

## Final Control Elements

### MINI-TOP ELECTRONIC ACTUATOR

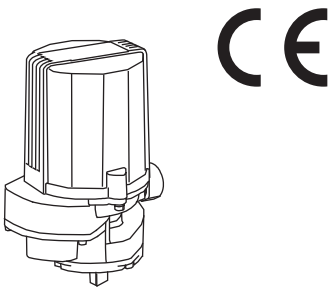
(rotary type)

#### Functions & Features

- Small-size control valve actuator
- Electrical positioner incorporated
- 1/1000 high resolution
- Easy adjustment: electronic limiter at the valve open & closed positions
- Overload protection
- Various power inputs
- CE marking available for 24 V DC power

#### Typical Applications

- Actuator for automatic control valve in pilotplants
- 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 [1] through [5].  
(e.g. MRP5-14LT-AOR)
- 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 MARKING

C: With

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)

L3: 200 - 240 V AC

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

(Not selectable for CE)

##### DC Power

R: 24 V DC

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

#### GENERAL SPECIFICATIONS

Degree of protection: IP55

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

##### •No terminal box

Wiring conduit: G 1/2 female; cable connector with 1 meter wire (0.5 mm<sup>2</sup>) provided

##### •Terminal box

Wiring conduit: G 1/2 female (two)

Terminal screws: M3 pillar terminal  
(Sequential control signal suffix code B)  
M3 chromated steel

(other terminal box types)  
(torque 0.5 N·m)

**Housing material:** Diecast aluminium

**Drive:** Stepping motor

**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:** Not available

## INPUT SPECIFICATIONS

- **DC Current:** Input resistor incorporated (250  $\Omega$ )
- **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  $\Omega$ )
- **Input resistance:** Approx. 1 M $\Omega$
- **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·lbs)
- **Position Output:** 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:**  $\geq$  5 k $\Omega$
- **Full-open / -closed signals:** Limit switch contact
- **Rating:** 125 V AC @ 0.75 A ( $\cos \phi = 1$ )  
30 V DC @ 0.6 A (resistive load)
- **Mechanical life:**  $3 \times 10^7$  cycles
- **Maximum operation frequency:** 60 cycles/min.

## INSTALLATION

### Power Consumption

- **AC power input:** Approx. 25 VA
- **DC power input:** 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 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 lbs)

**AC powered:** 1.7 kg (3.75 lbs)

Add 0.7 kg (1.54 lbs) for the terminal box.

## PERFORMANCE

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

### Insulation resistance

• **AC powered:**  $\geq$  100 M $\Omega$  with 500 V DC  
(signal or metallic housing to power)

$\geq$  100 M $\Omega$  with 100 V DC

(signal to metallic housing)

• **DC powered:**  $\geq$  100 M $\Omega$  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

### CE conformity:

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007

EMS EN 61000-6-2: 2005

Low Voltage Directive (2006/95/EC)

EN 61010-1: 2001

Measurement Category II

Pollution Degree 2

Full-open/-closed signal to other, power or metallic housing: Reinforced insulation (125 V)

## 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.

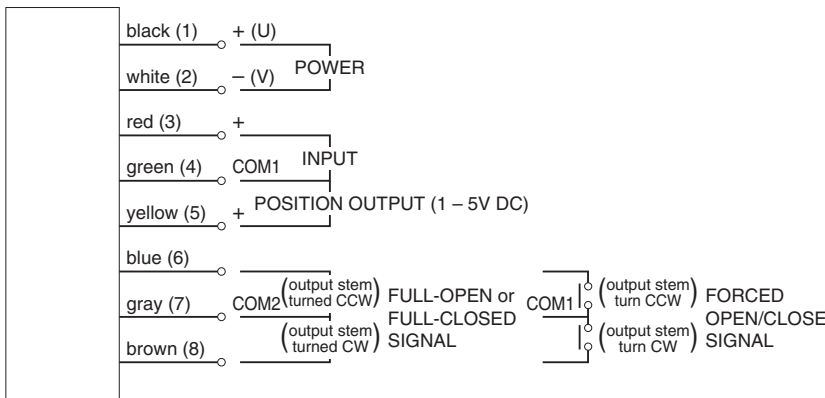
It is recommended to set a long restarting time when the ambient temperature and/or the temperature of flow material is high.

• **Electronic Limiter**

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

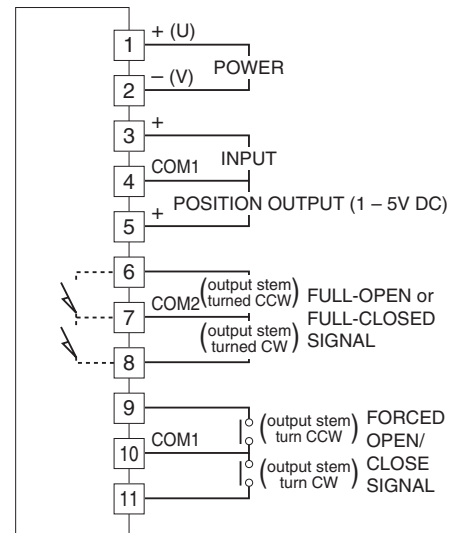
Limiters are set at approx. -0.5 % for the full-closed side, approx. 100.5 % for the full-open side.

## TERMINAL CONNECTIONS

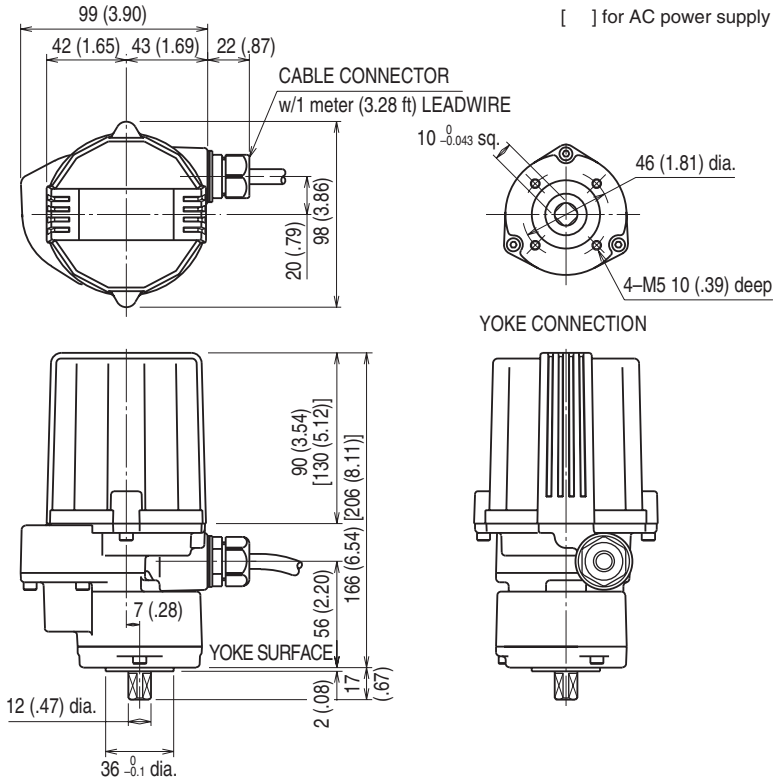


(1) to (8): Terminal No. of terminal box.  
Full-open/-closed signals and forced open/close signals are optional.

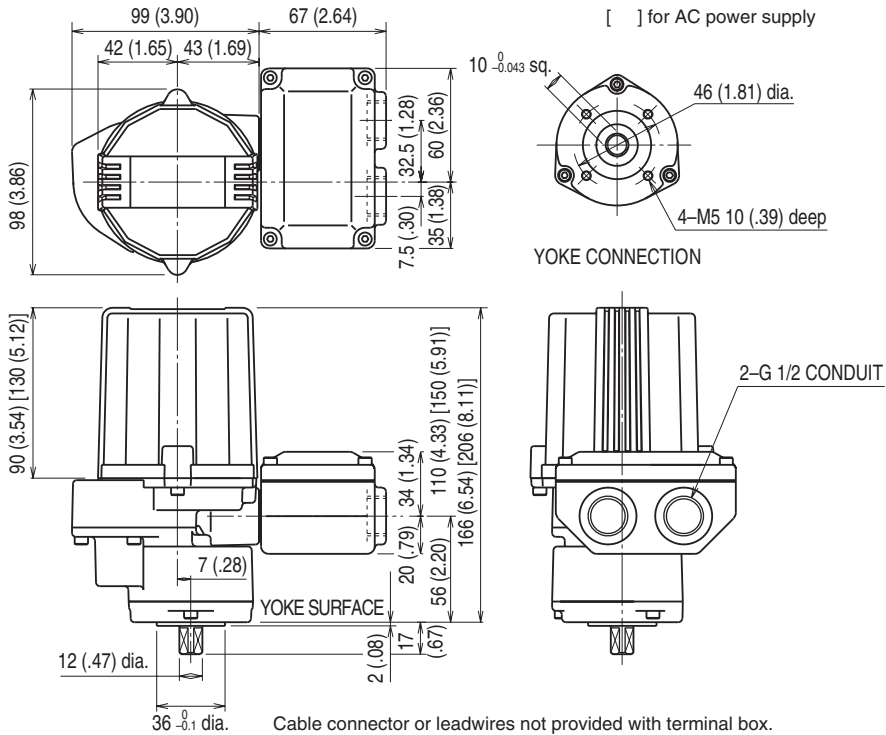
• With Both Full-open/closed Signal and Forced Open/Close Signal



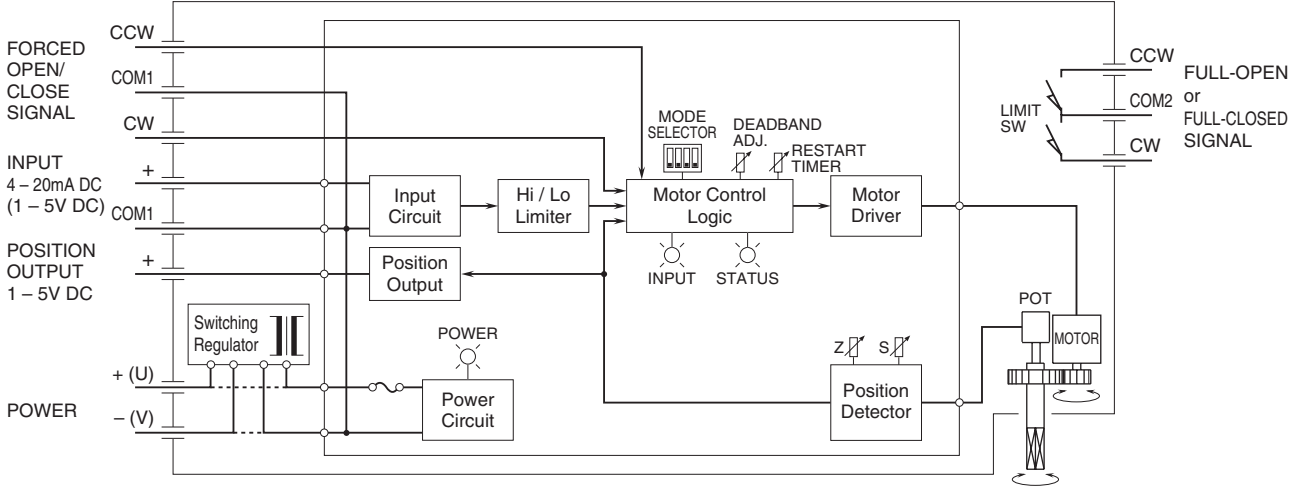
**DIMENSIONS unit: mm (inch)**




■ 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.