LATCHING SOLENOIDS

Featuring Long-Stroke Specifications

- 10 mm (ordinarily 5 mm)

High Durability

- 500,000 cycles

* (as tested by Takano Co. in a standard testing environment)

TSBP-09BN1
(Single-Sided Latching Model)

- Capable of maintaining position in only one direction.

* (This model requires separate return springs to maintain position in 2 directions)

TSB-LS
(Low-Noise Model)

- Suppresses operating noise.

FEATURES

1 Bi-stable Driving Force

Since our models carry out reciprocating motion without the use of springs, operating instead on the change of electrical current, our models maintain a stable response speed with no variation in torque upon activation. Even when current is cut off, the solenoid stays in its position using the holding force of a permanent magnet.

2 Power-Saving/Low-Heat

Since current is only required when driving the solenoid, no holding current is required. This makes the device both energy-efficient and free from problems caused by coil temperature rise or heat generation. (This is because the shaft stays in position using the magnetic force of a permanent magnet, even after the coil is de-energized.)

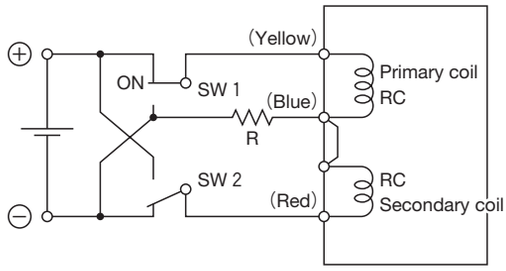
APPLICATIONS

1. **Light Control**
   can be used to block or polarize light, to switch between lights, and to change the color or amount of light.
2. **Sorting/Screening**
   can be used to sort or screen (mail, etc.).
3. **Locking/Positioning**
   can be used for electric locking or halting (of moving items on a conveyor belt, etc.).
4. **Valves**
   can be used to open and close plumbing or tubing by means of a clamp.

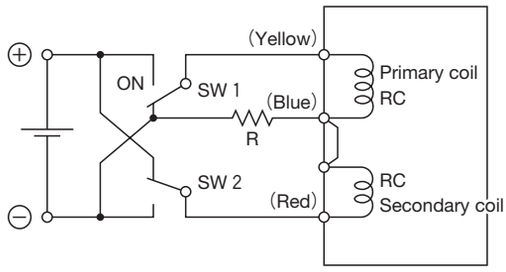
1 OPERATING PRINCIPLES

◆TSB Series

When switch SW 1 is turned on (with SW 2 off), the shaft is pulled to the primary coil side. Even if switch SW 1 is reset the shaft stays in position.



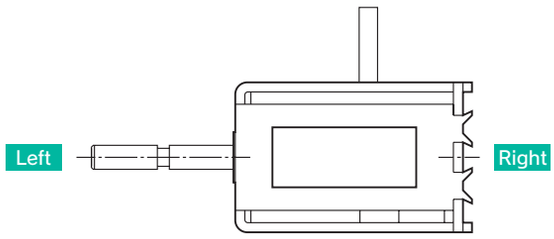
When switch SW 2 is turned on (with SW 1 off), the shaft is pulled to the secondary coil side. Even if switch SW 2 is reset the shaft maintains its position.

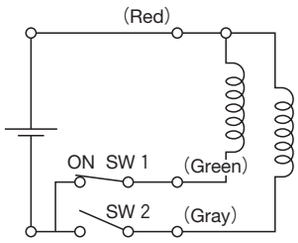


In either case, in order to cancel out the holding power of the permanent magnet on both coils (not just on the holding side), it is necessary to insert an external resistor (R) for degaussing. Thus, the unit operates on a two-loop structure.

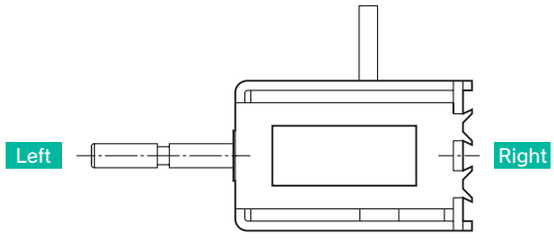
◆TSBP-09BN1 (Single-Sided Latching Model)

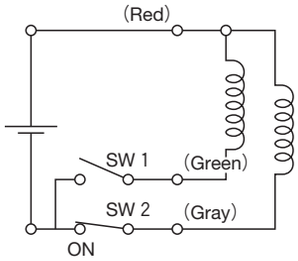
When switch SW 1 is turned on (with SW 2 off), the shaft is pulled from right to left. Even if switch SW 1 is reset the shaft stays in position.





When switch SW 2 is turned on (with SW 1 off), the switch is pulled from left to right.





2 INSTRUCTIONS AND PRECAUTIONS FOR USE

◆Attractive Force Data

The attractive force data of each of our products were measured by means of a load-testing device in a standard testing environment, with no load and with the shafts in a vertical position. Since we are able to adjust the stroke and attractive force to best match your intended load, please feel free to consult with us.

◆Response Characteristics

The response characteristics of each of our products were measured in a standard testing environment with no load and with the shafts in a horizontal position; we measured the current waveform while the product was stabilized in a heat sink.

Standard Testing Environment····Ambient Temp 20±15℃, Relative Humidity 65±20%,
Air Pressure 860～1060hPA
Heat Sink····80mm square, 3mm thick, aluminum

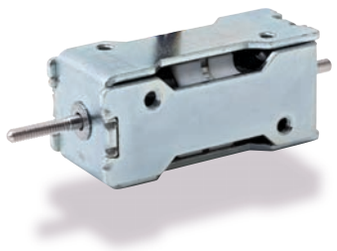
◆Duty Cycle/Temperature Change Over Short Periods of Time/ Coil Saturation Temperature Rise

You can consider these factors as similar to those of our bi-stable rotary solenoids. Please refer to **BI-STABLE ROTARY SOLENOIDS** 2 **INSTRUCTIONS AND PRECAUTIONS FOR USE**, pp.6～7.

TSB-0705

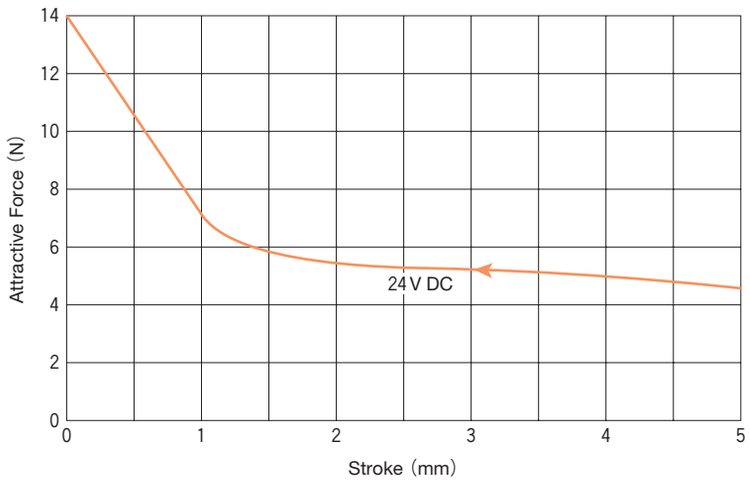
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	10 (Ω)
External Resistance	1.5 (Ω) 〈6 (W) or more〉
Duty Cycle	8 (%) or less
Max ON Time	50 (ms)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 17 \times W$ (℃) $K \fallingdotseq 17$ (℃/watt)
Temperature Rise Time Constant τ	4.5 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	45 (g)
Non-Excited Holding Force	3 (N) or more
Response Speed *1	9 (ms)



*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

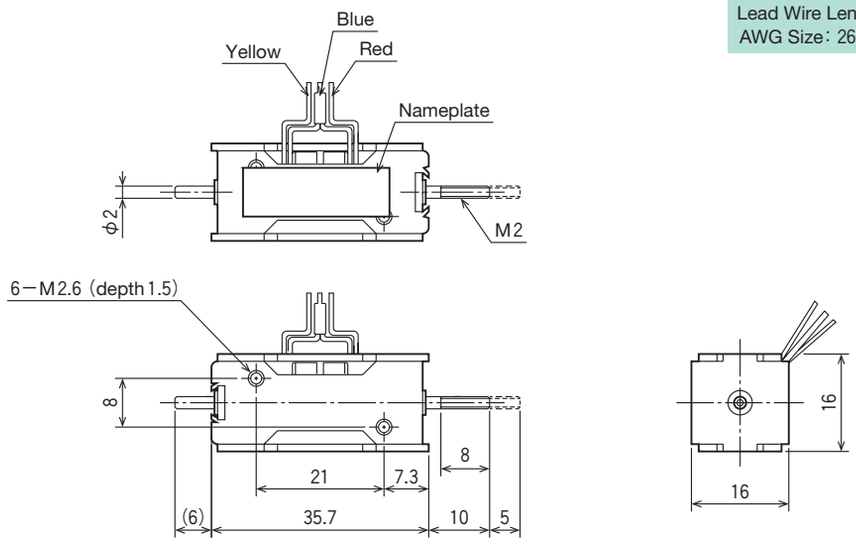
◆Attractive Force Data



◆External Dimensions (mm)

Terminal Specifications

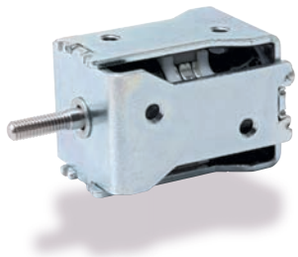
Lead Wire Length (mm): 200
AWG Size: 26



TSB-0805

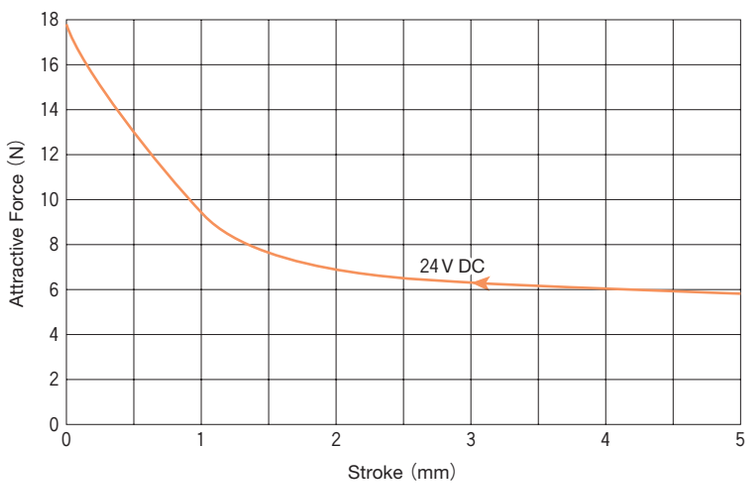
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	7.5 (Ω)
External Resistance	1 (Ω) 〈7 (W) or more〉
Duty Cycle	4 (%) or less
Max ON Time	100 (ms)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 17 \times W$ (℃) $K \fallingdotseq 17$ (℃/watt)
Temperature Rise Time Constant τ	5 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	65 (g)
Non-Excited Holding Force	5 (N) or more
Response Speed *1	7 (ms)

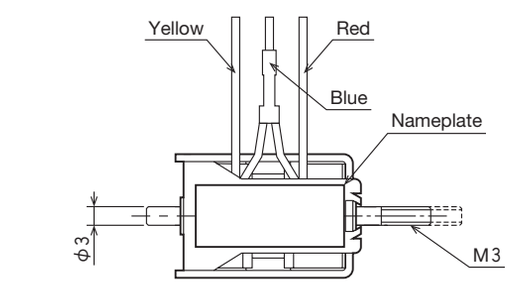


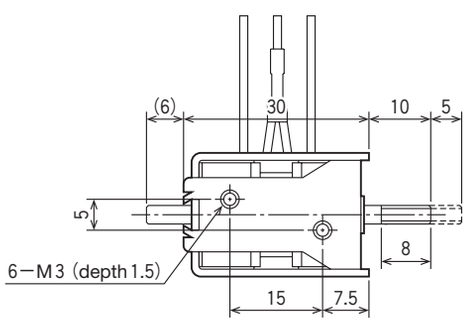
*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

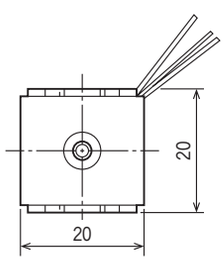
◆Attractive Force Data



◆External Dimensions (mm)







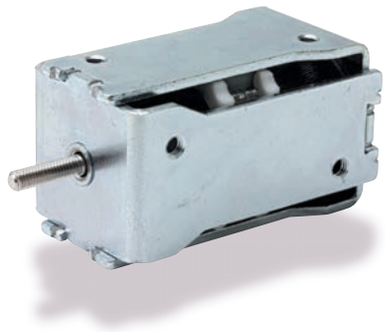
Terminal Specifications

Lead Wire Length (mm) : 210
AWG Size : 26

TSB-1005

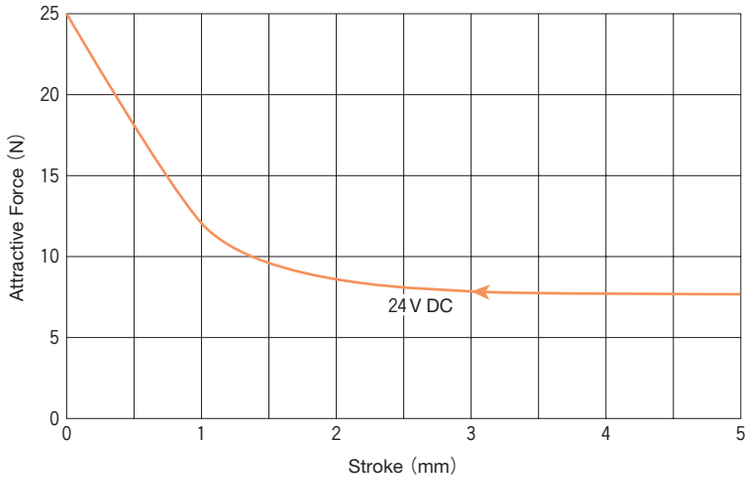
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	20 (Ω)
External Resistance	10 (Ω) 〈4 (W) or more〉
Duty Cycle	20 (%) or less
Max ON Time	40 (ms)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 12 \times W$ (℃) $K \fallingdotseq 12$ (℃/watt)
Temperature Rise Time Constant τ	9 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	140 (g)
Non-Excited Holding Force	15 (N) or more
Response Speed *1	15 (ms)

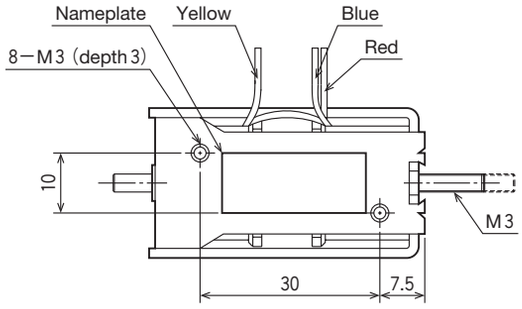


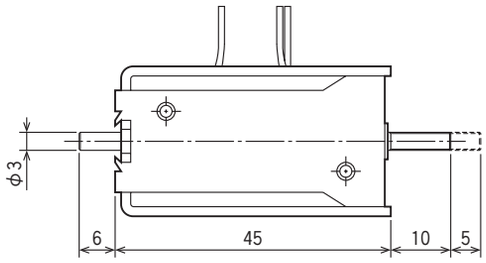
*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

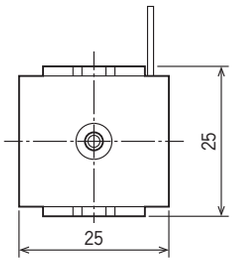
◆Attractive Force Data



◆External Dimensions (mm)







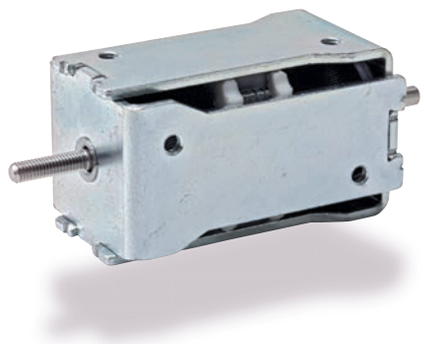
Terminal Specifications

Lead Wire Length (mm): 210
AWG Size: 26

TSB-1010

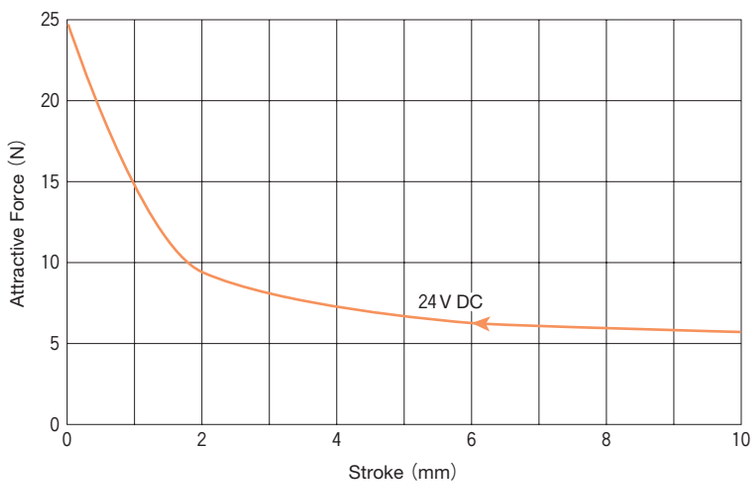
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	20 (Ω)
External Resistance	15 (Ω) 〈4 (W) or more〉
Duty Cycle	20 (%) or less
Max ON Time	40 (ms)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 12 \times W$ (℃) $K \fallingdotseq 12$ (℃/watt)
Temperature Rise Time Constant τ	9 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	120 (g)
Non-Excited Holding Force	10 (N) or more
Response Speed *1	20 (ms)

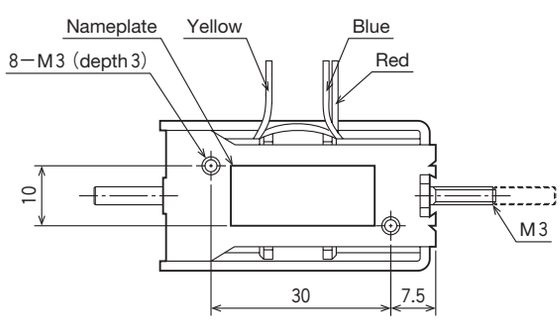


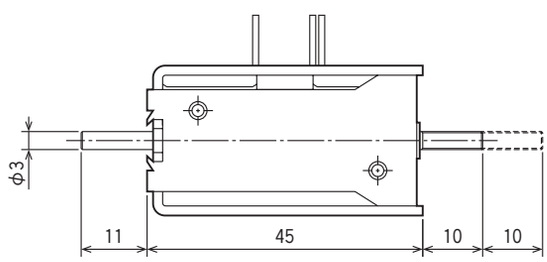
*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

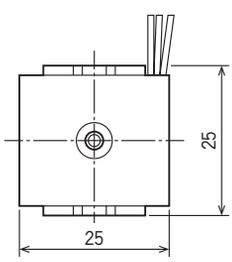
◆Attractive Force Data



◆External Dimensions (mm)







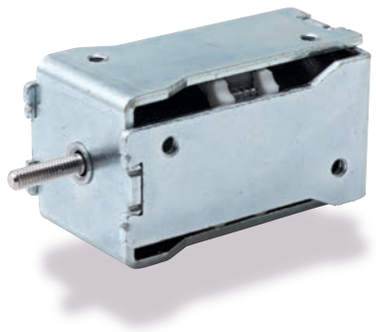
Terminal Specifications

Lead Wire Length (mm) : 210
AWG Size : 26

TSB-LS (Low-Noise Model)

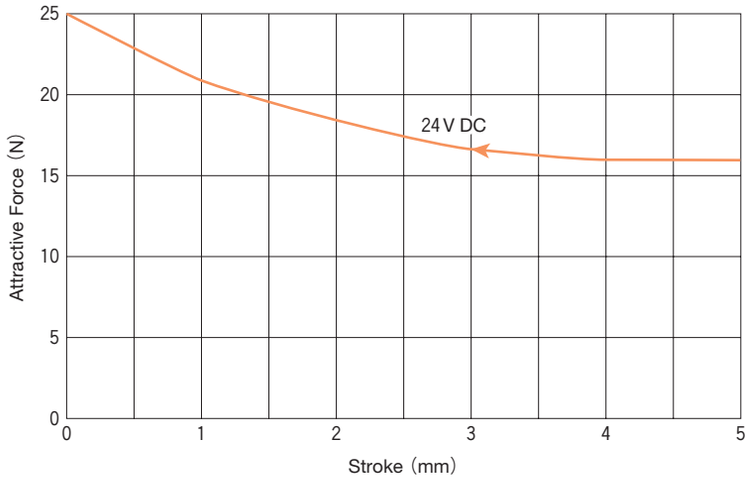
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	5 (Ω)
External Resistance	1 (Ω) 〈12 (W) or more〉
Duty Cycle	5 (%) or less
Max ON Time	40 (ms)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 12 \times W$ (℃) $K \fallingdotseq 12$ (℃/watt)
Temperature Rise Time Constant τ	9 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	120 (g)
Non-Excited Holding Force	2 (N) or more
Response Speed *1	6 (ms)

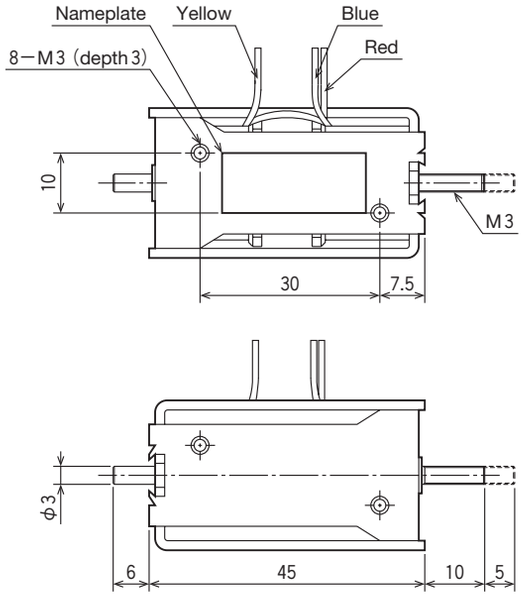


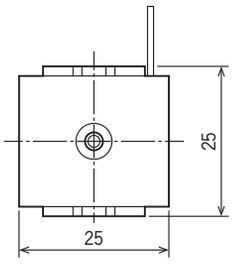
*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

◆Attractive Force Data



◆External Dimensions (mm)





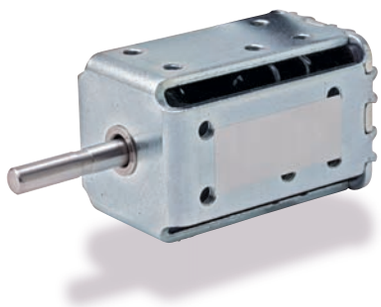
Terminal Specifications

Lead Wire Length (mm): 210
AWG Size: 26

TSBP-09BN1 (Single-Sided Latching Model)

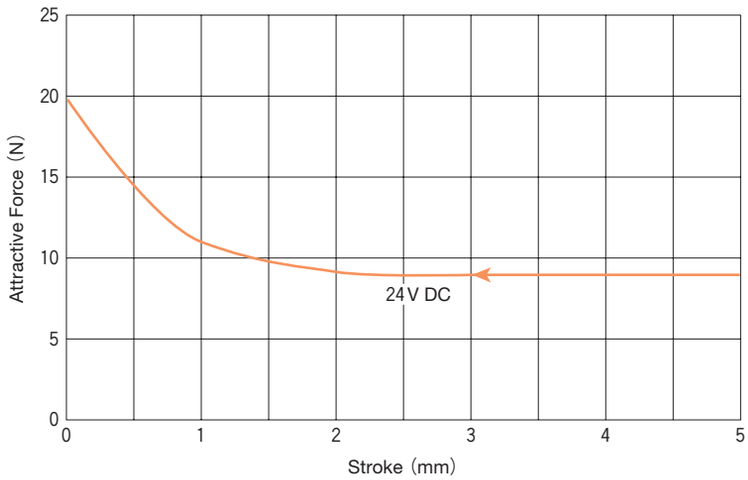
◆Main Specifications

Working Voltage	24 (V DC)
DC Resistance	Pulling Side 10.5 (Ω), Return Side 14 (Ω)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 12 \times W$ (℃) $K \fallingdotseq 12$ (℃/watt)
Temperature Rise Time Constant τ	5 (minutes)
Heat-Resistant Class	Class E (120℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Mass	100 (g)
Non-Excited Holding Force	20 (N) or more
Response Speed *1	6 (ms)



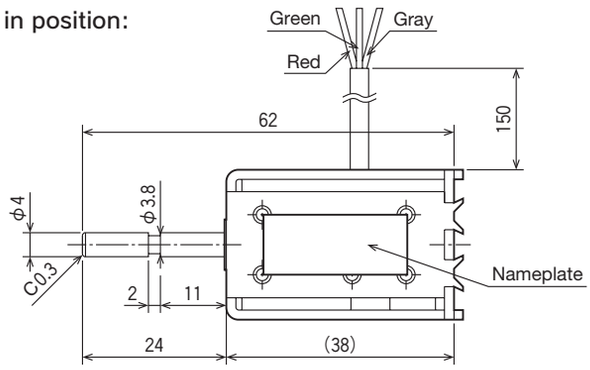
*1: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage 24 V DC.

◆Attractive Force Data



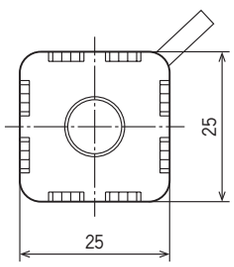
◆External Dimensions (mm)

With shaft held in position:



Terminal Specifications

Lead Wire Length (mm): 300
AWG Size: 26



With shaft released: