Instruction Manual
D104188X012
November 2026

Fisher™ D4 Control Valve with Fisher easy-Drive™ Electric Actuator



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Section 1: Introduction

1.1 Scope of the Manual

This instruction manual provides installation, maintenance and parts information for the Fisher D4 control valve with Fisher easy-Drive electric actuator. For Gen 1 electric actuators, use Fisher D4 with Fisher easy-Drive Instruction Manual, (D103597X012). If the actuator has a RPU-100 installed, refer to Fisher easy-Drive RPU-100 Instruction Manual, (D104551X012).

⚠ WARNING

Do not install, operate, or maintain a D4 control valve with Fisher easy-Drive electric actuator without being fully trained and qualified in valve, actuator and accessory installation, operation and maintenance. To avoid personal injury or property damage, it is important to carefully read, understand and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your Emerson sales office before proceeding.

Figure 1. Fisher D4 Control Valve with Fisher easy-Drive Electric Actuator



W9933-5

Table 1. Specifications

Valve Body Sizes and End Connection Styles[1]	Power Requirements
See Table 2.	11 to 30 V DC, minimum 4 A power supply required (fuse to 5 A)
Maximum Inlet Pressures and Temperatures[1]	**Maximum Current Draw**
If the valve nameplate shows an ASME pressure-temperature class, maximum inlet pressure and temperature is consistent with the applicable class per ASME B16.34. If the nameplate does not show an ASME class, it will show a maximum cold working pressure at 38°C / 100°F (for example, 293 bar / 4250 psi).	4 A
	Idle Current Draw
	15 mA at 24 V DC, 25 mA at 12 V DC
Maximum Pressure Drops[1]	**Conduit Connections**
See Table 4.	Two 3/4 NPT connections
Shutoff Classification per ANSI/FCI 70-2 and IEC 60534-4	**Stroke Length**
Class IV	19 mm / 0.75 in.
Material Temperature Capabilities[1]	**Nominal Stroke Speed[2]**
Valve Body Assembly: Standard Bonnet O-ring: -40 to +135°C / -40 to +275°F Optional Fluorocarbon Bonnet O-ring: -23 to +204°C / -10 to +400°F	3.9 mm/s / 0.15 in./s at 24 V DC 2.2 mm/s / 0.09 in./s at 12 V DC
	Hazardous Area Approvals
Flow Characteristic	**CSA (C/US):** Explosion-Proof Class I, Division 1, Groups C and D, T6, Ex db IIA T6, Class I, Zone 1, AEx db IIA T6 **ATEX Flameproof - Gas:** ⟨Ex⟩ II 2 G, Ex db IIA T6 Gb **IECEx Flameproof - Gas:** Ex db IIA T6 Gb
Equal percentage	
Flow Direction	
Flow up only	
Port Diameters	**Enclosure Rating**
See Table 2.	Type 4X and IP66
Valve Plug Travel	**Duty Cycle**
19 mm / 0.75 in.	50% maximum
Valve Plug Style	**Enclosure Material**
Micro-Form valve plug	Cast aluminum alloy with powder coat paint
Available Actuator Configurations	**Approximate Weight:**
On/off (snap acting) Positioning (flow or pressure control)	22 to 51 kg / 49 to 113 lbs, depending upon construction

1. The pressure or temperature limits in the referenced tables and any applicable ASME code limitations should not be exceeded.
2. 10% variation can be expected, based on temperature and pressure of application.

1.2 Description

The D4 control valve with Fisher easy-Drive electric actuator is a compact, rugged valve designed primarily for high-pressure throttling applications. This valve is ideal for use on pressure and flow control applications within the oil and gas production industry. The D4 valve also makes an excellent dump valve for high-pressure separators and scrubbers.

The D4 control valve meets the metallurgical requirements of NACE MR0175/ISO 15156 without environmental limits for temperatures below 135°C / 275°F. If the temperature is above 135°C / 275°F, the N07718 Belleville washers will impose some limits, as shown in Table 3.

1.3 Specifications

Table 1 lists specifications for the D4 control valve with Fisher easy-Drive electric actuator. Some of the specifications for a given control valve as it originally comes from the factory are stamped on a nameplate located on the lower actuator enclosure.

1.4 Education Services

For information on available courses for the Fisher D4 control valve with Fisher easy-Drive electric actuator, as well as a variety of other products, contact:

Emerson's Education Services
Phone: 800-338-8158
Email: education@emerson.com
emerson.com/en/final-control/services/valve-training

Table 2. Valve Sizes and Connection Styles

VALVE SIZE, NPS	PORT DIAMETER, IN.	SCREWED	RAISED FACE (RF) FLANGED				RING TYPE JOINT (RTJ) FLANGED	
		4250 psi	CL150	CL300	CL600	CL900 and CL1500	CL600	CL900 and CL1500
1	0.25, 0.375, 0.5, 0.75	X	X	X	X	X	X	X
2	0.25, 0.375, 0.5, 0.75, 1, 1.25	X	X	X	X	X	X	X
X = Available construction.								

Table 3. D4 Environmental Limits for NACE MR0175/ISO 15156 with Sour Trim

MAXIMUM TEMPERATURE		MAXIMUM H_2S PARTIAL PRESSURE		COMPATIBLE WITH ELEMENTAL SULFUR
°C	°F	MPa	psia	
232	450	0.2	30	No
204	400	1.4	200	No
199	390	2.3	330	No
191	375	2.5	360	No
149	300	2.8	400	No
135	275	No Limit		Yes

Table 4. Fisher D4 with Fisher easy-Drive Maximum Pressure Drop

PORT DIAMETER		MAXIMUM PRESSURE DROP(1)	
mm	in.	bar	psi
6.4	0.25	293	4250(1)
9.5	0.375	293	4250(1)
12.7	0.5	247	3576(1)
19.1	0.75	105	1518
25.4	1	56	814
31.8	1.25	34	495

1. Downstream pressure, P2, is limited to 2250 psig.

Section 2: Installation

⚠ WARNING

Always wear protective gloves, clothing and eyewear when performing any installation operations to avoid personal injury.

To avoid personal injury or property damage caused by bursting of pressure-retaining parts or by uncontrolled process fluid, be certain the service conditions do not exceed the limits shown on the valve nameplate and in Table 1. Use pressure-relieving devices required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the WARNING at the beginning of the Maintenance section in this instruction manual.

⚠ WARNING

For explosion-proof applications, ensure the actuator cover is properly bolted before applying power to the actuator. Personal injury or property damage may result from fire or explosion if power is applied to the actuator with the cover removed in a hazardous area.

For explosion-proof applications, install rigid metal conduit and a conduit seal no more than 457 mm / 18 in. from the actuator. Personal injury or property damage may result from explosion if the seal is not installed.

Select wiring and/or cable glands that are rated for the environment of use (such as hazardous area, ingress protection and temperature). Failure to use properly rated wiring and/or cable glands can result in personal injury or property damage from fire or explosion.

Wiring connections must be in accordance with local, regional and national codes for any given hazardous area approval. Failure to follow the local, regional and national codes could result in personal injury or property damage from fire or explosion.

⚠ WARNING

When ordered, the valve configuration and construction materials were selected to meet particular pressure, temperature, pressure drop and controlled fluid conditions. Responsibility for the safety of process media and compatibility of valve materials with process media rests solely with the purchaser and end-user. Since some body/trim material combinations are limited in their pressure drop and temperature ranges, do not apply any other conditions to the valve without first contacting your Emerson sales office.

NOTICE

To avoid product damage, inspect the valve before installation for any damage or any foreign material that may have collected in the valve body. Also remove any pipe scale, welding slag or other foreign material from the pipeline.

⚠ WARNING

Avoid personal injury or property damage caused by possible actuator failure. The use of a rigidly-mounted support on the actuator casing may cause additional stress on the actuator leading to premature wear and/or failure of the actuator components.

1. Before installing the control valve assembly, inspect it for any damage and for any foreign material that may have collected in the valve body.
2. Remove any pipe scale, welding slag and other foreign material from the pipeline.
3. The control valve can be installed in any position, but normally the actuator is vertical above the valve. Install the valve so the flow direction arrow on the side of the valve indicates the direction of the process flow.
4. Install the valve following local and national piping codes when they apply to the application. For screwed connections, treat the external pipe threads with a good grade pipe compound. For flanged valves, use suitable gaskets between valve and pipeline flanges.
5. If continuous operation is required during maintenance and inspection, install a conventional three-valve bypass around the valve.

2.1 Special Instructions for "Safe Use" and Installations in Hazardous Locations

ATEX/IECEx

WARNING

To avoid static discharge from the enclosure, do not rub or clean the enclosure with solvents. To do so could result in an explosion. Clean with a mild detergent and water only.

The enclosure is non-conducting and may generate an ignition-capable level of electrosatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as highpressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment shall only be done with a damp cloth.

NOTICE

To avoid damage to the enclosure, when screws are fully tightened into blind holes in enclosure walls, with no washer fitted, at least one full thread shall remain free at the base of the hole.

2.2 Startup Overview

Figure 2. Flowchart

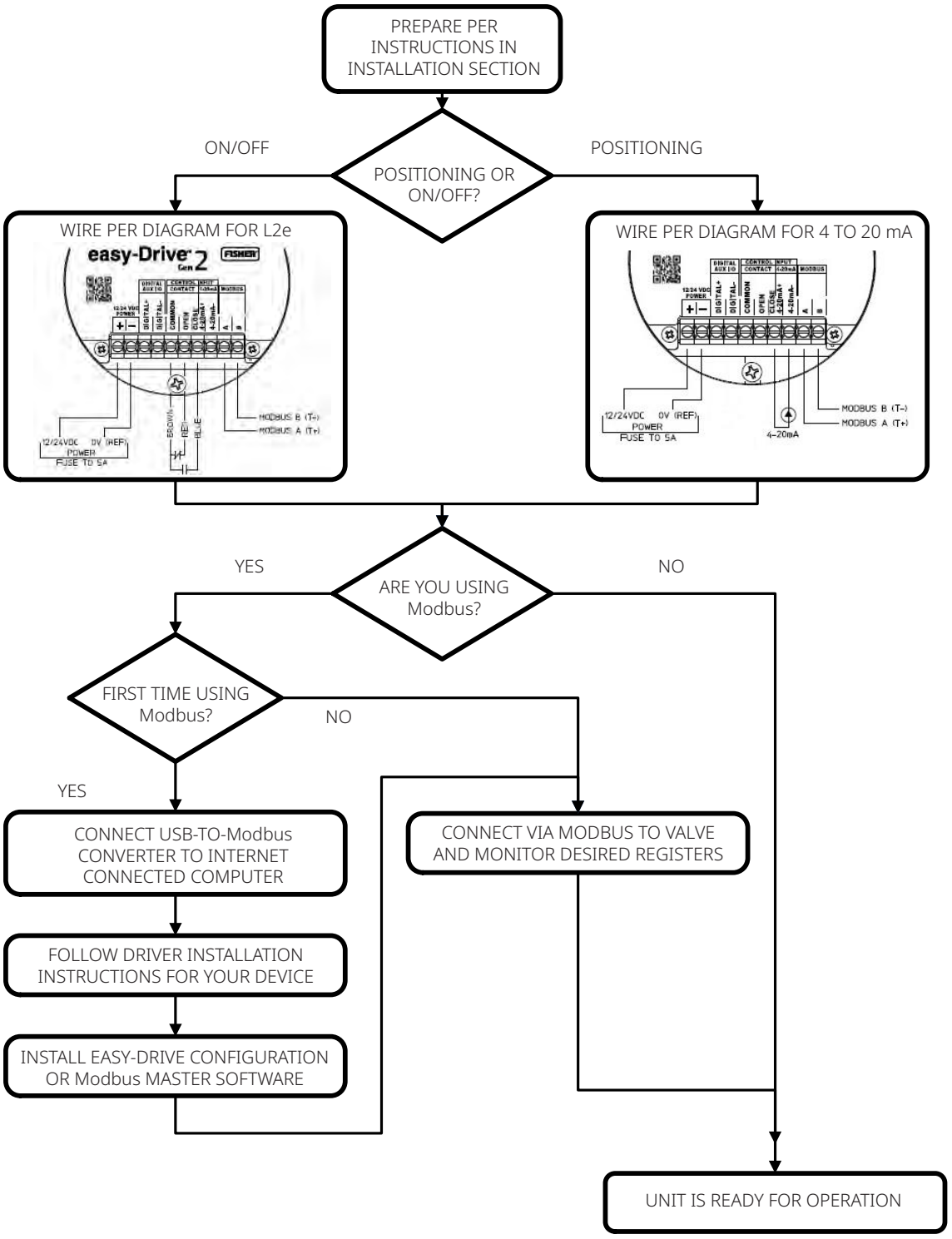
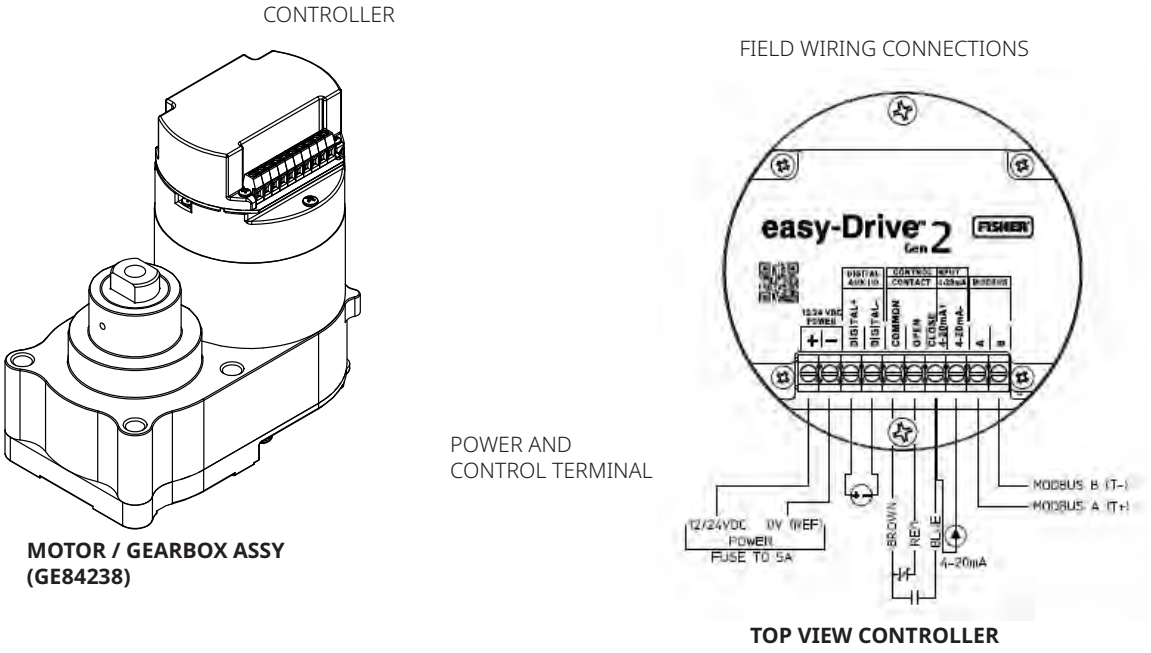


Figure 3. Fisher D4 Valve with Fisher easy-Drive Actuator Wiring Diagram



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Power Requirements

Ensure a stable DC power source is available, maintaining less than 5% ripple and sufficiently surge protected for the application. A 4 amp (minimum) power supply is required.

Wiring Instructions

1. Observe local wiring requirements for hazardous location usage.
2. Conduit seals within 450 mm / 18 in. of the enclosure port are required for explosion-proof installation.
3. 18 AWG / 0.52 mm^2 to 12 AWG / 3.31 mm^2 wire size required.
4. Fuse system to 5 A.
5. Connect enclosure and analog signal shields.
6. Ensure power is turned off before connecting the wires.

Power

1. Connect 12 or 24 V DC reference to: –
2. Connect 12 or 24 V DC positive to: +
3. Be sure to tighten terminals sufficiently to ensure solid mechanical connection.

Figure 4. Wiring - Analog Input

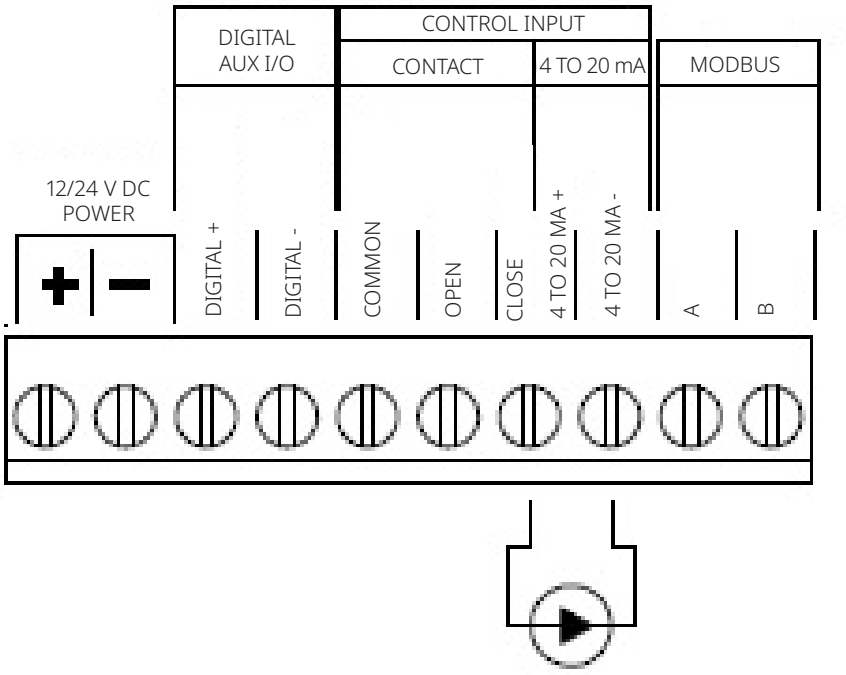


Figure 5. Wiring - L2e

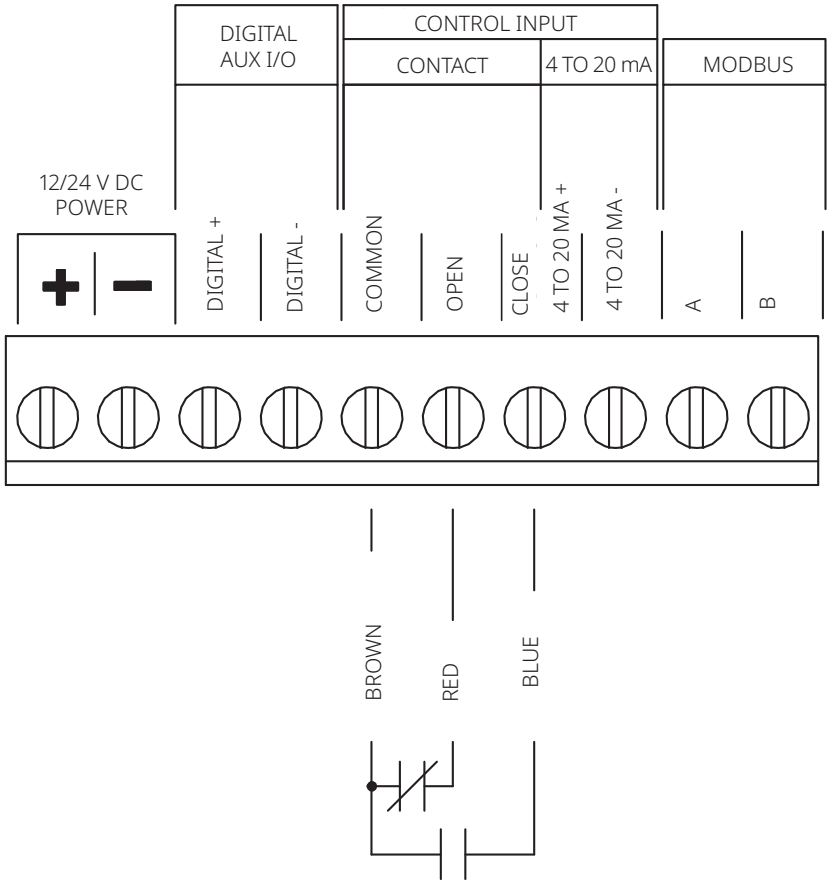


Figure 6. Wiring - Single Dry Contact

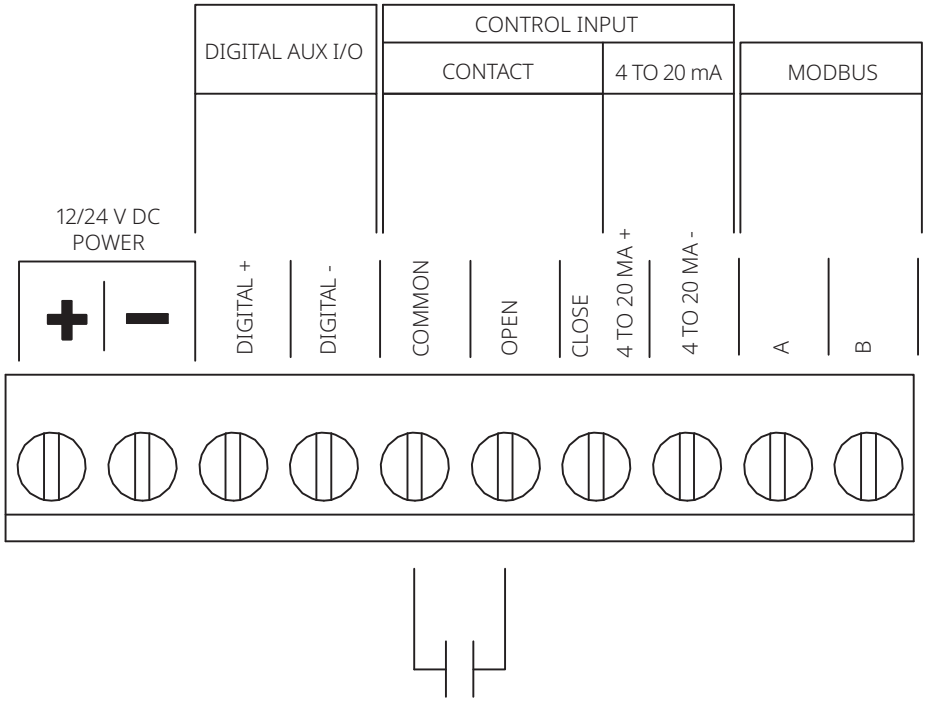


Figure 7. Wiring - Modbus Input

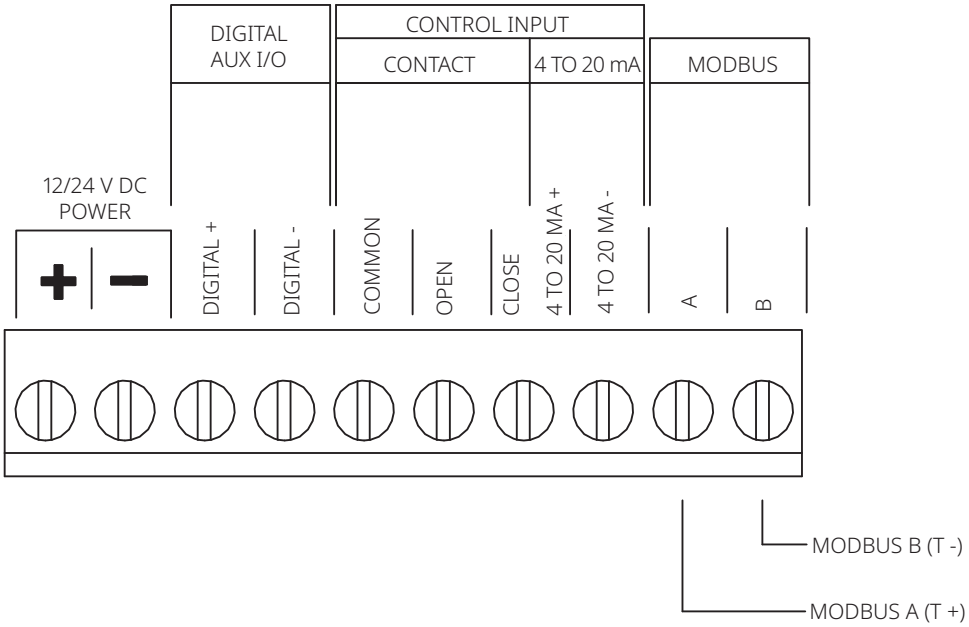


Figure 8. Wiring - Auxiliary Digital I/O Set to Input (40080=0)

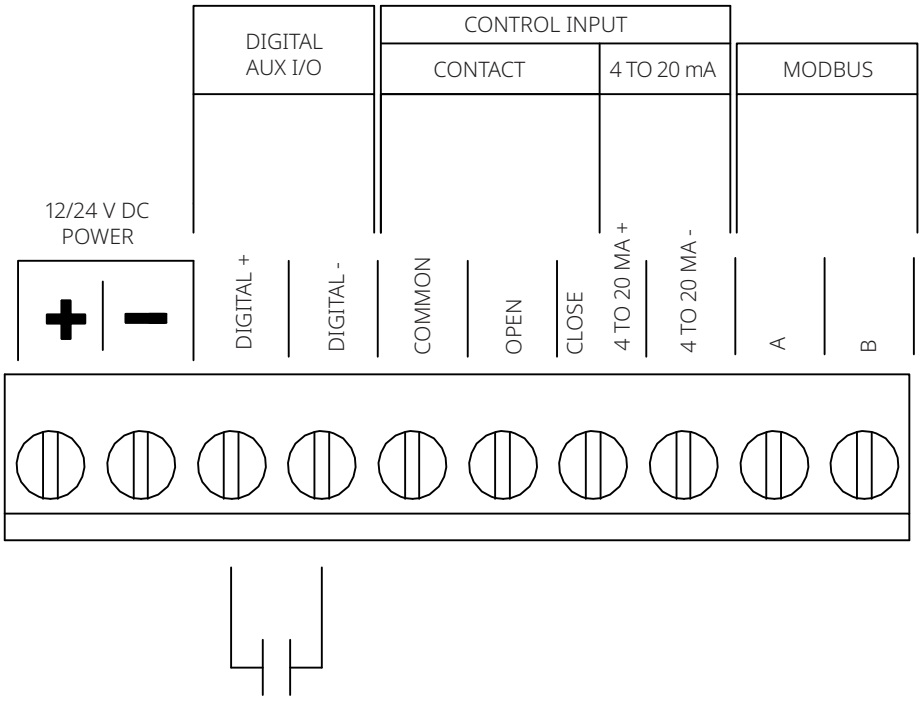
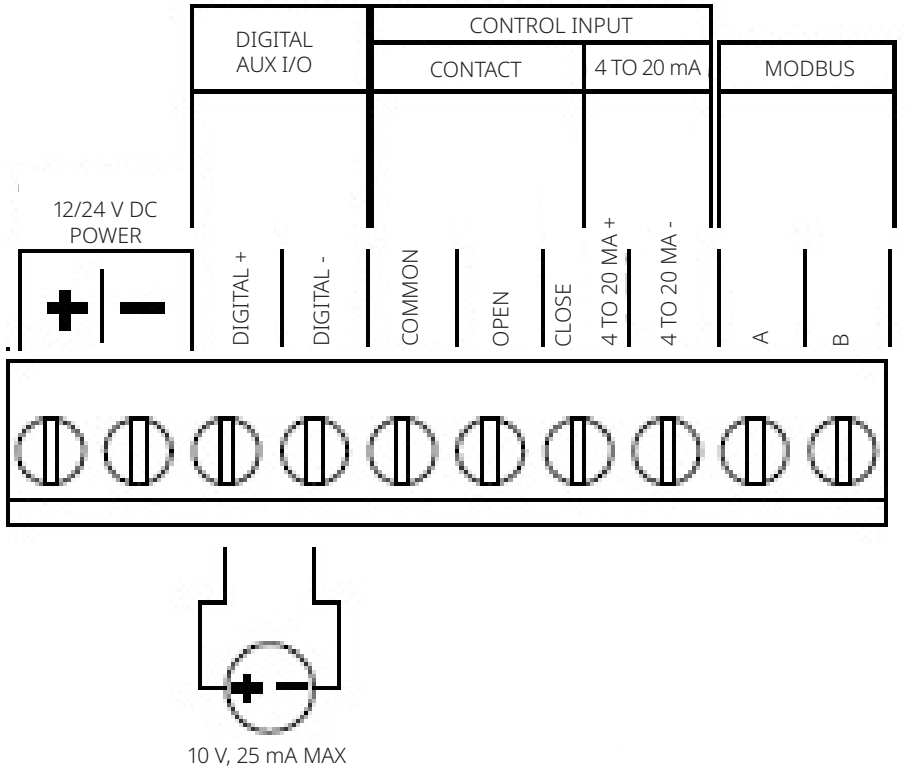


Figure 9. Wiring - Auxiliary Digital I/O Set to Output (40080=1)



2.3 Default Input Signals

The D4 with Fisher easy-Drive comes from the factory calibrated and ready for use with the following default input signals shown in Table 5.

Table 5. D4 with Fisher easy-Drive Default Input Signals

CONFIGURATION	ON/OFF	POSITIONING
Input Signal	L2e (dual dry contact)	4 to 20 mA

If the input signal of the application matches Table 5, proceed to the Wiring Instructions section. If the input signal of the application does not match Table 5, proceed to the Configuration section.

2.4 Configuration

Input Configuration

There are two functional configurations available for the Fisher easy-Drive electric actuator: On/Off and Positioning. It is possible to change an actuator from On/Off to Positioning after it has been delivered from the factory using a positioning license key. See Licensing section.

All available input signals are shown in Table 6.

Table 6. All Available Input Signals

CONFIGURATION	ON/OFF			POSITIONING	
Control Source	**Modbus**	**Local**		**Modbus**	**Local**
Input Signal	Modbus	L2e Dual Dry Contact (default)	Single Dry Contact	Modbus	4 to 20 mA (default)

If you are using the default inputs signals and the valve has not been disassembled or adjusted in any way, there is no need to recalibrate the assembly. You can proceed directly to Startup (page 21).

Changing the Inputs from Default Settings

All configuration within the valve is done by setting values in Modbus registers. This can be done using any Modbus master (flow computer, PLC, PC). Configuration software, providing a visual interface to the registers, is available through your Emerson sales office or the Fisher website, at www.emerson.com/en/final-control/products/fisher-easy-drive.

2.5 Modbus setup

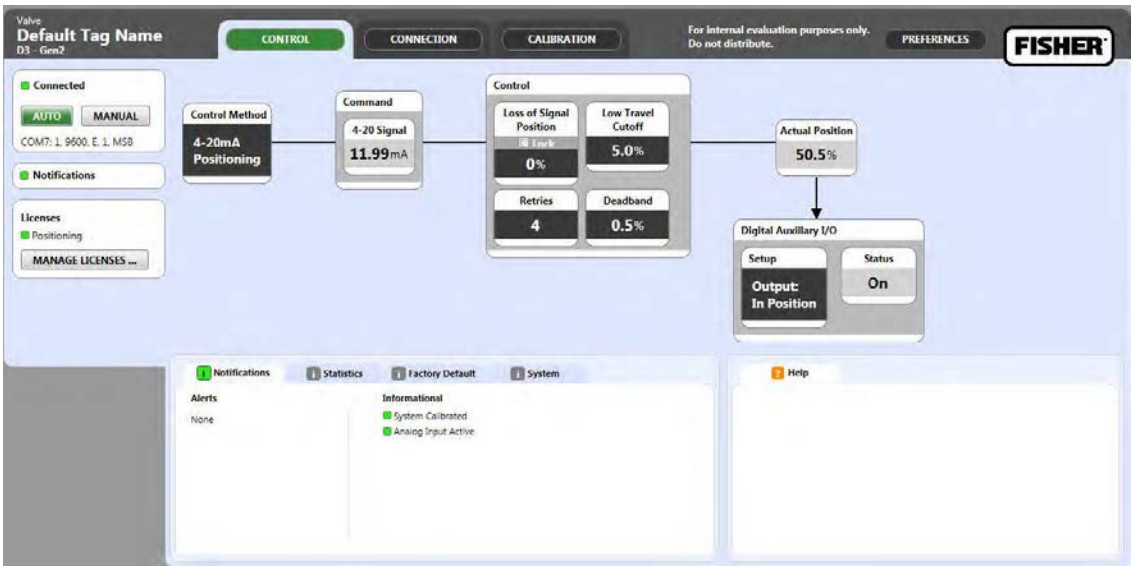
Use of a serial or USB to RS-485 device is required to connect to the actuator. Refer to manufacturer's requirements for installation. The D4 with Fisher easy-Drive electric actuator Modbus factory defaults are Address 1, 9600 baud, even parity, 1 stop bit, MSB.

When a connection has been achieved, the actuator may be configured to accept the input signal over the Modbus link (ignoring the physical inputs) and the Modbus settings may be changed to accommodate the network to which it is attached. Other changes to functionality are possible, such as:

- Low level cutoff: 40054 (default is 5%)
- Position upon loss of signal: 40053 (default is 0%)

See Appendix A for a full map of Modbus registers and their functions.

Figure 10. Fisher easy-Drive Configuration Software



Connecting Using the Fisher easy-Drive Configuration Software

The Fisher easy-Drive configuration software allows configuration and diagnosing of the Fisher easy-Drive electric actuator with a graphical interface. Connect a PC to the actuator using a USB or serial device to Modbus RTU converter using the wiring instructions. The USB or serial device will be visible in the drop menu under Serial Port Settings. Baud rate and parity should be set to the Modbus settings of the actuator. Default actuator settings are address 1, 9600 baud, even parity, 1 stop bit, MSB. Press the AUTO button in the upper left corner to connect to the valve.

Use the Fisher easy-Drive configuration software (Figure 10) to make the desired changes or register values may be changed to allow different functionality.

NOTE

If an actuator is on/off, a Modbus command of 0 to 499 in register 40001 will cause the valve to close fully, while a value of 500 to 1000 will cause the valve to open fully. The command register has one implied decimal point.

Initial Setup

The control method selection determines what control signal to which the valve will respond. Only the control signal selected will result in movement of the valve; all others will be ignored. The control methods available are dependent upon the licensing tier purchased with the valve. The functions for each tier are shown below.

- On/Off Tier
  - Dual Contact On/Off
  - Single Contact On/Off
  - Modbus On/Off
- Positioning Tier - License required (see Licensing section)
  - Dual Contact On/Off
  - Single Contact On/Off
  - Modbus On/Off
  - Modbus Positioning
  - 4 to 20 mA Positioning
  - 4 to 20 mA Level

When using the Fisher easy-Drive Configuration Tool, clicking on the “Control Method” box will create a drop menu as shown. Select the desired control source; the selection will turn yellow. A box with Pending Changes will appear showing all changers. Press “APPLY” and the valve will immediately respond to that signal only.

Figure 11. Initial Setup



Calibration Instructions

⚠ WARNING

To avoid personal injury or property damage, be aware that the valve will open fully and then close fully during the calibration cycle.

If Fisher easy-Drive actuator has been shipped from the Fisher factory, it is not necessary to perform a span calibration. If, however, the valve has a new controller board or maintenance has been performed on the valve, such as trim replacement, it will be necessary to perform a span calibration. A span calibration is accomplished by the following method:

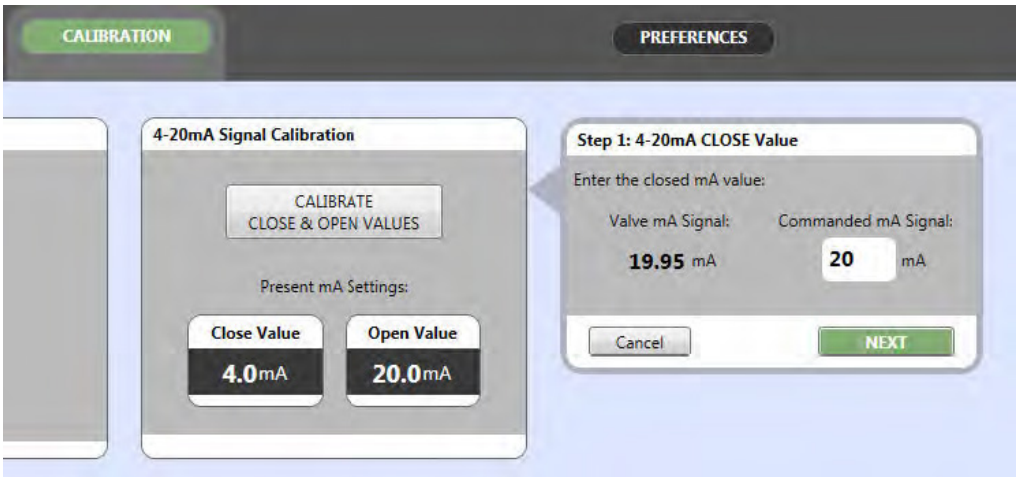
1. Ensure the process and valve are in a safe state – the valve may move during this operation.
2. Press the CALIBRATE SPAN button to initiate the span calibration. The software will show a progress bar during the calibration and display Valve Span Calibrated when complete.

Analog Input Calibration

For valves using 4 to 20 mA as a control source, several options are available to customize control of the actuator. Use a 4 to 20 mA signal generator to provide the desired signal. It is possible to calibrate the 4 to 20 mA signal in reverse acting or split-ranging with the method below with at least 4 mA of signal difference between the close and open values. The example shows a valve being changed from normal to reverse acting during the calibration process.

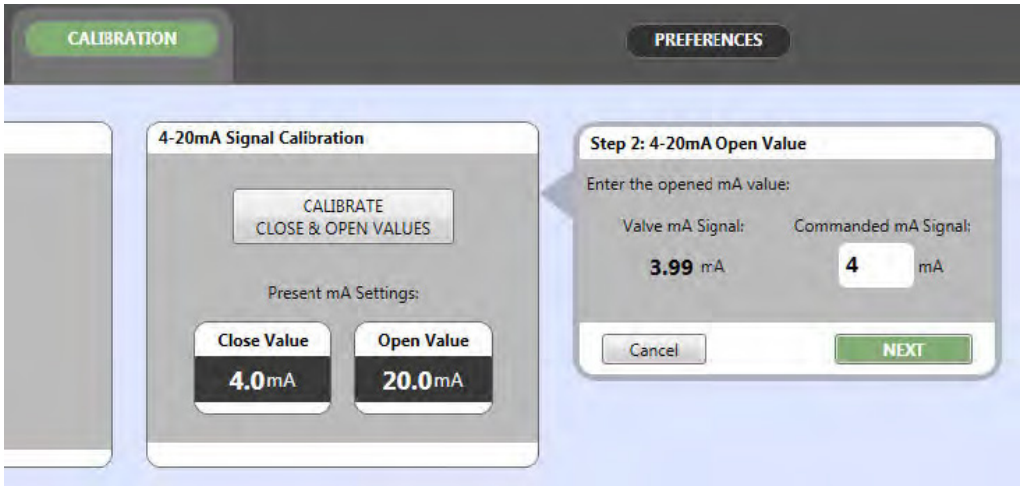
1. With the Control Method set to 4 to 20mA Positioning or 4 to 20mA Level, enter the Calibration screen and the 4 to 20mA Signal Calibration window will be visible.
2. Click the CALIBRATE CLOSE & OPEN VALUES button. A separate window will open to guide through the process.
3. Set the 4 to 20 mA signal to the desired value for when the valve is to be closed.
4. Enter this value into the Calibrated mA Signal text box and press Next.

Figure 12. Analog Input Calibration



5. Set the 4 to 20 mA signal to the desired value for when the valve is to be open.
6. Enter this value into the Calibrated mA Signal text box and press Next.

Figure 13. Analog Input Calibration



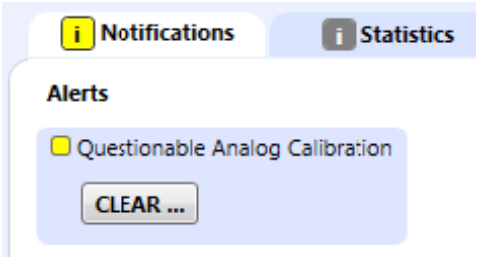
7. If the Close and Open values are as expected, press Confirm to accept these values. If not, press Cancel to restart the process.

NOTE

The value of the 4 to 20 mA signal must have at least 4 mA difference between the close and open signals. A differential less than that amount will cause the actuator to reject the calibration and use the previous values.

Should the entered values vary more than 10% from the expected 4 to 20 mA values; the actuator will accept the calibration and a Notification displaying “Questionable Analog Calibration” will result.

Figure 14. Analog Input Calibration



Calibration with the use of Modbus

1. After the unit has been properly wired and fused per instructions in the Wiring section of this instruction manual, turn power to the unit on.
2. Calibrate using Modbus:
   a. Send position command of 0% to actuator to prevent unexpected motion. Valve will move to commanded position following the calibration procedure.
   b. Send a value of 1 to register 40043. Valve plug will move to fully open position and then to fully closed. The valve plug will then return to the commanded position.

   If a Modbus connection is not available and recalibration is desired, use the appropriate calibration method as determined by the control method of your valve.

Calibration without the use of Modbus

3. Turn power to the actuator off.
4. Wait for 10 seconds to ensure all circuits have discharged.
5. Return power to the actuator and use the appropriate calibration method for your control signal. Calibration sequence must be done within 15 seconds of power being switched on.
6. For positioning operation using 4 to 20 mA:
   a. Apply a 4 mA signal between pins 4 to 20 mA - and 4 to 20 mA +. If Span is currently uncalibrated, valve plug will not move at this time.
   b. Apply a 20 mA signal between pins 4 to 20 mA - and 4 to 20 mA +. If Span is currently uncalibrated, valve plug will not move at this time.
   c. Apply a 4 mA signal between pins 4 to 20 mA - and 4 to 20 mA +; valve plug will move to the upper stop, immediately followed by moving to the lower, closed position.
   d. If calibration of the analog input is desired to improve positional accuracy, an optional operation is listed on page 16 titled Analog Input Calibration.
7. For On/Off operation using dual-input dry contact:
   a. Close the contact to create a short between pins COMMON and CLOSE. If Span is currently uncalibrated, valve plug will not move at this time.
   b. Close the contact to create a short between pins COMMON and OPEN. If Span is currently uncalibrated, valve plug will not move at this time.
   c. Close the contact to create a short between pins COMMON and CLOSE; valve plug will move to the upper, open position and then to the lower, closed position.
6. For On/Off operation using single dry contact:
   a. Open the contact to create an open circuit between pins COMMON and OPEN. If Span is currently uncalibrated, valve plug will not move at this time.
   b. Close the contact to create a short between pins COMMON and OPEN. If Span is currently uncalibrated, valve plug will not move at this time.

c. Open the contact to create an open circuit between pins COMMON and OPEN; valve plug will move to the upper, open position and then to the lower, closed position.

7. The unit is now calibrated.

Licensing

The Fisher easy-Drive actuator has two differing modes of operation: On/Off and Positioning. The On/Off mode is intended for snap-acting applications where the valve is either fully open or fully closed. In this mode, the valve plug cannot remain at any intermediate position; it will move to a fully closed or fully open position only. For applications that require the actuator to control over the full range of motion, it is necessary to have a Positioning license installed. A positioning license will allow access to 4 to 20 mA positioning, 4 to 20 mA level control and Modbus positioning.

Positioning licenses can be purchased with the actuator and installed at the factory or can be installed at a later date by use of a license key on a USB license dongle. Installation of the license can be completed using the configuration software.

1. Insert the USB license dongle into the computer connected to the Fisher easy-Drive actuator.

Figure 15. USB License Dongle



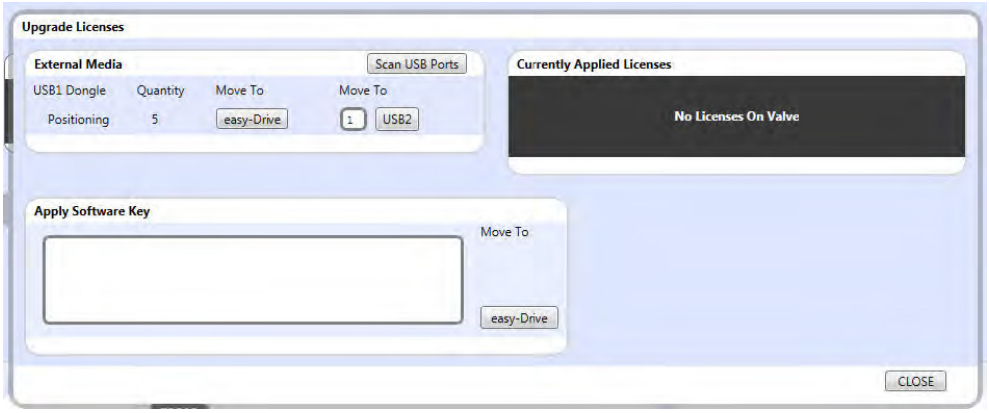
2. Click the button labelled MANAGE LICENSES on the left side of the configuration software screen.

Figure 16. Configuration Software Screen



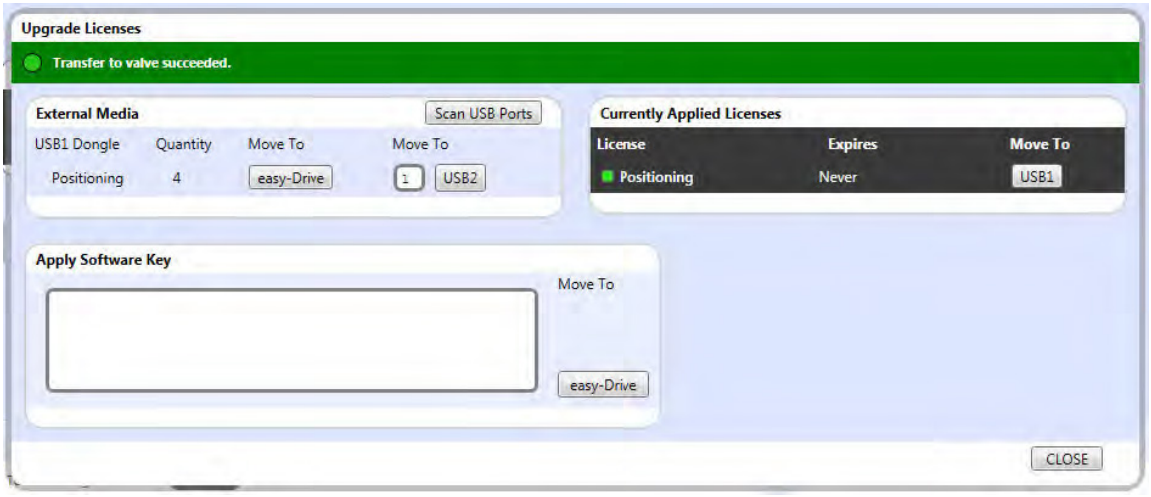
3. The license control screen will open, showing all licenses installed on the USB and the actuator.

Figure 17. License Control Screen



4. After verifying the presence of the desired license on the USB license dongle, click the button labelled 'easy-Drive' under Move To and the license will be transferred to the valve as shown below.

Figure 18. Licensing



5. It is also possible to transfer licenses from one USB license dongle to another. Place two dongles into the computer with the configuration software. Type in the number of licenses to move and click USB 2 to move the licenses.

Startup

WARNING

To avoid personal injury or property damage, be aware that the valve will move and respond to an input signal during startup.

1. Before turning on power to the unit, be sure that a closed signal is being commanded to the unit.
   - DryContact: contact is open.
   - L2e (Dual Dry Contact): Contact closed across pins COMMON and CLOSE.
   - Analog Input: signal = 4 mA.
   - Modbus: position demand = 0.
2. Turn on power to the unit.
3. Apply a change in position demand to ensure unit responds properly.
   - DryContact:
     - Closed contact between pins COMMON and OPEN will open the valve.
     - Dual contact / L2e only: Closed contact between pins COMMON and OPEN will open the valve. Closed contact between pins COMMON and CLOSE will close the valve.
   - Analog Input: valve will respond to proportional demand.
   - Modbus: valve will respond to positional demand in register 40001. 0 = fully closed and 1000 = fully open.
4. If the valve does not respond as expected, proceed to Troubleshooting guide on page 22.
5. Check conduit ports.
   - Conduit seal must be in place within 450 mm / 18 in. of the enclosure.
   - Unused conduit ports must be sealed with an explosion-proof port plug.
6. Replace the cover and tighten all 8 bolts to 20 N•m / 15 ft•lbs.

Section 3: Troubleshooting

1. Unit does not move.
    a. Verify that 12 V DC to 24 V DC is present on the power terminals as shown on the cover. Green heartbeat LED will pulse near Modbus terminals when power is present.
    b. Verify that all wires are firmly attached on both ends.
    c. Verify that wires are connected to the correct terminals - see Wiring in the manual.
    d. Verify mode of operation (on/off or positioning) matches control signal.
    e. Verify mode of control (local or Modbus) matches control signal.
2. Unit does not respond to 4 to 20 mA signal
    a. Verify that 12 V DC to 24 V DC is present on the power terminals as shown on the cover.
    b. Verify that the 4 to 20 mA signal is wired correctly and that the terminals are firmly on the wires.
    c. Verify mode of operation matches control signal (local control: 40067=0, positioning: 40065=1).
    d. Check the value of the analog input in register 40026 to determine if it is 0 or greater.
        i. If register 40026 shows 0, the 4 to 20 mA may be wired backwards. Swap wire and attempt again.
3. Diagnostics show a Motor Stall - Travel Deviation Fault.
    a. The Fisher easy-Drive electric actuator is designed to operate in a manner consistent with a pneumatic actuator. This means that if the valve plug cannot move to its commanded position, the actuator will stop, without damage and issue a Motor Stall - Travel Deviation Fault warning. When the command signal changes outside of the deadband (Modbus register 40036), it will attempt to move again. Recalibrate the actuator span per instructions in the Startup section of this manual.

Section 4: Maintenance

Refer to Figure 22.

Valve parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and maintenance depends on the severity of the service conditions.

⚠ WARNING

Avoid personal injury from sudden release of process pressure or bursting of parts. Before performing any maintenance operations:

- **Do not remove the actuator from the valve while the valve is still pressurized.**
- **Always wear protective gloves, clothing and eyewear when performing any maintenance operations to avoid personal injury.**
- **Disconnect any operating lines providing air pressure, electric power or a control signal to the actuator. Be sure the actuator cannot suddenly open or close the valve.**
- **Use bypass valves or completely shut off the process to isolate the valve from process pressure. Relieve process pressure on both sides of the valve. Drain the process media from both sides of the valve.**
- **Vent the power actuator loading pressure and relieve any actuator spring precompression.**
- **Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.**
- **The valve packing box may contain process fluids that are pressurized, even when the valve has been removed from the pipeline. Process fluids may spray out under pressure when removing the packing hardware or packing rings.**
- **Check with your process or safety engineer for any additional measures that must be taken to protect against process media.**

⚠ WARNING

For explosion-proof applications, ensure the actuator cover is properly bolted before applying power to the actuator. Personal injury or property damage may result from fire or explosion if power is applied to the actuator with the cover removed in a hazardous area.

Do not remove the actuator cover for 10 minutes after power is disconnected if the UPS option is installed.

For explosion-proof applications, install rigid metal conduit and a conduit seal no more than 457 mm / 18 in. from the actuator. Personal injury or property damage may result from explosion if the seal is not installed.

Select wiring and/or cable glands that are rated for the environment of use (such as hazardous area, ingress protection and temperature). Failure to use properly rated wiring and/or cable glands can result in personal injury or property damage from fire or explosion.

Wiring connections must be in accordance with local, regional and national codes for any given hazardous area approval. Failure to follow the local, regional and national codes could result in personal injury or property damage from fire or explosion.

4.1 Valve Plug and Seat Ring

Disassembly

Key Numbers are referenced in Figures 21 and 22.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body (key 1) and drain the process media from both sides of the valve.

NOTICE

The following steps are intended to prevent damage to the valve plug (key 3) and seat ring (key 2) during the removal of the bonnet and actuator.

2. For Positioning Actuators
   - Command the valve to anywhere between 10% and 20% travel.
   - Isolate power and signal.
   - Proceed to step 3.

   For ON/OFF Actuators
   - Command the valve to open or close and cut the power when the valve is at mid-stroke.
   - Isolate power and signal.
   - Proceed to step 3.
3. Break the hammer nut (key 6) loose with a hammer. Continue turning the hammer nut by using a hammer or a large adjustable wrench, tightened around one ear of the hammer nut. If the bonnet is stuck on the valve, continue to unscrew the hammer nut. The hammer nut will contact the spring pins (key 7) and will force the bonnet out of the valve. Carefully lift the actuator, bonnet and valve plug assembly from the valve body.

⚠ WARNING

The spring pins must always be in place during valve operation. They provide a safeguard against injury when the unit is being disassembled.

4. Use a socket wrench to loosen the seat ring (key 3).
5. Remove the seat ring (key 3) and seat ring gasket (key 9) from the valve body.
6. To replace the plug, the stem nut (key 42) must be removed to expose the groove pin (key 4). Open the explosion-proof enclosure (key 60), using a 13 mm wrench.
7. Remove the stem nut (key 42) using a 11/16 in. wrench; insert a punch in the hole in the stem to restrict rotation of the stem while removing the stem nut. The travel indicator (key 32) may need to be moved to expose the hole.

8. Push the stem downward just far enough to expose the groove pin (key 4) on the plug.
9. Remove the plug by driving out the groove pin and unscrewing the valve plug from the stem.

WARNING

Be careful to avoid damaging the seating surface on the valve plug or seat ring as damage in these areas will allow excessive leakage at shutoff. Avoid damaging the highly polished valve stem surface. A damaged valve stem could cut the packing and allow process fluid to leak to the atmosphere.

Table 7. Torque for Seat Ring (Key 3)

VALVE SIZE, NPS	RECOMMENDED TORQUE	
	N•m	Lbf•ft
1	407	300
2	698	515

Assembly

1. Make sure the bonnet O-ring (key 8) is on the bonnet and lubricated with lithium grease (key 49).
2. Install the plug (key 2) on the stem (key 47) and insert a new groove pin (key 4).
3. Push the plug and stem upward to ensure the threads on the top of the stem are exposed. Thread the stem nut (key 42) onto the top of the stem and tighten the stem nut (key 42) to 39 N•m / 29lbf•ft. Insert a punch in the hole in the stem to restrict rotation while tightening the stem nut.
4. Replace the top of the explosion-proof enclosure (key 60) and tighten cap screws (key 64) to 20 N•m / 15 lbf•ft.
5. Thoroughly clean the seat ring and bonnet threads in the valve body (key 1). Also clean the valve body seat ring gasket surfaces.
6. Apply anti-seize lubricant (key 54) to the threads of the seat ring (key 3) and its mating threads in the valve body.
7. Apply anti-seize lubricant (key 54) to the seat ring gasket (key 9) and install into the valve body.
8. Screw the seat ring into the valve body. Use a socket wrench to tighten the seat ring to the torque valves shown in Table 7. Remove all excess lubricant after tightening.
9. Lubricate (key 54) the threads on the valve body and hammer nut and the contact surfaces of the bonnet and hammer nut flange. Install the bonnet and actuator assembly with pinned valve plug onto the valve body. Tighten the hammer nut using an adjustable wrench until the nut stops turning. A few hammer blows will be required to ensure the assembly is tight.

4.2 Valve Packing

⚠ WARNING

Observe the warning at the start of the Maintenance section.

The valve stem packing can only be accessed from within the valve body. If packing maintenance is required, first disassemble per steps 1, 2 and 6 or 7 in the Valve Plug and Seat Ring Disassembly section of this document.

NOTE

Packing installation and adjustment is critical to the long-term packing performance. Absolutely no deviations from this procedure are allowed.

To minimize friction and maximize sealing performance, a small amount of fluorinated grease (key 56) is placed between the packing rings.

Single Packing Arrangement

The packing components are to be installed as shown in the assembly drawing per the following procedure:

1. Install packing spacer (key 48) in the packing box.
2. Using a non-marring installation tool, such as a 12 in. length of 1/2 in. PVC pipe, push the first anti-extrusion washer (key 12) fully into the packing box by hand. Then, use the packing spacer (key 14) to fully seat the anti-extrusion washer by firmly tapping the packing spacer against the anti-extrusion washer with a hammer and the PVC pipe.
3. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the female adaptor ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.

NOTE

All D4 packing kits include a single use packet of high performance flourinated grease. This is the only acceptable D4 packing lubricant.

4. Install the female adaptor ring using the packing spacer and PVC pipe to push the ring against the anti-extrusion washer. Apply only enough force to cause the female adaptor to make contact.
5. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the white V-ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.
6. Install the V-ring using the packing spacer and PVC pipe to push the V-ring against the female adaptor. Apply only enough force to cause the female adaptor to make contact.
7. Install the male adaptor.
8. Using the PVC pipe, push the second anti-extrusion washer (key 12) fully into the packing box by hand. Then, use the packing spacer (key 14) to fully seat the anti-extrusion washer by firmly tapping the packing spacer against the anti-extrusion washer with a hammer and the PVC pipe.
9. Install the packing spacer (key 14) and five Belleville springs (key 11). The Belleville springs (key 11) should be single stacked with the ID of the inner spring contacting the packing spacer (key 14) and the OD of the outer spring contacting the packing retainer (key 10). The final Belleville spring should be within the 1.26 in.-diameter bore of the bonnet.
10. Adjust the packing retainer by hand until it contacts the Belleville springs. Do not tighten by hand, simply install the packing retainer until it contacts the Belleville springs. Torque the packing retainer to 68 N•m / 50 lbf•ft.

Figure 19. Fisher D4 Packing Installation

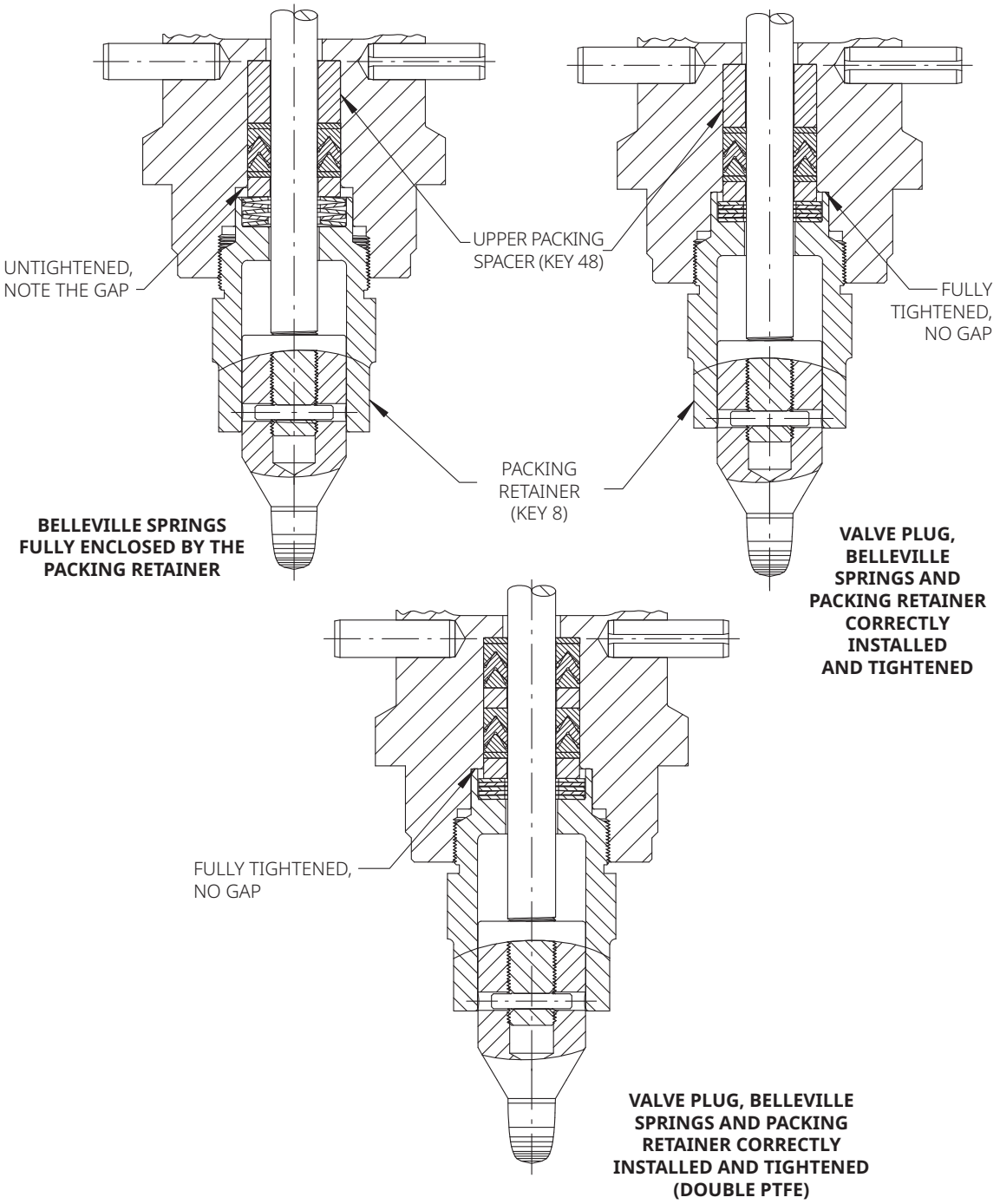
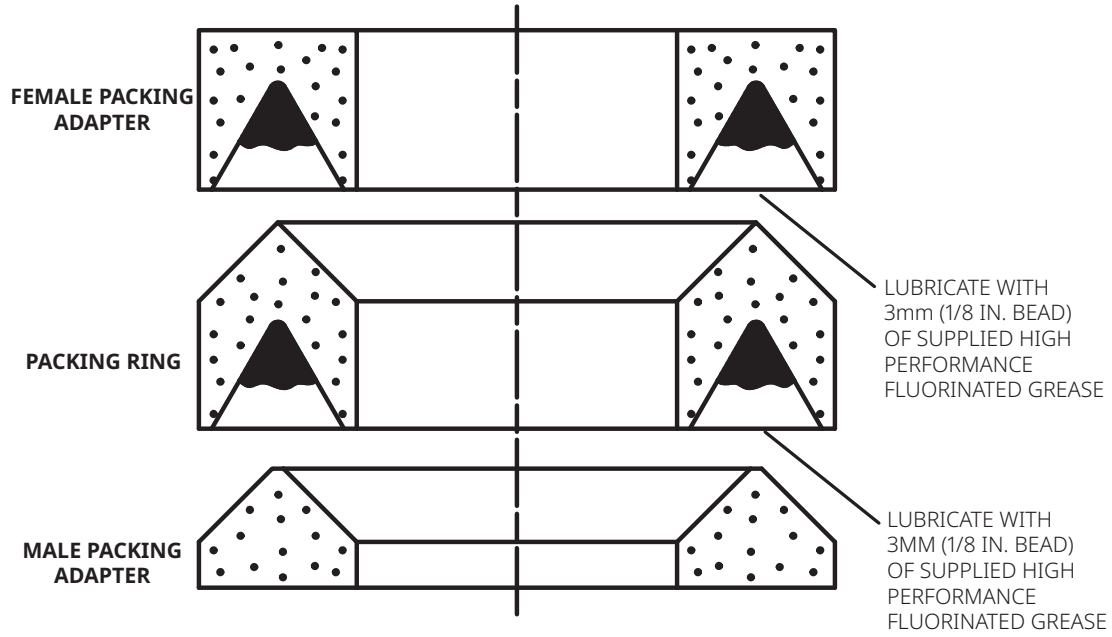


Figure 20. Lubrication Locations on Packing



Double Packing Arrangement

The packing components are to be installed as shown in the assembly drawing per the following procedure:

1. Using a non-marring installation tool, such as a 12 in. length of 1/2 in. PVC pipe, push the first anti-extrusion washer (key 12) fully into the packing box by hand. Then, use the packing spacer (key 14) to fully seat the anti-extrusion washer by firmly tapping the packing spacer against the anti-extrusion washer with a hammer and the PVC pipe.
2. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the female adaptor ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.

NOTE

All D4 packing kits include a single use packet of high performance fluorinated grease. This is the only acceptable D4 packing lubricant.

3. Install the female adaptor ring using the packing spacer and PVC pipe to push the ring against the anti-extrusion washer. Apply only enough force to cause the female adaptor to make contact.

4. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the white V-ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.
5. Install the V-ring using the packing spacer and PVC pipe to push the V-ring against the female adaptor. Apply only enough force to cause the female adaptor to make contact.
6. Install the male adaptor.
7. Install the packing spacer (key 14).
8. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the female adaptor ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.
9. Install the female adaptor ring using the packing spacer and PVC pipe to push the ring against the anti-extrusion washer. Apply only enough force to cause the female adaptor to make contact.
10. Using a needle point syringe filled with fluorinated grease, apply a continuous bead of approximately 3/16 in. diameter inside the V-groove of the white V-ring. See Figure 2. Take care to keep the lubricant confined to only the V-groove. Do not lubricate the other surfaces of the packing ring, the stem or the packing box.
11. Install the V-ring using the packing spacer and PVC pipe to push the V-ring against the female adaptor. Apply only enough force to cause the female adaptor to make contact.
12. Install the male adaptor.
13. Using the PVC pipe, push the second anti-extrusion washer (key 12) fully into the packing box by hand. Then, use the packing spacer (key 14) to fully seat the anti- extrusion washer by firmly tapping the packing spacer against the anti-extrusion washer with a hammer and the PVC pipe.
14. Install the packing spacer (key 14) and six Belleville springs (key 11). The Belleville springs (key 11) should be double stacked with the ID of the inner spring contacting the packing spacer (key 14) and the OD of the outer spring contacting the packing retainer (key 10). The final Belleville spring should be within the 1.26 in.-diameter bore of the bonnet.
15. Adjust the packing retainer by hand until it contacts the Belleville springs. Torque the packing retainer to 54 N•m / 40 lbf•ft.

Section 5: Parts

5.1 Parts Ordering

Each D4 control valve is assigned a serial number, which can be found on the nameplate. Refer to the number when contacting your Emerson sales office for assistance or when ordering replacement parts.

WARNING

Use only genuine Fisher replacement parts. Components that are not supplied by Emerson should not, under any circumstances, be used in any Fisher valve, because they may void your warranty, might adversely affect the performance of the valve and could cause personal injury and property damage.

5.2 Parts Kits

Table 8. Actuator Parts Kits

Kit	Part Number
Board Replacement Kit (On/Off is default)	GE83055X012
Board Replacement Kit + Positioning License Dongle	GE83126X012
Motor/Gearbox Assembly	GK10613X012
Motor/Gearbox/Board Assembly (On/Off is default)	GK16046X012
Motor/Gearbox/Board Assembly + Positioning License Dongle	GK16047X012
Replacement Kit - Belleville Springs	GK15266X012
Replacement Kit - Drivetrain	GK15328X012
Positioning License Dongle (1 License)	GE83574X012
Positioning License Dongle (5 License)	GE83574X022

5.3 Repair Kits

NOTE

All repair kits are supplied with HNBR (hydrogenated nitrile) bonnet O-ring. FKM (fluorocarbon) bonnet O-ring must be ordered separately when required.

Table 9. Repair Kits

Description	Part Number
Packing Repair Kit Includes key numbers 4, 8, 12 (qty. 2), 13 and high performance fluorinated grease	RD4X0000012

5.4 Parts List

NOTE

Contact your Emerson sales office for Part Ordering Information.

Table 10. Parts List

Key	Description	Key	Description
1	Valve body	42	Stem nut
2*	Valve plug	47*	Valve stem
3*	Seat ring	48	Upper packing spacer
4 *	Groove pin	49	Lubricant (lithium grease)
5	Bonnet	54	Lubricant (anti-seize)
6	Hammer nut	56*	High performance fluorinated grease Packing lubricant
7	Spring pin		
8*	Bonnet O-ring	58	Enclosure O-ring
9*	Seat ring gasket	59	Motor/gearbox/controller assembly
10	Packing retainer	60	Upper enclosure
11	Belleville springs (5 req'd)	61	Lower enclosure
12*	Anti-extrusion washer (2 req'd)	62	Motor cap screws (4 req'd)
13*	Packing set	63	Motor cap screw washers (4 req'd)
14	Packing spacer	64	Enclosure cap screws (8 req'd)
16	Valve nameplate	65	Enclosure cap screw retaining washers (8 req'd)
17	Drive screw	66	Ground screw
18*	O-ring	68	Certification nameplate
19	Stem O-ring	69	Fisher easy-Drive Label
32	Travel indicator	- - -	- - -
*Recommended spare parts.			

Figure 21. D4 Valve Assembly

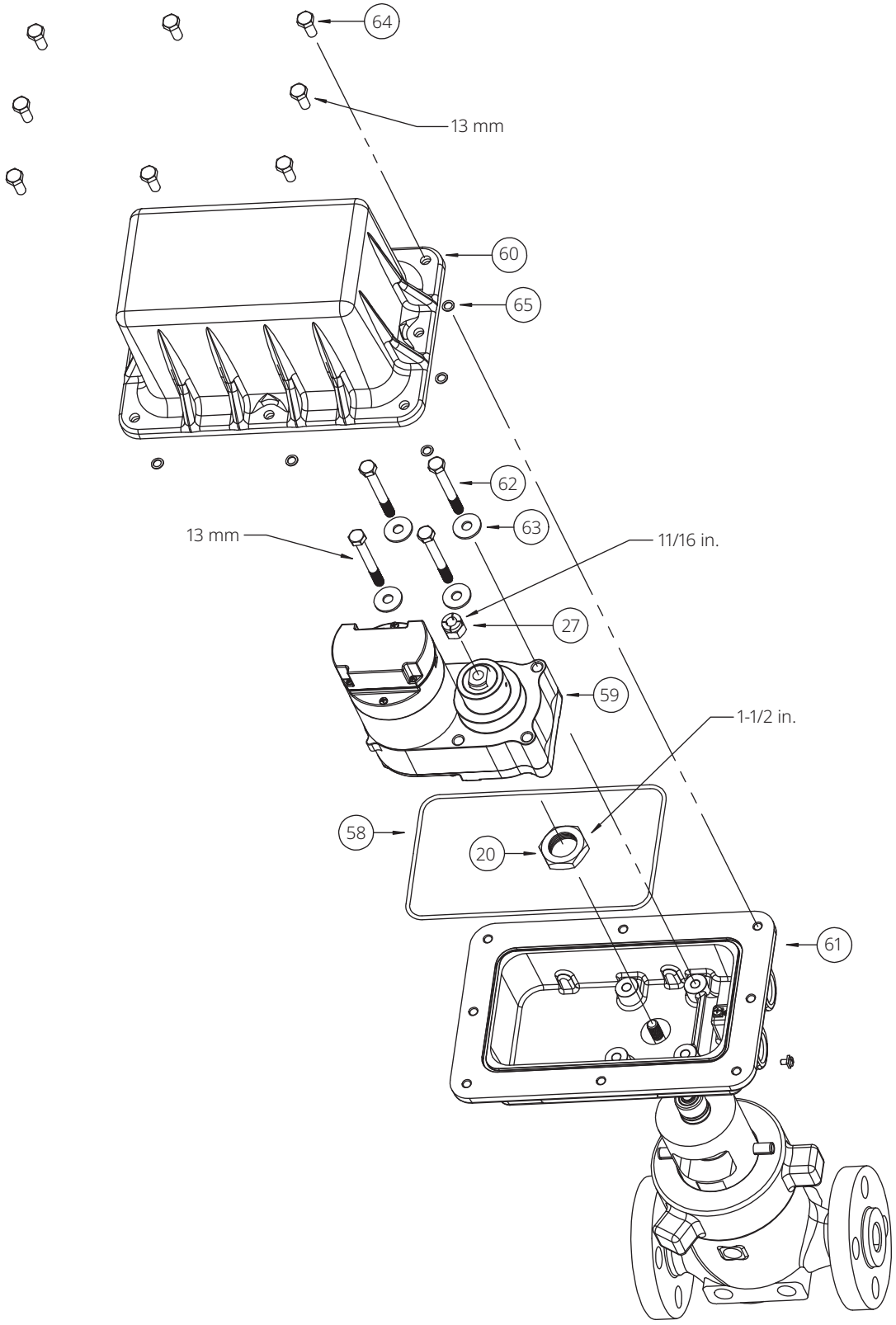
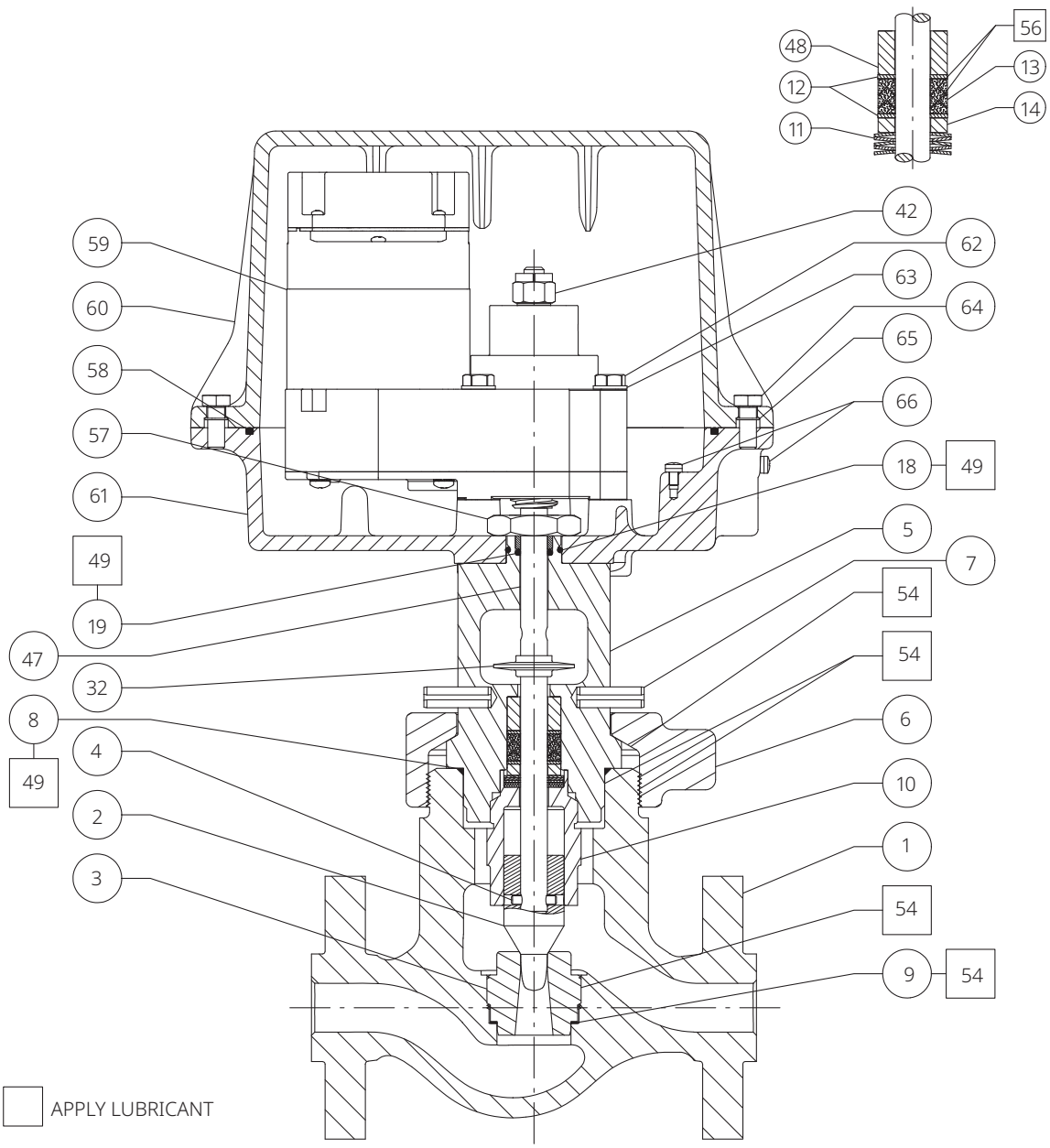


Figure 22. Fisher D4 Valve Assembly



GE49375-B

Appendix A: Modbus

A.1 Register Summary

Table A-1. Fisher easy-Drive Actuator Modbus Map

Type[1]	Name	MB Register	Default	R/W	Values	Notes
uint16	Modbus position command (100=10.0%)	40001	0	R/W	0 to 1000	Modbus command value with one implied decimal place (1000=100.0%). R/W at all times but only used in Modbus control mode. In on/off mode 0 to 499 will result in a move to 0% and 500 to 1000 will result in a move to 100%.
uint16	Digital output	40002	0	R/W	0, 1	0=no voltage supplied to terminals, 1=voltage supplied to terminals (Only used when output setup is set for Remote controlled)
uint16	Reset error codes	40003	0	R/W	0, 1	Value of 1 will clear faults. Will automatically set back to 0.
uint16	RESERVED	40004	- - -	- - -	- - -	- - -
uint16	RESERVED	40005	- - -	- - -	- - -	- - -
uint16	RESERVED	40006	- - -	- - -	- - -	- - -
uint16	RESERVED	40007	- - -	- - -	- - -	- - -
uint16	RESERVED	40008	- - -	- - -	- - -	- - -
uint16	RESERVED	40009	- - -	- - -	- - -	- - -
uint16	Actual position (100=10.0%)	40010	0	R	0 to 1000	Present position of the actuator relative to span with 1 implied decimal place (1000=100.0%). Valid for all control modes.
uint16	Commanded position (100=10.0%)	40011	0	R	0 to 1000	Present position command of the actuator relative to span (1000=100.0%). Valid for all control modes.
uint16	Diagnostic Flags	40012	0	R	0 to 65535	Bit flags - see chart
uint16	Digital status	40013	0	R	0 to 1	0=no connection between terminals, 1=connection between terminals (Status of digital input or output)
uint32	Total Running Time (min)	40014, 40015	0	R	4294967296	Total number of minutes the actuator has been powered on since time has been reset
uint32	Total Open Time (min)	40016, 40017	0	R	4294967296	Total number of minutes the actuator has been at 100% of travel since time has been reset
uint32	Total Closed Time (min)	40018, 40019	0	R	4294967296	Total number of minutes the actuator has been at 0% of travel since time has been reset

- continued -

Table A-1. Fisher easy-Drive Actuator Modbus Map (continued)

Type(1)	Name	MB Register	Default	R/W	Values	Notes
uint32	Number of Closed (Cycle count)	40020, 40021	0	R	4294967296	Total number of close cycles the actuator has performed since reset. One open/close cycle counts as 1.
uint32	Number of Power Cycles	40022, 40023	0	R	4294967296	Total number of times the actuator has been powered on.
uint32	Number of Movements	40024, 40025	0	R	4294967296	Total number of movements the actuator has performed. Move must be at least 5% of rated travel for cycle to increment.
uint16	Analog input control value	40026	0	R	0 to 2400	Value of the analog signal in mA with 2 implied decimals. In analog control mode, this is the command value and is subject to the analog settings in registers 40046 to 40059. Always active but a slower refresh rate when unit is not in analog control mode.
uint16	Incoming voltage	40027	0	R	0 to 350	Diagnostic register - value of incoming voltage with 1 implied decimal.
uint16	Latch Open State	40028	0	R	0 to 1	Normally open latch state
uint16	Latch Close State	40029	0	R	0 to 1	Normally closed latch state
uint16	RESERVED	40030	- - -	- - -	- - -	- - -
uint16	RESERVED	40031	- - -	- - -	- - -	- - -
uint16	RESERVED	40032	- - -	- - -	- - -	- - -
uint16	RESERVED	40033	- - -	- - -	- - -	- - -
uint16	RESERVED	40034	- - -	- - -	- - -	- - -
uint16	RESERVED	40035	- - -	- - -	- - -	- - -
uint16	RESERVED	40036	- - -	- - -	- - -	- - -
uint16	RESERVED	40037	- - -	- - -	- - -	- - -
uint16	RESERVED	40038	- - -	- - -	- - -	- - -
uint16	RESERVED	40039	- - -	- - -	- - -	- - -
uint16	Test Register - 16 bit	40040	45964	R	45964	Fixed register to test correct reading of 16 bit registers - Hex=B38C, Binary=1011001110001100
uint32	Test Register - 32 bit	40041, 40042	3,012,341,331	R	3,012,341,331	Fixed register to test correct reading of 32 bit registers - Hex=B38C AE53, Binary=1011001110001100 1010111001010011
uint16	Span calibration	40043	0	R/W	0, 1	Value of 1 will initiate span calibration. Will automatically set back to 0.
uint16	RESERVED	40044	- - -	- - -	- - -	- - -
uint16	RESERVED	40045	- - -	- - -	- - -	- - -

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Table A-1. Fisher easy-Drive Actuator Modbus Map (continued)

Type(1)	Name	MB Register	Default	R/W	Values	Notes
uint16	RESERVED	40046	- - -	- - -	- - -	- - -
uint16	RESERVED	40047	- - -	- - -	- - -	- - -
uint16	RESERVED	40048	- - -	- - -	- - -	- - -
uint16	RESERVED	40049	- - -	- - -	- - -	- - -
uint16	Loss of signal position (100=10.0%)	40050	0	R/W	0 to 1001	Position to which valve plug will be driven upon loss of signal. Loss of signal is based upon the active control mode. 0 to 1000=0-100.0% with 1 implied decimal point. In on/off mode 0 to 499 will result in movement to 0% while 500 to 1000 will result in movement to 100%. A value of 1001 in any control mode is the setting for "lock-in-last".
uint16	Modbus timeout (s)	40051	60	R/W	0 to 65535	Time without a valid Modbus message is seen (to any address) before "loss of signal" motion is engaged when in Modbus control mode. Only active in Modbus control mode. 0=disabled
uint16	Dual contact timeout (s)	40052	60	R/W	0 to 3600	Time without a digital signal being low (contact made) from either digital input as viewed by voltage level on the digital input terminals. If neither contact has been made (pulled input low) within the timeout period, the valve plug will be moved to the loss-of-signal position. Only active in the local, on-off, dual contact mode. 0=disabled.
uint16	Deadband (10=1.0%)	40053	5	R/W	0 to 250	Minimum percentage signal change to elicit a movement response based upon end position of last movement. For example, if the previous command resulted in the actuator moving to 31.2% of travel and deadband is set to 100 (10.0%), setpoint must command valve to 21.2% or 41.2% before valve will move to new position. Default is set set to minimize signal dithering.
uint16	Low travel cutoff position (100=10.0%)	40054	50	R/W	0 to 999	Analog input command, in percent with one implied decimal (50=5.0%), below this value will result in the valve plug moving to the closed position. Active in both local and Modbus control modes.

- continued -

Table A-1. Fisher easy-Drive Actuator Modbus Map (continued)

Type[1]	Name	MB Register	Default	R/W	Values	Notes
uint16	Analog on/off close position (100=10.0%)	40055	400	R/W	0 to 999	When the valve is in 4 to 20 mA on/off mode, this value is the point at which the valve will close. It must be set to a smaller value than the analog on/off open position. Percentage position value with one implied decimal (400=40.0%).
uint16	Analog on/off open position (100-10.0%)	40056	500	R/W	1 to 1000	When the valve is in 4 to 20 mA on/off mode, this value is the point at which the valve will open. It must be set to a larger value than the analog on/off close position. Percentage position value with one implied decimal (500=50.0%).
uint16	Analog Close Value	40057	40	R	31 to 220	The analog value, in mA with one implied decimal (40=4.0 mA), that defines the closed position.
uint16	Analog Open Value	40058	200	R	31 to 220	The analog value , in mA with one implied decimal (200=20.0 mA), that defines the open position.
uint16	Number of retries	40059	2	R/W	0 to 4	When the valve plug encounters an obstruction, how many attempts will it make to move past that point, assuming no change in the command signal within the deadband range.
uint16	RESERVED	40060	- - -	- - -	- - -	- - -
uint16	RESERVED	40061	- - -	- - -	- - -	- - -
uint16	RESERVED	40062	- - -	- - -	- - -	- - -
uint16	RESERVED	40063	- - -	- - -	- - -	- - -
uint16	RESERVED	40064	- - -	- - -	- - -	- - -
uint16	RESERVED	40065	- - -	- - -	- - -	- - -
uint16	RESERVED	40066	- - -	- - -	- - -	- - -
uint16	Control Source	40067	0	R/W	0 to 5	0=Dual Contact On/Off 1=Single Contact On/Off, 2=Modbus On/Off, 3=Modbus Positioning, 4=4 to 20 Positioning, 5=4 to 20 Level
uint16	Valve Type	40068	1	R/W	1 to 10	1=D3, 2=D4
uint16	RESERVED	40069	- - -	- - -	- - -	- - -
uint16	RESERVED	40070	- - -	- - -	- - -	- - -
uint16	RESERVED	40071	- - -	- - -	- - -	- - -
uint16	RESERVED	40072	- - -	- - -	- - -	- - -
uint32	RESERVED	40073	- - -	- - -	- - -	- - -
uint16	Modbus address	40074	1	R/W	1 to 247	Slave Address of the actuator

- continued -

Table A-1. Fisher easy-Drive Actuator Modbus Map (continued)

Type[1]	Name	MB Register	Default	R/W	Values	Notes
uint16	Baud Rate	40075	5	R/W	4, 5, 6, 7	4=4800 baud, 5=9600 baud (default), 6=19200 baud, 7=38400 baud
uint16	Parity	40076	0	R/W	0, 1, 2	0=Even, 1=Odd, 2=None
uint16	Modbus stop bits	40077	1	R/W	0, 1, 2	1 stop bit is the standard with even and odd parity while 2 stop bits is the standard for none.
uint16	MSB/LSB	40078	0	R/W	0, 1	0=MSB (Big Endian), 1=LSB (Little Endian)
uint16	RESERVED	40079	- - -	- - -	- - -	- - -
uint16	Digital I/O selection	40080	1	R/W	0, 1	0=9 V sinking digital input, 1=25 mA at 10 V digital output
uint16	Digital I/O output setup	40081	0	R/W	0, 1, 2, 3	Valid only when Digital I/O selection is set to Output (1) - 0=In position, 1=Fully closed, 2=Fully open, 3=Remote controlled (driven by Digital Output register)
uint16	Digital I/O input setup	40082	0	R/W	0, 1	Valid only when Digital I/O selection is set to Input (0) - 0=Reference only (status appears in 40013 and does nothing else), 1=Override (status appears in 40013 and valve plug is moved to safe position noted in register 40050)
uint16	RESERVED	40083	- - -	- - -	- - -	- - -
uint16	RESERVED	40084	- - -	- - -	- - -	- - -
uint16	RESERVED	40085	- - -	- - -	- - -	- - -
uint16	RESERVED	40086	- - -	- - -	- - -	- - -
uint16	RESERVED	40087	- - -	- - -	- - -	- - -
uint16	RESERVED	40088	- - -	- - -	- - -	- - -
uint16	RESERVED	40089	- - -	- - -	- - -	- - -
uint16	RESERVED	40090	- - -	- - -	- - -	- - -
uint16	RESERVED	40091	- - -	- - -	- - -	- - -
uint16	RESERVED	40092	- - -	- - -	- - -	- - -
uint16	RESERVED	40093	- - -	- - -	- - -	- - -
uint32	Device Tag	40094 to 40113	"easyDrive2"	R/W	0 to 255 per character	Device Tag (20 character UTF8 string)
uint32	Valve serial number	40114, 40115	0	R/W*	0 to 4,294,967,296	Valve assembly serial number assigned at Fisher assembly plant
uint32	Motor serial number	40116, 40117	0	R/W*	0 to 4,294,967,296	Motor/gearbox serial number

- continued -

Table A-1. Fisher easy-Drive Actuator Modbus Map (continued)

Type(1)	Name	MB Register	Default	R/W	Values	Notes
uint32	Motor revision	40118, 40119	0	R/W*	0 to 4,294,967,296	Motor/gearbox revision
uint32	PCB serial number	40120, 40121	0	R/W*	0 to 4,294,967,296	PCB serial number
uint16	PCB revision	40122, 40123	0	R/W*	0 to 4,294,967,296	PCB revision
uint16	Flash Firmware major revision	40124	0	R	0 to 65535	From flash firmware when compiled
uint16	Flash Firmware minor revision	40125	0	R	0 to 65535	From flash firmware when compiled
uint16	Flash Firmware mod revision	40126	0	R	0 to 65535	From flash firmware when compiled
uint16	Flash Firmware build revision	40127	0	R	0 to 65535	From flash firmware when compiled
uint16	Boot Firmware major revision	40128	0	R	0 to 65535	From boot firmware when compiled
uint16	Boot Firmware minor revision	40129	0	R	0 to 65535	From boot firmware when compiled
uint16	Boot Firmware mod revision	40130	0	R	0 to 65535	From boot firmware when compiled
uint16	Boot Firmware build revision	40131	0	R	0 to 65535	From boot firmware when compiled
uint32	PCB test date	40132, 40133	0	R/W*	0 to 4,294,967,296	Seconds since January 1, 2000, Board Supplier Functional Test Date
uint32	Motor test date	40134, 40135	0	R/W*	0 to 4,294,967,296	Seconds since January 1, 2000, Motor Supplier Test Date
uint32	System completion date	40136, 40137	0	R/W*	0 to 4,294,967,296	Seconds since January 1, 2000, Final Assembly Test Date

1. uint is defined as unsigned integer
   uint16 – unsigned 16 bit variable, can take value 0 to 65535.
   uint32 – unsigned 32 bit variable, can take value 0 to 4294967295.
   (Reserved) – registers used for development use only.

† - 32bit register contains data that spans two registers – reads and write of data needs to be performed within the same Modbus command function to ensure coherency of data.

Table A-2. Diagnostic Fault Flags

Hex Value	Bit Mask	Description	Value	Bit	Definition
0x8000	1000 0000 0000 0000	Fault in N.V. Memory – system has restored default settings	32768	15	A memory fault has occurred and the actuator has been restored to factory defaults. Contact your Emerson sales office.
0x8000	1000 0000 0000 0000	Fault in N.V. Memory – system has restored default settings	32768	15	A memory fault has occurred and the actuator has been restored to factory defaults. Contact your Emerson sales office.
0x4000	0100 0000 0000 0000	Motor Assembly Stall - Travel Deviation	16384	14	The actuator is unable to move to the commanded position and has stopped. Follow troubleshooting guide in Help section to remedy.
0x2000	0010 0000 0000 0000	Discrete Input override mode active	8192	13	The digital input has detected a closed contact and the actuator has moved to its safe position. Check switch input device status.
0x1000	0001 0000 0000 0000	System or Watchdog fault	4096	12	The actuator has experienced a fatal error and shut down. Contact your Emerson sales office.
0x0800	0000 1000 0000 0000	Analog Input calibration value not in expected range	2048	11	The analog values entered do not match the analog signal level. Check analog signal value and value entered.
0x0400	0000 0100 0000 0000	Valve travel distance calibration not in legal range	1024	10	The valve travel distance is outside the acceptable range. Confirm valve type and that no obstructions are present.
0x0200	0000 0010 0000 0000	Analog Input span calibration not in legal range	512	9	The analog values for open and close are less than 4 mA and previous values have been maintained. Calibrate analog input with differential >4 mA.
0x0100	0000 0001 0000 0000		256	8	- - -
0x0080	0000 0000 1000 0000	Valve was shutdown while moving	128	7	Actuator was powered down during a move and actual position may vary from commanded. Recalibrate the valve span.
0x0040	0000 0000 0100 0000	Valve span calibrated (informational)	64	6	Span has been calibrated and actuator is ready.
0x0020	0000 0000 0010 0000	Valve position controller active (informational)	32	5	Actuator is active and ready.
0x0010	0000 0000 0001 0000	Loss of signal active	16	4	Control signal not present. Signal is <3 mA, timeout period exceeded (40051 or 40052).
0x0008	0000 0000 0000 1000		8	3	- - -
0x0004	0000 0000 0000 0100	Modbus command has been sent (starts a calibrated system)	4	2	The actuator is successfully moving the valve.
0x0002	0000 0000 0000 0010	Analog input initialized (system has seen input >3 mA/1 V)	2	1	4 to 20 mA analog input has a valid signal present
0x0001	0000 0000 0000 0001	Start delay active (within 15 second calibration window)	1	0	Span calibration using physical inputs allowed during startup

Appendix B: Certificate of Conformance

EMERSON

FISHER

EU Declaration of Conformity

We, the manufacturer,

Emerson
Fisher Controls International LLC
205 South Center Street
Marshalltown, Iowa 50158 USA

declare under our sole responsibility that the following product(s);

Electric Actuator
easy-Drive

to which this declaration relates, is in conformity with the provisions of the following European Community Directives, including the latest amendments, as shown in the attached schedule.

Assumption of conformity is based on the application of the harmonized standards and, when applicable or required, a European Community Notified Body certification, as shown in the attached schedule.

Chad Engle
Director – Product Design Compliance
Marshalltown, Iowa 50158

20-Oct-2025
Date

European Contact
Emerson | Group Services SAS | Rue Paul-Baudry | B.P. 10150 | 68701 Cernay Cedex France

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- continued -

EMC Directive – 2014/30/EU

Models: All
EN 61326-1:2013

RoHS Directive – 2011/65/EU as amended by 2015/863/EU

Declaration of Exclusion

Models: All

The above equipment is excluded from the scope of this directive per Article 2, Paragraph 4, part C of 2011/65/EU, therefore the equipment cannot bear the CE mark related to RoHS compliance. However, the equipment may bear the CE mark to indicate compliance with other applicable EU directives.

ATEX Directive – 2014/34/EU (Applicable only if this mark  appears on the product)

Certificate – **SIRA12ATEX1168X** – **Group II Category 2 G** – Flameproof
easy-Drive
Ex db IIA T6(Ta ≤ 70ºC) Gb
Standards used: EN IEC 60079-0:2018/AC:2020, EN60079-1:2014

ATEX Notified Body for EC-Type Examination Certificate(s)
CSA Group Netherlands B.V. – Notified Body Number: 2813
Utrechtseweg 310, Building B42
6812AR Arnhem
The Netherlands

ATEX Notified Body for Quality Assurance

SGS Fimko Oy – Notified Body Number: 0598
P.O. Box 30 (Särkiniementie 3)
Helsinki, 00211
Finland

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