Replacement of Fisher™ 667 Sizes 30-76 Diaphragm Actuators with Sizes 30i-76i Diaphragm Actuators

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Management of Change

Management of Change (MOC) is a procedure used to proactively manage changes that have the potential to impact safety or the process within a plant. Evaluating new techniques for improving MOC approval procedures can have an impact on plant efficiency. Historically, upgrading obsolete products or replacing existing process control equipment had been delayed or abandoned due to the extensive paperwork involved in completing a complex MOC approval sheet.

Background

The Fisher 667 spring-opposed diaphragm actuator positions the valve plug in response to varying controller or valve positioner pneumatic output signals applied to the actuator diaphragm. The 667 actuator is reverse-acting and is designed to provide dependable on/off or throttling operation of automatic control valves.

The 667 size i spring-opposed diaphragm actuator features an updated yoke design to increase reliability and reduce complexity, and incorporates an integrated mounting for Fisher FIELDVUE™ instruments. An internal air passage feature eliminates the requirement for traditional external instrument tubing and fittings when paired with a FIELDVUE DVC2000 or DVC6200 digital valve controller.

Question & Answer Checklist

1 **Q:** Does the proposed modification cause any changes to the piping and instrumentation diagram (P&ID)?

A: No.

2 **Q:** Does the proposed modification change process chemistry, technology, or operating and control philosophies?

A: No.

3 **Q:** Does the proposed modification change how the existing plant is operated?

A: No.

4 **Q:** Does the proposed modification change process flows?

A: No.

5 **Q:** Does the proposed modification change existing pressure relief cases?

A: No.

6 **Q:** Does the proposed modification change the process description?

A: No.

7 **Q:** Have the codes and standards to which the new equipment was designed changed?

A: No. However, they may have been updated since installation.

8 **Q:** Does the proposed modification change the materials of construction, such as a change in material form (cast, forged, or alloy)?

A: No.

9 **Q:** Does the proposed modification introduce new equipment items that require periodic predictive maintenance?

A: No. These equipment items will require the same periodic predictive maintenance.

10 **Q:** Does the proposed modification change existing operator training requirements?

A: No.

11 **Q:** Does the proposed modification introduce new equipment items that require spare parts, training manuals, maintenance procedures or training to teach the maintenance department how to maintain them?

A: Yes. Emerson local business partners and sales offices offer local training and support to help ensure operators, maintenance personnel, and instrument technicians are trained on the 667 sizes 30i through 76i actuators.

12 **Q:** Does the proposed modification introduce new equipment items that require spares or obsolete spares for existing equipment?

A: No. Existing spares for the 667 sizes 30 through 76 are compatible with the 667 sizes 30i through 76i actuators.

13 **Q:** Does the proposed modification permanently remove the spares for existing pieces of equipment?

A: No.

14 **Q:** Does the proposed modification change the inspection scope or inspection interval?

A: No.

15 **Q:** Does the proposed modification require welding work to be performed?

A: No.

16 **Q:** Have the materials of construction been reviewed to ensure that the metallurgy is correct?

A: No.

17 **Q:** Does this update limit what can be mounted to the current product?

A: No. The 667 size 30i through 76i actuators are backwards compatible. They may require a different mounting kit, but all instruments and accessories that are currently available will be offered for the size i design. Refer to the Other Instrument and Mounting Kits section of this document for more information.

18 **Q:** How does the 667 size i actuator utilize instrument tubing?

A: The 667 sizes 30i through 76i actuators feature an internal air passage, which eliminates the need for tubing and fittings when paired with FIELDVUE DVC2000 or DVC6200 digital valve controllers using the integrated instrument mounting. External instrument tubing may also be used if desired or required by certain instruments and accessories, as is true with the sizes 30 through 76 actuators.

Comparison of 667 and 667 Size i Actuators

The following information is intended to provide a general comparison between current Fisher 667 sizes 30 through 76 and 667 size 30i through 76i actuators.

Figure 1: 667 Size 40 Actuator with DVC6200 Digital Valve Controller

Scope of Sizes

Table 1 describes the scope of actuators that will have the “size i” designation. The actuator nameplate and Fisher serial card included with the shipment will designate the actuator size and identify it as a “size i”, where applicable.

Note: Not all sizes of the Fisher 667 actuator portfolios will be offered as a size i at this time.

Current Size	New Size	Yoke Boss Size
30	30i	2-1/8”
34	34i	2-1/8”
40	40i	2-13/16”
45	45i	2-13/16”
46	46i	2-13/16”
50	50i	3-9/16”
60	60i	3-9/16”
70	70i	3-9/16”
76	76i	3-9/16”
87	No change	5”
80	No change	5”
100	No change	5”

Table 1. 667 Size Conversion

Figure 2: 667 Size 40i Actuator with DVC6200 Digital Valve Controller

Instrument Attributes

The 667 size i actuator has an updated design which increases reliability and reduces complexity by integrating the FIELDVUE instrument mounting. This approach eliminates the need for the traditional mounting bracket. The number of parts required to mount a FIELDVUE instrument to the size i actuator has been reduced by one-half and the steps required to position the feedback array have decreased. This mounting allows FIELDVUE DVC2000 and DVC6200 digital valve controllers to be bolted directly to the yoke of the size i actuator, which results in quick and simple mounting.

The 667 size i actuator also features an internal air passage in the yoke that mates with the rear output port of a FIELDVUE instrument, which eliminates the need for traditional external instrument tubing and fittings. When a traditional instrument or additional air operated accessories (solenoids and volume boosters) are used, the 667 size i actuator can still be tubed externally by utilizing the traditional air

connection below the casing. This air connection will otherwise be plugged when shipped from the factory as an assembly with a FIELDVUE instrument. The key differences in the mounting design are compared in Figures 1 and 2.

Side-Mounted Handwheel

The side-mounted handwheel on 667 actuators has traditionally been attached with a combination of U-bolts, hook bolts, cap screws, and nuts (as shown in Figure 3). The 667 sizes 34i through 60i actuators incorporate cast mounting pads, which simplify the mounting procedure and reduce mounting hardware required to attach the handwheel by 50 percent. The key differences are noted by comparing Figures 3 and 4.

Figure 3: 667 Actuator Side-Mounted Handwheel

Integral Mounting FIELDVUE Instruments with Internal Air Passage

The 667 size i actuators feature an integral mounting pad specifically designed for FIELDVUE instruments. This mounting allows the FIELDVUE DVC2000 and DVC6200 digital valve controllers to be bolted directly to the yoke of the size i actuators. Additionally, the instrument housing has a rear output pressure port that mates to the internal air passage of the 667 size i actuators through an o-ring sealed connection, eliminating the need for external tubing and fittings.

Note: In order to utilize the internal air passage with the 667 size i actuator, the DVC6200 digital valve controller Housing B must be used. The DVC6200 digital valve controller was updated in 2014 to include this rear air connection. Without the rear output port, the instrument must be tubed externally. The DVC2000 digital valve controller contains this rear output port as standard.

Figure 4: 667 Size i Actuator Side-Mounted Handwheel

Other Instrument and Accessory Mounting

All other actuator-mounted instruments will continue to utilize the traditional yoke mounting pads or casing bracket of the 667 size i actuators, including non-integral mounted digital valve controllers. These mounting kits have been modified, where necessary, in order to provide compatibility. It is important to note that some older kits cannot be used with the size i actuator, due to interference with the cast pads of the yoke. Therefore, when installing any instrument on the size i actuator, an updated mounting kit must be ordered.

The following information summarizes which mounting kits have been updated. For more specific information regarding mounting kit compatibility, please contact your local Emerson sales office.

Instrument Type	Mounting Kit Change
3582 Positioner	New connecting arm
3600 Positioner	Incompatible, new kit design required
4200 Position Transmitter	New connecting arm
4300 Wireless Position Monitor	Incompatible, new kit design required
546, 646, 846, and i2P-100 Transducers	New spacers and bolts for yoke mounting
DVC2000/DVC6200 Instruments with Traditional Bracket Mounting	No change
DVC5000/DVC6000 Instruments with Traditional Bracket Mounting	No change
C1 Controller	No change
4194, 4195K, and 4196 Controllers	No change
VBL Booster	No change
2625 Booster	No change
TopWorx™ Switches	No change

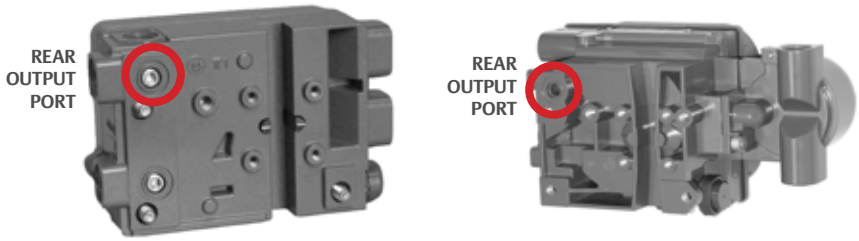

Figure 5. Fisher DVC2000 and DVC6200 Digital Valve Controllers with Rear Output Pressure Ports

Approximate Actuator Weights

Fisher 667 size i actuators are slightly heavier than 667 actuators. Exact weight of a specific actuator assembly is dependent upon instruments and accessories mounted to the actuator. Table 2 lists approximate weights of actuator-only assemblies. For more specific information, please contact your Emerson local business partner or sales office.

Size	kg	lb	Size	kg	lb
30	15	34	30i	17	37
34	22	48	34i	26	58
40	23	50	40i	26	56
45	41	90	45i	44	98
46	55	121	46i	59	129
50	43	94	50i	48	105
60	55	122	60i	60	133
70	115	254	70i	118	260
76	86	190	76i	89	196

Table 2: Approximate Actuator-Only Assembly Weights

Conclusion

The enhanced Fisher 667 sizes 30i through 76i actuators reduce complexity and increase reliability to simplify maintenance and reduce downtime. The 667 size i actuators incorporate an integrated mounting pad for FIELDVUE instruments and an internal air passage, which eliminates the need for external tubing and fittings. The 667 size i actuator simplifies the side-mounted handwheel (34i-60i) mounting by reducing the number and complexity of parts required. With these enhancements, the 667 size i actuators simplify installation and maintenance steps, while increasing the reliability of this time-tested actuator platform.

Please contact your local Emerson sales office for additional details or questions regarding Fisher 667 size i actuators.

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