



1-GENERAL SAFETY PRECAUTIONS

The RADIUS Electro-hydraulic Actuators are specifically designed to operate quarter-turn valves, such as Ball, Butterfly and Plug valves and just are available in spring return series. As such they should be:

- Used as specified.
- Regularly maintained to remain in good working order.
- Not be modified without first consulting a Radius representative.

The electro-hydraulic actuator is a device integrated of 7 basic elements:

- Pneumatic Rack and Pinion actuator
- Mono-phase engine 110VAC
- Hydraulic power supply
- Solenoid valve
- Pressure Switch
- Limit switch
- Control panel cabinet

BEWARE; METAL SURFACES ARE EXCELLENT HEAT CONDUCTORS.

Protect **HANDS** and **EXPOSED SKIN** whenever handling **ACTUATOR OR ACCESSORIES** in extreme temperature environments.

BEWARE AT ALL TIMES; KEEP FINGERS CLEAR OF ALL MOVING PARTS.

The Electrical Installation, maintenance and use of these actuators should be carried out in accordance with the National Legislation and Statutory Provisions relating to the safe use of the equipment, applicable to the site of installation. For UK: Electricity at Work Regulations 1989 (IEE Wiring Regulations), for: USA: NFPA70.

The mechanical installation should be carried out as specified in this manual, and just if the actuator has a nameplates indicating that it is suitable for hazardous can be installed in these zones.

WARNING: COMPRESSED SPRINGS

All springs within the MEH are pre-compressed and the springs must not be removed from the actuator.

WARNING: HYDRAULIC FLUID

The MEH actuators are filled with hydraulic fluid. The type of oil supplied on the data sheet of these actuators.

Only authorized personnel by virtue of their training or experience should be allowed to install, maintain and repair the Radius MEH actuators. Any service or maintenance must only be undertaken by an approved Radius Technician or an Authorized Radius agent.



2-ACTUATOR DESIGNATION

The actuators are designated as follows:

FAIL SAFE ELECTROHYDRAULIC UNIT IP67 FOR SAFE AREA	
MEH	Basic composition
ACTUATOR	
XXX	Model of rack and pinion actuator (030, 040, 060, 100, 140, 200, 250, 370 & 500) <i>*Higher torque available - Contact Radius</i>
MOTOR POWER SUPPLY	
XXXVAC	110/220/380 VAC Motor power supply
XXXVDC	24 VDC Motor power supply
CONTROLS POWER SUPPLY	
BLANK	110VAC (Standard)
24	24 VDC for control unit
LOW PRESSURE	
BLANK	Not required
P1	With one safety pressure switch for checking the opening of the actuator
HIGH PRESSURE	
BLANK	Not required
P2	With one safety pressure switch for high pressure relief in the unit
TYPE OF CONTROL	
BLANK	Not required
RY	With programable relay for PST, STOP button and other options
MOD	With 4-20mA signal for modulation
LOCAL / REMOTE SELECTOR	
BLANK	Not required
S	With selector switch OPEN / CLOSE / REMOTE
L	Local control unit with OPEN - CLOSE - REMOTE/LOCAL SELECTOR buttons
LR	Local control unit for programmable relay or modular version with OPEN - CLOSE - STOP - PST - REMOTE / LOCAL SELECTOR buttons
LIGHTS FOR LOCAL CONTROL	
BLANK	Not required
H	Lights for the local control unit
MANUAL OVERRIDE	
BLANK	Not required
MH	With manual hand pump as manual override
MO	With manual hand wheel as manual override
OTHERS	
BLANK	Not required
YYY Others	Others

Ex: MEH-030-110VAC24-P1P2MOD-SH-MO

3- GENERAL DATA

Interface for positioner or signal transmitter dimensions in accordance with: **VDI/VDE-3845**

Valve connection flange according to: **ISO-5211**

Solenoid valve interface: **DIN228/1**

Working pressure: 87-145 PSI (6 – 10 Bar) Single Acting Actuator

Medium: Hydraulic oil Viscolube 62/18 EP or similar

Working temperature: Temp. -4°F to +140°F (Extended ranges optional)

Travel stop adjustment: 0°±2,5° to 90°±2,5°



4- STORAGE

For those applications where the actuator is not put into immediate service (or is used in an intermediate function), it is recommended that the actuator is cycled at least once every 3 months. Indoor storage, wherever possible, is recommended. Care should be taken to keep them free from the ingress of foreign particles and/or moisture. Actuators should not be stored in an aggressive atmosphere, which could be harmful to the elastomeric seals. Do not store in temperatures outside of normal operating temperatures.

5- INSTALLATION

ACTUATOR ONTO THE VALVE

- Determine valve direction of rotation, usually is aligned the axis of cylinder with the axis of tube associated.
- Determine correct operating quadrant for mounting bracket according to direction of rotation and whether valve is Normally Open (N/O) or Normally Closed (N/C).
- Attach bracket/actuator/valve assembly as follows:
 - 1) Rotate valve stem to correct operating position (N/O or N/C).
 - 2) Attach mounting bracket to valve. Do not fully tighten the bolts at this time.
 - 3) Insert coupling onto valve stem making that sure that the coupling is correctly engaged.
 - 4) Mount actuator onto the valve ensuring the coupling insert engages properly into drive sleeve of the actuator drive shaft. **Warning** MEH must be lifted by the handles. Never lift assembly by actuator.
 - 5) Secure bracket to valve using correctly sized fasteners (nuts & bolts) and tighten them fully.
 - 6) At this point CHECK that both actuator and valve are in the correct operation mode (N/O or N/C).
 - 7) If the actuator is not mounted correctly, remove the actuator and repeat the mounting procedure.

ELECTRICAL CONNECTION

The actuator is delivered with all the connections between accessories done. There are two cable glands free to be used to connect, one for the power supply, and another one for the remote control.

The power supply of the installation must be connected by the gland num.1 in section 8, and must be connected in the **N & F** port.

The remote control is connected by the gland 2 in section 8.

The wiring connection for the power supply and the remote control can be found in the electric diagram attached.

Proper lead placement can be verified by viewing the pump/motor fan while in operation. It should be rotated anti-clockwise, you can check the arrow on the motor cover. The pump won't charge the system and may be damage if the leads are incorrectly terminated.



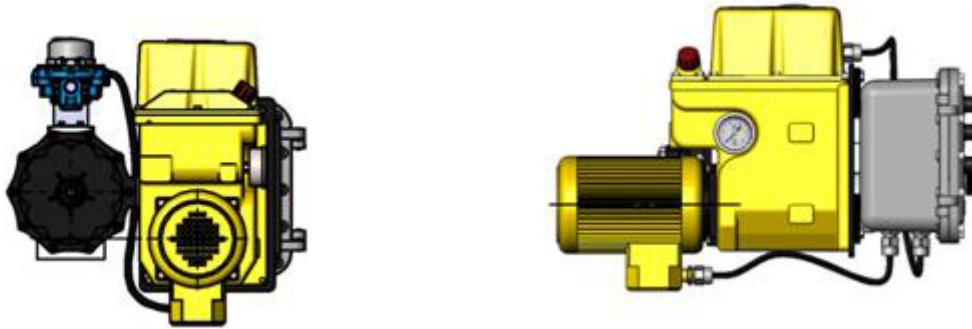
HYDRAULIC FLUID

The MEH actuators are supplied with hydraulic fluid, the level must be checked before operation, make sure the small reservoir is full. To check the level, remove the plastic vent cap. The correct level is about 3” below the top. If it is not, add enough oil to reach this level than cycle the actuator one time. If at the end of the cycle the oil level is not maintained add more and cycle again. It is typical that one or two cycles is all that is needed before oil maintains the full position.

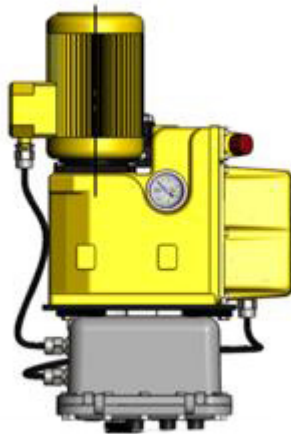
WARNING

MOUNTING ORIENTATION (Explosion Proof unit pictured)

The Electro-hydraulic can be mounted in horizontal position and vertical as following:



Horizontal Position (recommended) Fig.1



Pump side up
Vertical Position (Permitted) Fig.2



6- OPERATION

The MEH actuator is delivered to fail close as standard. The actuator opens with the hydraulic pump and close with the springs.

The MEH actuator can be delivered fail open under request, and in this case the actuator close with the hydraulic pump and open with the springs.

The actuator can be operated in two ways, local control and remote control. *NOT ALL UNITS HAVE THESE OPTIONS*

A) LOCAL CONTROL OPERATION

BEFORE BEGINNING LOCAL CONTROL OPERATION:

- 1- Notice that power supply is connected to the system

The actuators have a control box where we can find 3 buttons, if selected. OPEN, CLOSE, STOP and a selector switch.

CONTROL PANEL Fig.3

①



②

ITEM	DESCRIPTION
1	Control cabinet
2	Selector switch: 1 - REMOTE 2 - LOCAL

To operate the device in local system:

1. Put the selector switch in open position to open the actuator.
2. Put the selector switch in close position to close the actuator.



B) REMOTE CONTROL OPERATION

BEFORE BEGINING LOCAL CONTROL OPERATION:

Notice that power supply is connected to the system

To operate the actuator by remote control, cable gland num. 2 must be wired by the user.

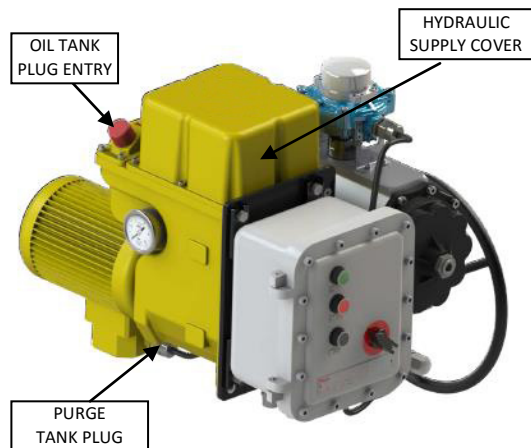
The MEH actuator is designed as standard to have the possibility to operate the actuator remotely with OPEN position and CLOSE position

In remote position the local lights will operate.

Notice that for the remote position, the electrical signal for open and close must be constant, not pulse.

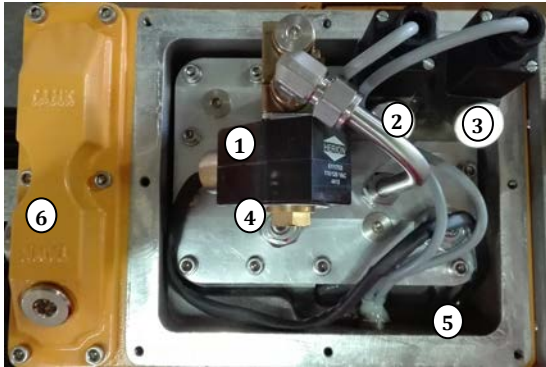
See the wiring diagram for more information.

7-HYDRAULIC SYSTEM: (Explosion Proof unit pictured)



Hydraulic system Fig.4

- To remove the oil from the unit, it will be needed to do so thru the purge tank plug.
- The hydraulic system is located under the hydraulic supply cover.



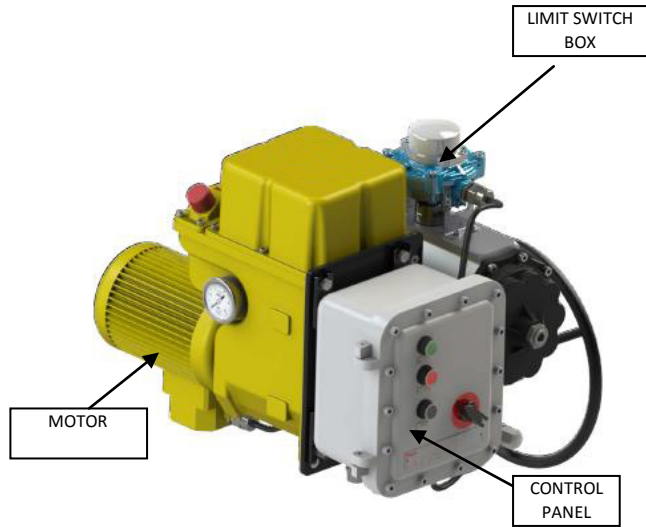
Hydraulic plate Fig.5

Items above and functions:

- 1. Solenoid valve 2/2 110 VDC**
Solenoid valve drives the oil to the actuator or to the tank depending on the position:
 - If solenoid valve is energized, it drives oil to the actuator and it opens.
 - If solenoid valve is de-energized, it drives oil to the tank and it closes.
- 2. Pressure switch P1**
Detects the pressure of the loop and stops the motor when actuator is open.
- 3. Pressure switch P2**
Safety pressure switch that when the pressure of the loop increase to 145 PSI (10 Bar), it energizes the solenoid valve.
- 4. Mechanic pump relief valve**
This mechanic relief valve set up the pressure driven by the hydraulic pump of the line. Normally is adjusted at 102 – 131 PSI (7 – 9 Bar)
- 5. Mechanic high pressure relief valve**
This mechanic relief valve reduces pressure of the system in case of overpressure. This valve normally is adjusted to shoot at 145 – 174 PSI (10 – 12 Bar)
- 6. Oil Tank**
Cover of the oil tank with a port to fill the tank of oil.



8-ELECTRIC SYSTEM: (Explosion Proof unit pictured)



Electric system Fig.6

The actuator is delivered completely wired between all parts. The only wiring needed is to connect the power of the line to the actuator and the wiring of remote control.

The motor is connected to the power supply of the actuator.

Limit switch box is 2xSPDT and is connected to the control cabin.

The electric wire is located inside the control panel



- 1. General breaker of the device**
Protects the power supply of overpressure and can give or cut the supply
- 2. Single relay**
To drive the solenoid valve
- 3. Single relay**
To drive the limit switch box
- 4. Contactor**
Protect the motor from increase of tension.
- 5. Remote wiring strip**
In case that remote control is used, wires must be connected to this strip

9-GENERAL CONDITIONS OF OPERATION

The actuators stop at the end of opening and closing through a Limit switch + a limit switch for pressure (up/down regulate valve).

The working pressure is between 87 – 145 PSI (6-10 bars), and are delivered regulated from to the factory and it shouldn't be manipulate. In any special case that need manipulate it, please contact RADIUS.

The overpressure is protected with the pressure relief valve, which evacuates the excess pressure to the tank.

If the pressure drops to 87 PSI (6 bars) the up/down control valve (limit switch of pressure) gives order to switch on the engine before that the springs move the actuator and the valve beginning to close.

In case of de energize the device, the actuator will close or open according to the fail position.

10-MANUAL OPERATION

The Electro-hydraulic actuators are prepared to install a RKS gearbox as manual override.



11-MAINTENANCE

A preventive maintenance of these actuators can help to reduce future problems.

Visually inspect the external components for to check that don't have any physical damage.

Check the oil level at least twice a year when the pump motor is turned off and the actuator is in spring return position.

Check the fuse of the control panel.

Test the battery of the programmable relay

Test run the unit regularly to prevent the valve from sticking due to long stand still periods.

WARNING: "ELECTRICAL FAIL"

If there is an electrical fail, check if security devices of the engine and control are not switched off.

If programmable relay do not have light, contact the supplier.

12-ADJUSTMENT

TRAVEL STOP ADJUSTMENTS

All Radius Electro-hydraulic are delivered totally adjusted between -1° and 91° degrees, but if you wish to modify the adjustment proceed as follows:

During the adjustment process is probably that the actuator will leak oil, because the chamber of the springs are full of oil. After the actuator adjustment is recommended to check the level of oil.

ADJUSTMENT OF OPENING

1. Taking the actuator closed loosen travel stop lock-nut.
2. Back the travel stop screw, O-Ring and nut as one assembly, a quarter turn in each side, unscrew (to open more) or screw (to open less)
3. Check the opening adjustment and if you didn't get what you wish repeat the operation again.
4. Once you get the adjustment wished, taking the actuator opened tighten the travel stop lock-nut

ADJUSTMENT OF CLOSING

1. Taking the actuator closed loosen travel stop lock-nut.
2. Loosen the travel stop screw, O-Ring and nut as one assembly, two turns in each side
3. Open de Actuator
4. Remove the travel stop screw, O-Ring and nut as one assembly
5. Turn the inner travel stop, a quarter turn in each side, unscrew (for to close more) or screw (for close less).
6. Assembly the travel stop screw, O-Ring and nut as one assembly until resistance is felt it is also very important to make sure that both end stops are equally adjusted.
7. Check the closing adjustment and if you didn't get what you wish repeat the operation again.
8. Once you get the adjustment wished, check the opening adjustment. If it isn't as you wish adjust it as specified in the adjustment of opening.



13 - TROUBLESHOOTING

NOTICED FAULT	POSSIBLE CAUSE	SUGGESTED REMEDY
Loss of actuator torque	Inadequate supply pressure	Verify that the process supply pressure value is within the required range pressure of the actuator (See actuator data plate) Check filter. If necessary replace
	Internal tubing leakage	If necessary tighten the nuts of the tube fittings.
	Wrong flow control valves settings	Adjust flow control valves to increase supply flow.
	Defective controls	Check the controls status, reset if necessary. Check and refer to components manufacturer's supplied user manual
	Increased valve torque	Check the valve manufacturers documentation
	Wrong valve sizing	Check the required valve torque (valve manufacturers' documentation) and the provided actuator torque (Radius documentation).
	Internal Actuator Piston Leakage (Damaged piston seals)	Replace the piston seals.
	External Actuator Leakage (Damaged cylinder seals).	Replace the cylinder seals.
STROKE NOT COMPLETED.	Setting of mechanical stops and/or limit switches not correct.	Adjust travels stops and/or limit switch settings.
	Defective valve.	Check the valve manufacturers' documentation.
IRREGULAR STROKE MOVEMENT	Irregular process supply pressure.	Check supplied oil pressure, pressure switch & relief valve. Adjust if necessary.
	Worn or sticky valve.	Check the valve manufacturers' documentation.
	Worn components	Consult Radius