

# Fisher™ easy-Drive™ 200R

## Contents



Introduction .....	1
Scope of Manual .....	1
Description .....	1
Specifications .....	3
Educational Services .....	3
Security .....	3
Installation .....	4
Special Instructions for “Safe Use” and Installations in Hazardous Locations .....	5
Actuator Mounting .....	5
Power Requirements .....	7
Wiring Instructions .....	7
Configuration .....	11
Control Method Configuration .....	11
Modbus Setup .....	11
Connecting Using the Fisher easy-Drive Configuration Software .....	12
Valve Type Configuration .....	12
Initial Setup .....	13
Calibration Instructions .....	13
Operational Verification .....	17
Troubleshooting .....	17
Maintenance .....	18
Disassembly .....	19
Assembly .....	20
Parts Ordering .....	22
Parts Kits .....	22
Parts List .....	22
Actuator Mounting Configuration .....	26
Appendix A - Modbus .....	27
Appendix B - Certificate of Conformance .....	32

Figure 1. Fisher easy-Drive 200R



## Introduction

### Scope of Manual

  This instruction manual provides installation, maintenance, and parts information for the easy-Drive 200R. Do not install, operate, or maintain an easy-Drive 200R 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.

### Description

The easy-Drive 200R electric rotary actuators are used on rotary-shaft valve bodies for throttling or on-off applications. The 200R has an ISO 5211 mating interface that allows installation to non-Fisher valves. Style F mounting is available for coupling with Fisher rotary valves. This actuator is ideal for use on pressure and flow control applications for Fisher Vee-Ball NPS 1-6, HPBV NPS 2-4 and non-Fisher 90° rotary valves with 9 mm, 11 mm, 14 mm, or 19 mm square shaft connections, and 5/8-inch or 3/4-inch splined shaft connections. In applications that require a known loss of power position, an RPU-100 can be used to drive the easy-Drive actuator open or closed. Consult the easy-Drive RPU-100 Instruction Manual ([D104551X012](#)).



Table 1. Specifications

<p><b>Material Temperature Capabilities<sup>(1)</sup></b> Electric Actuator Assembly: -40 to 70°C (-40 to 158°F)</p> <p><b>Available Actuator Configurations<sup>(4)</sup></b> Positioning</p> <p><b>Compatible Fisher Valve Types and Sizes</b> See tables 2 and 3</p> <p><b>Power Requirements</b> 11-30 VDC, minimum 2.7 amp power supply required (fuse to 5 amps)</p> <p><b>Maximum Current Draw</b> ■ 2.3 amps</p> <p><b>Idle Current Draw</b> ■ 15 mA at 24 VDC ■ 25 mA at 12 VDC</p> <p><b>Conduit Connections</b> Two 3/4 NPT connections</p> <p><b>Travel<sup>(3)</sup></b> Rated: 1/4 turn, 90°</p>	<p><b>Torque<sup>(5)</sup></b> Rated: 124 N • m (1100 in • lbf)</p> <p><b>Nominal Stroke Speed<sup>(2)</sup></b> 9° per second at 24 VDC</p> <p><b>Hazardous Area Approvals</b> CSA (C/US): Explosion-Proof Class I, Division 1, Groups C and D, T6, Ex db IIB T6, Class I, Zone 1, AEx db IIB T6 ATEX Flameproof - Gas: ⊕ II 2 G, Ex db IIB T6 Gb IECEx Flameproof - Gas: Ex db IIB T6 Gb</p> <p><b>Enclosure Rating</b> Type 4X and IP66</p> <p><b>Duty Cycle</b> 50% maximum</p> <p><b>Enclosure Material</b> Cast aluminum alloy with powder coat paint</p> <p><b>Approximate Weight:</b> 17.7 kg (39 lbs)</p>
--	--

1. The temperature limits in the referenced tables and any applicable code or standard limitations should not be exceeded.  
 2. Variation can be expected, based on temperature and pressure of application.  
 3. Actuator is capable of 14° of over-travel (104° of total travel) for travel stop adjustment and valve zeroing.  
 4. Not compatible for use with valve assemblies that include a handwheel or manual actuator.  
 5. Not intended for applications where process conditions could produce torque beyond the rated torque.

Table 2. Compatible Fisher Valve Types and Sizes for Square Shaft Connection

VALVE TYPE	VALVE SIZE, NPS	SQUARE SHAFT CONNECTION SIZE (mm)
V150, V150E, V200, and V300	1	9
	1-1/2 and 2	11
	3 and 4	14
	6	19
8580	2	9
	6	19
8580 and 8590	3	11
	4	14

Table 3. Compatible Fisher Valve Types and Sizes for Splined Shaft Connection (Retro-fit Only)<sup>(1)</sup>

VALVE TYPE	VALVE SIZE, NPS	SPLINE SHAFT CONNECTION SIZE (Inch)
V150, V150E, V200, and V300	1-1/2 and 2	5/8
	3 and 4	3/4
8580 and 8590	3	5/8
	4	3/4

1. Mounting bracket not supplied with splined shaft adaptor.

## Specifications

Table 1 lists specifications for the easy-Drive 200R. Some of the specifications for a given actuator as it originally comes from the factory are stamped on a nameplate located on the lower actuator enclosure.

## Educational Services

Emerson Educational Services  
Phone: 1-800-338-8158  
E-mail: [education@emerson.com](mailto:education@emerson.com)  
[emerson.com/mytraining](http://emerson.com/mytraining)

## Security

### **NOTICE**

**Physical security is an important part of any security program and is fundamental to protecting your system.**

**Unauthorized personnel may potentially cause significant damage to and/or misconfiguration of end users' equipment. This could be intentional or unintentional and must be protected against by restricting access to unauthorized personnel in your facility.**

---

- If unsecured, any device in the field is vulnerable to a physical attack; safety and security procedures must include mitigation by physical security controls.
- The easy-Drive actuator has optional Configurator software for configuration and data viewing. When the Configurator software is used, it must run on devices that are configured according to local security policies.
- Ensure that operation personnel are trained both on local security policies and the secure operation of the easy-Drive actuator.
- Operate the device within a controlled and secured physical environment.
- Operate the easy-Drive actuator and Configurator software within a controlled and secured network environment.
- Apply security patches and updates as they are released.
- Report security incidents and potential product vulnerabilities.  
([https://go.emersonautomation.com/reportvulnerability\\_en](https://go.emersonautomation.com/reportvulnerability_en))
- Follow local disposal policy for securely disposing of an unneeded device.

# 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. Do not remove cover(s) or make live connections unless the area is known to be non-hazardous.

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**

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. The easy-Drive 200R can be installed in any position. Install the valve per the manufacturer's guidelines and per any applicable local, regional, and national piping codes.
2. For explosion-proof applications, install rigid metal conduit and seal no more than 457 mm (18 in) from the actuator.
3. Plastic conduit ports provided by factory are to be removed prior to operation and replaced with an explosion-proof port plug.

## Special Instructions for “Safe Use” and Installations in Hazardous Locations

### **⚠ 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 electrostatic 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 high-pressure 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.

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.

Flame proof joints are not intended to be repaired. To ensure safe use in hazardous locations, do not attempt to repair the upper enclosure (key 3), lower enclosure (key 2) or output shaft assembly (key 5). Contact your [Emerson sales office](#) for more information.

## Actuator Mounting

The following procedure describes how to mount an easy-Drive 200R actuator.

Standalone actuators will be shipped with the shaft adaptor at the configured loss of signal position.

User designed and manufactured Mounting Kit and Stem Coupler will be needed to complete this procedure.

### **⚠ 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.
- 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**

To avoid personal injury and equipment damage from moving parts, keep fingers and tools clear while stroking the actuator in the following steps.

### **NOTICE**

To avoid damage to the 200R actuator, do not install on a valve assembly that includes a handwheel or manual actuator.

1. Supply a method of supporting the weight of the valve and actuator during assembly.
2. Manually rotate the valve shaft to the loss of signal position.
3. Mount the easy-Drive 200R to the mounting kit designed and supplied by the user.
4. Lift or hoist the actuator and mounting assembly onto the valve and mate the mounting kit securely to the valve following the valve manufacturer's guidelines.
5. Make the shaft connection between the actuator coupler and valve shaft.
  - a. When installing the user-supplied shaft connector the actuator shaft coupler should fully engage the valve shaft by a distance equal to or greater than the diameter of the actuator stem.

## NOTICE

**Be sure that the output shaft adaptor on the actuator and valve shaft are completely engaged. Do not attempt to remove the shaft adaptor when force is applied to the shaft.**

6. Configure the actuator to the appropriate mode using the easy-Drive configurator tool. See Valve Type Configuration section of this manual.
7. Externally adjustable travel stops are used to limit the degree of rotation at both ends of the actuator stroke to calibrate valve to the actuator.
8. Calibrate the actuator. See Calibration Instructions section of this manual.

Figure 2. Fisher easy-Drive 200R

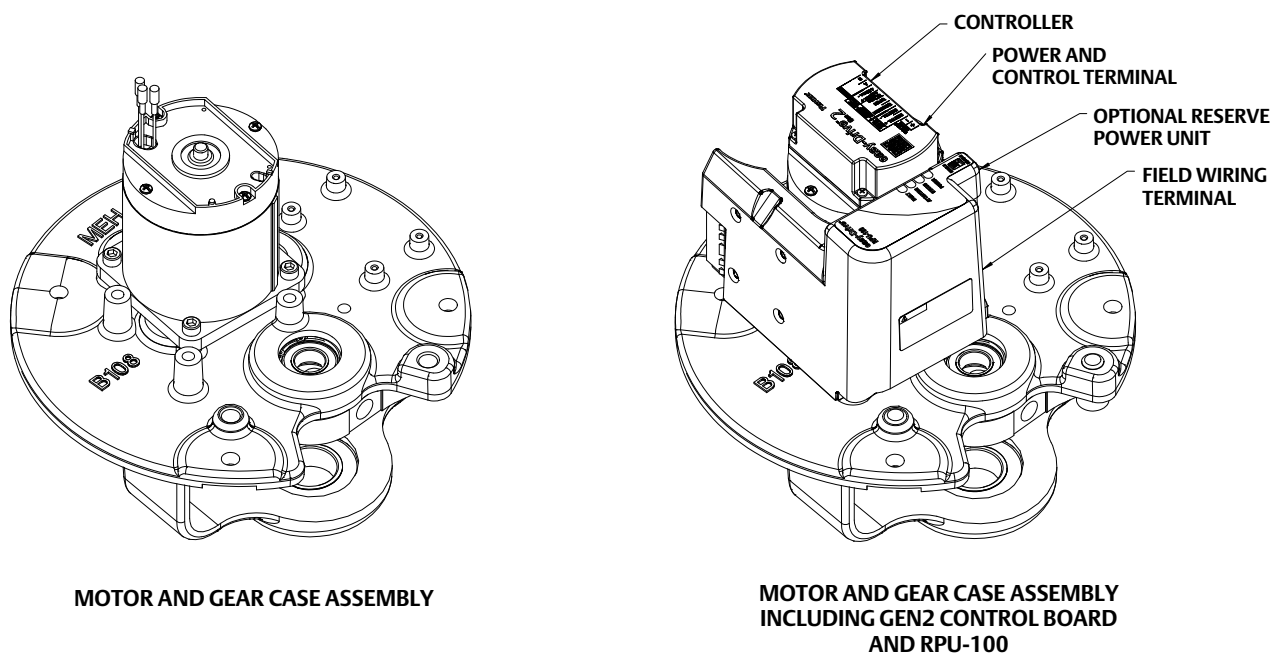
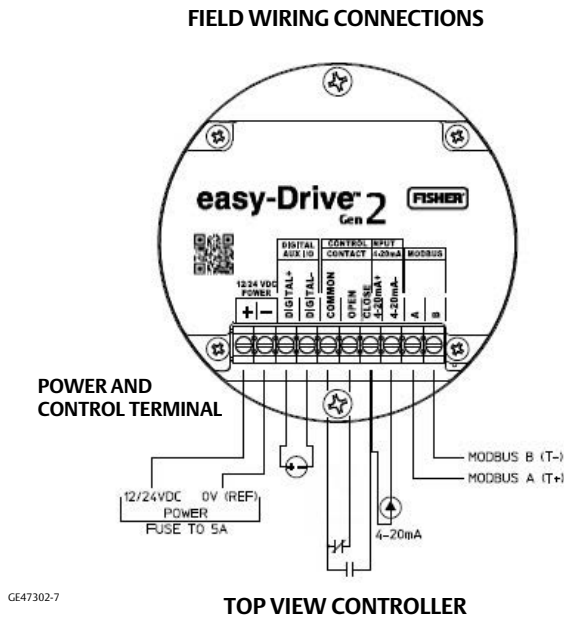


Figure 3. Fisher easy-Drive 200R Wiring Diagram



## Power Requirements

Ensure a stable DC power source is available, maintaining less than 5% ripple and sufficiently surge protected for the application. A 2.7A (minimum) power supply is required, fused to 5A. 12 VDC or 24 VDC is typical.

### **NOTICE**

**Misconfiguration of the valve type when powering the control board could result in damage to the valve or actuator. Ensure proper configuration and decommissioning are performed when installing, removing, or configuring a control board.**

## Wiring Instructions

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

## Power

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

Figure 4. Wiring - Analog Input

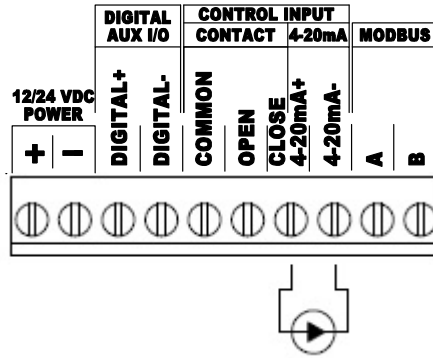


Figure 5. Wiring - Dual Dry Contact

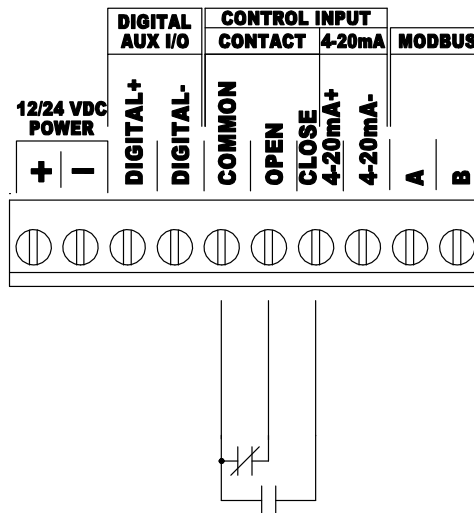




Figure 6. Wiring - Single Dry Contact

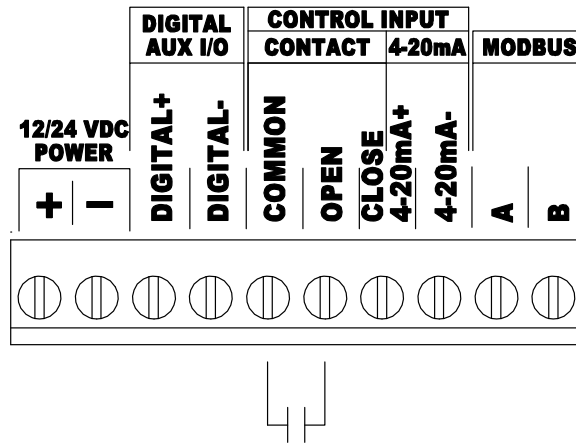


Figure 7. Wiring - Modbus Input

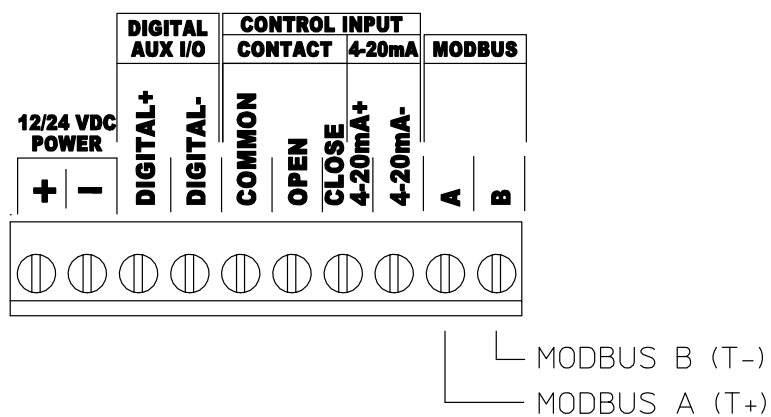


Figure 8. Wiring - Auxiliary Digital I/O set to input (40080=0)

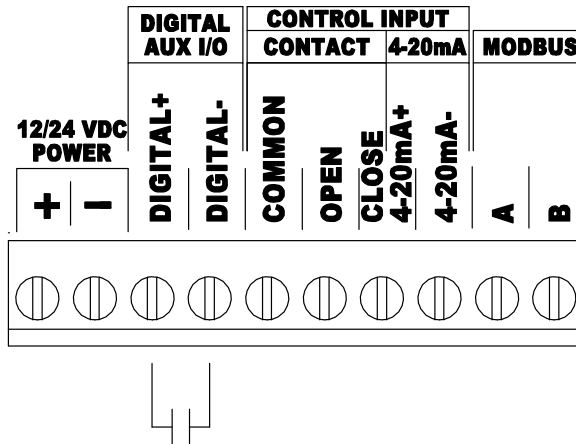
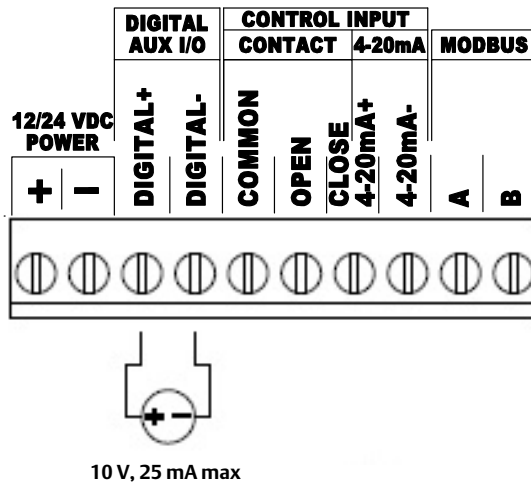


Figure 9. Wiring - Auxiliary Digital I/O set to output



## Configuration

The easy-Drive 200R must be configured prior to operation.

All configuration within the actuator is done by setting values in Modbus registers. Configuration software, providing a visual interface to the registers, is available through your Emerson sales office or at [www.emerson.com/en-us/catalog/fisher-200R](http://www.emerson.com/en-us/catalog/fisher-200R). Control and monitoring can be done using any Modbus master (flow computer, PLC, PC).

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

## Control Method Configuration

There are two functional configurations available for the easy-Drive electric actuator: On/Off and Positioning.

All available input signals are shown in table 4.

Table 4. All Available Input Signals

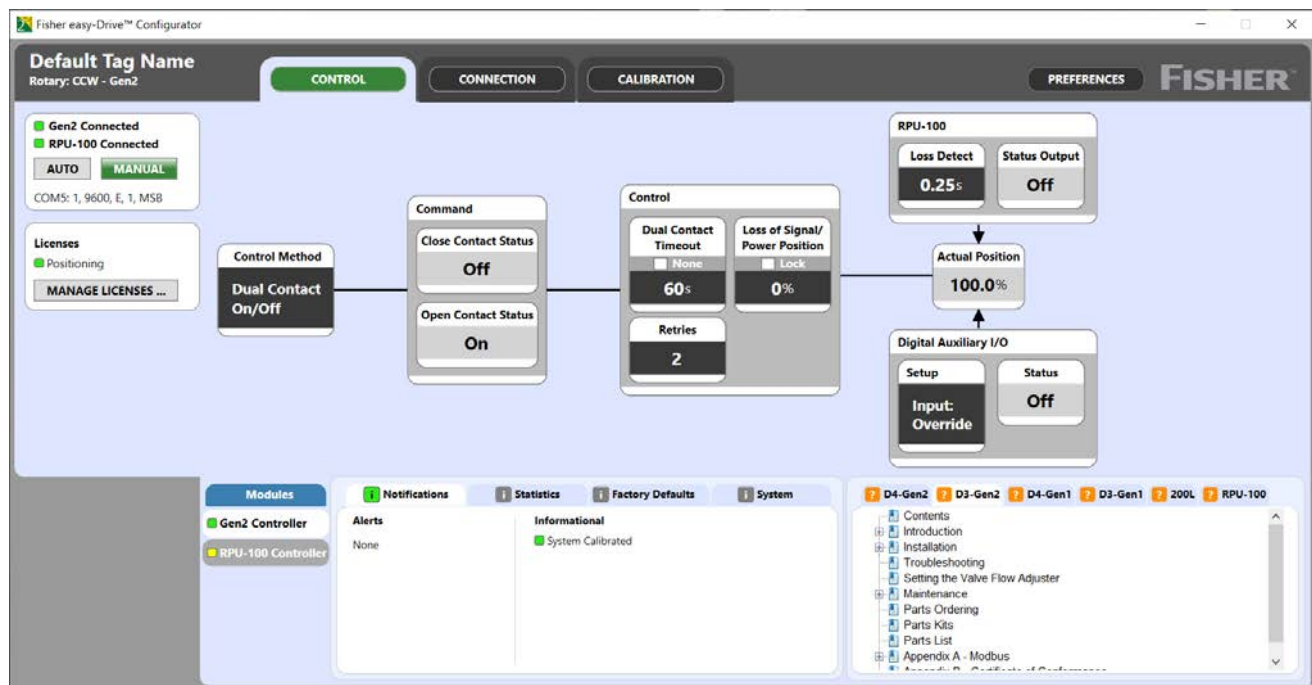
CONFIGURATION	ON/OFF			POSITIONING	
Control Source	Modbus	Local		Modbus	Local
Input Signal	Modbus	Dual Dry Contact (default)	Single Dry Contact	Modbus	4-20 mA (default)

## 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 easy-Drive 200R 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 as required for the application.

Figure 10. Fisher easy-Drive Configuration Software



## Connecting Using the Fisher easy-Drive Configuration Software

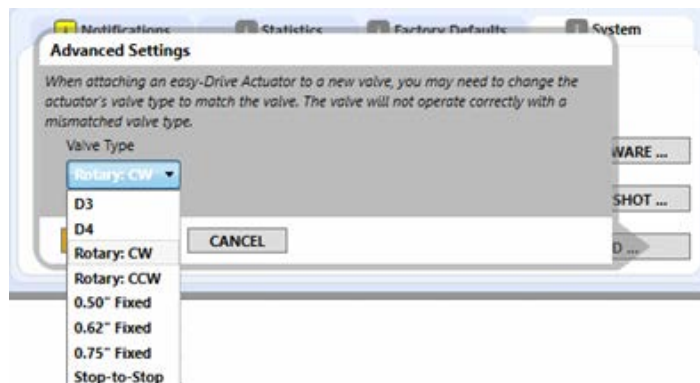
The Fisher easy-Drive Configurator software allows configuration and diagnosing of the Fisher easy-Drive electric actuator with a graphical interface. Connect a PC to the actuator using a serial or USB to RS-485 device using the wiring instructions above. The USB or serial device will be visible in the drop menu under Serial Port in the Manual Computer Connection settings. Address baud rate, parity, stop bits, and byte order should be set to the Modbus settings of the actuator. See Modbus Setup above for default actuator settings. Press the AUTO button in the upper left corner to attempt to scan for and enable from the Preferences in the upper right.

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

## Valve Type Configuration

- Valve Type
  - Rotary: CW (clockwise to close)
  - Rotary: CCW (counterclockwise to close)

Figure 11. Fisher easy-Drive Configuration Software



The easy-Drive 200R limits travel using hard stops that define the full range (max 104° rotation). Adjustable Travel Stops are provided to allow for adjustments to travel to meet the application requirements, and for valve alignment/calibration. See Actuator Mounting Section for more information on configuring the adjustable travel stops.

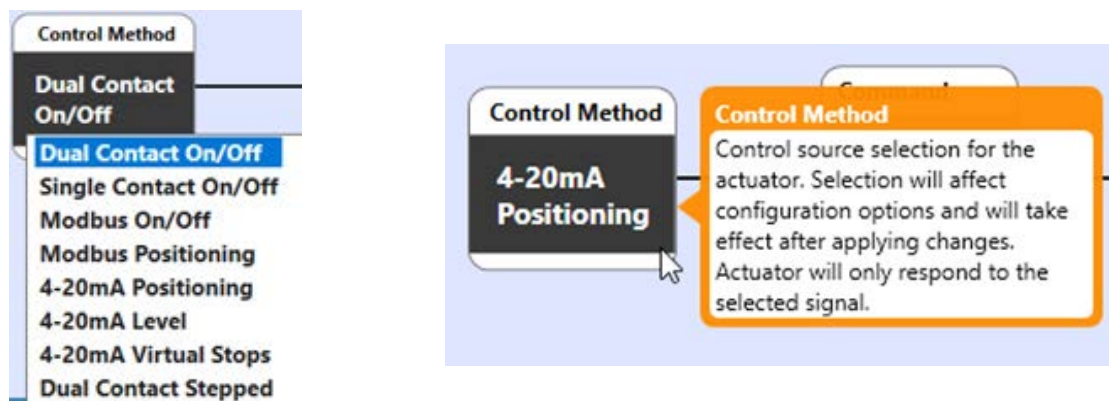
## Initial Setup

The control method selection determines the 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.

- Control Methods
  - Dual Contact On/Off
  - Dual Contact Stepped Control
  - Single Contact On/Off
  - Modbus On/Off
  - Modbus Positioning
  - 4-20mA Positioning
  - 4-20mA Level
  - 4-20mA Virtual Stops

When using the easy-Drive Configuration Tool, clicking on the “Control Method” box will create a drop down menu as shown. Select the desired control source; the selection will turn yellow. A box with Pending Changes will appear showing all changes. Press “APPLY” to confirm the change(s).

Figure 12. Fisher easy-Drive Configuration Software



## Calibration Instructions

### **⚠ WARNING**

To avoid personal injury or property damage, be aware that the valve will move during the calibration cycle.

### **NOTICE**

A mismatch between the Configurator and valve type may cause damage to the actuator.

## Span Calibration

It will be necessary to perform a span calibration. A span calibration is accomplished by the following method:

---

### Note

If the actuator is equipped with a RPU-100, the RPU-100 must be disabled via the Disable switch prior to powering off the actuator.

---

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.

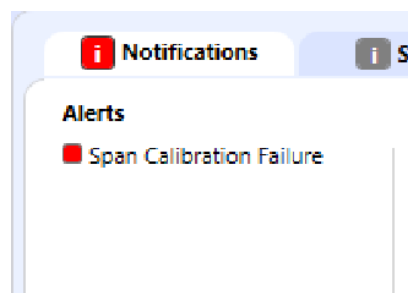
---

### Note

Should actual travel not equal the expected travel you will receive a span calibration failure alert. See figure 13. Ensure valve type is selected correctly. It may be necessary to re-couple the valve actuator assembly.

---

Figure 13. Fisher easy-Drive Configuration Software



---

## Span Calibration without the use of Modbus

1. Turn power to the actuator off.
2. Wait for 10 seconds to ensure all circuits have discharged.
3. 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.
4. For positioning operation using direct acting 4-20 mA:
  - a. Apply a fully closed signal between pins 4-20 mA - and 4-20 mA +. If Span is currently uncalibrated, valve ball/disk will not move at this time.
  - b. Apply a fully open signal between pins 4-20 mA - and 4-20 mA +. If Span is currently uncalibrated, valve ball/disk will not move at this time.
  - c. Apply a fully closed signal between pins 4-20 mA - and 4-20 mA + – valve ball/disk will move its fully opened position, followed by moving to its closed position.
  - d. If calibration of the analog input is desired to improve positional accuracy, an optional operation is listed in the next section titled Analog Input Calibration.

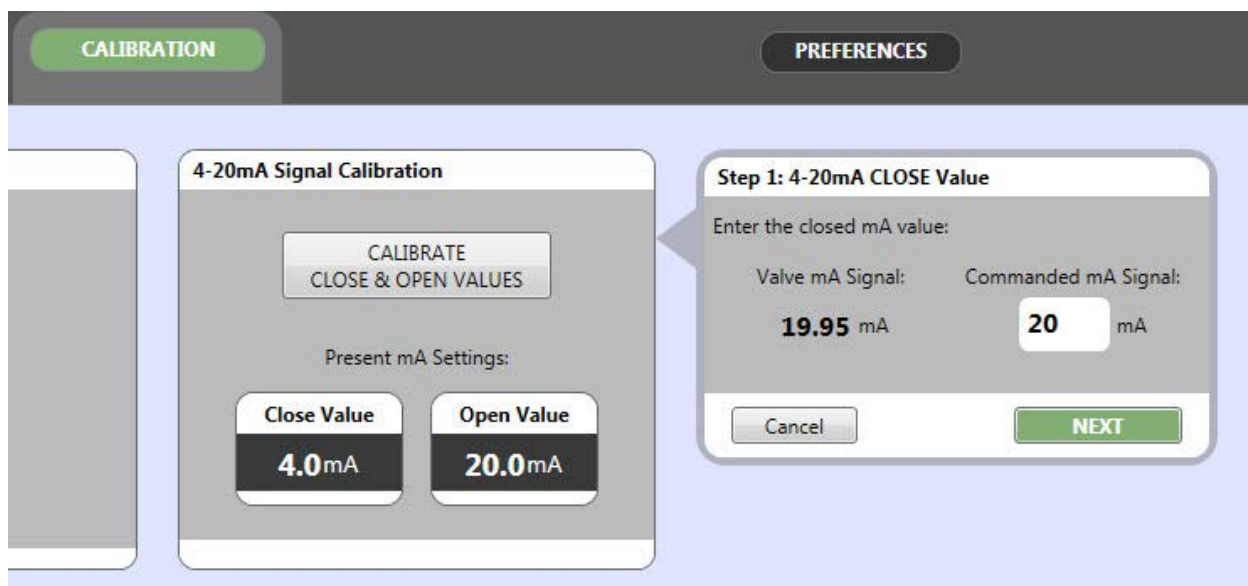
5. For On/Off operation using dual-input dry contact:
  - a. Close the contact to create a short between pins COMMON and CLOSE. If Span is currently uncalibrated, valve ball/disk will not move at this time.
  - b. Close the contact to create a short between pins COMMON and OPEN. If Span is currently uncalibrated, valve ball/disk will not move at this time.
  - c. Close the contact to create a short between pins COMMON and CLOSE – valve ball/disk will move to its fully opened position, followed after a delay by moving to its 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 ball/disk 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 ball/disk 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 its fully opened position, followed after a delay by moving to its closed position.
7. The unit is now calibrated.

### Analog Input Calibration

For valves using 4-20 mA as a control source, several options are available to customize control of the actuator. Use a 4-20 mA signal generator to provide the desired signal. It is possible to calibrate the 4-20 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.

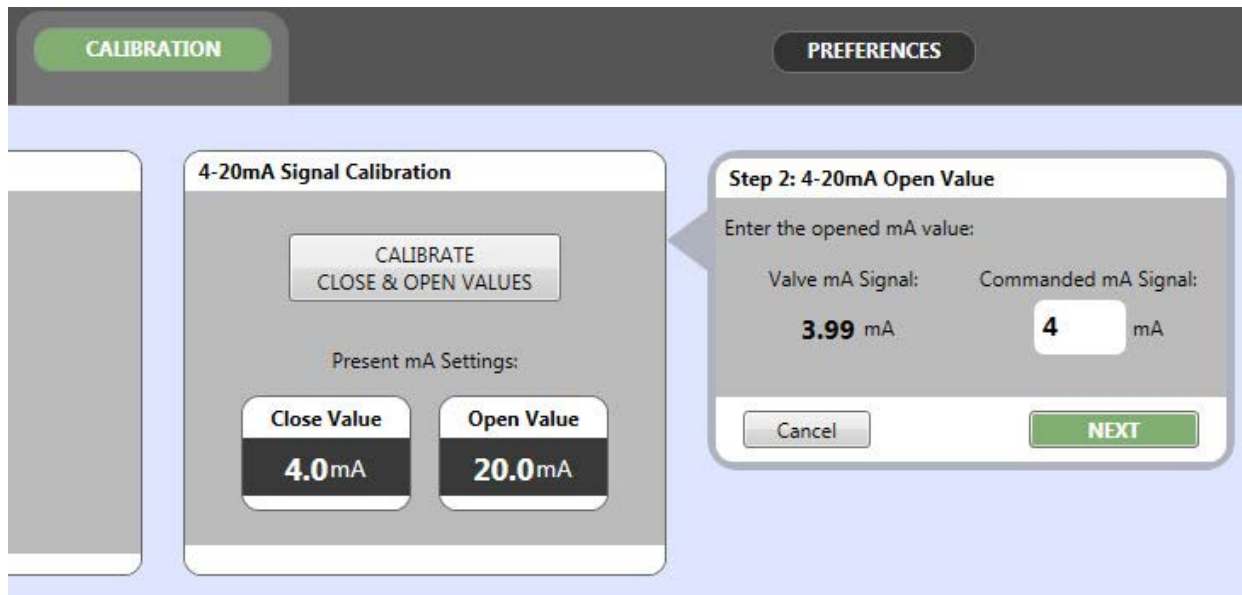
1. With the Control Method set to 4-20 Positioning or 4-20 mA Level, enter the Calibration screen and the 4-20 mA Signal Calibration window will be visible.
2. Click the CALIBRATE CLOSE & OPEN VALUES button. A separate window will open to guide through the process.
3. Set the 4-20 mA signal to the desired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

Figure 14. Fisher easy-Drive Configuration Software



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

Figure 15. Fisher easy-Drive Configuration Software



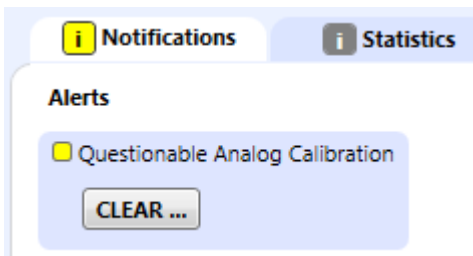
7. If the Close and Open values are as expected, press Confirm to accept these values. If not, press Cancel to restart the process.

**Note**

The value of the 4-20 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 4-20 mA values; the actuator will accept the calibration and a Notification displaying “Questionable Analog Calibration” will result.

Figure 16. Fisher easy-Drive Configuration Software





## Operational Verification

### **⚠ WARNING**

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

1. Before turning on power to the unit, be sure that a closed signal is being commanded to the unit.
  - Single Dry-Contact: contact is open.
  - 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.
  - Single Dry-Contact:
    - Closed contact between pins COMMON and OPEN will open the valve.
    - Dual dry contact: 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 of this instruction manual.
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 10 bolts to 40.7 N•m (30 ft•lbs).

## Troubleshooting

1. Unit does not move.
  - a. Green heartbeat LED will pulse near Modbus terminals when power is present. Verify the 12VDC to 24VDC is present on the power terminals as shown on the cover.
  - b. Verify all wires are firmly attached on both ends, screw terminals are fully screwed down and wire gauge is sufficient for length of wiring.
  - c. Verify the wires are connected to the correct terminals - see Wiring in the manual.
  - d. Verify the configured control method matches control signal.
  - e. Verify the configured valve type matches the mounted valve.

2. Unit does not respond to 4-20 mA signal
  - a. Green heartbeat LED will pulse near Modbus terminals when power is present. Verify the 12VDC to 24VDC is present on the power terminals as shown on the cover.
  - b. Verify all wires are firmly attached on both ends.
  - c. Verify the wires are connected to the correct terminals - see Wiring in the manual.
  - d. Verify the configured control method matches control signal.
  - e. Check the analog input control value. If the value is 0, the 4-20 mA may be wired backwards. Swap wire and attempt again.
3. Unit does not respond to Modbus signal.
  - a. Green heartbeat LED will pulse near Modbus terminals when power is present. Verify the 12VDC to 24VDC is present on the power terminals as shown on the cover.
  - b. Verify all wires are firmly attached on both ends.
  - c. Verify the wires are connected to the correct terminals. See Wiring section of this instruction manual.
  - d. Verify the configured control method matches control signal.
  - e. Verify multiple Modbus devices are not using the same Modbus address.
4. Unit does not communicate with easy-Drive Configurator software.
  - a. Ensure appropriate drivers are installed for RS-485 modem.
  - b. Verify multiple Modbus devices are not using the same Modbus address.
  - c. Ensure RS-45 modem is functional and compatible.
5. Diagnostics show a Motor Stall - Travel Deviation Fault.
  - a. If the actuator can not 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 40053), it will attempt to move again.

## Maintenance

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.
- Back plug away from seat to relieve spring compression.
- Use lock-out procedures to be sure that the above measures stay in effect while you work on the equipment.
- 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.

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.

## Disassembly

1. Follow valve manufacturer's warnings and instructions for isolating and releasing line pressure prior to disassembling the valve.

**NOTICE**

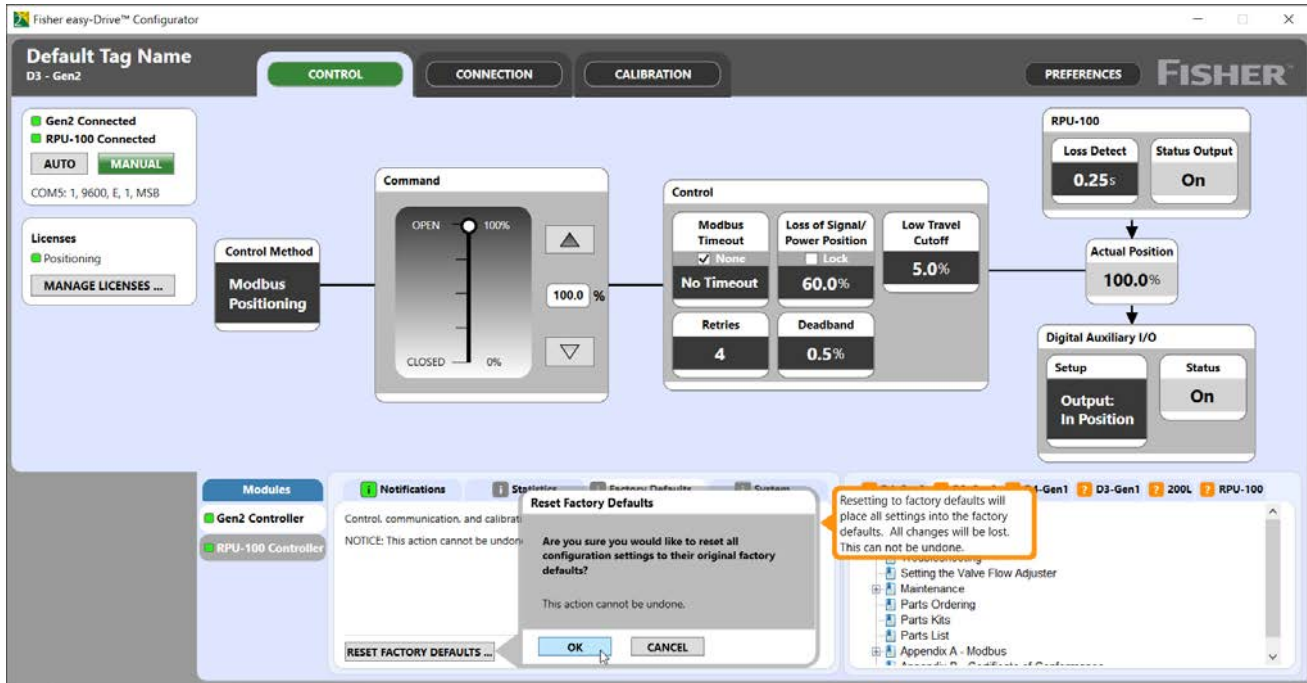
The following steps are intended to prevent damage to the valve during the removal of the yoke and actuator.

**Note**

If the actuator is equipped with a RPU-100, the RPU-100 must be disabled via the Disable switch prior to powering off the actuator.

2. Remove any positioning licenses to a license dongle if you wish to use them on a different device.
3. Perform a Restore to Defaults operation on the control board if the control board is to be used on a different actuator.

Figure 17. Fisher easy-Drive Configuration Defaults

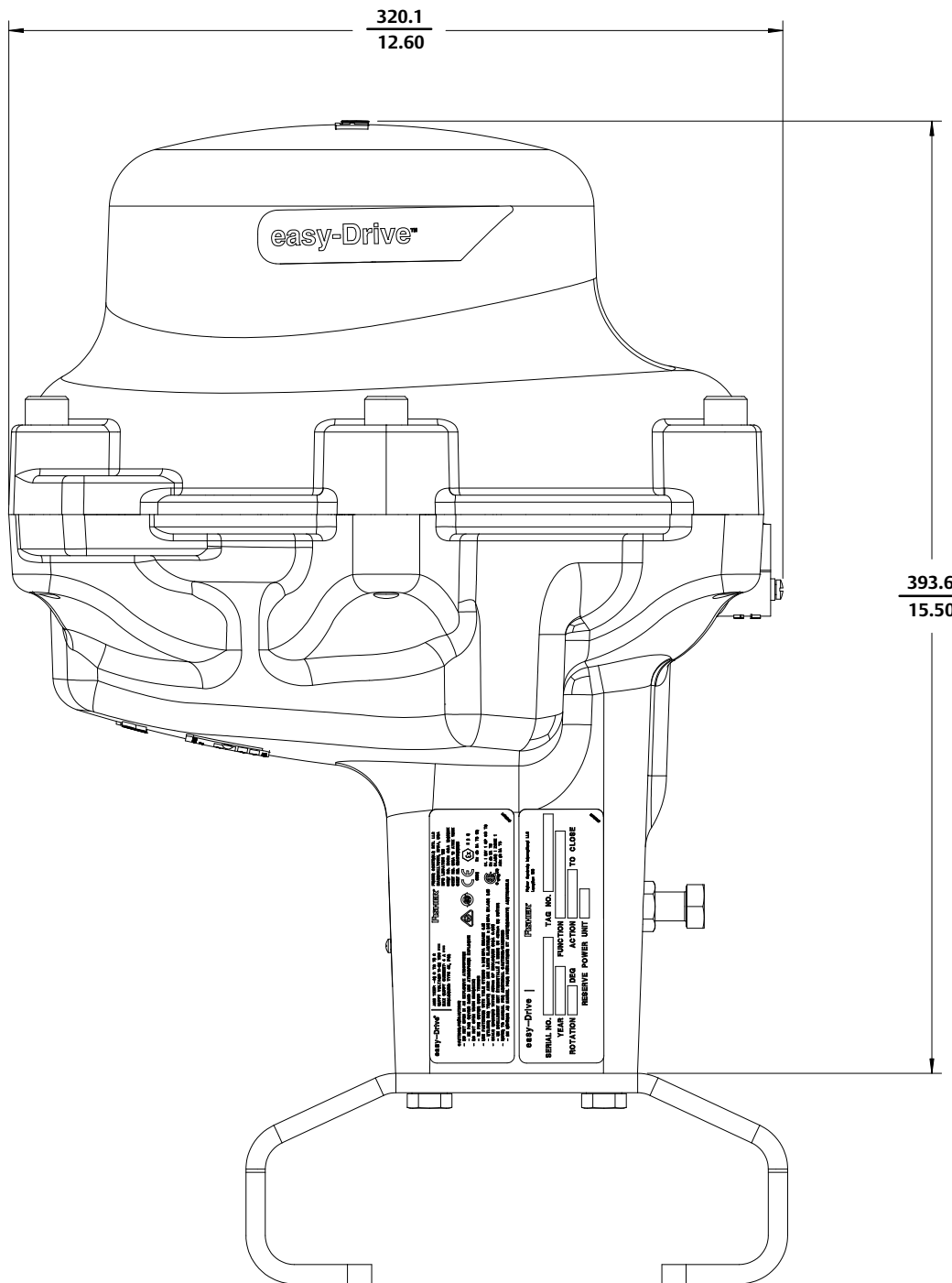


4. Remove actuator and mounting kit from the valve body.

## Assembly

1. Connect actuator and mounting bracket to valve body.
2. Replace the top of the explosion proof enclosure (key 3) and tighten cap screws (key 32) to 40.7 N • m (30 lbf • ft).

Figure 18. Fisher easy-Drive 200R Actuator Dimensions



mm  
inch

CE69539

## Parts Ordering

Each easy-Drive 200R actuator 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 actuator, because they may void your warranty, might adversely affect the performance of the actuator, and could cause personal injury and property damage.**

## Parts Kits

KIT NAME	PART NUMBER
Board Replacement Kit (On/Off is default)	GE83055X012
Board Replacement Kit + Positioning License Dongle	GE83126X012
Motor/Gearbox Assembly	GE84237X012
Positioning License Dongle (1 License)	GE83574X012
Positioning License Dongle (5 License)	GE83574X022

## Parts List

**Note**  
Contact your Emerson sales office for part ordering information.

Key	Description
1	Motor Gear Box Assembly
2	Lower Enclosure
3	Upper Enclosure
4	Output Shaft O-ring
5	Output Shaft Assembly
6	Output Shaft Adapter
7	Output Shaft Bearing
8	Output Shaft Upper Snap Ring
11	Taper Key

Key	Description
12	Taper Key Washer
13	Taper Key Bolt
14	Ground Screw
15	Internal Travel Stop
16	Dowel Pin
21	Enclosure O-ring
22	Bolt Retainer
23	Adjustable Travel Stop
24	Travel Stop Jam Nut
25	Nameplate
31	Drive Screw
32	Bolt Enclosure
33	Travel Scale and Cover Screw
34	Travel Scale Cover
35	Travel Scale
36	easy-Drive Label
37	Output Shaft Adapter Bolt
71	HiPot Label
72	Gen2 Board

Figure 19. Fisher easy-Drive 200R Exploded View

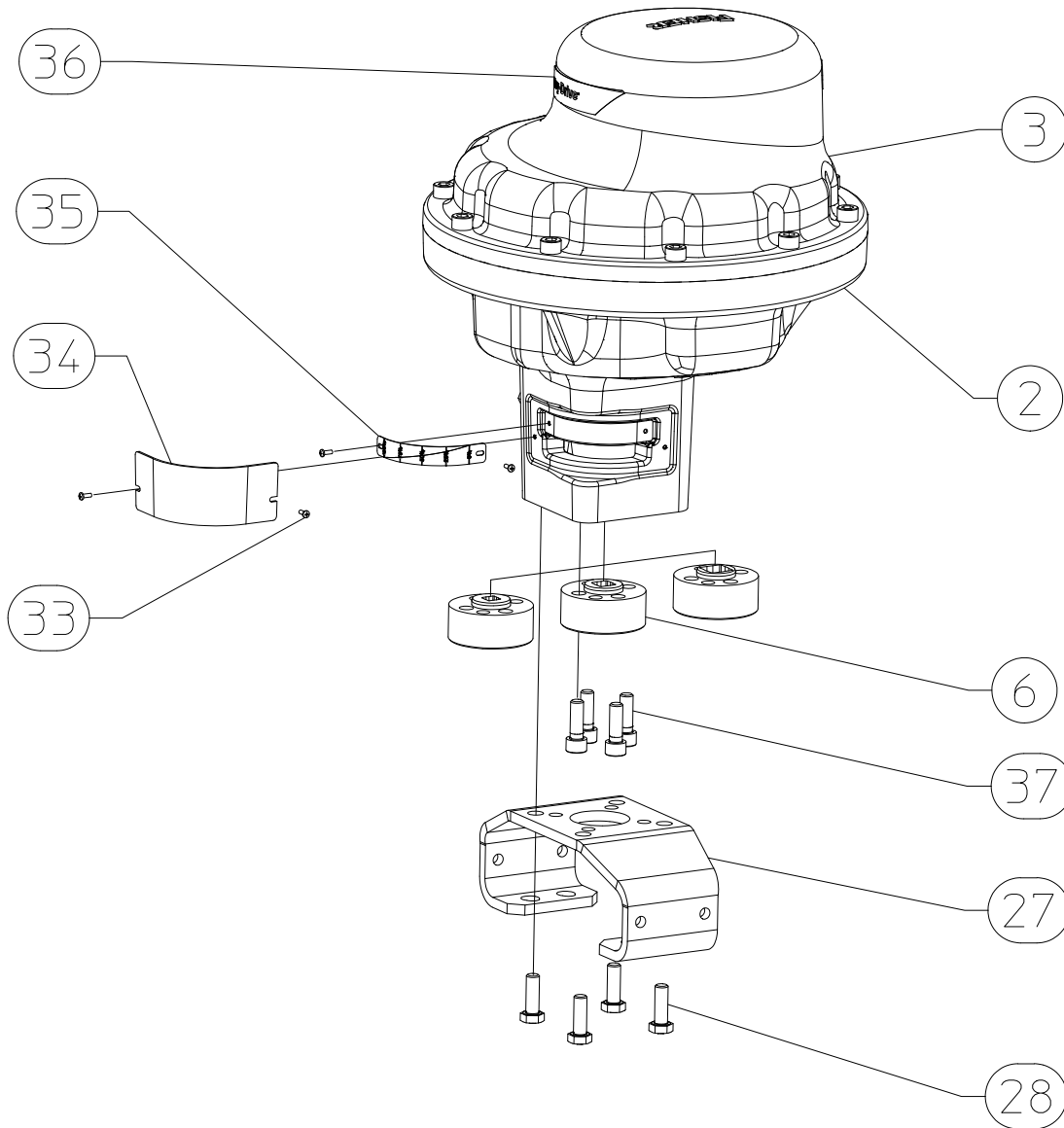
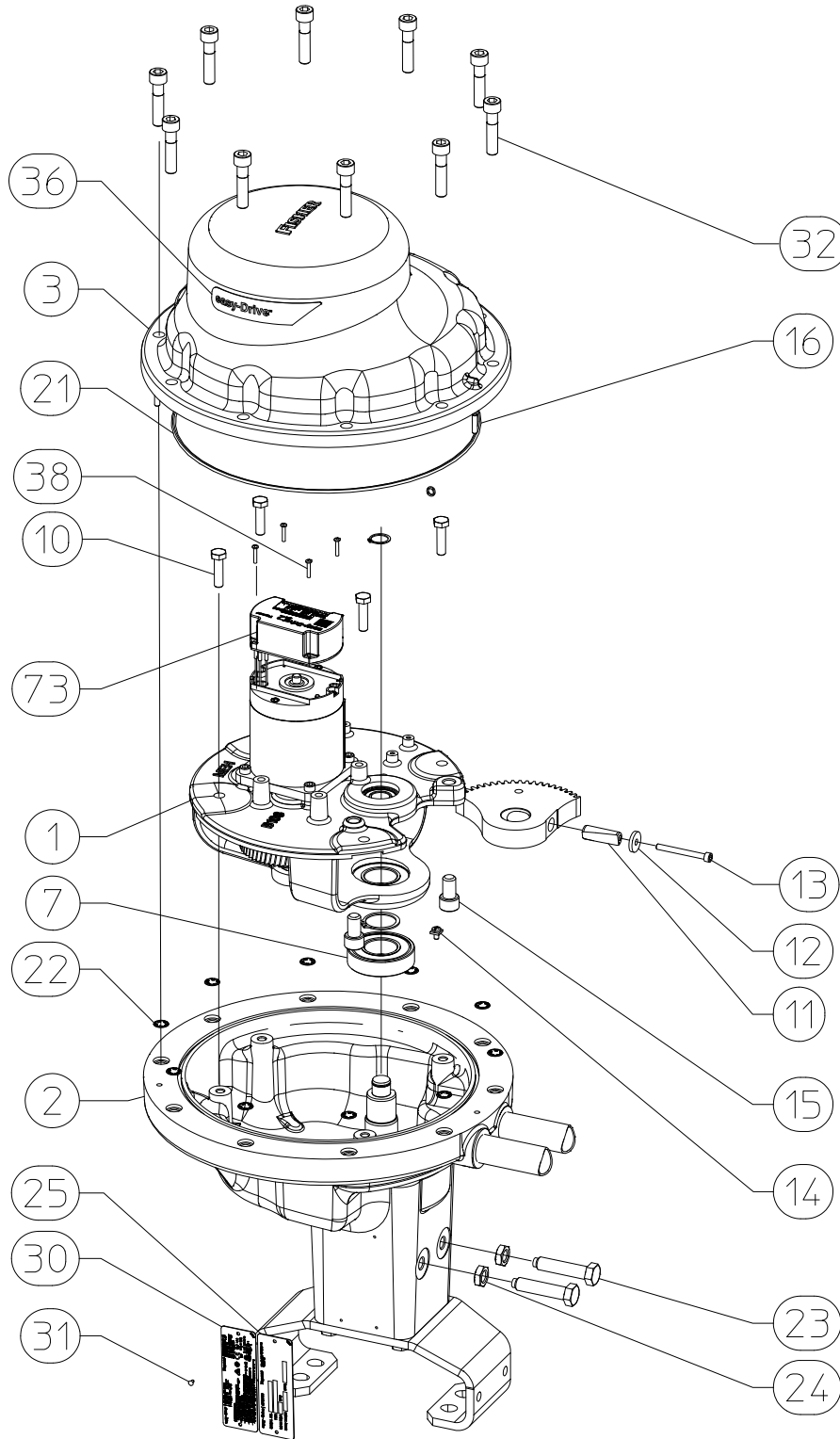


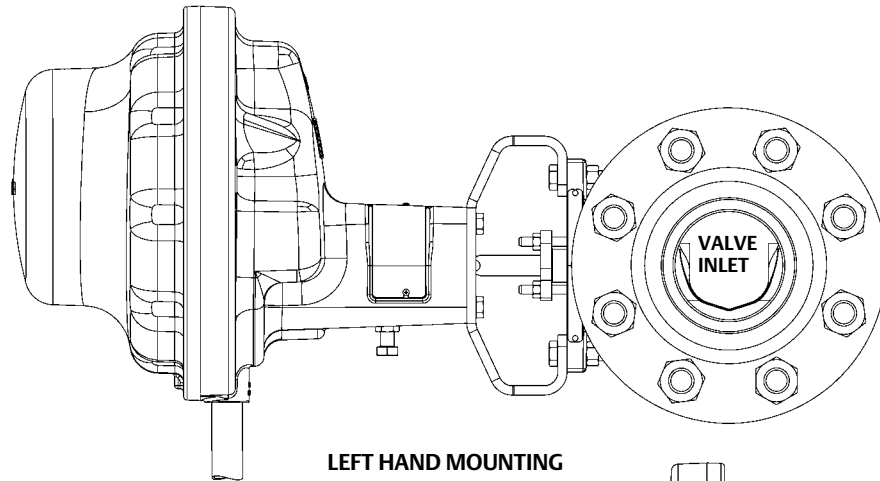
Figure 20. Fisher easy-Drive 200R Actuator Exploded View



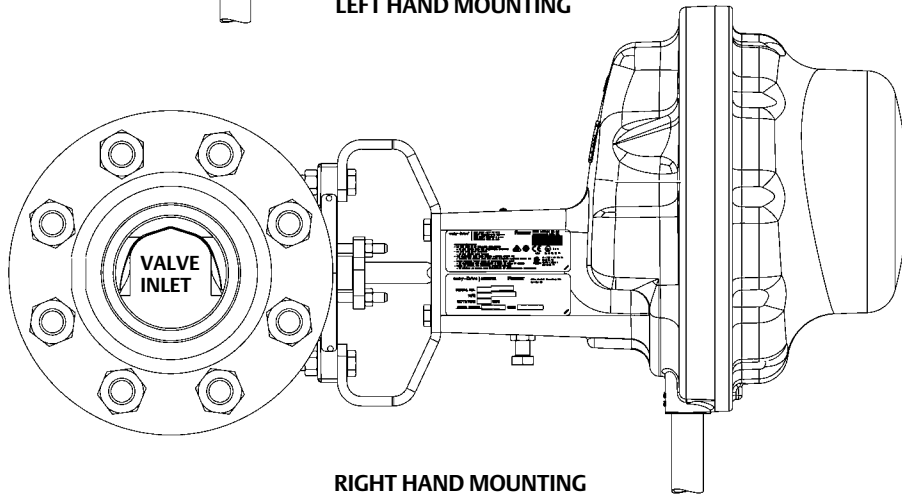
CE69539



Figure 21. Fisher easy-Drive 200R Mounting Positions

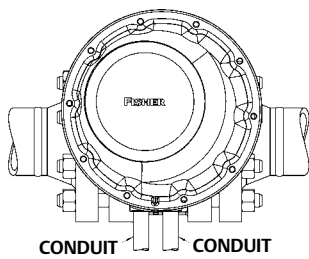


LEFT HAND MOUNTING

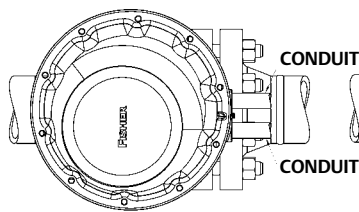


RIGHT HAND MOUNTING

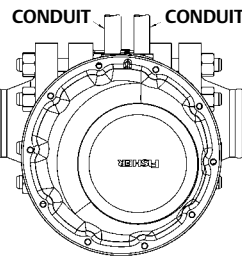
POSITION 1  
(PREFERRED)



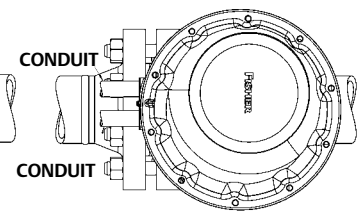
POSITION 2



POSITION 3



POSITION 4



CE69652\_B

## Actuator Mounting Configuration (Figure 21)

Position 1 is preferred for both right or left hand mounted options. This has the conduit ports facing down below the centerline of the valve body, and the 210.1 mm (8.72 in) dimension of the actuator above the centerline of the valve, in either configuration. A vertical mounted orientation may be used if desired but may not be recommended for the trim wear of the intended valve assembly.

---

### Note

Refer to the Instruction manual of the valve body to determine which position the valve can be oriented for optimal performance and life of trim parts.

---

## Appendix A - Modbus

### A.1 Register Summary

Table 5. easy-Drive 200R Modbus Map

Type <sup>(1)</sup>	Name	MB Register	Default	R/W	Values	Notes
uint16	Modbus position command (100=10.0%)	40001	0	R/W	0-1000	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 0-499 will result in a move to 0% and 500-1000 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	0-1000	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	0-1000	Present position command of the actuator relative to span (1000=100.0%). Valid for all control modes.
uint16	Diagnostic Flags	40012	0	R	0-65535	Bit flags - see Table 6
uint16	Digital status	40013	0	R	0 - 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	4,294,967,296	Total number of minutes the actuator has been powered on since time has been reset
uint32	Total Open Time (min)	40016, 40017	0	R	4,294,967,296	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	4,294,967,296	Total number of minutes the actuator has been at 0% of travel since time has been reset
uint32	Number of Closed (Cycle count)	40020, 40021	0	R	4,294,967,296	Total number of close cycles the actuator has performed. One open/close cycle counts as 1.
uint32	Number of Power Cycles	40022, 40023	0	R	4,294,967,296	Total number of times the actuator has been powered on.
uint32	Number of Movements	40024, 40025	0	R	4,294,967,296	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	0-2400	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	0-350	Diagnostic register - value of incoming voltage with 1 implied decimal. Future plans are to have this available in a historian type register.
uint16	Latch Open State	40028	0	R	0 - 1	Normally open latch state
uint16	Latch Close State	40029	0	R	0 - 1	Normally closed latch state
uint16	Dual Contact Stepped Status	40030		R	0-10	Current status of Dual Contact Stepped Control. 0=Closed, 1=At first position, 2=At second position, 3=At third position, 4-7=RESERVED, 8=Override close, 9=Override open, 10=At Loss of Signal/Power Position

-continued-

Table 5. easy-Drive 200R Modbus Map (cont.)

Type	Name	MB Register	Default	R/W	Values	Notes
uint16	Dual Contact Stepped Remaining Time	40031	0	R	0-60001	The time remaining in seconds at the current Dual Contact Stepped Position. If time is 60001, this position will be held until dual contact is closed.
uint16	RESERVED	40032	0			
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				
uint16	RESERVED	40046				
uint16	RESERVED	40047				
uint16	RESERVED	40048				
uint16	RESERVED	40049				
uint16	Loss of signal position (100=10.0%)	40050	0	R/W	0-1001	Position to which valve plug will be driven upon loss of signal. Loss of signal is based upon the active control mode. 0-1000=0-100.0% with 1 implied decimal point. In on/off mode 0-499 will result in movement to 0% while 500-1000 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	0-65535	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	0-3600	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	0-250	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	0-999	Analog input command below this value will result in the valve plug moving to the closed position. Always active in Modbus and 4-20mA Positioning control modes, active in 4-20mA Virtual Stop Positioning if Lower Virtual Hard Stop is disabled (0).

-continued-

Table 5. easy-Drive 200R Modbus Map (cont.)

Type	Name	MB Register	Default	R/W	Values	Notes
uint16	4-20mA level close position	40055	400	R/W	0-999	When the valve is in 4-20mA level mode, this value is the point at which the valve will close. It must be set to a smaller value than the 4-20mA level open position.
uint16	4-20mA level open position	40056	500	R/W	1-1000	When the valve is in 4-20mA level mode, this value is the point at which the valve will open. It must be set to a larger value than the 4-20mA level close position.
uint16	Analog Close Value	40057	40	R	31 - 220	The analog value that defines the closed position
uint16	Analog Open Value	40058	200	R	31 - 220	The analog value that defines the open position
uint16	Number of retries	40059	4	R/W	0-4	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	Upper Virtual Hard Stop (100=10.0%)	40060	1000	R/W	1-1000	When the valve is in 4-20mA Virtual Stop control mode, it will not travel above this point.
uint16	Lower Virtual Hard Stop (100=10.0%)	40061	0	R/W	0-999	When the valve is in 4-20mA Virtual Stop control mode, it will not travel below this point.
uint16	4-20mA level max position	40062	1000	R/W	1-1000	When the valve is in 4-20mA level mode, it will not travel above this point. Must be greater than or equal to 4-20mA level open value.
uint16	RESERVED	40063				
uint16	RESERVED	40064				
uint16	RESERVED	40065				
uint16	RESERVED	40066				
uint16	Control Method	40067	2	R/W	0 - 7	0=Dual Contact On/Off 1=Single Contact On/Off, 2=Modbus On/Off, 3=Modbus Positioning, 4=4-20 Positioning, 5=4-20 Level, 6=4-20 Virtual Stop Positioning, 7=Dual Contact Stepped Positioning
uint16	Valve Type	40068	1	R/W	1 - 10	0=Dual Contact On/Off 1=Single Contact On/Off, 2=Modbus On/Off, 3=Modbus Positioning, 4=4-20mA Positioning, 5=4-20mA Level, 6=4-20 Virtual Stop Positioning, 7=Dual Contact Stepped Positioning
uint16	CW or CCW Close	40069	1	R/W	0,1	Only used on rotary valves. 0=Rotate clockwise to close. 1=Rotate Counter-clockwise to close
uint16	RESERVED	40070				
uint16	RESERVED	40071				
uint16	RESERVED	40072				
uint16	RESERVED	40073				
uint16	Modbus address	40074	1	R/W	1-247	Slave address of the actuator
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	1,2	1 will be the standard with even and odd parity while 2 is the standard for none.
uint16	MSB/LSB	40078	0	R/W	0,1	0=MSB, 1=LSB
uint16	RESERVED	40079				
uint16	Digital I/O selection	40080	1	R/W	0,1	0=9V sinking digital input, 1=200mA 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)

-continued-

Table 5. easy-Drive 200R Modbus Map (cont.)

Type	Name	MB Register	Default	R/W	Values	Notes
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	Dual Contact Stepped Position 1	40083	1000	R/W	0-1001	When dual contact is Open, the actuator will first move to this position. It will remain at this position for the number of seconds specified in Dual Contact Stepped Time at Position 1, or until dual contact is closed. If Position is 1001, this position is disabled and the next position will be considered.
uint16	Dual Contact Stepped Position 2	40084	1001	R/W	0-1001	When dual contact is Open, the actuator will move to this position following position 1. It will remain at this position for the number of seconds specified in Dual Contact Stepped Time at Position 2, or until dual contact is closed. If Position is 1001, this position is disabled and the next position will be considered.
uint16	Dual Contact Stepped Position 3	40085	1001	R/W	0-1001	When dual contact is Open, the actuator will move to this position following position 2. It will remain at this position until dual contact is closed. If Position is 1001, this position is disabled and the actuator will close upon reaching this position.
uint16	Dual Contact Stepped Time at Position 1	40086	6001	R/W	1-60001	The time in seconds to remain at Dual Contact Stepped Position 1 before moving to Dual Contact Stepped Position 2. If time is 60001, this position will be held until dual contact is closed.
uint16	Dual Contact Stepped Time at Position 2	40087	6001	R/W	1-60001	The time in seconds to remain at Dual Contact Stepped Position 2 before moving to Dual Contact Stepped Position 3. If time is 60001, this position will be held until dual contact is closed.
uint16	Dual Contact Stepped Override	40088	0	R/W	0-2	If configured to a non-zero value (Off), the actuator will move to the position specified regardless of the Dual Contact Stepped Control Status. Options are 0=Off, 1=Close, 2=Open. This does not take precedence over loss of signal/power positioning.
uint16	RESERVED	40089				
uint16	RESERVED	40090				
uint16	RESERVED	40091				
uint16	RESERVED	40092				
uint16	RESERVED	40093				
uc10	Device Tag	40094 - 40113	"Default Tag Name"	R/W	0 - 255 per character	Device Tag (10 character UTF8 string)
uint32	Valve serial number	40114, 40115	0	R/W*	0-4,294,967,296	Valve assembly serial number assigned at Fisher assembly plant
uint32	Motor serial number	40116, 40117	0	R/W*	0-4,294,967,296	Motor/gearbox serial number assigned by Nidec
uint32	Motor revision	40118, 40119	0	R/W*	0-4,294,967,296	Motor/gearbox revision assigned by Nidec
uint32	PCB serial number	40120, 40121	0	R/W*	0-4,294,967,296	PCB serial number
uint32	PCB revision	40122, 40123	0	R/W*	0-4,294,967,296	PCB revision
uint16	Flash Firmware major revision	40124	0	R	0-65535	From flash firmware when compiled
uint16	Flash Firmware minor revision	40125	0	R	0-65535	From flash firmware when compiled
uint16	Flash Firmware mod revision	40126	0	R	0-65535	From flash firmware when compiled
uint16	Flash Firmware build revision	40127	0	R	0-65535	From flash firmware when compiled
uint16	Boot Firmware major revision	40128	0	R	0-65535	From boot firmware when compiled
uint16	Boot Firmware minor revision	40129	0	R	0-65535	From boot firmware when compiled
uint16	Boot Firmware mod revision	40130	0	R	0-65535	From boot firmware when compiled
uint16	Boot Firmware build revision	40131	0	R	0-65535	From boot firmware when compiled
uint32	PCB test date	40132, 40133	0	R/W*	0-4,294,967,296	Seconds since January 1, 2000, Board Supplier Functional Test Date

Table 5. easy-Drive 200R Modbus Map (cont.)

Type	Name	MB Register	Default	R/W	Values	Notes
uint32	Motor test date	40134, 40135	0	R/W*	0-4,294,967,296	Seconds since January 1, 2000, Motor Supplier Test Date
uint32	System completion date	40136, 40137	0	R/W*	0-4,294,967,296	Seconds since January 1, 2000, Final Assembly Test Date

1. uint is defined as unsigned integer  
 uint16 – unsigned 16 bit variable, can take value 0-65535.  
 uint32 – unsigned 32 bit variable, can take value 0-4294967295.




(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 6. 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 <a href="#">Emerson sales office</a> .
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	4-20 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

	
<h3>EU Declaration of Conformity</h3>	
We, the manufacturer,	
<b>Emerson</b> <b>Fisher Controls International LLC</b> <b>205 South Center Street</b> <b>Marshalltown, Iowa 50158 USA</b>	
declare under our sole responsibility that the following product(s);	
<b>Electric Actuator</b> <b>easy-Drive 200R</b>	
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.	
	
_____ <b>Michael Gotlieb</b> Vice President-Sliding Stem Valve Business Unit Marshalltown, Iowa 50158	
_____ <b>10/23/2023</b> Date	
<b>European Contact</b> Emerson   Group Services SAS   Rue Paul-Baudry   B.P. 10150   68701 Cernay Cedex France	
EDOCS ID: FCS_91	Page 1 of 2

-continued-



## Appendix B - Certificate of Conformance (cont.)

### **EMC Directive – 2014/30/EU**

Models: All  
EN 61326-1:2013

### **RoHS Directive – 2011/65/EU**

Declaration of Exclusion

Models: All

The above equipment is excluded from the scope of this directive per Article 2, Paragraph 4, part C. 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 – **CSANe 21ATEX1000X – Group II Category 2 G** – Flameproof  
easy-Drive 200R  
Ex db IIB T6(Ta ≤ 70°C) Gb  
Standards used: EN60079-0:2018, 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





Neither Emerson, nor any of their affiliated entities assumes responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use, and maintenance of any product remains solely with the purchaser and end user.

Fisher and easy-Drive are marks owned by one of the companies in the Emerson business unit of Emerson Electric Co. Emerson and the Emerson logo are trademarks and service marks of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available upon request. We reserve the right to modify or improve the designs or specifications of such products at any time without notice.

**Emerson**

Marshalltown, Iowa 50158 USA

Sorocaba, 18087 Brazil

Cernay, 68700 France

Dubai, United Arab Emirates

Singapore 128461 Singapore

[www.Fisher.com](http://www.Fisher.com)

---

