

# Replacement of Fisher™ 657 Diaphragm Actuators Sizes 30-70 with Sizes 30i-70i

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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 657 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 657 actuator is direct-acting. This actuator is designed to provide dependable on/off or throttling operation of automatic control valves.

The 657 size i spring-opposed diaphragm actuator provides an updated yoke design to increase reliability and reduce complexity by incorporating an integrated mounting for Fisher FIELDVUE™ instruments.

## 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 Fisher 657 actuators were installed.
- 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 sales offices offer local training and support to help ensure operators, maintenance personnel, and instrument technicians are trained on Fisher 657 size i 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 657 sizes 30 through 70 actuators are compatible with 657 sizes 30i through 70i 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:** Yes.
- 17 Q:** Does this update limit what can be mounted to the current product?  
**A:** No. The 657 sizes 30i through 70i actuators are backwards compatible with current instruments and accessories. They may require a different mounting kit, but all instruments and accessories that are currently available will be offered for the size i. Refer to the Other Instrument and Accessory Mounting section of this document for more information.
- 18 Q:** How does the 657 size i actuator utilize instrument tubing?  
**A:** The 657 actuator sizes 30i through 70i will utilize external instrument tubing, as they do today. The yoke design will have the integrated FIELDVUE instrument mounting.

## Comparison of 657 and 657 Size i Actuators

The following information is intended to provide a general comparison between current Fisher 657 sizes 30 through 70 and 657 sizes 30i through 70i actuators.

### Scope of Sizes

Table 1 describes the scope of actuators that will have the size i designation. The actuator nameplate and serial card included with the actuator shipment will designate the actuator size and identify it as a size i. Note: Not all sizes of the current Fisher 657 actuator portfolio will be offered as a size i.

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"
87	No change	5"
80	No change	5"
100	No change	5"

\*Includes the 657-4 actuator.

Table 1. 657 Size Conversion

## Instrument Attributes

The 657 size i actuator has an updated design that increases reliability and reduces complexity by integrating the FIELDVUE instrument mounting. This approach eliminates the need for the traditional mounting bracket, so the number of parts required to mount a FIELDVUE instrument to the size i actuator has been reduced by 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 a faster and simpler mounting procedure. The key differences in the mounting design are compared in Figures 1 and 2.



Figure 1. 657 Size 40 Actuator with DVC6200 Digital Valve Controller



Figure 2. 657 Size 40i Actuator with DVC6200 Digital Valve Controller

## Side-Mounted Handwheel

The side-mounted handwheel on Fisher 657 actuators has traditionally been attached with a combination of U-bolts, hook bolts, cap screws, and nuts (as shown in Figure 3). The 657 sizes 34i through 60i actuators incorporate cast mounting pads that simplify the mounting procedure and reduce mounting hardware required to attach the handwheel by 50%. The key differences are noted by comparing Figures 3 and 4.

## Other Instrument and Accessory Mounting

All other actuator-mounted instruments will continue to utilize the traditional yoke mounting pads or casing brackets on the 657 size i actuator (including non-integral mounted DVC2000 and DVC6200 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, be sure to order an updated mounting kit.

The following table summarizes which mounting kits have been updated. For more specific information regarding mounting kit compatibility, 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	New mounting bracket and stem connector
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

Table 2: Mounting Kit Updates

## Approximate Actuator Weights

Fisher 657 size i actuators are slightly heavier than 657 actuators due to the integral yoke mounting pads. Exact weight of a specific actuator assembly is dependent upon instruments and accessories mounted to the actuator. Table 3 lists approximate weights of actuator-only assemblies. For more specific information, contact your local Emerson sales office.



Figure 3. 657 Actuator with Side-Mounted Handwheel



Figure 4. 657 Size i Actuator with Side-Mounted Handwheel

Size	kg	lb	Size	kg	lb
30	16	36	30i	17	38
34	22	48	34i	25	54
40	23	51	40i	25	56
45	37	82	45i	40	89
46	49	107	46i	52	114
50	42	92	50i	45	99
60	53	116	60i	56	123
70	107	235	70i	109	240

Table 3: Approximate 657 Actuator-Only Assembly Weights

## Conclusion

The enhanced Fisher 657 sizes 30i through 70i actuators reduce complexity and increase reliability to simplify maintenance and reduce downtime. The 657 size i actuators incorporate an integrated mounting pad for FIELDVUE instruments and simplify the side-mounted handwheel mounting by reducing the number and complexity of parts required. With these enhancements, the Fisher 657 size i actuators simplify installation and maintenance steps, and increase the reliability of this time-tested actuator platform.

## Additional Resources

Please contact your [local Emerson sales office](#) for additional details or questions regarding Fisher 657 size i actuators.

[657 Product Bulletin](#)

[657 Instruction Manual](#)

[657 Actuator Webpage](#)



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