

Final Control Elements

MINI-TOP ELECTRONIC ACTUATOR

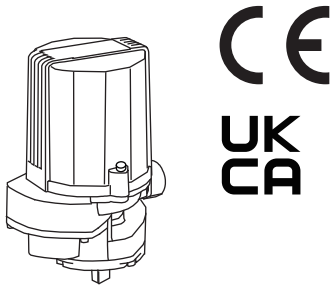
(rotary type)

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: MRP5-14[1][2]-[3][4][5]

ORDERING INFORMATION

- Code number: MRP5-14[1][2]-[3][4][5]
- Specify a code from below for each of [1] through [5]. (e.g. MRP5-14LT-A0R)
- Special input range (for codes Z and 0)

SPAN

1: 45 to 90 degrees

OPERATION TIME, TORQUE

4: 13 seconds / 90°, 10 N·m

[1] 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

[2] TERMINAL BOX

- T: With
- 0: Without

[3] 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)

[4] CE & UKCA MARKING

- C: With CE and UKCA
- 0: Without

[5] 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 mm²)
- 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 operating handle: Not 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)**
MRP5-14: 13 sec. / 90°; 10 N·m (7.38 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 × 10⁷ 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/s²) 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: 1.5 kg (3.31 lb)
AC powered: 1.7 kg (3.75 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.

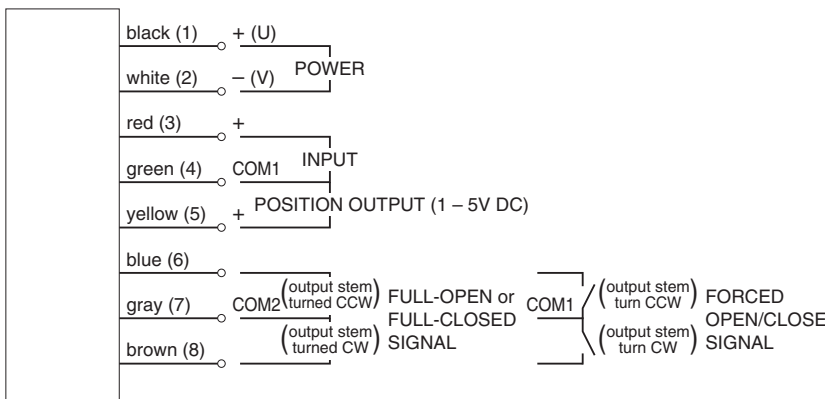
It is recommended to set a long restarting time when the ambient temperature and/or the temperature of flow material is high.

• **Electronic Limiter**

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

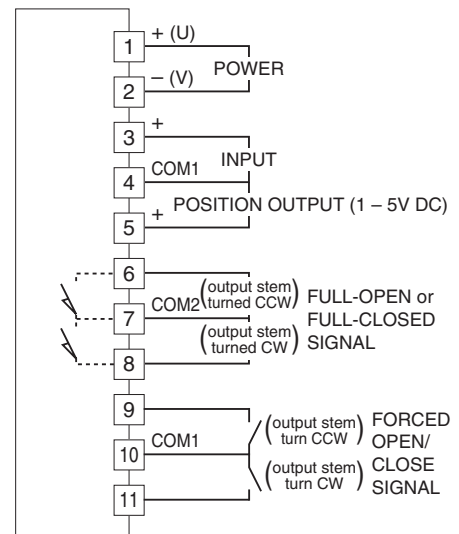
Limiters are set at approx. -0.5 % for the full-closed side, approx. 100.5 % for the full-open side.

TERMINAL CONNECTIONS

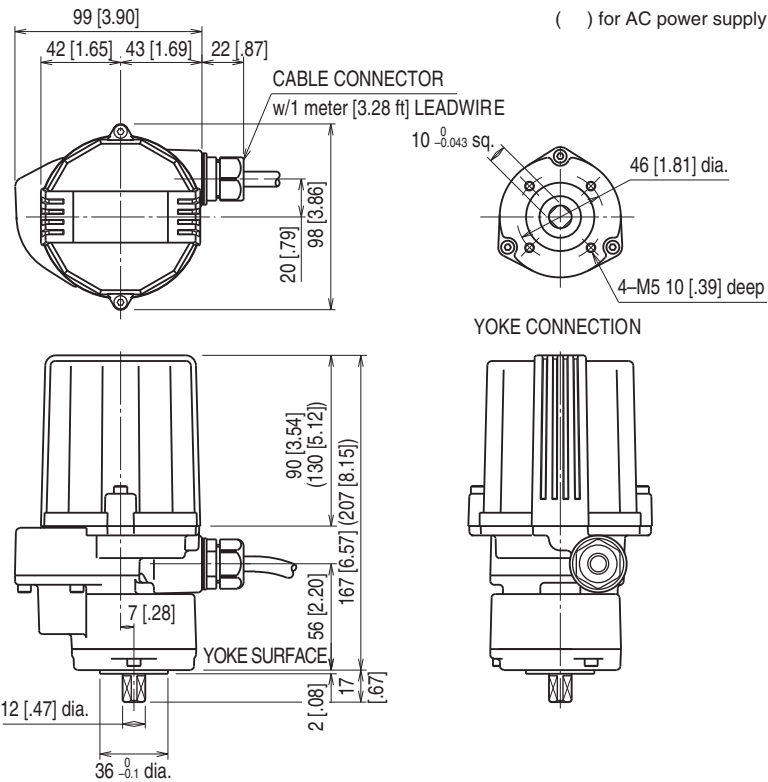


(1) to (8): Terminal No. of terminal box.
Full-open/-closed signals and forced open/close signals are optional.

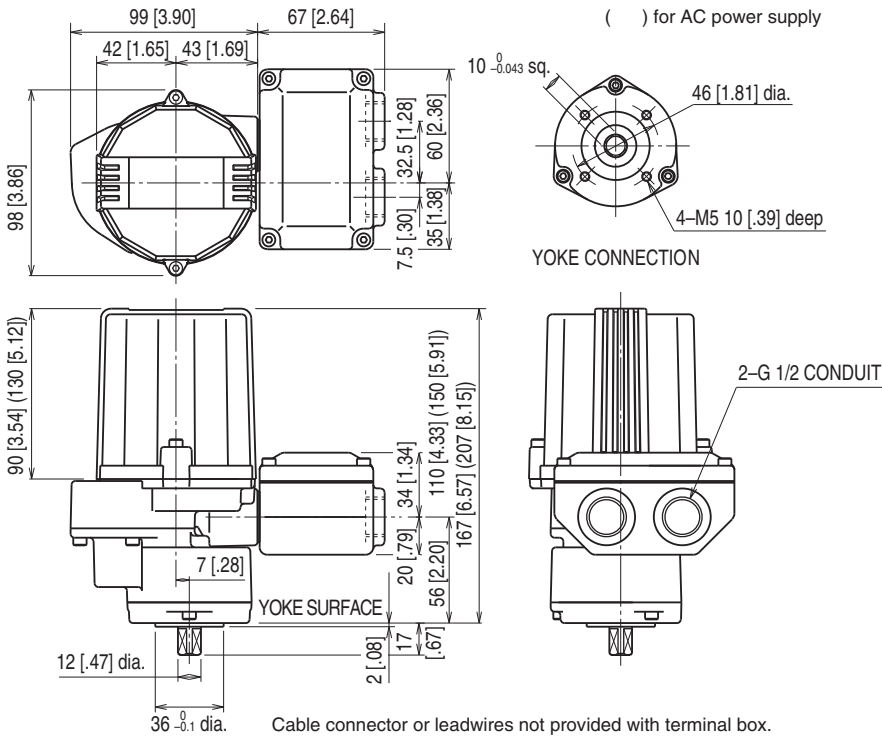
• With Both Full-open/closed Signal and Forced Open/Close Signal



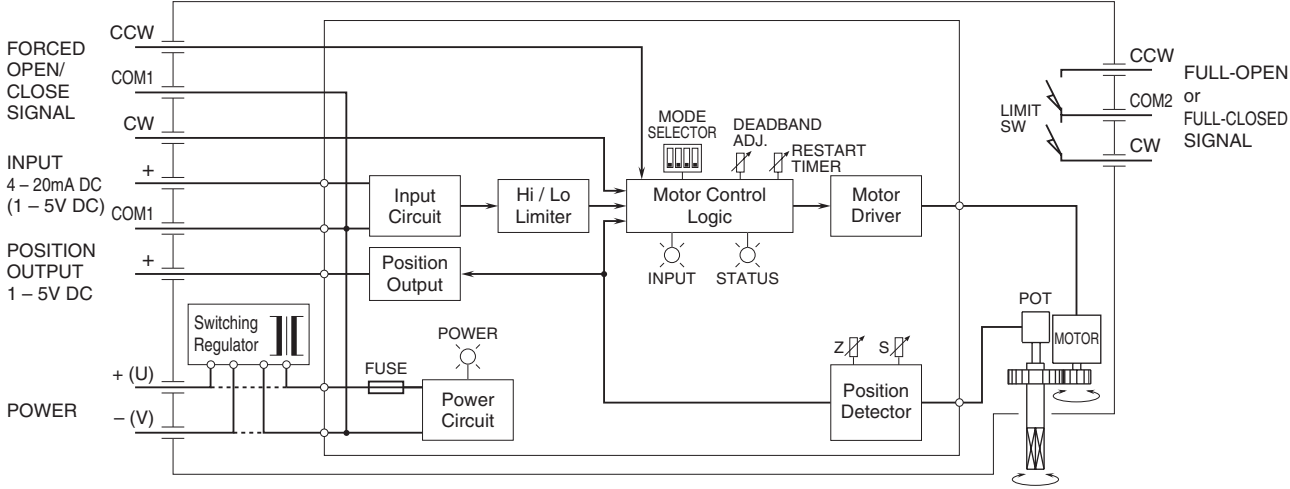
EXTERNAL DIMENSIONS unit: mm [inch]




■ TERMINAL BOX TYPE



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.