

Signaling & Control Accessories

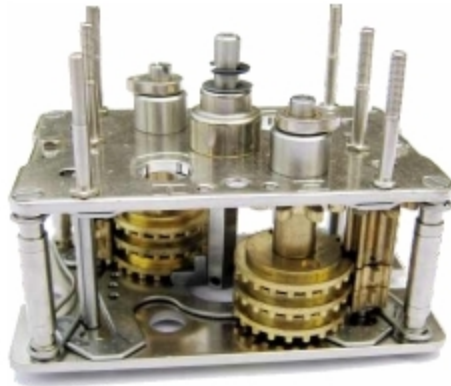
Limit Switching

The limit switching enables actuators to switch off when reaching defined valve position, usually end positions. The valve travel is measured by mechanical counter gear mechanism, which when reaching the set switching points, operate the electrical limit switches by cams. The setting accuracy is 1/10 of a turn of actuator output shaft.

In limit switching, Two train counter gear and Four train counter gear versions are available.

Two Train Counter Gear

For Two train counter gear, two limit switches, one for each direction of travel having 1 NO + 1 NC or 2 NO + 2 NC contacts are provided. The number of spindle turns can be set between 1 and 480 or 1 and 4800.



Two Train Counter Gear

Four Train Counter Gear

If limit switching is required at two end positions only, Two train counter gear is used. However, if two additional intermediate switching positions are desired, Four train counter gear is required. This limit switching has four counter gears and four limit switches. Two counter gears are used to switch off at end positions as in Two train counter gear while the other two are available for setting any desired intermediate positions between end positions. After cam actuation, the switches remain actuated till reaching end of valve travel.

Example of such applications are:

- To stop at intermediate position.
- Sequence control, that is to start another equipment like pump or bypass valve actuator after certain travel of valve.

The accuracy of setting is 1/10 of a turn of actuator output shaft. For four train counter gear, four limit switches of 1 NO + 1 NC or 2 NO + 2 NC contacts are provided.



Four Train Counter Gear

Torque Switching

The torque switching enables to switch off the actuator when pre-determined torque is reached. The torque switching works on principle of sliding worm.

Axial displacement of worm proportional to thrust is transmitted to torque switches. Torque switches operate in closing & opening directions. The required tripping torque can be easily set on the graduated dial and can be read directly in daNm. If limit switch cut off is selected prior to torque switch, then torque switch serves as overload protection.

For tight seating of certain valves, the actuator must be operated to end position CLOSED with defined force. Such operation can be carried out by torque seating. Limit seating is commonly used in the end position OPEN.

When torque seating is used at end position, limit switches can be used for signalization. Therefore, actuator controls can differentiate whether actuator was switched off by torque switch or by limit switch. Micro switches of torque switching are provided with 1 NO + 1 NC or 2 NO + 2 NC contacts for both open and close directions.



Torque Switching

Running Indication

Blinker switch is provided in the actuator and can be used as running indicator.



Blinker Switch

Micro Switches

With the help of micro switches, mechanical parameters such as travel & torque are converted into electrical signals for actuator control. There are four switches in the basic version:

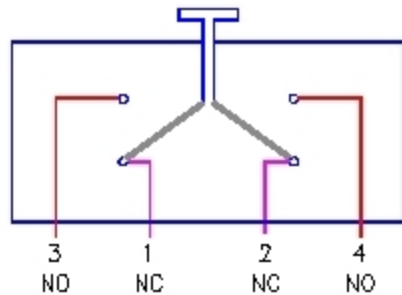
- One limit switch each for the end positions OPEN and CLOSE.
- One torque switch each for the directions OPEN and CLOSE.

Limit switches are tripped when an end position is reached and torque switches are tripped when the set tripping torque is exceeded.

The micro switches are individually sealed to enclosure protection class IP 66, as per IS 13947. The micro switches have double break change over potential free contacts. The circuit is interrupted simultaneously at two points. The basic versions of the switch contacts are of silver. For low current ratings, micro switches with gold plated contacts are available as an option.

Single and Tandem Micro Switches

Limit and torque switches are available in single or tandem versions.

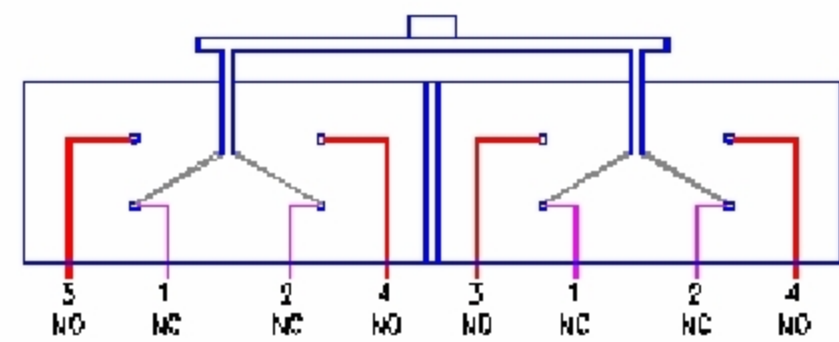


Single Micro Switch

Limit or torque switches in tandem version have additional switching contacts. These contacts can be wired for following applications:

- Switching another circuit also with different voltage and current.
- Safety function, to operate with single switch.
- Multiplying the available contacts, example for signalization.

For such applications, a relay is recommended since there may be small differences in tripping points of tandem switches.



Tandem Micro Switch

| Technical Data - Micro Switch Ratings | | | | | | |
|---------------------------------------|------------------------------------|------------------|------|-------|-------|---------------------------------------|
| Type of Switch | Type of Current | Rating in Amp at | | | | Approximate Electrical Contact Rating |
| | | 30 V | 75 V | 125 V | 250 V | |
| Limit and Torque | AC, $\cos \phi = 0.8$ Inductive | 8 | 7 | 6 | 5 | 50,000 cycles at 250 V AC, 5 A |
| | DC Inductive | 5 | 1 | 0.2 | 0.1 | 50,000 cycles at 250 V DC, 0.1 A |
| | DC Resistive | 7 | 1 | 0.5 | 0.25 | 50,000 cycles at 250 V DC, 0.25 A |
| Blinker | AC, $\cos \phi = 0.8$ Inductive | | | | 4 | |

Signaling & Control Accessories

Reduction Gear Unit

A reduction gear unit (RGU) in the actuator is used for mechanical position indication, remote position indication and for operation of intermediate switches. The output shaft of the actuator drives final output shaft of RGU through a series of reduction gears and final shaft turns by approximately 270° while actuator output shaft performs full number of turns as set on Two train or Four train counter gear unit. The reduction gear ratio needed for each particular case is fitted at works if the ratio is known. For this purpose fixed RGU is supplied. If the ratio needs to be altered at site, variable ratio RGU is available, which allows simple modification at site depending upon number of output shaft for full stroke of valve.



Reduction Gear Unit (RGU)

Position Indicators

Continuous Mechanical Position Indicator

Adjustable discs having symbols for OPEN and CLOSE indicate the position of the valve continuously. The discs can be seen through an indicator glass on switch compartment cover. The OPEN-CLOSE discs can be set to coincide with limit switching. The mechanical position indicator requires reduction gear unit for operation.

*As an option digital mechanical position indicator can be provided in place of mechanical position indicator.



Continuous Mechanical Position Indicator

* As an option the position display can be provided by either analog or digital remote position indicator.



Digital Remote Position Indicator

Intermediate Switches

With this limit switching, additional switching points can be set for each direction of rotation. The switching can be set between 25% and 75% of valve travel in each direction. The switch sub-assembly consisting of 2 or 4 cam switches is mounted on output shaft of RGU. Each micro switch has 1 NO + 1 NC contact.



Intermediate Switches

Space Heater

Condensation in the actuator is possible due to wide fluctuation of the ambient temperature. The heater integrated in the control unit prevents the water condensation. The heater is rated for continuous duty.

*Self regulating space heater and space heater with thermostat can also be provided on request.

Technical Data - Space Heater

| | | | | | |
|------------------|-----|-------|-------|-------|-----|
| Volts, AC | 230 | 230 | 110 | 110 | 24 |
| Resistance, Ohms | 5 k | 2.7 k | 1.2 k | 0.6 k | 120 |
| Rating, Watts | 10 | 20 | 10 | 20 | 5 |

Manual Operation

During commissioning or in an emergency or when there is no power supply, actuator can be operated by handwheel. The manual drive is engaged by means of a lever. When motor starts running, the manual drive gets disengaged immediately & handwheel does not rotate during power operation.

In manual operation, hammer blow can be effected with handwheel. The hammer blow makes it possible to open a jammed or rarely operated valve.

Top Bevel Gear Set

Using a side mounted handwheel instead of the standard handwheel can further reduce manual effort on the handwheel. Reduction ratios available are:

| | |
|----------------------|-----|
| SA 3 / 6 / 12 / 15 | 2:1 |
| SA 25 / 30 / 50 / 60 | 3:1 |
| SA 100 | 4:1 |

Instead of handwheel, a chain pulley can also be provided for actuators mounted in inaccessible zones.



Top Bevel Gear Set