Amflow®

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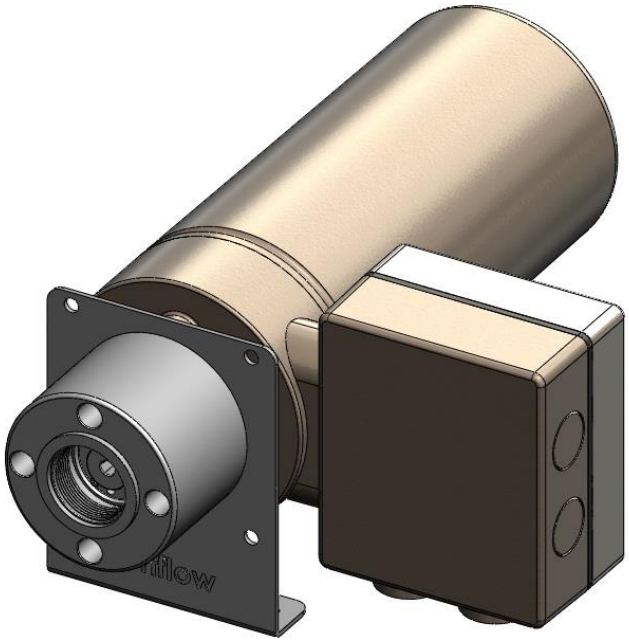
INSTALLATION, OPERATION & SERVICE MANUAL

AMFLOW®
A2-VACM VALVE ACTUATOR
(DIRECT DRIVE)



Part Number: 00000222-0501

NOTE
Reference the "As Built" data sheet supplied with order for specific actuator configuration.

A & H Enterprises, Inc. reserves the right to make modifications and/or improvements to ***Amflow®*** products without prior notice.

Explanation of Graphic Symbols

DANGER AND/OR WARNING
The exclamation point within an equilateral triangle surrounded by red is intended to alert the user to the presence of important operating and maintenance instructions that may cause personal injury or harm to the system.

CAUTION AND/OR IMPORTANT
The exclamation point within an equilateral triangle that is solid yellow with an exclamation point is intended to alert the user to use caution or contains important information.

TABLE OF CONTENTS

TABLE OF CONTENTS

END OF SECTION

SECTION 1: INFORMATION

1.01 DESCRIPTION

The ***Amflow***® A2-VACM Actuator is a direct drive actuator designed to accommodate a variety of ***Amflow***® products in hazardous area usage. Product compatibility includes; AM7 Series, AM8 and AM11A flow control valves and the PR7 Series and PR-HF-SSSP back pressure regulators .

Once ***Amflow***® A2-VACM Actuator is installed the valve is screwed onto the TAPER RING (Item 2.2) and locked into place with a 6 mm set screw. The Inlet and Outlet ports of valve will then need to be connected to the system. An optional mounting bracket is available.

1.02 DESIGN FEATURES

- Normal module operation includes valve position, current limit, pressure & flow feedback.
- Low maintenance.
- Environmentally sealed.

1.03 MECHANICAL FEATURES

- ATEX Certification: DNV 2007 OSL ATEX-1498
- Certification Category: CE Ex **II 2G Ex de IIC T4**
- Degree of Protection: IP66
- Weight: 28.5 lbs. (13 Kg)
- Optional Cable Glands: M20 x 1.5

Amflow® **A2-VACM Actuator: Electrical Specifications**

	Motor	Watts	Max. Operating Current	Max In-Rush Current	Manual Override	Communication
A2-VACM 00000222-0501-016	DC Gear	24 VDC 30 Watts	1.25 amps (continuous)	3.0 amps	No	• Industrial Ethernet • Hart / 4-20mA • H1 FOUNDATION fieldbus • Modbus RTU / RS485 • Modbus TCP

1.04 COMMUNICATION PROTOCOLS

- Circuit board: Main motherboard with interchangeable daughter boards.
- Remote access from host computer for control, monitoring, and configuration.
- Available Communication Protocols:
  - ❖ INDUSTRIAL ETHERNET
  - ❖ HART/4-20mA
  - ❖ H1 FOUNDATION fieldbus
  - ❖ MODBUS RTU / RS485
  - ❖ MODBUS TCP
- Ethernet Protocol: IEEE 802.3 - 10T/100T

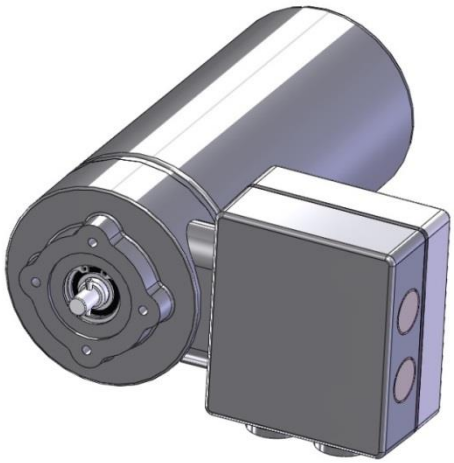
These protocols provide ease of use in the field with their own embedded web pages eliminating third party communication devices. Refer to the Circuit Board Manual provided with order for information and issues regarding communication.

1.05 SAFETY INFORMATION

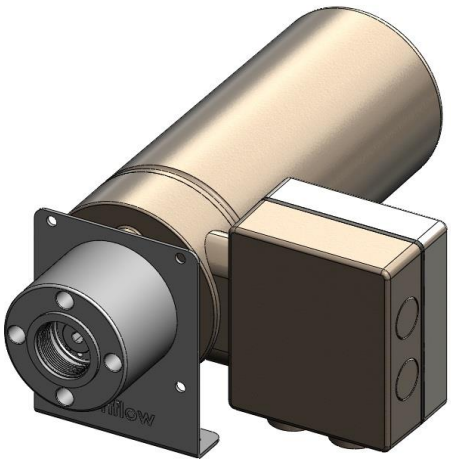
SAFETY INFORMATION

- Follow IEC when working with electrical units.
- When handling product avoid dropping, damaging, or submerging.
- Ensure proper wiring.
- Person(s) handling circuit board should be properly grounded.
- Do not open unit while energized.

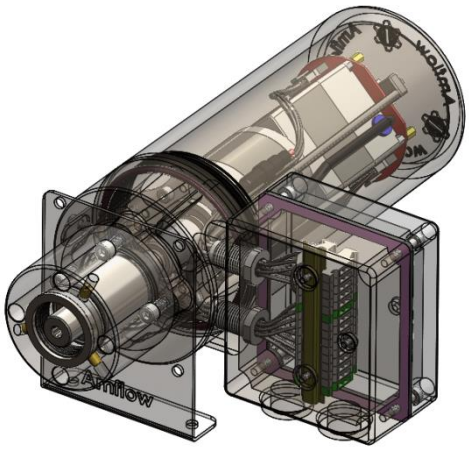
1.06 ASSEMBLY VIEW



AMFLOW® A2-VACM Actuator
Shown without Clutch Assembly
or Mounting Bracket

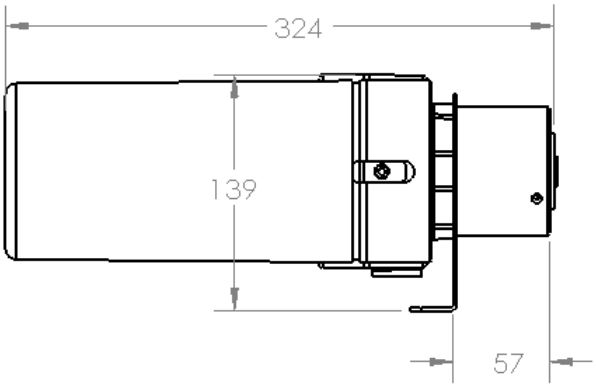


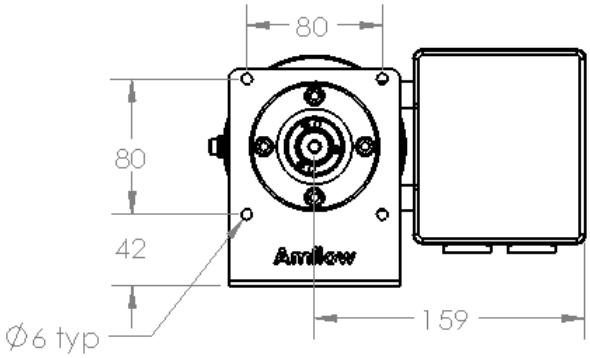
AMFLOW® A2-VACM Actuator
Shown with Clutch Assembly
and Mounting Bracket

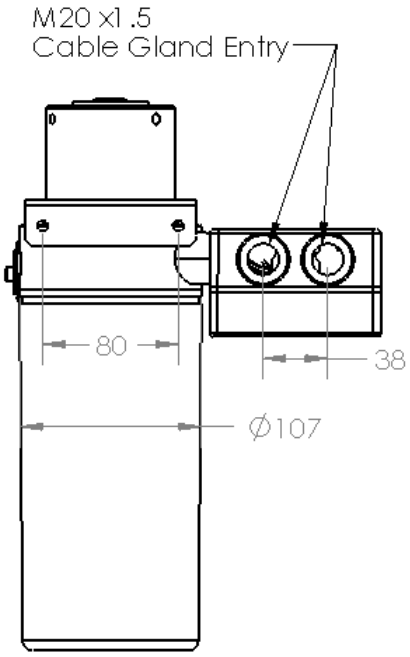


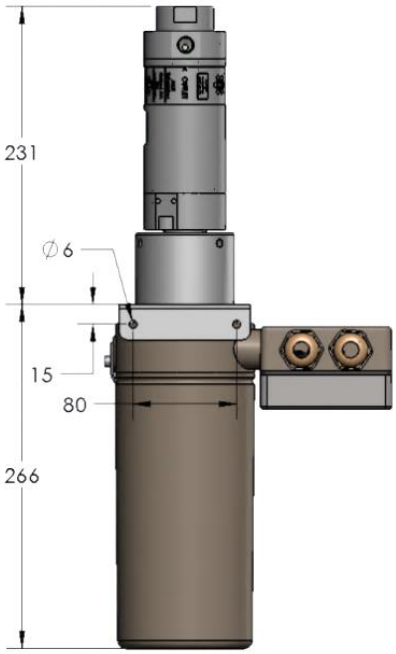
AMFLOW® A2-VACM Actuator
Transparent View

1.07 GA DRAWING



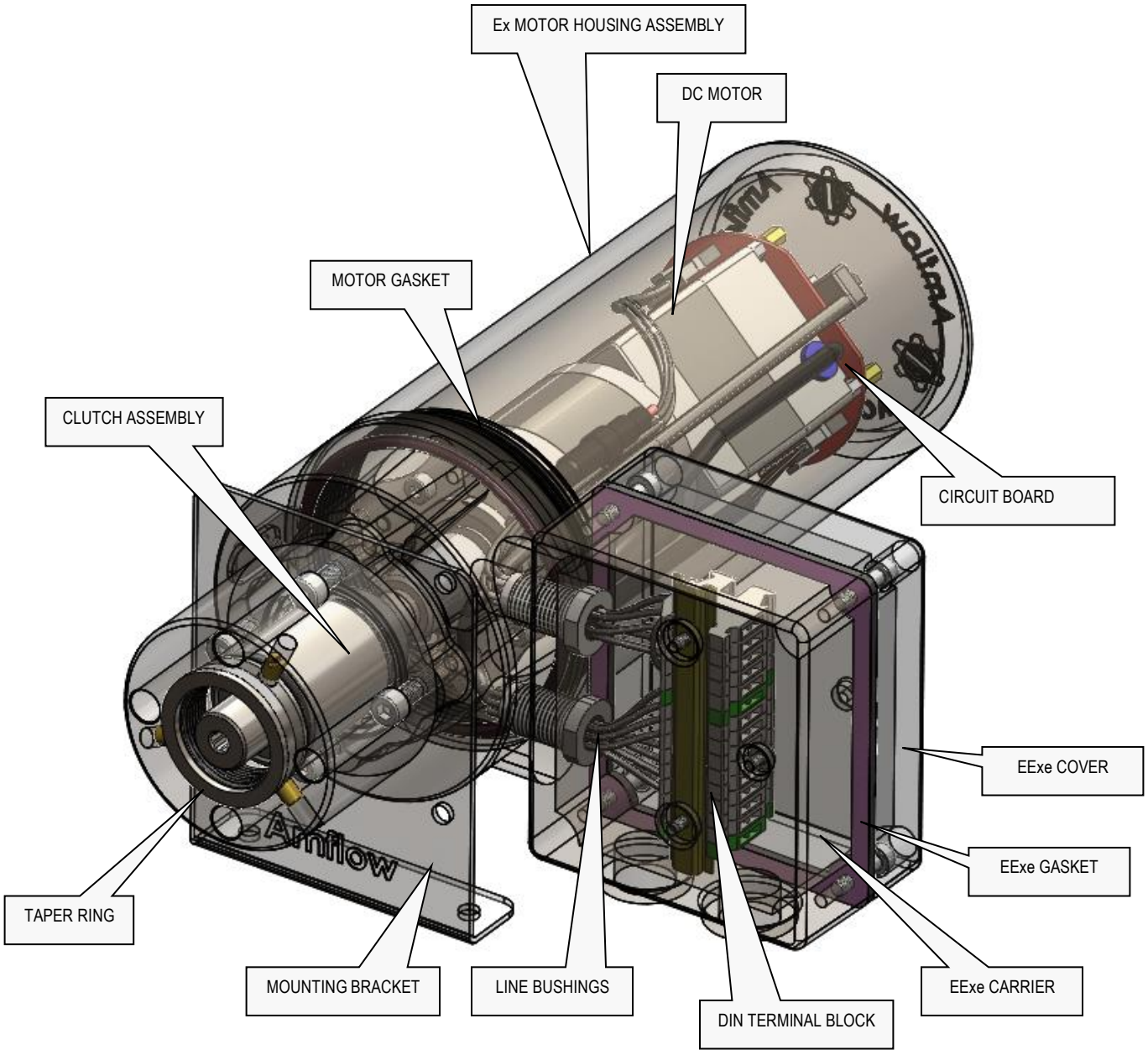




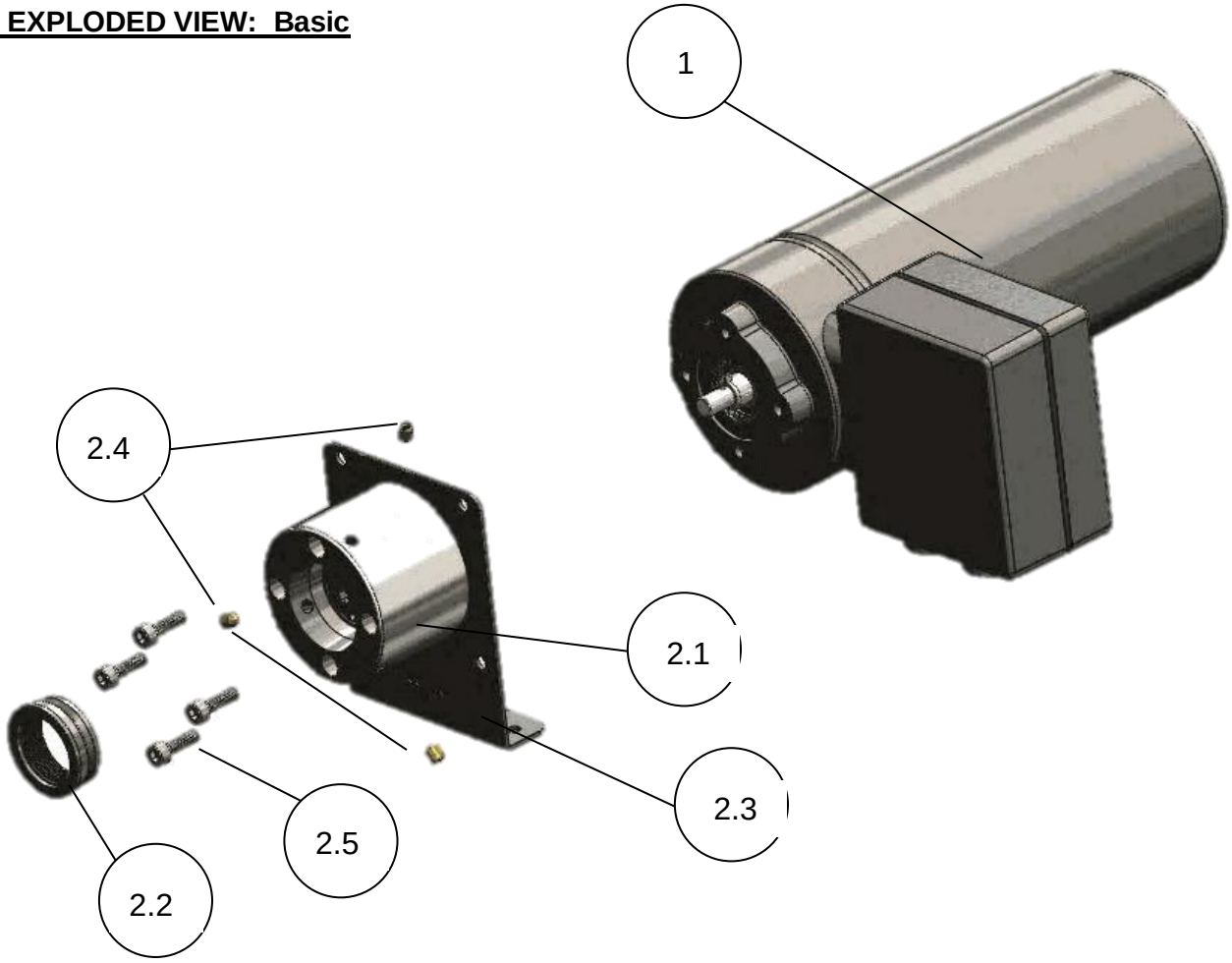


AMFLOW® A2-VACM ACTUATOR
Shown Fully Assembled with
AM7B Flow Control Valve

1.08 FULL VIEW



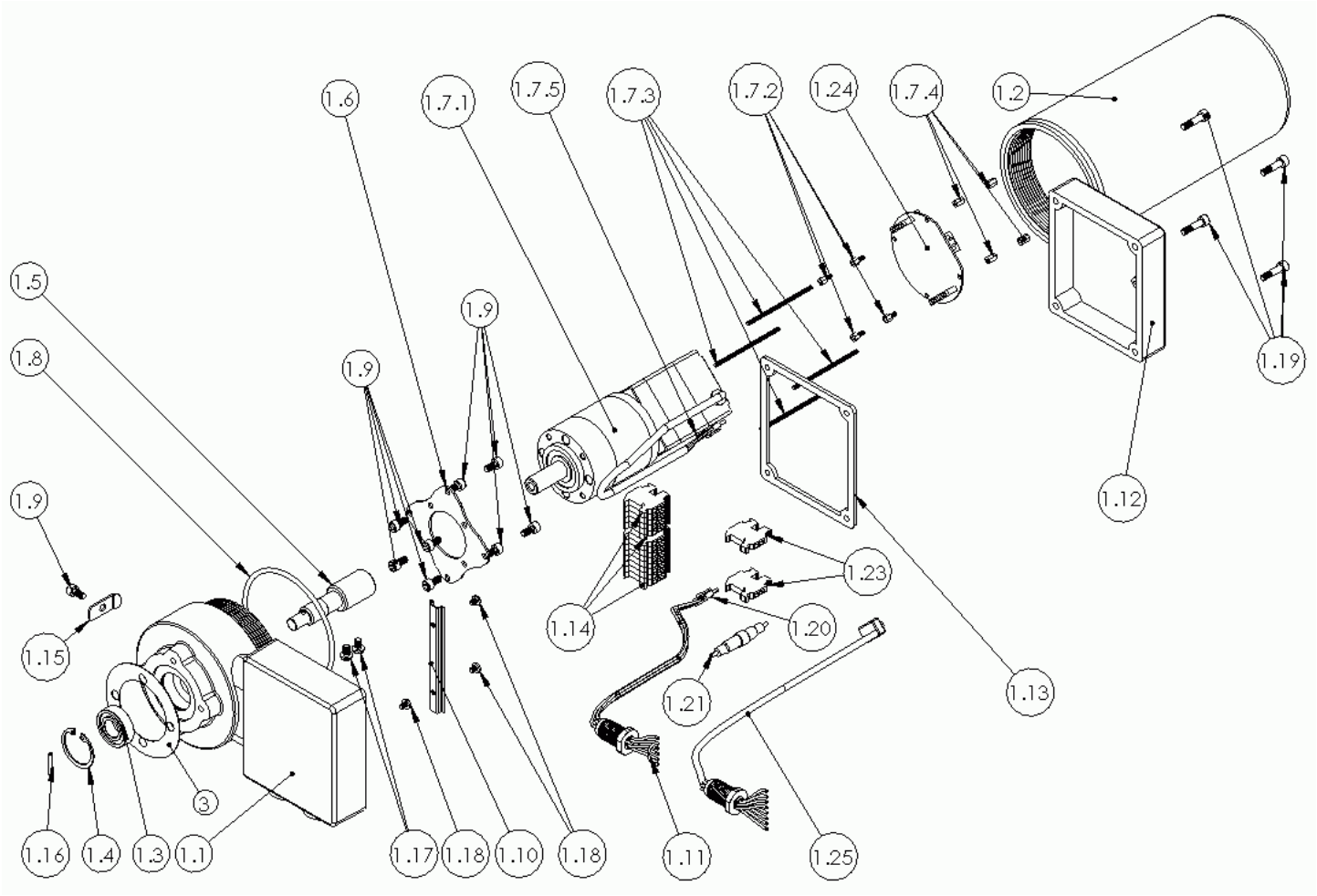
1.09 EXPLODED VIEW: Basic



1.09a BOM: Basic

ITEM	PART	DESCRIPTION	QTY
1	00000471-0401-000	Ex Housing Assy	1
2.1	00000994-0301-000	Adapter Block	1
2.2	00000995-0301-000	Taper Ring	1
2.3	00000999-0301-000	Mounting Plate	1
2.4	00001500-7306-008-00	Set Screw	3
2.5	00001500-7006-020-00	M6x20 SHCS	4

1.10 EXPLODED VIEW: Detailed



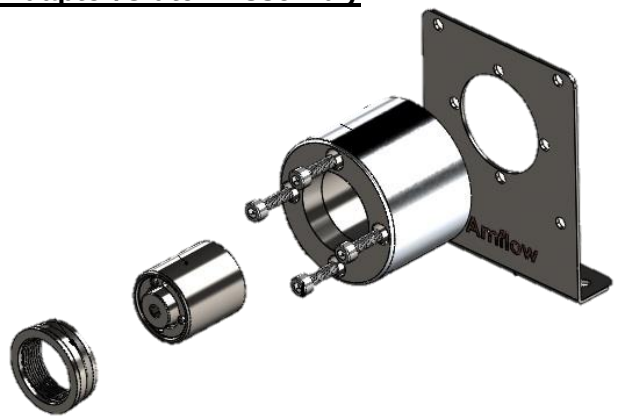
1.10a BOM

ITEM #	PART #	DESCRIPTION	QTY
1	00000471-0401-000	Ex Housing Assy	1
1.1	00000469-0301-000	EEx de Carrier	1
1.2	00000470-0301-000	Bell Housing	1
1.3	00000328-0301-000	Bearing	1
1.4	00000327-0301-000	Circlip	1
1.5	00000326-0301-000	Shaft Adaptor	1
1.6	00000473-0301-000	Motor Plate Adaptor	1
1.7	00001410-0401-001	DC Motor Assy, w/Circuit Board	1
1.7.1	00000342-0301-000	DC Motor	1
1.7.2	00001130-0301-000	M3 x 5 M/F Hex Spacer	4
1.7.3	00001133-0301-XXX	3 mm x 70 mm Stud	4
1.7.4	00001132-0301-000	3 mm x 8 mm OAL Hex Nut	4
1.7.5	00001127-0301-007	Connector: 7 Pin	1
1.8	00001555-2153-000	Carrier O-Ring	1
1.9	00001500-7005-010-00	M5 x 10 SHCS	9
1.1	00000498-0301-000	15 mm DIN Rail	1
1.11	00000499-0301-002	Line Bushing: 7 Wire - 16 mm	1
1.12	00000501-0301-000	EEx de Cover	1
1.13	00000502-0301-000	EEx de Gasket	1
1.14	00000503-0301-000	DIN Terminal Block	13
1.15	00000494-0301-000	Safety Clamp	1
1.16	00000337-0301-000	Drive Pin	1
1.17	00001500-7105-008-00	M5 x 8 Panhead	2
1.18	00001500-7104-006-00	M4 x 6 Panhead	3
1.19	00001500-7005-020-00	M5 x 20 SHCS	4
1.2	00001127-0301-009	Connector: 9 Pin	1
1.21	00001139-0301-000	Fuse Holder	1
1.22	00001381-0401-000	Circuit Board Assy	1
1.23	00000503-0301-001	DIN Earth Terminal	2
1.24	00001708-0301-000	Circuit Board	1
1.25	00000499-0301-003	Line Bushing: 9 Wire - 16 mm	1

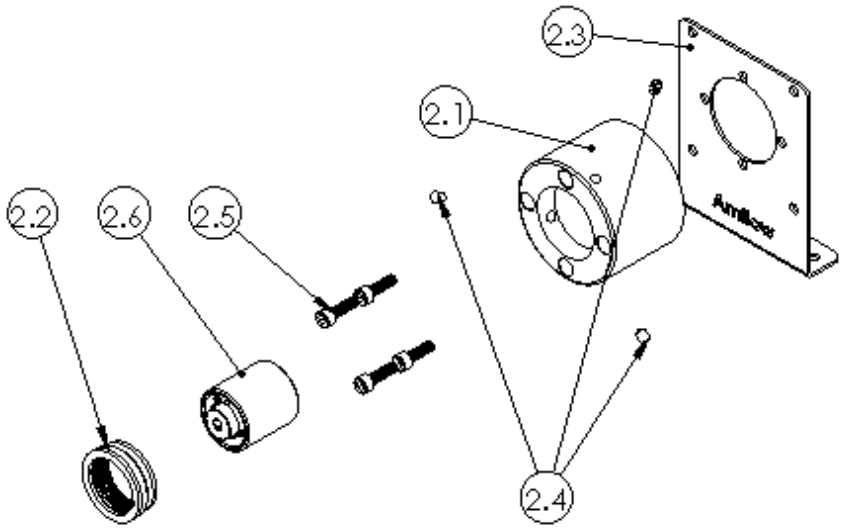
ITEM #	PART #	DESCRIPTION	QTY
2	00001000-0401-000	Adapter Housing / Clutch Assy	1
2.1	00000994-0301-000	Adapter Block	1
2.2	00000995-0301-000	Taper Ring	1
2.3	00000999-0301-000	Mounting Plate	1
2.4	00001500-7306-008-00	Set Screw	3
2.5	00001500-7006-020-00	M6x20 SHCS	4
3	00000286-0301-000	Mounting Gasket	1

1.11 ASSEMBLY VIEW: Adaptor/Clutch Assembly

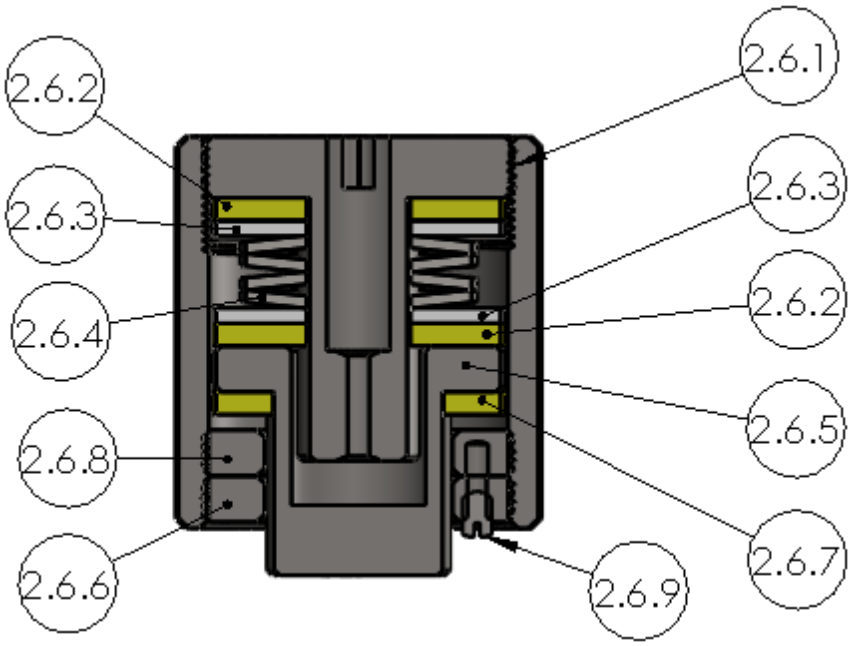
1.11a EXPLODED VIEW: Adaptor/Clutch Assembly



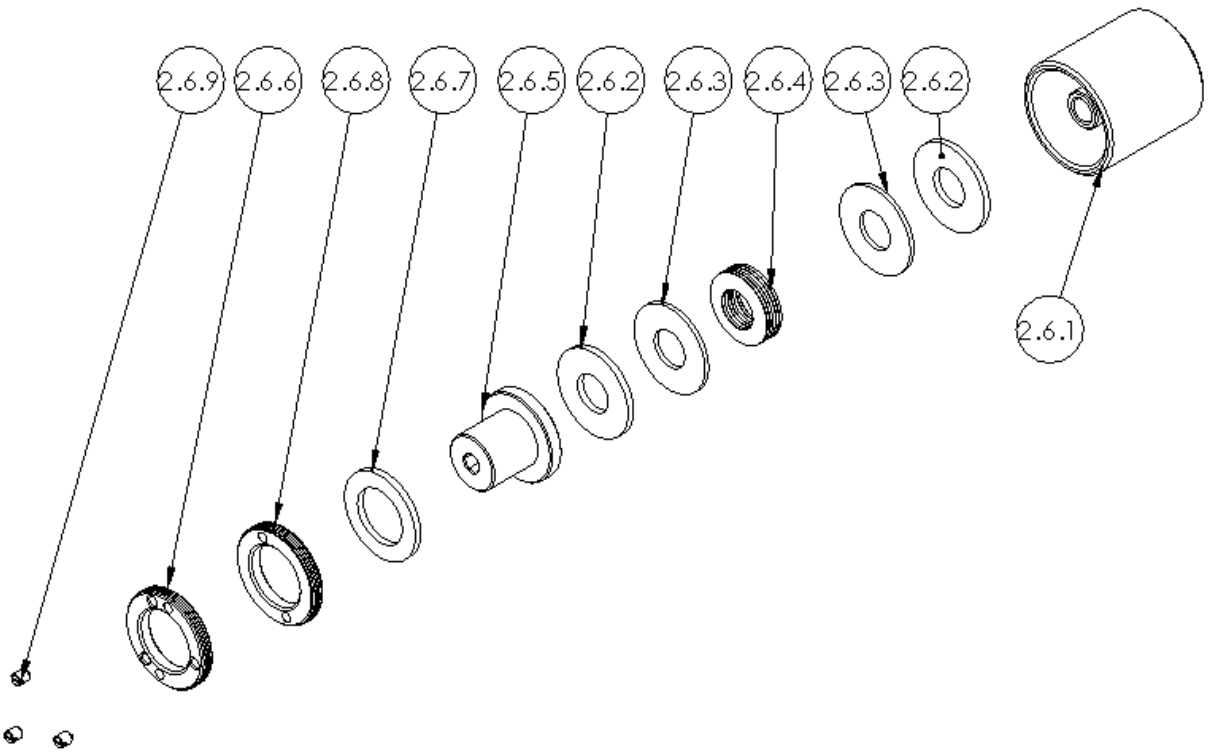
1.11b EXPLODED VIEW: Adaptor/Clutch Assembly



1.12 CUTAWAY VIEW: Detailed Clutch Assembly



1.12a EXPLODED VIEW: Detailed Clutch Assembly



1.12b BOM: Detailed Clutch Assembly

ITEM #	PART #	DESCRIPTION	QTY
2	00001000-0401-000	Adapter Housing / Clutch Assy	1
2.1	00000994-0301-000	Adapter Block	1
2.2	00000995-0301-000	Taper Ring	1
2.3	00000999-0301-000	Mounting Plate	1
2.4	00001500-7306-008-00	Set Screw	3
2.5	00001500-7006-020-00	M6x20 SHCS	4
2.6	00001214-0401-000	Clutch Assy	1
2.6.1	00001156-0401-000	Clutch Housing	1
2.6.1.1	00000996-0301-000	Clutch Barrel	1
2.6.1.2	00000998-0301-000	FC Shaft	1
2.6.2	00000246-0301-000	Clutch Ring	2
2.6.3	00000249-0301-000	Clutch Washer	2
2.6.4	00001600-1000-050-00-0505	Belleville Spring	4
2.6.5	00000997-0301-000	FC Loader	1
2.6.6	00001003-0301-000	Lock Ring	1
2.6.7	00000246-0301-001	Modified Clutch Ring	1
2.6.8	00001001-0301-000	Tension Ring	1
2.6.9	00001500-7304-006-00	M4 x 6 Set Screw	3

END OF SECTION

1.13 PANEL MOUNT: Cut-out Dimensions

- Vertical mount A2-VACM Actuator using two 6.35 mm holes located on bottom portion of MOUNTING PLATE (ITEM 2.3). Ref. Diagram 1
- Horizontal mount A2-VACM Actuator using four 6.35 mm holes located on vertical portion of MOUNTING PLATE (ITEM 2.3).

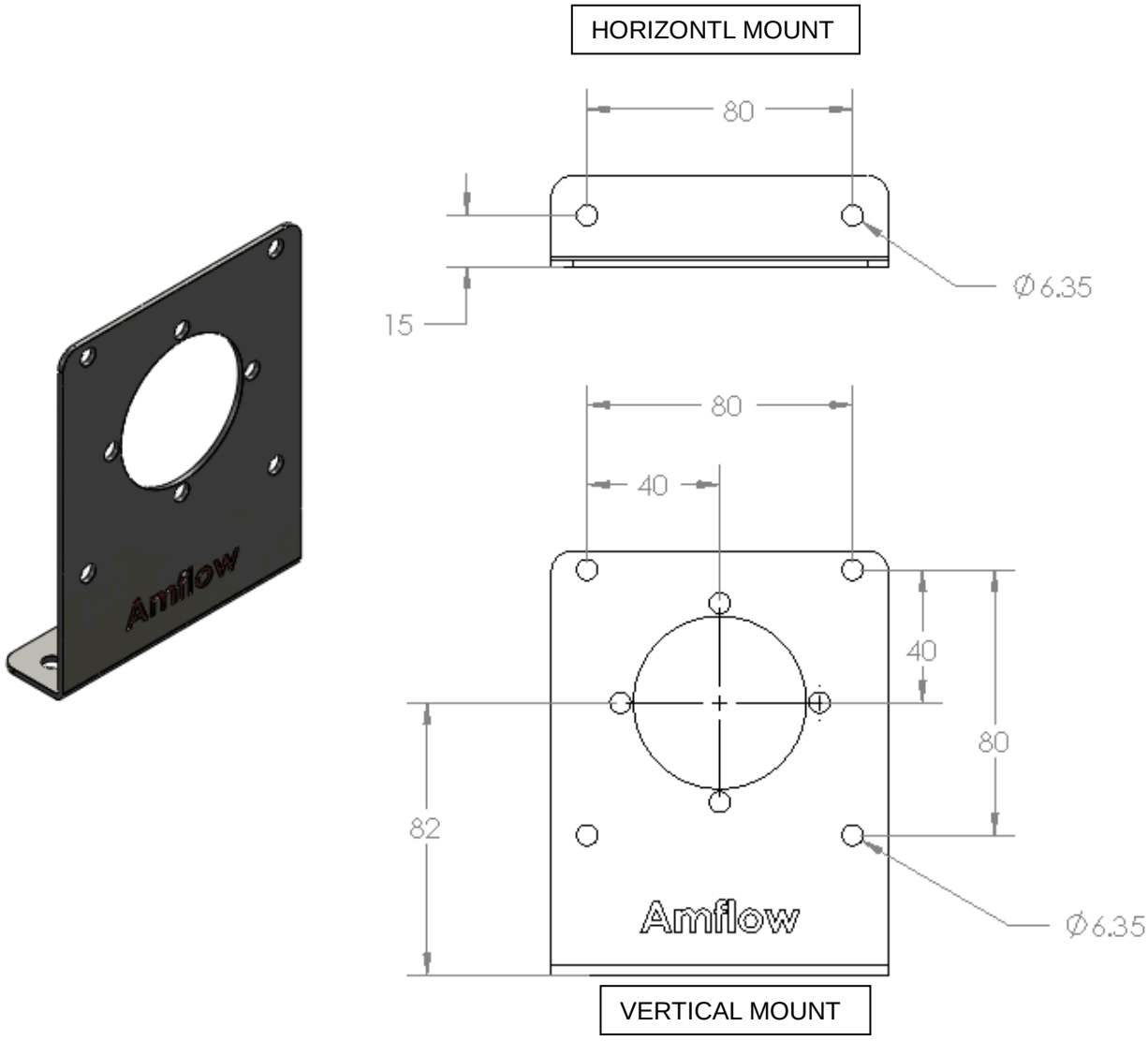


DIAGRAM 1: A2-VACM Actuator MOUNTING PANEL

END OF SECTION

SECTION 2: INSTALLATION: Actuator

2.01 INSTALLATION PRECAUTIONS: Actuator

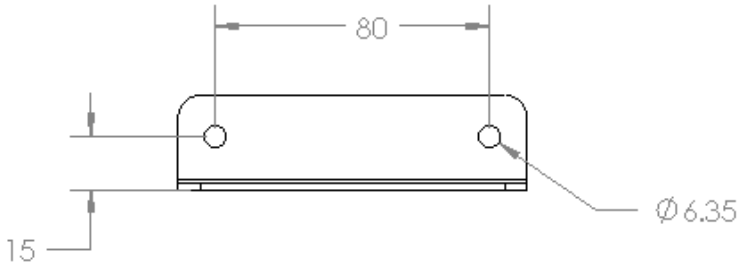
- Be careful when handling actuator, if dropped internal electronics may be damaged.
- Do not change manufacturer's torque settings or unit may function incorrectly.
  - However, instructions have been supplied for torque setting adjustments if needed.

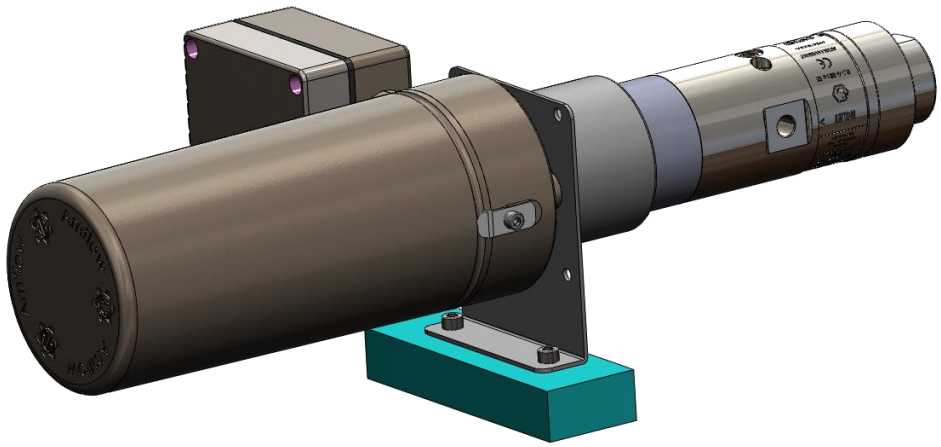
WARNING
Failure to set torque correctly may cause actuator to function improperly!

2.02 INSTALLATION: Tools

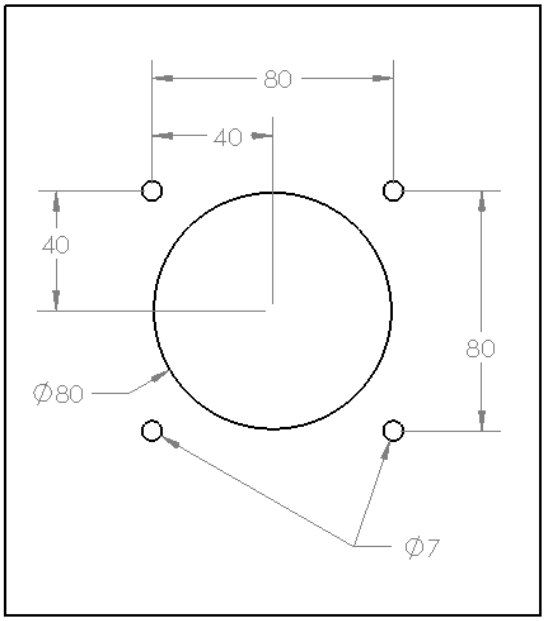
- 4 mm, 6 mm Allen Wrench
- Flathead Screwdriver

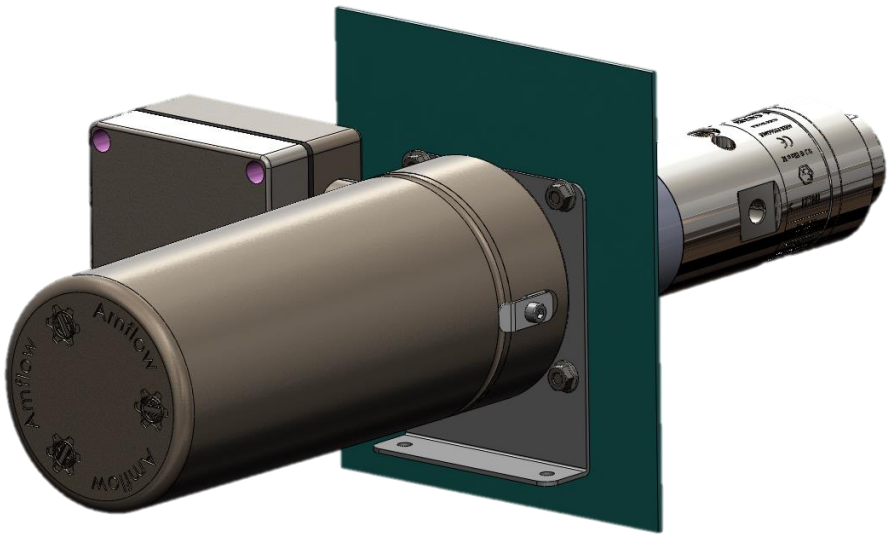
2.03 INSTALLATION PROCEDURE: Horizontal Panel Mount





2.04 INSTALLATION PROCEDURE: Vertical Panel Mount





END OF SECTION

SECTION 3: INSTALLATION: Valve

3.01 INSTALLATION PRECAUTIONS: Valve

Good system design is critical to the optimum operation of the ***Amflow®*** Valves. At a minimum, the design should include:

- Isolation valves located near inlet and outlet ports of the ***Amflow®*** Valve. (The outlet isolation valve is normally a three-way valve that can be incorporated into the calibration loop.)

IMPORTANT: The importance of proper media filtering cannot be overstated. It is **strongly** recommended that filters be placed on both the suction side and the pressure side of pump. It is not unusual to have individual filters inline for each valve. The recommended micron size of the high-pressure filter is somewhat dependent on the specific configuration of any given ***Amflow®*** Valve. However, a 50-micron filter size is generally adequate for most applications.

- The system design should take into consideration that materials which come into contact with the injected media should not contribute to foreign matter entering into the system. This means it is unwise to use material that can be easily corroded, such as mild steels.

- A check valve located on the outlet side of each ***Amflow®*** Valve is strongly recommended. There are a number of reasons for this:
  - The first and most obvious is for safety considerations.
  - The second is to prevent a massive backflow through the ***Amflow®*** Valve.

This backflow can occur if there is a pump failure or some other system failure that would cause a loss of positive pressure across the ***Amflow®*** Valve. The ***Amflow®*** Valve is designed to accommodate some backflow conditions; however, piston seal damage can occur if backflow is excessive. The seal is designed to fail under certain conditions in order to prevent damage that is more serious to the valve.

NOTE: Reference Installation, Operation & Service manual supplied with valve order for information

3.02 INSTALLATION PROCEDURE: Valve to Actuator

Step 1

- Remove panel lock.

NOTE

Adjustment Knob & Panel Lock shipped with valve are not intended for this installation.

Install only if needed for manual operation.

Step 2

- Attach TAPER RING (ITEM 2.2) and thread onto valve.

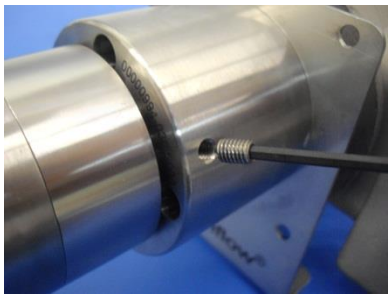
NOTE

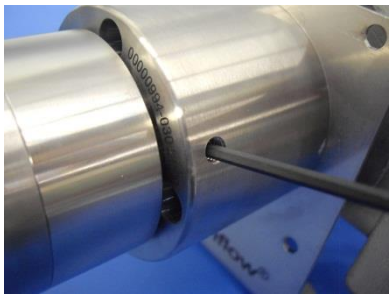
AM7 Series, AM8 Series and PR7 Series use a 33 mm TAPER RING (ITEM 2.2).

AM9A and PR-HF-SSSP use a 44 mm TAPER RING (ITEM 2.2)

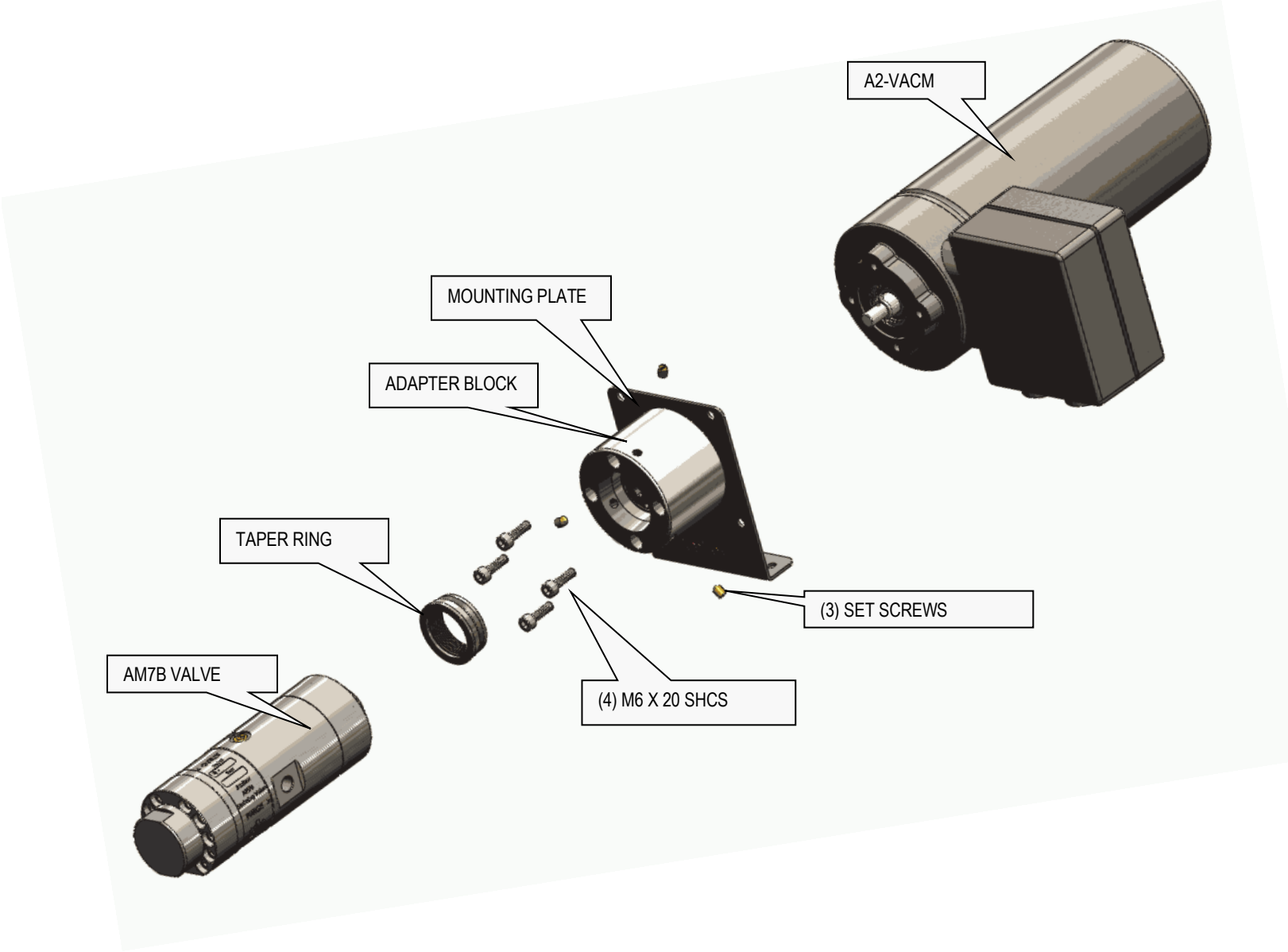
Step 3

- Insert TAPER RING (ITEM 2.2) into ADAPTER BLOCK (ITEM 2.1).
  - Secure in place using SET SCREWS (ITEM 2.4).





3.02 INSTALLATION PROCEDURE: Valve to Actuator, continued



END OF SECTION

SECTION 4: SERVICE: Valve Removal

BEFORE CARRYING OUT NEXT ACTIONS

1. Close down system or isolate valve to be removed.

2. Vent all pressure.

4.01 VALVE REMOVAL FROM SYSTEM

Step 1

- Disconnect tubing from Inlet and Outlet ports.

Step 2

- Loosen three(3) 6 mm SET SCREWS (Item 2.4) located on ADAPTOR BLOCK (Item 2.1), using a 3 mm hex head wrench. Ref. FIGURE 1

FIGURE 1

Step 3

- Remove valve.

4.02 OPENING VALVE PROCEDURE

For maintenance and service of valve, please reference the Installation, Operation & Service Manual for the specific valve provided with order.

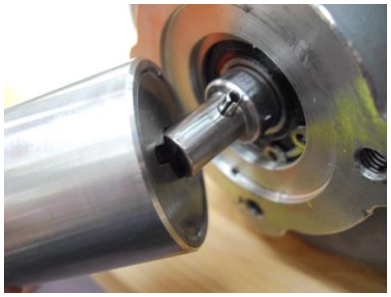
END OF SECTION

SECTION 5: SERVICE: Adjustments

5.01 CHECK TORQUE

Step 1

- Remove CLUTCH ASSEMBLY(Item 2.6) from SHAFT ADAPTER (Item 1.5) by pulling the two sections apart.



Step 2

- Hold CLUTCH ASSEMBLY (Item 2.6) securely. Ref. FIGURE 1

Step 3

- Using a torque wrench, with a fitted 6 mm hex drive, check to ensure spinning torque is between 6.7 and 9 newton meters (60-80 in lbs.). Ref FIGURE 2,3, & 4

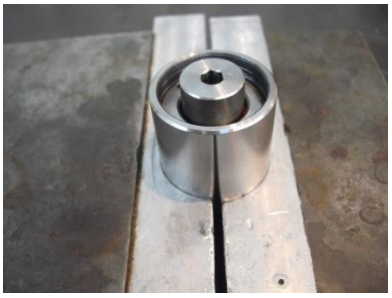


FIGURE 1

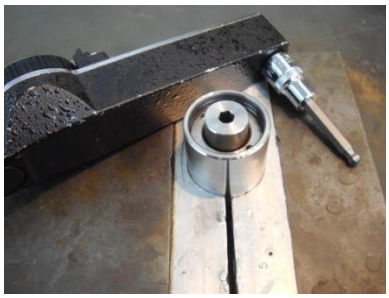


FIGURE 2

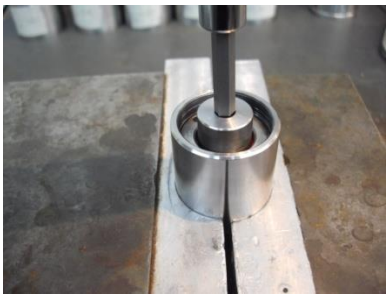


FIGURE 3

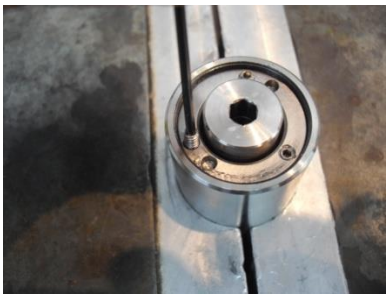
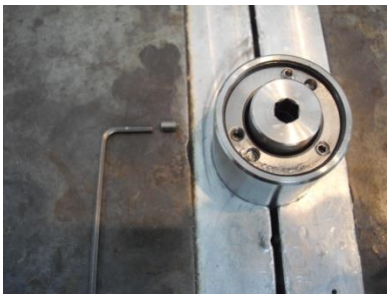
FIGURE 4

END OF SECTION

5.02 TORQUE ADJUSTMENT (if needed)

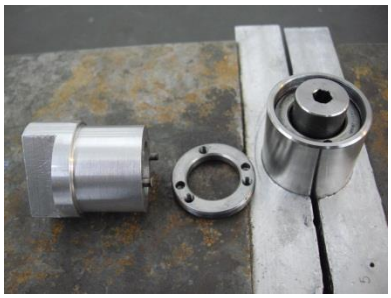
Step 1

- Remove three (3) M4x6 SET SCREWS (Item 2.6.9).

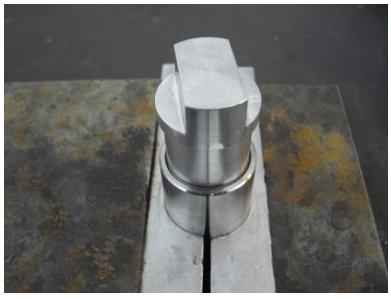
Step 2

- Using Torque Tool (Part 1412-1000-000) (Ref. Appendix A) remove LOCK RING (Item 2.6.6).

Step 3

- Using Torque Tool (Part 1412-1000-000) (Ref. Appendix A) adjust TENSION RING (Item 2.6.8).
  - Clockwise to increase torque or counter-clockwise to decrease torque to achieve the proper torque setting between 6.7 and 9 newton meters (60-80 in lbs.).




Step 4

- Confirm torque.

END OF SECTION

SECTION 6: SERVICE: REPLACEMENTS - Gaskets

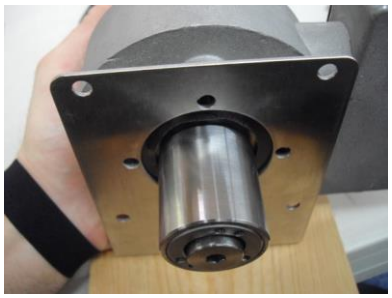
6.01 REPLACMENT: Mounting Plate Gasket

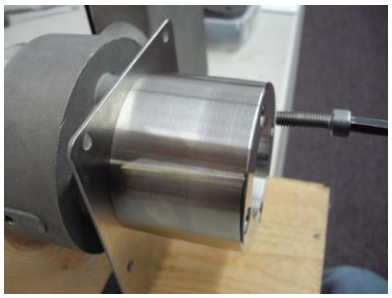
Step 1

- Locate MOUNTING PLATE (Item 2.3).

Step 2

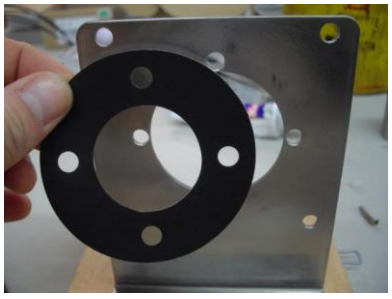
- Remove four (4) M6X20 SHCS (Item 2.5) attached to ADAPTER BLOCK (Item 2.1) located on front side of MOUNTING PLATE (Item 2.3).

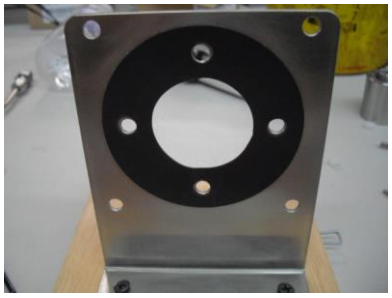




Step 3

- Locate the side of the MOUNTING PLATE with laser markings, then on opposite side:
  - Remove MOUNTING GASKET (Item 3).
  - Aligning holes attach new MOUNTING GASKET (Item 3) onto backside of MOUNTING PLATE (Item 2.3).
  - Press into place.





Step 4

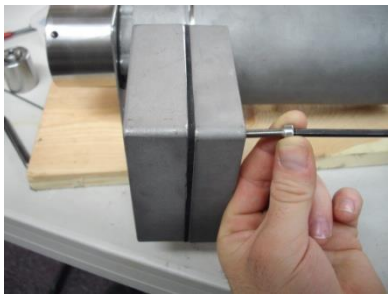
- Re-attach ADAPTOR BLOCK (Item 1.2) and MOUNTING PLATE (Item 2.3).

END OF SECTION

6.02 REPLACMENT: EEx de Cover Gasket

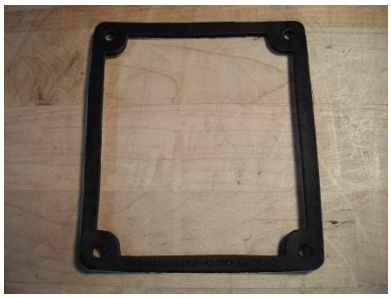
Step 1

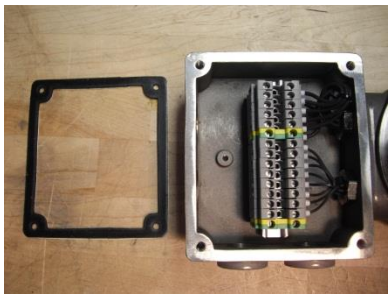
- Remove EEx de COVER (Item 1.12), by unscrewing four (4) M5X20 SCREWS (Item 1.19).

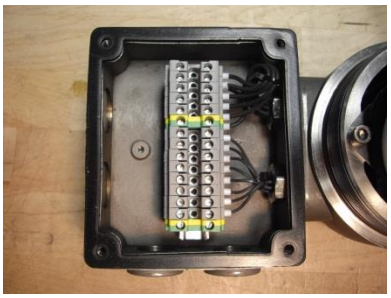


Step 2

- Remove and replace EEx de GASKET (Item 1.13) to EEx de COVER (Item 1.12).







Step 3

- Re-attach EEx de COVER (Item 1.12).

END OF SECTION

SECTION 7: SERVICE: REPLACEMENTS

7.01 REPLACEMENT: Set Screw

Step 1

- Remove and replace three (3) SET SCREWS (Item 2.4) located on ADAPTOR BLOCK (Item 2.1), using a 4 mm Allen head wrench.

7.02 REPLACEMENT: Drive Pin

Step 1

- Insert DRIVE PIN (Item 1.16) onto SHAFT ADAPTOR (Item 1.5). Ref. FIGURE 1 & 2
  - The open side of DRIVE PIN (Item 1.16) **must** face away from EEx de CARRIER (Item 1.1).
  - Using a punch and mallet insert DRIVE PIN (Item 1.16) so there are even lengths of the DRIVE PIN on both sides of SHAFT ADAPTOR (Item 1.5).

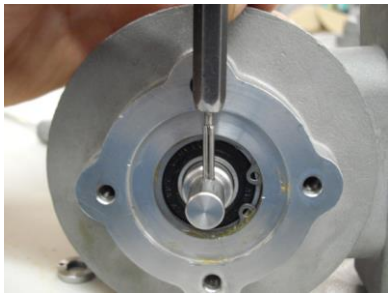


FIGURE 1

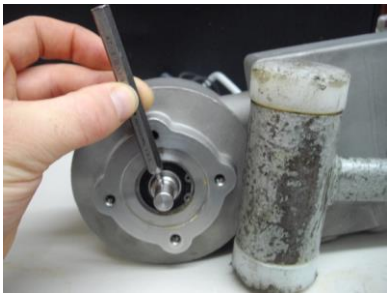


FIGURE 2

7.03 REPLACEMENT: Circuit Board

- In the event of circuit board replacement and/or program updates, a new circuit board will need to be installed.
  - Please contact manufacturer for instructions.

END OF SECTION

SECTION 8: SERVICE: Clutch Assembly - Removal & Disassembly

8.01 CLUTCH ASSEMBLY: Removal

Step 1

- Remove CLUTCH ASSEMBLY (Item 2.6) from SHAFT ADAPTOR (Item 1.5). Ref. FIGURE 1 & 2

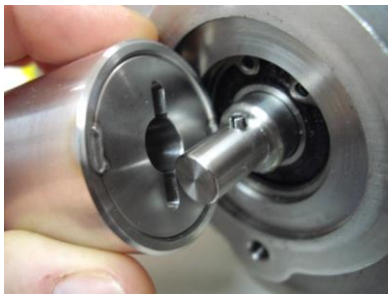


FIGURE 1

FIGURE 2

8.02 CLUTCH ASSEMBLY: Disassembly

Step 1

- Using a hex wrench, loosen and remove three (3) M4X6 SET SCREWS (Item 2.6.9). Ref. FIGURE 3

FIGURE 3

Step 2

- Remove LOCK RING (Item 2.6.6), using Torque Tool (Part 1412-1000-000) (Ref. Appendix A). Ref. FIGURE 5 & 6

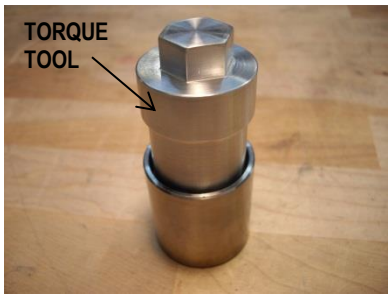


FIGURE 5

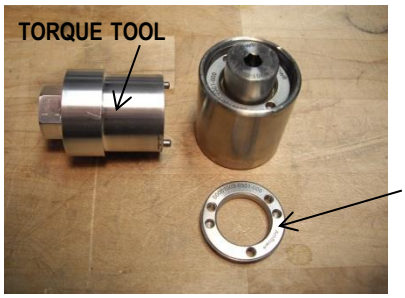


FIGURE 6

8.02 CLUTCH ASSEMBLY: Disassembly, continued

Step 3

- Using Torque Tool, remove TENSION RING (Item 2.6.8). Ref. FIGURE 7

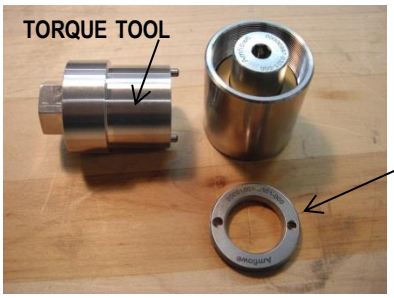


FIGURE 7

Step 4

- Remove parts **in order**:
  - MODIFIED CLUTCH RING (Item 2.6.7) Ref. FIGURE 1
  - FC LOADER (Item 2.6.5) Ref. FIGURE 2
  - 1ST CLUTCH RING (Item 2.6.2) Ref. FIGURE 3
  - 1ST CLUTCH WASHER (Item 2.6.3) Ref. FIGURE 3
  - BELLEVILLE SPRINGS (Item 2.6.4) **(NOTE CONFIGURATION OF SPRINGS)** Ref. FIGURE 4
  - 2ND CLUTCH WASHER (Item 2.6.3) Ref. FIGURE 5
  - 2ND CLUTCH RING (Item 2.6.2) Ref. FIGURE 5

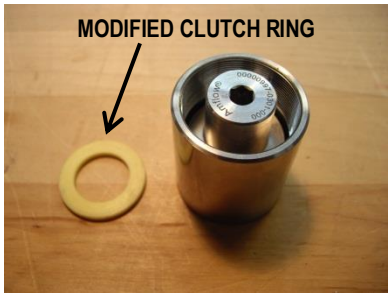


FIGURE 1

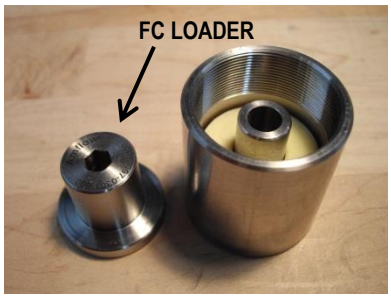


FIGURE 2

FIGURE 3

FIGURE 4

FIGURE 5

Step 5

- Replace needed part(s).

Step 6

- Re-assemble reversing above order.
  - Pay particular attention to order and placement of BELLEVILLE SPRINGS (Item 2.6.4).

END OF SECTION

SECTION 9: RE-ASSEMBLY: Clutch Assembly

NOTE
Reverse Section 5 for all re-assembly work done within CLUTCH ASSEMBLY (Item 2.6).

CAUTION

IMPROPER ORDER OR PLACEMENT OF BELLEVILLE SPRINGS WILL CAUSE UNIT TO MALFUNCTION.

Replace BELLEVILLE SPRINGS (Item 2.6.4) **in order as removed**.

- Insert first BELLEVILLE SPRING (Item 2.6.4) concave side up, and then reverse order after, (e.g.… Up, Down, Up).

Step 1

- Insert TENSION RING (Item 2.6.8).

NOTE
Use Anti-seize on thread when inserting TENSION RING (Item 2.6.8).

Step 2

- When adjusting TENSION RING (Item 2.6.8) adjust so there is between 6.7-9 newton meters (60–80 in. lbs) of spinning torque. Ref. FIGURE 1 & 2
  - Using a 6 mm torque wrench, ensure that proper torque specifications have been met. Ref. FIGURE 2

FIGURE 1

FIGURE 2

SECTION 9: RE-ASSEMBLY: Clutch Assembly, continued

Step 3

- Insert LOCK RING (Item 2.6.6). Ref. FIGURE 3
  - ➢ Lock in place with three (3) M4x6 SET SCREWS (Item 2.6.9). Ref. FIGURE 4

FIGURE 3

FIGURE 4

NOTE
Use Anti-seize on thread when inserting LOCK RING (Item 2.6.6).

Step 4

- Place CLUTCH ASSEMBLY onto DRIVE PIN (Item 1.16). Ref. FIGURE 5
  - ➢ Using a rubber or plastic mallet, lightly tap CLUTCH ASSEMBLY (Item 2.6) onto SHAFT ADAPTOR (Item 1.5). Ref. FIGURE 6

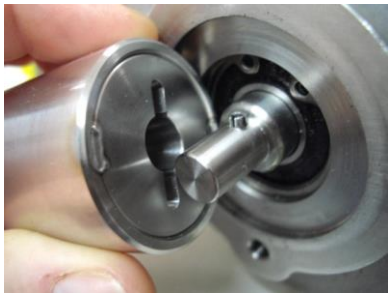


FIGURE 5

FIGURE 6

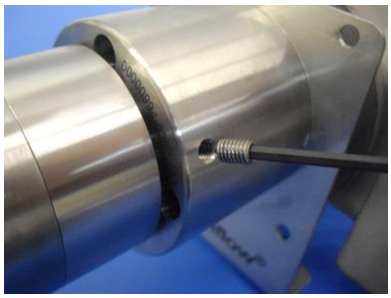
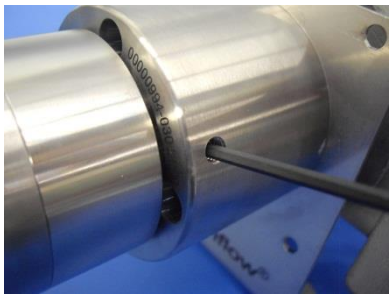
IMPORTANT
Care must be taken that DRIVE PIN (Item 1.16) is fully seated in groove.

END OF SECTION

SECTION 10: RE-ATTACH VALVE TO ACTUATOR

Step 1

- Insert TAPER RING (ITEM 2.2) onto ADAPTER BLOCK (Item 2.1).
  - Secure in place using SET SCREWS (Item 2.4).

Step 2

- Re-connect the Inlet and Outlet ports of valve to the system.

END OF SECTION

SECTION 11: TROUBLESHOOTING

11.01 No Power

Issue: Actuator not responding.
Cause: Blown fuse.
Correction: Check and replace fuse.

11.02 Torque Slippage

Issue: Valve not operating.
Cause: Incorrect torque setting.
Correction #1: Check that there is between 6.8 -9 newton meter (60-80 in. lbs.) rolling torque.

11.03 Unable to Obtain Newton Meter Reading

Issue: Unable to get 6.8 newton meter (60 in. lbs.) when adjusting torque.
Cause: Worn BELLEVILLE SPRINGS.
Correction: Replace BELLEVILLE SPRINGS.

11.04 Broken Drive Pin

Issue: Clutch Assembly not turning properly.
Cause: Broken DRIVE PIN.
Correction: Contact manufacturer.

11.05 Inaccurate Turn Count - Valve

Issue: Improper valve turn count.
Cause: Error in valve turn count.
Cause: Valve not fully opening or closing due to spinning valve.
Correction #1: Tighten SET SCREW to secure valve.

11.06 Clutch Assembly Slippage

Issue: Unable to obtain proper torque.
Cause #1: Improper torque setting.
Cause #2: Worn BELLEVILLE SPRINGS.
Correction #1: Adjust torque settings.
Correction #2: Replace BELLEVUE SPRINGS.

11.07 Valve Not Fully Engaged in Clutch Assembly

Issue: Valve not fully engaged into CLUTCH DRIVE SHAFT ASSEMBLY.
Cause: Loosen SET SCREW.
Correction: Check valve and actuator are assembled correctly.

11.08 Handle Torque Adjustment

Issue: Actuator not operating in “Automatic Mode”.
Cause: Loosen LOCK NUT.
Correction: Loosen LOCK NUT on front of SHAFT ASSEMBLY.

- Adjust BEARING NUT to desired torque.
- Re-tighten lock nut.

NOTE:
Large adjustments to handle torque can affect actuator rolling torque.

END OF SECTION

STANDARDS

A&H Enterprises designs its products to meet the applicable **ASME,** and **API** standards for valve design and pressure vessels.

Products are also **CE** marked and **ATEX** approved for Hazardous area installations.

MEMBERSHIPS

CERTIFICATIONS

ATEX DIRECTIVE (94/9/EC)

In the interest of safety and quality, A&H Enterprises has certified its ***Amflow®*** series of actuators for use in potentially explosive atmospheres as defined by the ATEX Directive (94/9/EC) as Category 2G.

ATEX
II 2 G Ex de IIC T4
US & INTERNATIONAL PATENTS PENDING

To ensure the safety of all parties, only genuine ***Amflow®*** parts must be installed in accordance with supplied instructions, good engineering, and construction practices. The actuators must not be modified in any way from the original purchased actuators. The actuators must only be operated in the conditions indicated on product data sheet. This equipment is certified for Group 2 Category II. Equipment should not be used in systems requiring a higher level of certification.

LIMITED WARRANTY

Each ***Amflow®*** product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is three (3) years and begins on the date of original purchase. This warranty extends only to the original buyer and does not apply to any product which, in A & H Enterprises' opinion, has been misused, altered, neglected, contaminated, damaged by accident or abnormal conditions of operation or handling.

At A & H Enterprises' option, the A & H Enterprises' warranty obligation is limited to the replacement or repair of a defective product that is returned to A & H Enterprises within the warranty period. Merchandise returned to A & H Enterprises within the warranty period which, in A & H Enterprises' opinion, is defective by accident, improper operation or improper handling shall be subject to a charge for repair. Merchandise, free from defects, returned to A & H Enterprises shall be subjected to a 20% restocking fee within thirty (30) days of the purchase date. Written authorization is required for all merchandise returned to A & H Enterprises.

To obtain warranty service, contact A & H Enterprises to obtain return authorization information. Then send the product to A & H Enterprises with a description of the difficulty, transportation and insurance prepaid. A & H Enterprises assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation and insurance prepaid. If A & H Enterprises determines that failure was caused by neglect, misuse, contamination, alteration, accident, or abnormal condition of operation or handling, A & H Enterprises will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer, transportation and insurance prepaid, and the Buyer will be billed for the repairs and the return transportation and insurance charges.

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Since some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of the Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

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