

## Final Control Elements

### MINI-TOP ELECTRONIC ACTUATOR

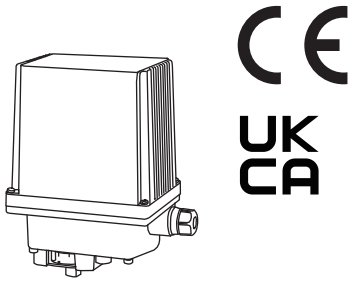
(rotary type)

#### Functions & Features

- Small-size control valve actuator
- 1/1000 high resolution
- Easy adjustment: electronic limiter at the valve open & closed positions
- Overload protection
- Various power inputs

#### Typical Applications

- Actuator for automatic control valve in pilot plants
- Air-conditioning in buildings or plants
- Micro-flow control for pharmaceutical injection
- For small-size control valves



### MODEL: MRP6-[1][2][3][4]-[5][6][7]

#### ORDERING INFORMATION

- Code number: MRP6-[1][2][3][4]-[5][6][7]
- Specify a code from below for each of [1] through [7].  
(e.g. MRP6-16LT-A0R)
- Special input range (for codes Z and 0)

#### [1] SPAN

- 1: 45 to 90 degrees
- 2: 90 to 180 degrees

#### [2] OPERATION TIME, TORQUE

- 3: 4 seconds / 90°, 10 N·m
- 4: 7 seconds / 90°, 16 N·m
- 6: 13 seconds / 90°, 33 N·m

#### [3] SEQUENTIAL CONTROL SIGNALS

- L: Full-open/-closed signal
- F: Forced open/close signal
- B: Full-open/-closed and forced open/close signals

(Select 'With Terminal Box.')

0: Without

#### [4] TERMINAL BOX

T: With

0: Without

#### [5] INPUT

Current

A: 4 - 20 mA DC (Input resistance 250 Ω)

Z: Specify current (See INPUT SPECIFICATIONS)

Voltage

6: 1 - 5 V DC (Input resistance approx. 1 MΩ)

0: Specify voltage (See INPUT SPECIFICATIONS)

#### [6] CE & UKCA MARKING

C: With CE and UKCA

0: Without

#### [7] POWER INPUT

AC Power

K3: 100 - 120 V AC

(Operational voltage range 90 - 132 V, 47 - 66 Hz)

(Not selectable for CE and UKCA)

L3: 200 - 240 V AC

(Operational voltage range 180 - 264 V, 47 - 66 Hz)

(Not selectable for CE and UKCA)

DC Power

R: 24 V DC

(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

#### GENERAL SPECIFICATIONS

**Degree of protection:** IP66

**Action:** Direct or reverse; field selectable with DIP switches (factory set to "reverse")

(In "reverse" action, the output stem seen from the cover turns counterclockwise with an input signal increase.)

**Operation at abnormally low input:** Counterclockwise turn, clockwise turn or stop; field selectable with DIP switches (factory set to "clockwise")

Note: Counterclockwise or clockwise if seen from the cover.

**Detectable input drop level:** -16 ±2.5 %

**Electrical connection**

•Without terminal box

**Wiring conduit:** cable connector with 1 meter wire (0.5 mm<sup>2</sup>)

•With terminal box (Sequential control signal suffix code: B)

**Wiring conduit:** G 1/2 female (two)

**Terminal screws:** M3 pillar terminal

•With terminal box (Sequential control signal suffix code:

other than B)

**Wiring conduit:** G 1/2 female (two)  
**Terminal screws:** M3 chromated steel (torque 0.5 N·m)  
**Housing material:** Diecast aluminum  
**Drive:** Stepping motor  
**Insulation class:** E  
**Position detection:** Potentiometer  
**Deadband:** 0.1 – 4.5 % adjustable (factory set to 1.5 %)  
**Restarting timer:** 0 – 10 sec. adjustable (factory set to 1.5 sec.)  
**Isolation:** AC power to signal  
**Zero adjustment:** 0 – 25 %  
**Span adjustment:** 50 - 100 %  
**Protective functions:** Overload protection  
**Power indicator:** Green LED turns on with power supplied.  
**Input indicator:** Green LED turns on with normal input  
**Status indicator LED:** Red light blinks in 2 sec. intervals in normal operations; blinks in 0.5 sec. intervals when a foreign object is detected mechanically caught inside.  
**Manual operation:** Available

## INPUT SPECIFICATIONS

- **DC Current:** Input resistor incorporated (250 Ω)
- **DC Voltage:** 1 – 5 V DC or specific range within 0 – 5 V DC, minimum span 1 V  
 (For a current input, convert the current to a voltage with 250 Ω)
- Input resistance:** Approx. 1 MΩ
- **Forced open/close signal:**  
 Dry contact inputs to command clockwise and counterclockwise turns
- Rating:** 5 V DC @ 2.5 mA

## OUTPUT SPECIFICATIONS

- **Operation Time & Torque** (at rated power voltage)  
 MRP6-x3: 4 seconds / 90° 10 N·m (7.38 ft·lbf)  
 MRP6-x4: 7 seconds / 90° 16 N·m (11.8 ft·lbf)  
 MRP6-x6: 13 seconds / 90° 33 N·m (24.3 ft·lbf)
- **DC Voltage:** 1 – 5 V DC (not isolated)  
 With “direct” action, 5 – 1 V DC position output is provided proportionally to 4 – 20 mA DC (1 – 5 V DC) input.
- Load resistance:** ≥ 5 kΩ
- **Full-open / -closed signals:** Limit switch contact
- Rating:** 125 V AC @ 0.75 A (cos φ = 1)  
 30 V DC @ 0.6 A (resistive load)
- Mechanical life:** 3 × 10<sup>7</sup> cycles
- Maximum operation frequency:** 60 cycles/min.

## INSTALLATION

**Power consumption**  
 •AC: Approx. 25 VA

- DC: Approx. 0.6 A
- Operating temperature:** -5 to +55°C (23 to 131°F)
- Operating humidity:** 30 to 85 %RH (non-condensing)
- Vibration:** 0.5 G (4.9 m/s<sup>2</sup>) max.
- Mounting position:** All directions

Do not mount the actuator with its output stem or cable connector on the upside if the actuator is to be exposed to dripping water.

**Weight**  
 DC powered: 2.7 kg (5.96 lb)  
 AC powered: 2.8 kg (6.17 lb)  
 Add 0.5 kg (1.1 lb) for the terminal box.

## PERFORMANCE

**Resolution:** 1/1000 or 0.09°, whichever is greater, with 0.1 % deadband setting

**Insulation resistance**  
 •AC powered: ≥ 100 MΩ with 500 V DC (signal or metallic housing to power)  
 ≥ 100 MΩ with 100 V DC (signal to metallic housing)  
 •DC powered: ≥ 100 MΩ with 100 V DC (signal or power to metallic housing)

**Dielectric strength**  
 •AC powered: 1500 V AC @ 1 minute (signal or metallic housing to power)  
 100 V AC @ 1 minute (signal to metallic housing)  
 •DC powered: 100 V AC @ 1 minute (signal or power to metallic housing)

## STANDARDS & APPROVALS

- **EU conformity (CE marking)**
  - EMC Directive  
 EMI EN 61000-6-4  
 EMS EN 61000-6-2
  - Low Voltage Directive  
 EN 61010-1  
 Measurement Category II (125 V)  
 Reinforced insulation:  
 Full-open/-closed signal to other signals or power  
 Full-open/-closed signal to metal housing  
 Pollution Degree 2
  - RoHS Directive  
 EN IEC 63000
- **UK conformity (UKCA marking)**  
 The UK legislations and designated standards equivalent to the applicable EU directives.

**TERMINOLOGY**

• **Overload (Lock) Protection**

The Mini-Top Series is equipped with a protection circuit against overload caused by for example the valve catching an alien substance.

When an overload is detected, the Mini-Top stops supplying power to the motor and the status LED blinks in 0.5 sec. intervals.

The protection is reset automatically with applying opposite-direction input signal or turning the power off and restarting.

• **Restarting Timer**

The Mini-Top Series is equipped with a timer circuit which gives an interval period (0 - 10 seconds) between stop-restart actions to prevent the motor and other internal components from overheating.

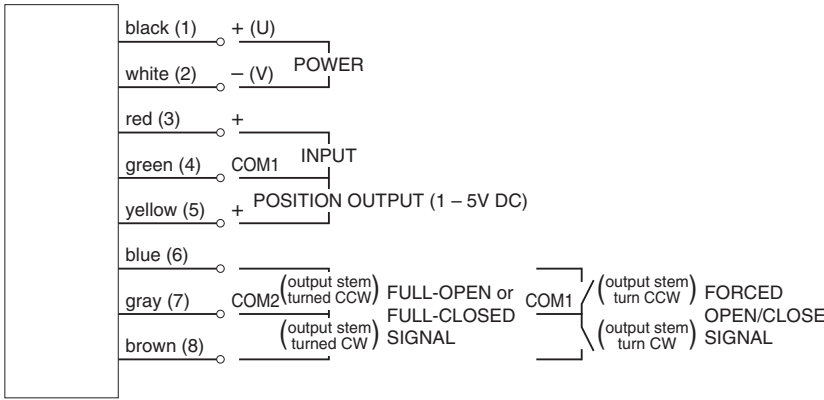
It is recommended to set a long restarting time when the ambient temperature and/or the temperature of flow material is high.

• **Electronic Limiter**

This model is equipped with electronic limiters in order to prevent mechanical locks when the input goes below 0 % or above 100 %.

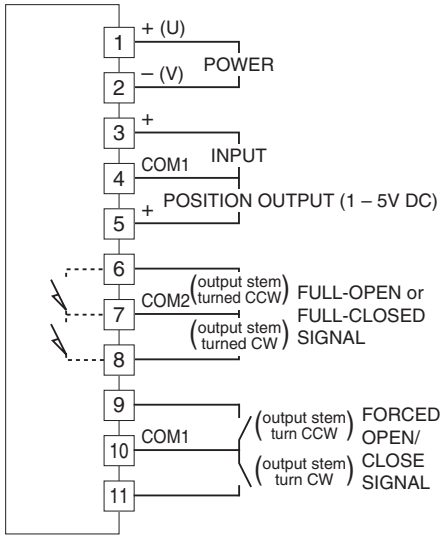
Limiters are set at approx. -0.5 % for the full-closed side, approx. 100.5 % for the full-open side.

**TERMINAL CONNECTIONS**

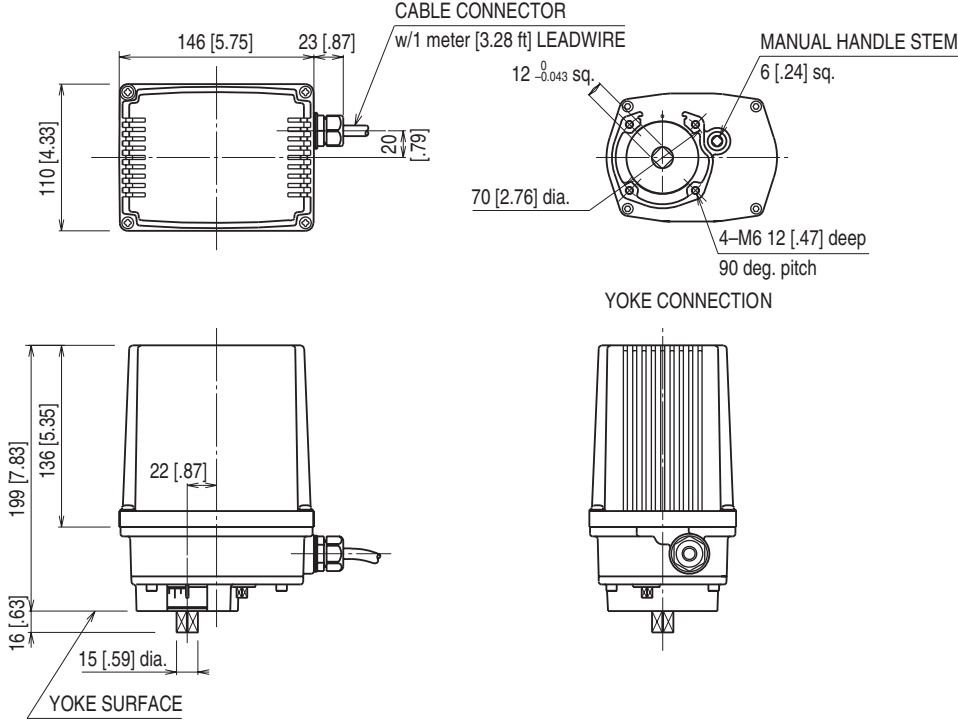


(1) to (8): Terminal No. of terminal box.  
Full-open/-closed signals and forced open/close signals are optional.

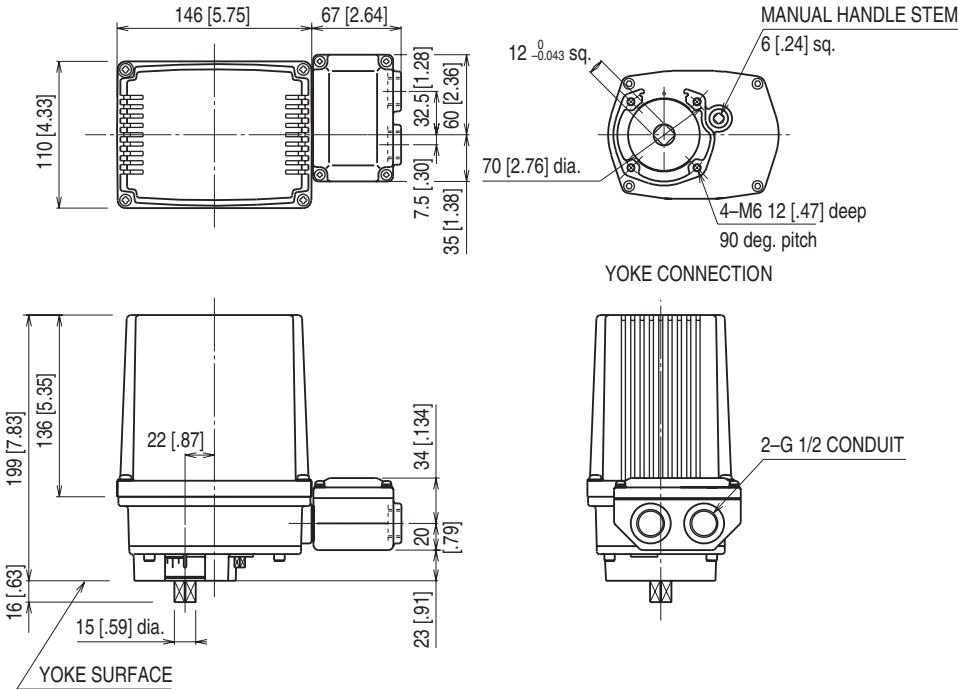
• **With Both Full-open/closed Signal and Forced Open/Close Signal**



**EXTERNAL DIMENSIONS unit: mm [inch]**

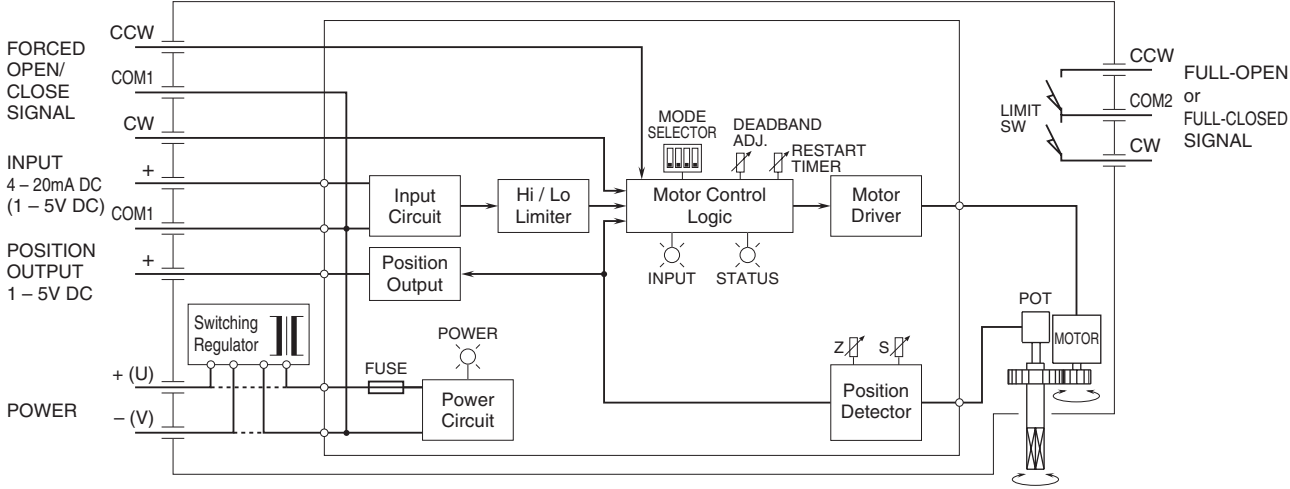


■ TERMINAL BOX TYPE




Cable connector or leadwires not provided with terminal box.

**SCHEMATIC CIRCUITRY**



Full-open/-closed signals and forced open/close signals are optional.  
Disregard the switching regulator circuit for DC power input.

 Specifications are subject to change without notice.