

**IOM FOR DYNATORQUE™ SPRING RETURN MANUAL OVERRIDE (SRD TYPE)****Scope:**

It is the purpose of this document to provide general installation, operation, storage, and maintenance instructions for DYNATORQUE™ manual spring return override worm gear operator.

NOTE: DYNATORQUE SRD automated valve manual overrides may be used with electric, hydraulic or pneumatic spring return valve actuators. For purposes of convention, the term “pneumatic actuator” will be used to refer to torque-generating driving device (actuator). The term “operator” will refer to the DYNATORQUE manual override.

**Installation Tips:**

All Cameron DYNATORQUE operators & accessories have been designed to transmit the rated output torque of the operator. When designing mounting kits, torque transmission devices, or specifying mounting hardware the operator rating should be considered. Cameron recommends using grade 5 and higher bolts with lock washers for mounting DYNATORQUE devices to valve actuators, valve mounting flanges and/or valve adaptation kits. DYNATORQUE components should not be installed in areas where those components will be subjected to high temperatures, corrosive atmospheres, or high pressures without prior knowledge by Cameron or unless originally designed for that purpose. Doing so may affect the product warranty.

Cameron recommends a watertight seal be established at time of installation between the bottom of the SRD override and the valve, as well as the top of the SRD override and the actuator mounting pad. Apply a liberal amount of a liquid gasket material (Cameron recommends using DOW Corning RTV #732 multi-purpose sealant) on both surfaces prior to SRD override installation. Make sure to surround the mounting holes with sealant to assure a complete seal.

**Installation:**

The Cameron DYNATORQUE model SRD manual override operator offers safe and easy positioning of valves when manually overriding a spring return pneumatic actuator. Each SRD operator comes complete with a handwheel and machined or blank drive coupling, which can be easily removed for machining to match the pneumatic actuator and valve stem requirements.

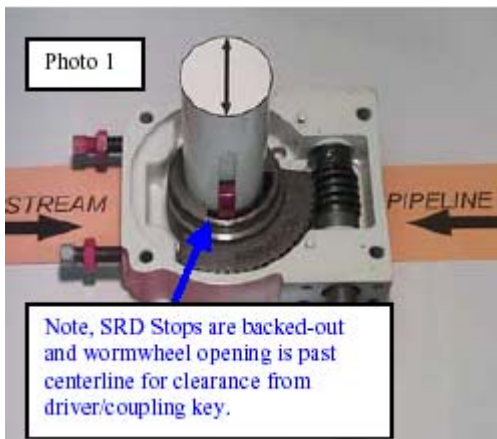
**Important Note:** Since the external key in the blank drive coupling mentioned above is not contained in the mating part in a traditional manor, it is necessary to bolt that key to the drive coupling to prevent possible key roll. The key has been pre-drilled and counter-bored, and hardware has been supplied for blank drivers. Position the key in the key slot to provide maximum engagement in the override output and using the key as a guide, drill and tap two holes for the hardware provided.

The following steps should be taken to install the DYNATORQUE SRD override. Cameron recommends operator mounting while on the test stand with the valve in the fail position.

Proper orientation and initial commissioning of the SRD manual override is a vital step as a part of the total valve and pneumatic actuator system. *[The following information is designed for the installation start-up procedure of a valve system including a DYNATORQUE SRD override operator. It is critical the installer verify the pneumatic actuator, the valve, the SRD override, and drive coupling, and any adapting bracketing are all in the correct orientation when fully assembled.]*

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The SRD is *unidirectional*. The same SRD unit may be used for either, but not both, “Fail CCW” (counterclockwise rotation as viewed from above) or “Fail CW” (clockwise as viewed from above) with proper key arrangement and assembly.

**Typical Example: Overrides for use with fail closed (CW) actuators:**


[Although the pictures show a CW (clockwise) fail closure; the same mirrored steps can be followed for a CCW (counter-clockwise) fail closure.

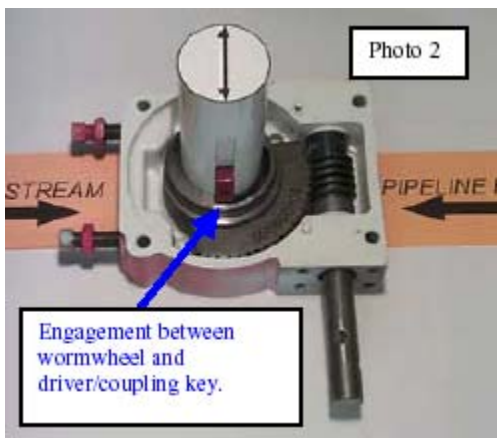
**Step 1.** Prior to installation in the valve and actuator system, loosen (back-out) both SRD travel stop bolts from the main housing approximately six to eight turns (Warning: rotating the stop bolt more than six to eight turns may allow the worm wheel and worm to disengage during the next phase of Step 1). Rotate the input shaft CW which in turn rotates the override output clockwise until the end of the key slot is just past centerline. (Ref Photo 1).

**Step 2.** Install the SRD override in the valve and actuator assembly making sure that the valve and actuator are in the closed position.

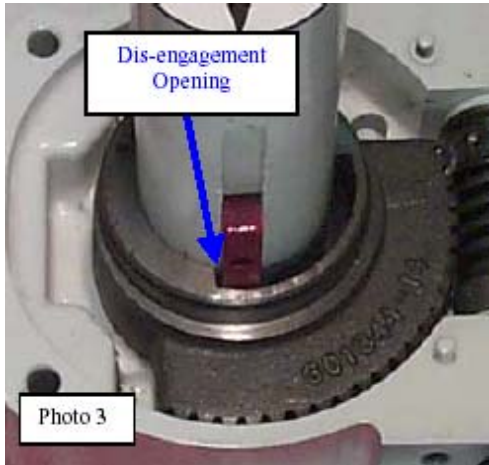
**Note:** *Mounting holes on some SRD overrides break into the housing cavity creating a grease leak path. The use of Teflon tape is recommended for all valve side bolt installations.*

**Step 3.** Set the pneumatic actuator position stop for full closed position. The actuators position stop will always be contacted for the full closed position during normal operation, not the SRD's stop.

**IMPORTANT NOTE:** *The actuator stops (NOT the SRD stops) must be set to establish the full clockwise and counterclockwise travel of the actuator. The SRD stops should be set so that they are not subject to the rotational force generated by the actuator.*



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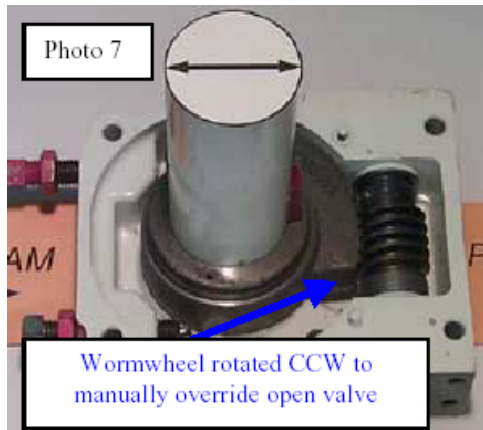


**Step 4.** Rotate the SRD input shaft CCW until the key in the drive coupling comes into contact with the end of the key slot and the coupling just begins to turn. (Ref Photo 2). Upon contact, reverse the SRD input shaft  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn to disengage the drive coupling key from the worm wheel. This will put a very small opening between the key slot and the drive coupling key. This is the SRD unit's **Home Position**. (Ref Photo 3)



**Step 5.** Set the SRD travel stop for the closed position (Home Position) by turning the bolt clockwise until the bolt comes into contact with the end of the worm wheel. Reverse the bolt  $\frac{1}{2}$  turn to ensure that the SRD travel stop is not used as the primary seating element for the pneumatic actuator. Tighten the lock/jam nut against the body of the override. (Note: If the SRD override has been optionally equipped with the Home Position Indicating Stop Bolt, the indicating head will be extended to indicate the SRD override is in the "Home Position".

**Step 6.** Reposition the valve to the full open position using the pneumatic actuator. (Note: There should be no interruption of the 90 degree strike of the valve by the SRD or any other component. If there is an interruption, identify the problem and make the necessary corrections.) Set the pneumatic actuator travel stop for the full valve and actuator open position. (Ref. Photo 5)

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**Step 7.** Return the valve to the full closed position using the pneumatic actuator, to confirm the proper setting of all components. Stroke the valve and actuator assembly several times from closed to open to close to confirm proper pneumatic operation. (Note: When the assembly is in the closed position, the SRD input shaft should be able to be freely rotated  $\frac{1}{2}$  to  $\frac{3}{4}$  of a turn in the CCW direction if properly adjusted. (Note: It is critical to the function of the assembly that the SRD be returned to the home position after every manual cycle) Failure to do so may render the assembly inoperable and damaged.

**Step 8.** Manually turn the input shaft of the SRD CCW to fully open the valve. (Note: Air lines, which may prevent back driving the actuators pneumatic piston, must be purged or otherwise vented to atmosphere.) As the spring in the actuator becomes compressed, the operating input torque of the SRD will increase along with human manual effort (Ref Photo 7).



**Step 9.** Verify the full open position of the valve by visually locating the position of the disc, ball, or plug. Set the SRD open stop bolt by turning it CCW until it comes into contact with the worm wheel. Upon contact, reverse half turn to insure the SRD stop bolt is not used as the primary travel stop. (Ref. Photo 8)

**Step 10.** Return the SRD to the “Home Position” by rotating the input shaft CW. Complete at least one more cycle test to ensure correct operation of the pneumatic actuator.

**Additional SRD Installation Tips:**

1. With the drive coupling removed from the override, place the override on the valve assembly and loosely bolt into place.
2. Before reinstalling the drive coupling, liberally grease the outside of the driver and the override bore. This may prevent galling and reduce the possibility of corrosion between the two components.
3. Reinstall the driver making sure the end of the driver configured to fit the valve stem, is correctly aligned.
4. Tighten the valve to SRD with mounting bolts.
5. The opposite end of the drive coupling should be configured to match the pneumatic actuator output. Align the pneumatic actuator drive with the override drive coupling and lower the pneumatic actuator into place on the top flange of the override.
6. Bolt the pneumatic actuator in place.
7. Adjust override travel stops as indicated above.

**IOM FOR DYNATORQUE™ SPRING RETURN MANUAL OVERRIDE (SRD TYPE)****Safety:**

The use of handwheels larger than recommended by the factory, cheater bars, etc. will void the override warranty and may cause damage to the operator, valve stem, drive shafts, or other torque transmitting devices as well as being dangerous to the user. Additionally, the use of chainwheels on operators that are not recommended for those applications will result in voiding operator warranty.

***Important Safety Warnings for SRD Overrides:***

1. The SRD must remain in the “Home Position” at all times for the pneumatic operator to function properly. Leaving the SRD in any other position will result in system failure and may cause damage to the SRD or pneumatic system components.
2. Adjustment of the SRD stops from initial assembly position may prevent valve from achieving full open or full closed positions and may cause damage to SRD or pneumatic system or components.
3. Remember, drive coupling exterior key should be bolted in place to prevent key roll.

**Operation:**

NOTE: In this example we are using the convention of “on loss of power, valve will spring-to-fail closed moving in the clockwise direction as viewed from above”.

In the event the pneumatic actuator’s power supply fails, a spring return pneumatic actuator will move to its fail position. Prior to manual operation, assure the pneumatic actuator’s cylinders have been vented to atmosphere. To manually override the actuator, rotate the handwheel counterclockwise for a fail closed actuator, and clockwise for a fail open actuator. The gearing is self locking, so once the override position has been reached (full CCW for a fail closed, and full CW for a fail open) the valve, actuator, and override can stay in this position until the air supply is restored. **Note:** When pneumatic actuator air has been restored, the manual override must be returned to its home position. For a fail CW actuator, the handwheel needs to be rotated full CW, and for a fail CCW actuator, the handwheel needs to be rotated full CCW. For a video demonstration of the operation of the SRD override see visit our website or use link: <http://www.c-a-m.com/Forms/Product.aspx?prodID=c606a051-471c-4e48-9800-6ac41cc9ae86>. ***It is extremely important to remember this last step, as failure to do so could cause damage to the SRD, its gearing, or the pneumatic system components, and void warranty.***

**Trouble Shooting:**

*Override doesn’t work at all:*

1. Never use excessive force. If the operator will not operate correctly, follow these steps.
2. Make certain that all compressed air has been exhausted from the pneumatic actuator. The actuator must be vented on both sides of all pistons.
3. Make sure that all components were installed in the same beginning position. The wrong position of any one of the torque transmitting devices, couplings, drivers, can prevent the operator from stroking.
4. Be certain that nothing is physically preventing the valve from closing/opening. That is, make sure that nothing is lodged in the valve trim (ball, plug, disc. etc.).
5. Check that no physical damage has occurred which might limit or prevent movement of the actuator. Examples could be: a dented actuator cylinder, damaged drive coupling or hardware.

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*Override operates, but not full travel:*

1. Never use excessive force. If the operator will not operate correctly, follow these steps.
2. Make certain that all compressed air has been exhausted from the pneumatic actuator. The actuator must be vented on both sides of all pistons.
3. Check to ensure that the stop adjustment settings for the pneumatic actuator, valve, and override will allow the desired amount of travel.
4. Be certain that nothing is physically preventing the valve from closing/opening. That is, make sure that nothing is lodged in the valve trim (ball, plug, disc, etc.).
5. Check that no physical damage has occurred which might limit or prevent movement of the actuator. Examples could be: a dented actuator cylinder, damaged drive coupling or hardware.
6. Check to ensure that no drive components have been deformed. All drive components and mounting surfaces must be correctly aligned. Check all couplings for excessive wear or looseness and all bolts are snug.

*Still problems after performing above steps:*

1. Cycle test the pneumatic actuator and override as an assembly apart from and not mounted to the valve. Assuming these components cycle fully, the problem is probably the valve. Check the valve for any obstructions. If no obstructions are visible call the valve manufacturer for further information.
2. If the pneumatic actuator and the override assembly do not appear to function properly, make sure that the pneumatic actuator's spring is fully extended. **Never remove or separate the pneumatic actuator from the override without fully extending the spring.** Separate the pneumatic actuator from the override and cycle test separately. The problem component should be apparent at this time.
3. If the pneumatic actuator appears to be the problem, contact the manufacturer for further instructions. If the override appears to be the problem please contact your local DYNATORQUE representative or the factory.

**Maintenance:**

- A. **Storage:** For best results, DYNATORQUE operators should be stored in a clean, dry area in their original factory shipping containers. If operators are stored in high humidity areas, steps should be taken to reduce the amount of moisture the units will be exposed to. Operator input shafts are plated or stainless steel to prevent corrosion. If operators are being stored for a long period of time, operator mounting surfaces should be lightly greased to prevent corrosion.
- B. **Maintenance:** DYNATORQUE manual operators do not require periodic maintenance. They are, for most applications, lubricated for life, with all components designed to have a life equal to or exceeding the wear life of the operator gearing.

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- C. Lubrication: If for any reason, lubrication replacement is necessary, Cameron recommends replacement of that lubrication with:

DYNATORQUE Standard Grease Specification:- Alpha Green 2000

NLGI Grade: Grade 2 EP  
Grease Base: Calcium Sulfonate  
Color: Green  
Anti-Wear EP Additives: Yes  
Dropping Point: ASM D566 572Deg F(300Deg C)  
4 Ball Wear KG Load ASTM 2596: 500  
Timken OK Load Lbs. ASTM 2509: 65  
Oil Separation, ASTM D1742-24Hous@77 deg F (25 Deg C)  
Base Oil Viscosity SUS @100 Deg F 600  
Base Oil Viscosity SUS @210 Deg F 70  
Pour Point +5 Deg F

- D. Spare Parts: Cameron warrants work performed by the factory or by factory trained personnel only. Please consult the factory or your local DYNATORQUE representative to arrange assistance. Cameron modifies a great percentage of its DYNATORQUE operators to meet specific customer requirements. Please refer to the operator part list number as supplied on the shipping document, acknowledgement, or invoice, when ordering spare parts.
- E. Spare Parts: For your records, please enter the operator part number from your shipping documents, acknowledgement, or invoice here:

Part Number: \_\_\_\_\_

Date Stamp: \_\_\_\_\_ (Located on the bottom of the operator housing.)

Purchase / Sales Order Number: \_\_\_\_\_

**Please Note:**

When assembling Cameron DYNATORQUE products to a valve or to an automated valve package, standard engineering practices must be utilized to assure proper mounting orientation, configuration, and distribution of weights and forces. Failure to do so could cause product damage and/or malfunction, **and void warranty consideration**. If there are any questions please contact the factory at info-dyt@c-a-m.com.