Service Manual
VCIOM-17255-EN Rev. 4
May 2023

Bettis RTS Electric Actuator

FQ and FL Series Fail-Safe Handwheel Operation Manual

BETTIS™

EMERSON™

Document History

Description	Date	Revision	Owner	Approver
Initial	August 15, 2022	0	Kwang Liu - Sr. Electronics Engineer	Anthony Kmitta - Software Engineering Manager
Update	September 19, 2022	1	Kwang Liu - Sr. Electronics Engineer	Anthony Kmitta - Software Engineering Manager
Migration to new template	October 17, 2022	2	Roman Kudinov - Product Marketing Manager	Stephanie Jones - Global Marketing Communications Manager
Update	February 14, 2023	3	Kwang Liu - Sr. Electronics Engineer	Roman Kudinov - Product Marketing Manager
Update	May 16, 2023	4	Roman Kudinov - Product Marketing Manager	Roman Kudinov - Product Marketing Manager

Table of Contents

Objective: Proper operation of the handwheel manual override with handwheel handle of the Bettis RTS Fail-Safe Quarter-Turn (FQ) and Fail-Safe Linear (FL) units.

Procedure: This document shows the proper way to manually operate an FQ/FL unit using the handwheel.

⚠ WARNING

When operating electrical devices, certain parts are inevitably under dangerous voltage. Work on the electrical systems or components may only be carried out by electricians or by individuals who have been instructed how to do so, working under the guidance and supervision of an electrician in accordance with electro technical regulations.

⚠ WARNING

When working in potentially explosive areas, heed European Standards EN 60079-14 "Installing Electrical Systems in Explosion Endangered Areas" and EN 60079-17 "Inspection and Maintenance of Electrical Installations in Explosion Endangered Areas". Working in potentially explosive areas is subject to special regulations (European Standard EN 60079-17), which must be complied with. Any additional national regulations must be heeded.

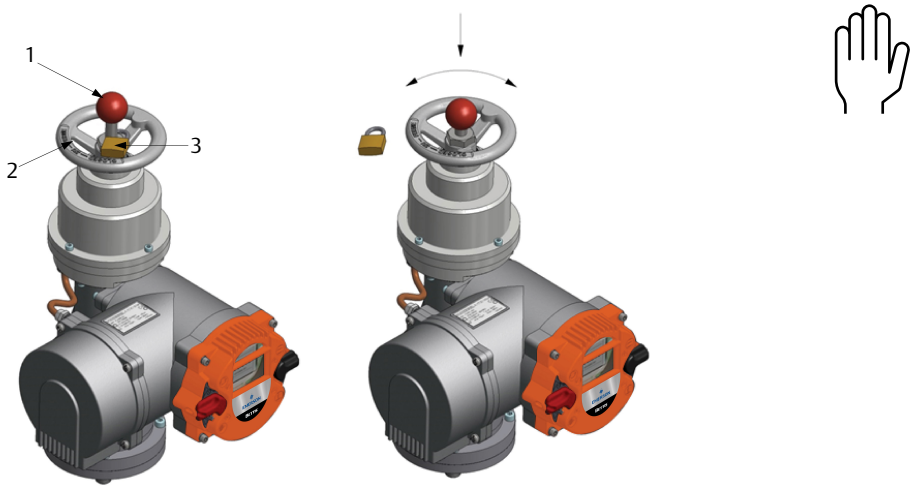
⚠ WARNING

Working on the opened and energized actuator may only be carried out if it is ensured that there is no risk of explosion for the duration of the work.

Section 1: RTS Manual Handwheel Operation with Fail-Safe

1. Red knob/declutch shaft
2. Handwheel
3. Padlock

Figure 1.



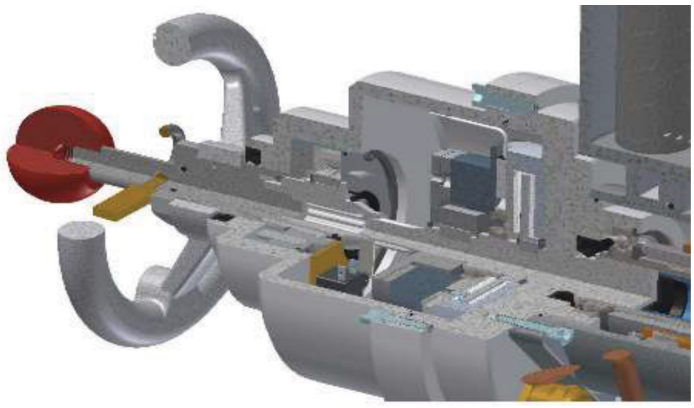
⚠ WARNING

By activating the manual override, the fail-safe function and electrical drive are disabled. Display will turn RED.

Section 2: RTS Manual Handwheel Declutch on Fail-Safe Actuators – How It Works

- FL and FQ fail-safe/spring-return actuators optional manual handwheel override option is available.
- The intended use of the manual handwheel option is to provide a means of moving the actuator manually when main power is OFF. The handwheel assembly can be engaged when main power is ON but ONLY when the return spring is in its relaxed or fail-safe position.
- Once the handwheel padlock is removed then the red knob/declutch shaft can be pushed inward to engage the handwheel. If this is done when main power is ON and the actuator is in the full relaxed spring position, the microswitch state is changed in the fail-safe brake compartment and the local display screen back lighting will change to RED in color as well as indicate fail-safe alarm and manual override alarm on the screen. At this point, the actuator motor will not operate until the declutch shaft is withdrawn.
- Before the handwheel declutch shaft/red knob can be retracted to its normal operational position, the actuator must first be placed back into the spring-return/relax position.
- When engaging the declutch shaft, the manual handwheel may need to be slightly rotated to line up spline engagement assembly inside the fail-safe brake compartment.
- Once the declutch shaft is fully disengaged, the padlock can be replaced if desired.

Figure 2.

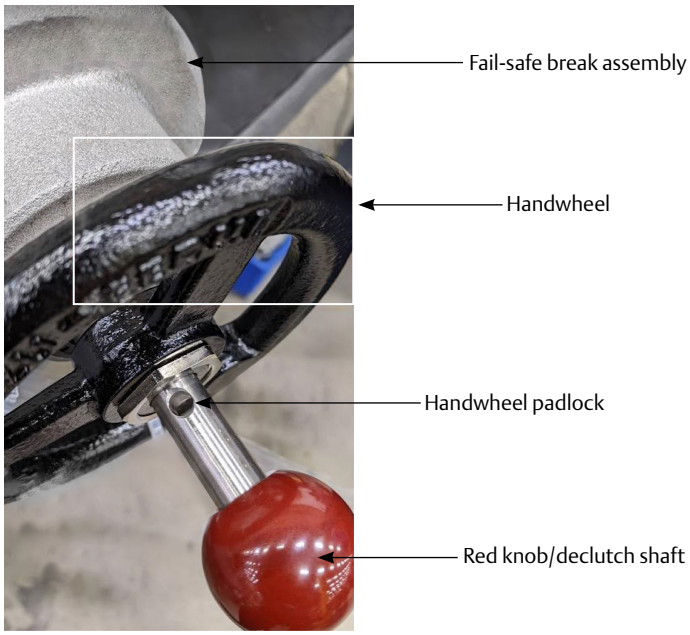


Section 3: RTS Handwheel Structure

All Fail-Safe (FQ and FL) units will have a similar structure as shown below.

1. Fail-safe brake assembly
2. Handwheel
3. Red knob/declutch shaft

Figure 3.



Section 4: RTS Handwheel, Red Knob/Declutch Shaft Position

1. (Disengage position, motor operation)
When in “motor” operation mode (declutch shaft disengaged), the handwheel assembly will appear as shown in Figure 4 below. Note that the “handwheel padlock hole” is visible and that the declutch shaft is at its longest position. The handwheel will spin freely but will not drive the actuator.

Figure 4.

2. (Engage position, handwheel operation)
When in “handwheel” operation mode (declutch, shaft engaged), the handwheel assembly will appear as shown in Figure 5 below. Note that the “handwheel padlock hole” is not visible and that the declutch shaft is at its shortest position. The handwheel will now drive the actuator.

Figure 5.

Section 5: RTS Red Knob/Declutch Shaft Engage Method

To properly engage the declutch shaft, the user may need to wiggle the handwheel while pushing the red knob/declutch shaft. This ensures that the internal spline connection is properly aligned and that the declutch shaft is fully engaged.

When engaging the declutch shaft, ONLY use hand force to push in or pull out. Do not use hammer or any other tool to force red knob/declutch shaft into engage position. The handwheel assembly can be severely damaged if excessive force is applied while splines are not properly aligned.

Figure 6.

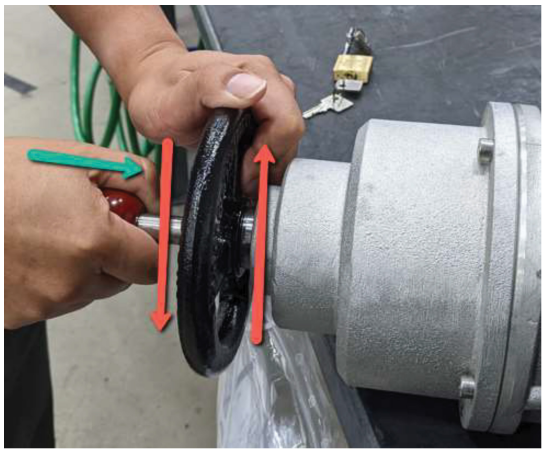
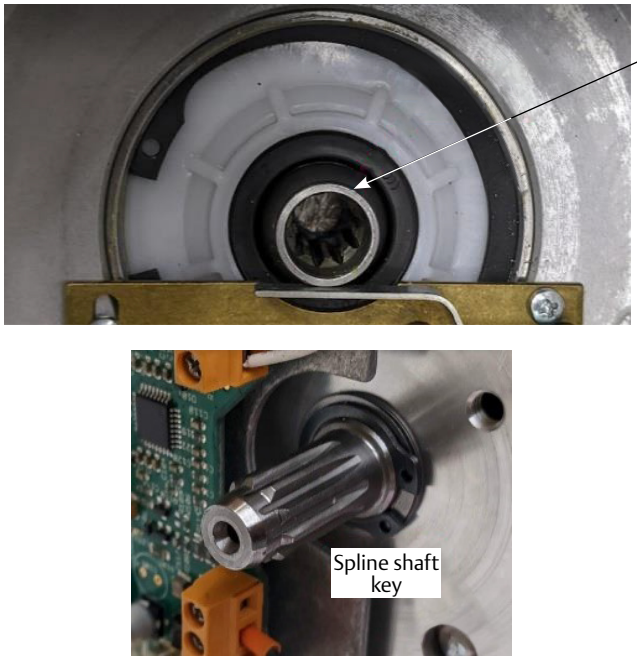


Figure 7.

Figure 8.



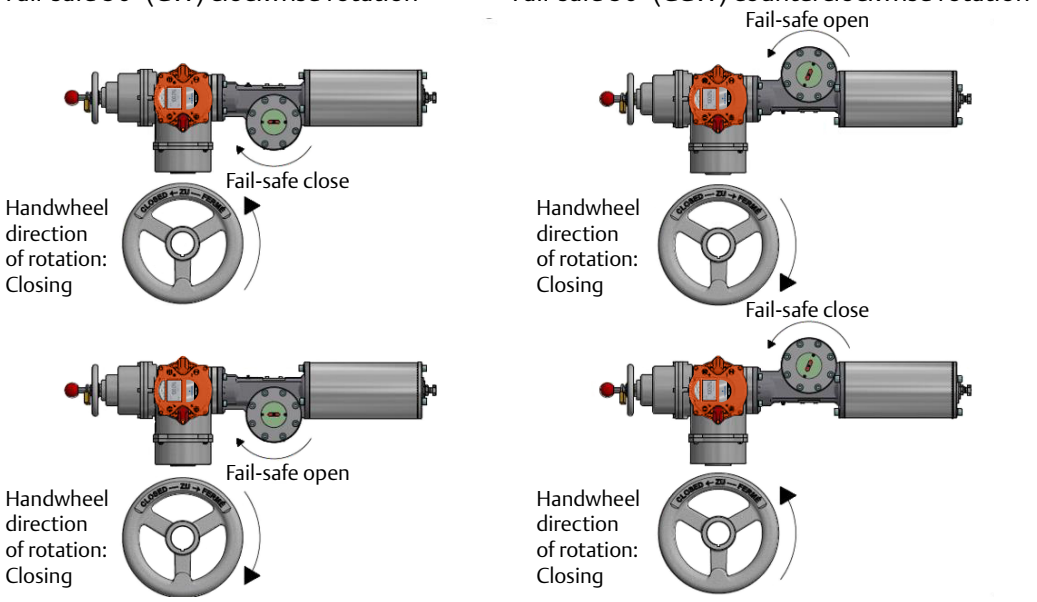
Section 6: RTS Handwheel Operation Method

All fail-safe handwheels have marking for CW (Clockwise) to CLOSE and CCW (Counterclockwise) to CLOSE. Ensure that the CLOSE direction indicated on the handwheel matches the operation of the valve. The marking on the handwheel can be changed by removing the handwheel and flipping it over.

⚠ CAUTION

Only use your hands to operate the handwheel. Do not use any other tool to operate the handwheel or declutch shaft. Do not use cheater bar to operate the handwheel. Do not engage or disengage the declutch shaft unless the spring is in the fully relaxed position.

Figure 9.



In some circumstances, you may need to open a valve when a fail-safe actuator loses a main power and closes the valve with the spring. If this is the case, you need to engage the clutch and open the valve with the actuator handwheel following the correct rotation direction. In this condition, the spring will get compressed by handwheel operation and you should never try to remove the clutch because it may cause damage of the handwheel and/or internal mechanical parts.

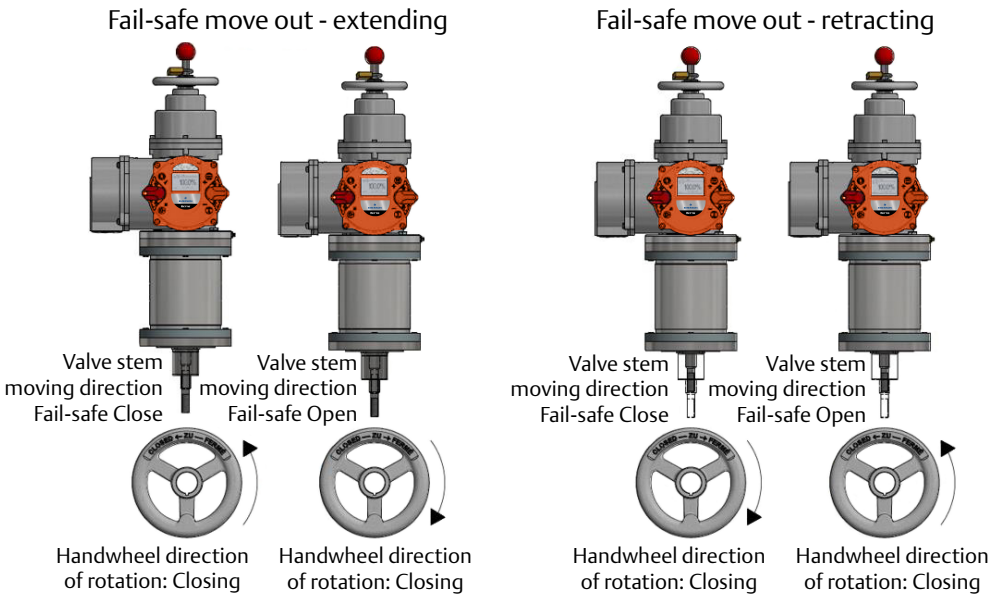
To disengage the clutch, the right procedure will be as follows:

1. Close the valve with the handwheel to the spring fully relaxed position
2. Remove the clutch
3. Reopen the valve with the power

⚠ WARNING

During manual handwheel operation, the clutch must always stay engaged to keep the loaded fail-safe spring in place. Disengaging the clutch while the spring is compressed will cause the spline shaft key or red knob shaft damages.

Figure 10.



This page intentionally left blank.

www.emerson.com/bettis

BETTIS™

EMERSON™