASSEMBLY DRAWING			
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DO NOT SCALE DRAWING	DESIGNED BY: K. FRIESEN	DATE: 22 MAY 01	264AY44.ASY R03

KAF 402 Parts List – Refer to Drawing

Items Common to All KAF 402 Valves:

- Item 1, MRP# 25218, Qty. 4, Description: Screw, Hex-Socket Cap, 3/8-16 x 1-1/2", Alloy Steel, ASME B18.3, ASTM A574
- Item 3, MRP# 17094, Qty. 1, Description: N70-126: BC2153: O-Ring
- Item 4, MRP# N70-016, Qty. 1, Description: N70-016: BC2009: O-Ring
- Item 5, MRP# BUN-016, Qty. 1, Description: BUN-016: BC2010: Back-Up Ring
- Item 6, MRP# BUN-212, Qty. 1, Description: BUN-212: BC2011: Back-Up Ring
- Item 7, MRP# N70-212, Qty. 1, Description: N70-212: BC2012: O-Ring
- Item 8, MRP# N90-019, Qty. 1, Description: N90-019: BC2013: O-Ring
- Item 9, MRP# 22568, Qty. 1, Description: BC2563: Spigot, High Flow Solenoid Valve Model KAF402
- Item 10, MRP# BC793, Qty. 2, Description: BC793: Piston Ring, Teflon
- Item 13, MRP# N90-015, Qty. 1, Description: N90-015: BC2005: O-Ring
- Item 14, MRP# 7121Z006, Qty. 1, Description: BC2002: Operator c/w Armature, Spring, Seal (Parker/Skinner) (712Z006)
- Item 15, MRP# 26340, Qty. 1, Description: BC1973: Piston Pin, Short Head – KAF Valves
- Item 18, MRP# N/A, Qty. 1, Solenoid Valve Model Number/Electrical Rating
- Item 19, MRP# 22652, Qty. 1, BC 1970: Serial # Label

Coils:

- Item 16, MRP# H111P3, Qty. 1, Description: H111P3: Coil 120 VAC 60 Hz c/w Nut & Washer, 48" Wires
- Item 16, MRP# 17437, Qty. 1, Description: H111Q3: Coil 240 VAC 60 Hz c/w Nut & Washer, 48" Wires

Body:

- Item 2, MRP# 22569, Qty. 1, Description: BC2564: Outlet Block, High Flow Solenoid Valve Model KAF402
- Item 12, MRP# 22567, Qty. 1, Description: BC2562: Main Body, High Flow Solenoid Valve KAF 402

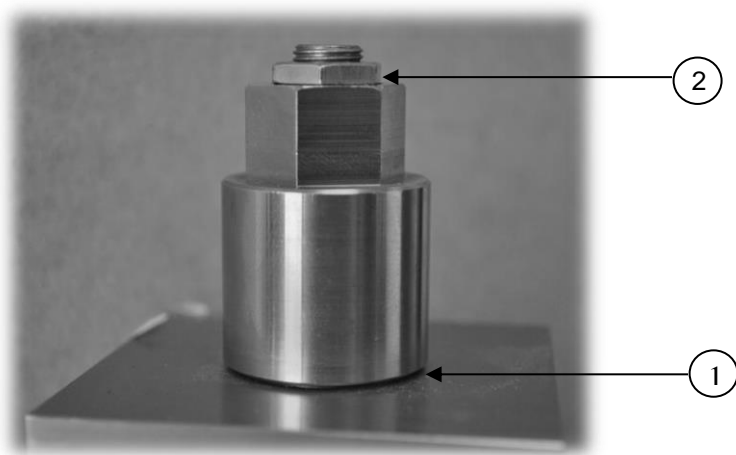
Stem Removal Tool is not included in rebuild kit – part sold separately.

Stem Removal Tool – Part # 24825
 Replacement Stem Tool Pin – Part # 22109

Placement of Stem Tool

To prevent the stem tool pins from breaking please:

1. Ensure stem tool is tight against stem base
2. Place stem nut over tool, hand tighten then give ¼ turn with wrench



Product Certifications

- Certificate of Compliance
- Valve Approvals
- Descriptive and Test Report

For an electronic copy of the above certificates, please call 204-663-3601.

