

Operating instructions for MF worm gearbox

1 Preface

This instruction manual is designed to be an aid to the valve maker and the end user. It is not intended to be a fully comprehensive document as it would not be practical to cover all the possible applications.

The manual should be read in conjunction with the valve manufacturer's data and, where applicable, electric, hydraulic and pneumatic actuator manufacturers' data. Any data for additional ancillary equipment, such as limit switches, etc. should also be referred to.

Check also whether any drawings or other technical information has been supplied for the actuator.

2 Unit Description

The basic unit comprises of a 90°, 180° or 360° worm box. The high ratio reduction ensures back driving from the valve cannot occur and gives low input torque for high output torque. Input drive can be handwheel or electric/hydraulic/pneumatic actuator.

Reduction spur boxes can be added to the input face to increase the ratio. This is a standard feature on the larger units. The spur boxes can be single, double, triple or quadruple reduction.

Ancillary items are often supplied to customer requirements. Common features are:

- Padlock flanges.
- Declutch mechanisms.
- Friction locks (input and output).
- Pedestals mounted on input and output faces.
- Electrical/mechanical limit switches
- Chainwheels for remote operation.
- 90 degr. mitre boxes.
- Extended shafts and bearing arrangements.
- Output torque plug.
- Output adaptor flanges.
- Lever arms.
- Travelling nut stops.

3 Safety

At any time when maintenance is carried out on an actuator, the pipeline should be depressurised and drained.

Actuators should not be overloaded by placing extension bars in handwheels. On electric, hydraulic or pneumatic drives it is bad practice to drive in an overload condition.

The valve maker should consider the necessity for fitting a pressure relief valve to relieve pressure in the event of a valve stem seal failure. This can be fitted either in the valve, adaptor flange or the indicator cap of the actuator.

Setting of the actuator stop screw is the responsibility of the valve manufacturer. Once set, these should not be tampered with on site.

4 Storage

Isolate any electric wiring to limit switches or electric actuators before carrying out any maintenance work (if fitted). Ensure that power cannot be accidentally applied. This also applies to any hydraulic/pneumatic power lines.

Where eyebolts are fitted to actuators, they are to be used for lifting the actuator only.

4 Storage

Actuators must be stored in a clean, dry warehouse and protected from variations in temperature, high humidity and dust. Storage temperature range should be between 0°C to 50°C.

Units should be stored so as to avoid accidental damage.

At 3 monthly intervals, operate the actuator for one complete open/shut cycle either by handwheel or power device.

Inspect any unpainted surfaces for rust at 3 monthly intervals. Apply a preservative oil coating if require

Maintain records of storage/inspection for the above.

If the actuator has been operated every 3 months it should be returned to the factory for inspection and refurbishment after 10 years. If it has not been operated during storage, it should be returned after 5 years.

5 Installation Recommendations

Ensure that the valve stem, valve interface flange, actuator mounting flange bore, keys, etc. are thoroughly cleaned and deburred before fitting. Coat valve stem with suitable oil or grease to aid fitting. Apply liquid sealant or gasket to flange face, lower actuator into position on the valve. (The actuator bore should be a light clearance fit to the valve stem). Apply sealant or P.T.F.E. tape to flange bolts and tighten to the required torque, tighten opposing bolts to ensure actuator sits down square and concentric to the valve stem. (see Figure 1, illustration 1)

N.B. Dowel pins should be considered for location and anti-rotation of actuator to valve during operation.

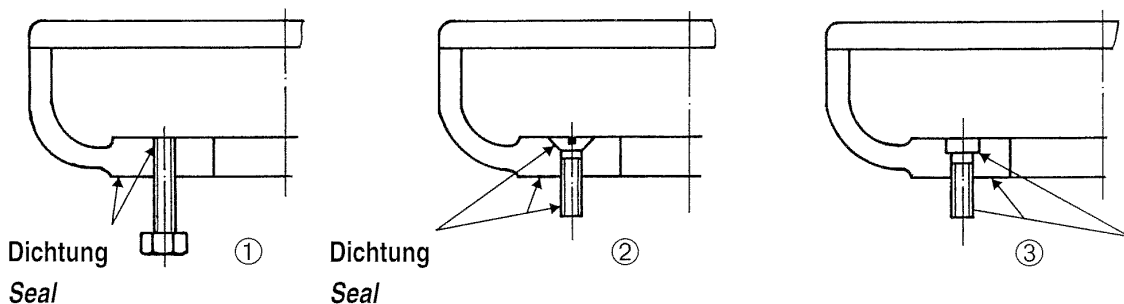


Figure 1

If any adaptor plate is fitted between the actuator and valve interface flange, this should be fitted to the actuator prior to lowering assembly on to the valve. The adaptor plate should be fitted concentric to the actuator bore. The flange is required to be sealed to the actuator. Dowel pins should be considered for location and anti-rotation of actuator. (see Figure 1, illustration 1 for sealing bolts).

For internal fixing screws, apply sealants to the under-side of the screw head and faces. (see Figure 1, illustration 2 and 3) Refit the actuator cover with a suitable sealant or gasket as supplied. Recommended sealant Loctite 574 or 572.

Unless otherwise specified, units are supplied grease filled for life, under normal operating conditions, this

is 10 years. If the worm box requires filling on installation (normally only if internal fixing screws are customer supplied) remove top cover and pack grease to the top of the quadrant gear teeth. Ensure a minimum of air pockets. Recommended grease is a good quality EP.2. No. 2 consistency which covers max/min operating temperature conditions. Spurboxes and mitres are always grease filled for life.

N.B. Special greases may be required for high/low temperature, nuclear, oxygen, firesafe or submersible applications.

After fitting the actuator to the valve, stop screws should be adjusted to suit the open and closed positions. For electric actuation drive, it is normal to set the open and shut position on the electrical limit stops. The manual actuator stop screws should then be wound down to the quadrant stop pad and wound back one half turn. The manual stop screws then are only contacted in the event of electrical limit switch failure.

N.B. stop screws insulate with sealant or PTFE tape.

Fill any cavity above the valve stem, under the indicator cap, with grease to avoid corrosion and ingress of water. Seal indicator cap to quadrant with a suitable sealant.

The handwheel is supplied separately from the actuator and will require fitting. This will be secured by a tension pin or a grubscrew and keyed fixing.

If electric actuator drive requires fitting, ensure coupling, input shaft, input adaptor face and electric actuator mating face are thoroughly cleaned and deburred before fitting. Fit shaft coupling in correct position on input shaft and tighten grubscrew. Mount electric actuator to flanged adaptor, fit and tighten bolts to correct torque. Refer to electric actuator manufacturers' instructions.

Where angles other than 90° or 180° are required by customers, travelling nut stop assemblies are used in place of stop screws. To adjust, remove the travelling nut stop housing, rotate locknuts/actuator to required open/shut position, tighten locknuts. Coat the assembly with a suitable grease and replace the housing. Further details and drawings can be furnished on request.

6 Painting

The actuators are normally supplied with a red oxide primer finish for the customer to apply finish paint coating. It is the customer's responsibility to sufficiently mask off any sensitive areas prior to any painting or shot-blasting and painting work.

Attention is drawn to the following sensitive areas:

- Input shaft.
- Quadrant journals (particularly upper journal beneath the indicator cap).
- Quadrant bore.
- Actuator mounting face.
- Any moving parts on declutch type units or lever arm units
- Electric switches and ancillary equipment.
- The nameplate or instruction plates may be removed temporarily or masked.

After final painting, clean and apply a small amount of grease around the top quadrant journal as this can wash out with cleaning solvents on the painting process. Failure to pay attention to this detail may result in premature corrosion at this point.

7 Operation

For manual operation, rotate the handwheel in the desired direction to open or close the valve. Industry standard is clockwise rotation to close. Check that this is the case for your application. Refer to the indicator cap

pointer for actual positions of valve seat prior to operation.

For electric/hydraulic/pneumatic drive refer to the drive manufacturers' instructions.

Worm declutch units(MVWD, MAWD, MCWD) will normally be in the disengaged position and are only engaged when a pneumatic failure occurs. To engage, lift plunger, raise handle to the position where the plunger automatically springs into position. The handwheel will normally need rotating to help with gear tooth meshing. There is an instruction plate on the cover of all units.

To disengage reverse the engagement procedure.

8 Maintenance

The units require very little maintenance if all storage and installation procedures have been followed. It is good practice at six monthly intervals to add a small amount of grease around the top quadrant journal and also around the input shaft on handwheel drives. If the valve is normally idle, operate one full open/shut cycle every three months.

Should any major maintenance or strip down work be required, we recommend that the unit should be returned to our factory.