BI-STABLE ROTARY SOLENOIDS

Featuring Models with Built-In Stops

- Made with materials carefully selected to reduce impact noise and maximize durability.

Featuring Models with Return Springs

- Simplified driver board
- Failsafe capabilities

Plenty of Variations

- Select the model best suited to your application, whatever it may be!

Specialized Compact Models

- Aspiring to make the world's smallest solenoids, we cut no corners in our manufacturing.

FEATURES

1 Bi-stable Driving Force

Our models work without springs, reciprocating instead on the change of electrical current.
For this reason, they 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 No Axial Stroke

Our rotary solenoids are driven by magnetic attraction and repulsion, so the shaft does not move forward or backward: it just rotates.

3 High Durability

Since our models have no sliding parts except for the bearings, they have a long life cycle.
〈Target durability〉
with ball-bearings: 30,000,000 cycles
with oil-retaining bearings: 10,000,000 cycles

＊Depending on load and environmental conditions. In all cases we recommend that you confirm operation of the solenoid with its load attached.

4 A Wide Range of Operating Angles

By setting up external stops, you can set the angle of rotation to your liking within a range of 90°. (With the exception of our built-in stop models, external stops will be required. See **4 INSTRUCTIONS** for information on how to set up external stops)

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 rapidly redirect the course of flow, or to open and close plumbing and tubing by means of a clamp.

1 STRUCTURE AND OPERATING PRINCIPLES

The structural advantage of this model lies in the very small air gap between its yoke and its rotor; moreover, the rotor has been coupled with a permanent magnet.
The magnetic flux of the permanent magnet flows in the direction of the dotted arrow.
When the coil is energized as in Fig.1, the magnetic flux induced by the coil current flows in the direction of the dot-and-dash arrow.
The rotational torque operates in a clockwise direction as the two magnetic fluxes increase in air gap g_a and decrease in air gap g_b.

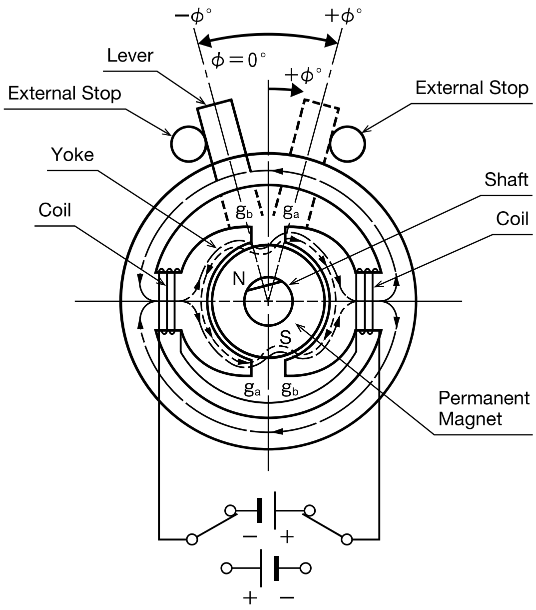


Fig.1 Operating Principles

2 INSTRUCTIONS AND PRECAUTIONS FOR USE

◆Torque Characteristics

The solid line shows the torque generated when rotating in the direction of (−ϕ) to (+ϕ) when voltage is applied. When the (+) and (−) lead lines are reversed, it rotates from (+ϕ) to (−ϕ), as shown by the dotted line. These solid and dotted curves are symmetrical with the line passing through the $\phi = 0°$ position of the rotation angle.
The 0 W curve shows the holding force of the permanent magnet when the solenoid is not being powered. It generates this force even when the shaft rotates in the (−ϕ) direction.
The torque characteristics of each of our products were measured by means of in-house instruments in a standard testing environment, with the shafts in a horizontal position.

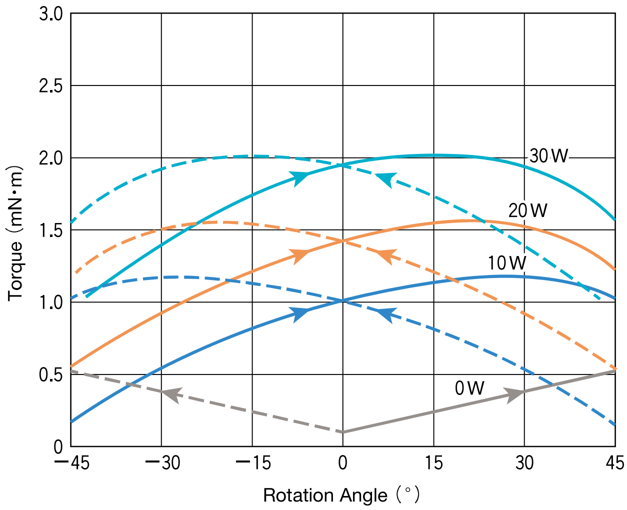


Fig.2 Torque Characteristics (at 20 ℃)

◆Response Characteristics

Each product page displays the time elapsed between power-on and when the load reaches its final position. The response characteristics of each of our products were measured in a standard testing environment with their shafts in a horizontal position; we measured the current waveform while the product was stabilized in a heat sink. The axial moment of inertia differs from model to model, so please refer to the specific Response Characteristics note on each product page.

Standard Testing Environment····Ambient Temp 20±15℃, Relative Humidity 65±20%,
Air Pressure 860～1060hPA

Heat Sink····80mm square, 3mm thick, aluminum

◆Duty Cycle

As shown in Fig.3 (a), when current is flowing at time t_{on} and stops at t_{off}, and this operation repeats continuously over time, the duty cycle may be calculated like so:

$$\frac{1}{f} = \frac{t_{on}}{t_{on} + t_{off}} \quad \cdots\cdots\cdots (1)$$

As shown in Fig.3 (b), when the magnet exerts insufficient holding force and the shaft is held in place for time t_h with wattage W_h, and this operation repeats continuously over time, the duty cycle may be calculated like so:

$$\frac{1}{f} = \frac{W_w \cdot t_w + W_h \cdot t_h}{W_w (t_w + t_h)} \quad \cdots\cdots\cdots (2)$$

When operation is irregular and cannot be expressed with equations (1) and (2), the number of operations n, over a sufficiently long interval of time t, can be expressed as follows:

$$\frac{1}{f} = \frac{n \times t_{on}}{t} \quad \cdots\cdots\cdots (3)$$

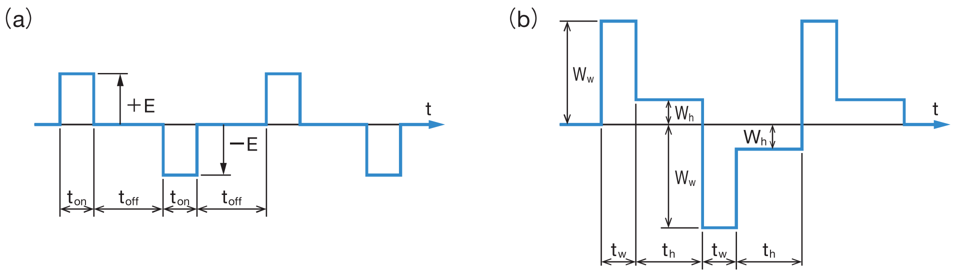


Fig.3 Explanation of Duty Cycle

◆Temperature Change Over Short Periods of Time

The temperature rise $\Delta\theta$ at time t after energization is expressed by formula (4):

$$\Delta\theta = \Delta\theta(1 - e^{-\frac{t}{\tau}}) \fallingdotseq \Delta\theta \cdot t/\tau \quad (t/\tau \ll 1) \cdots\cdots\cdots (4)$$

e = base of natural logarithm

Then, when the temperature rise reaches $\Delta\theta$ and the solenoid is deenergized, the temperature θ' at time t after de-energization can be expressed by formula (5):

$$\theta' = (\Delta\theta)^{-\frac{t}{\tau}} \cdots\cdots\cdots (5)$$

Therefore, if we define the rate of temperature drop during this duration as $\Delta\theta'$, it can be obtained as follows, in a manner similar to formula (4):

$$\Delta\theta = \Delta\theta(1-e^{-\frac{t}{\tau}}) \fallingdotseq \Delta\theta \cdot t/\tau \quad (t/\tau \ll 1)$$

The relation between $(1-e^{-\frac{t}{\tau}})$ and t/τ is shown in Fig.4:

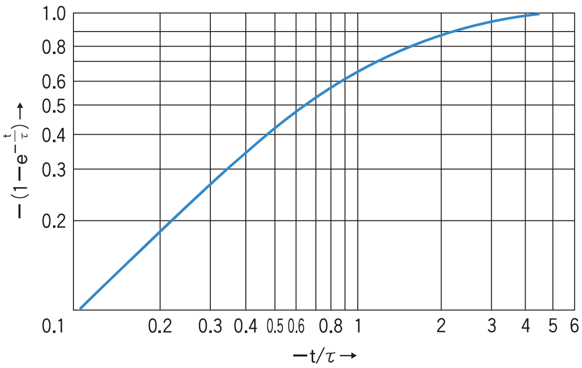


Fig.4 Relation between $(1-e^{-\frac{t}{\tau}})$ and t/τ

◆Coil Saturation Temperature Rise

Each of our products has a proportionality constant (k) which represents the rise in saturation temperature of the coil, per Watt. Please carefully consider the applied voltage, duty cycle, heat sink, environmental conditions etc., so that the combination of the ambient temperature and coil saturation temperature rise does not exceed the unit's heat-resistant class.

(Ex.) If our RSR 20/20 model, whose proportionality constant is $k \fallingdotseq 7$℃/W, is continuously powered at 10 W, the coil saturation temperature rise will be:

$$\Delta\theta_s = 7.0 \times 10 = 70(℃)$$

With the duty cycle 1/f factored in, it looks like this:

$$\Delta\theta_s \fallingdotseq 7.0 \times W \times 1/f$$

So the duty cycle for 10 ms ON/OFF operation at 10 W will be:

$$1/f = \text{ON time}/(\text{ON time} + \text{OFF time}) = 10/(10+10) = 1/2$$

Accordingly, the coil saturation temperature rise for these intermittent energizations will be:

$$\Delta\theta_s \fallingdotseq 7.0 \times 10 \times 1/2 = 35(℃)$$

Let's say that the ambient temperature is 40℃. Since the RSR 20/20 has a heat class of 120℃, when we subtract the ambient temperature from the unit's heat class, we are left with a value of 80℃. Thus we can conclude that in this case, there will be no problems.

On the contrary, because the coil saturation temperature rise for this unit is 70℃, you could even keep it powered continuously without any issues.

3 WHEN SELECTING YOUR PRODUCT

❶ Duty Cycle

Please calculate the Duty Cycle from the time ON after current starts and the time OFF when the current stops.（See 2 : ◆Duty Cycle）However, please be cautious, as each of our products has a maximum ON time when energization is possible.（See 2 : ◆Temperature Change Over Short Periods of Time）

❷ Rotation Angle

Please decide the angle of rotation you will use, and install your external stops.（For our built-in stop models, please choose the angle of rotation）

❸ Working Voltage

Please refer to the coil data and decide the working voltage you will use. If you cannot find the applicable voltage in the coil data, please select the resistance for the nearest approximate voltage.

❹ Bearings

Our products use ball bearings or oil-retaining metal bearings. Since each of our products has different standard specifications, please select the model which best fits your application, required durability, etc.

❺ Shaft

The D-cut shaft is our standard; however, we offer custom options such as keyway shafts, tapped shafts, and shafts with changeable shape.

❻ Terminal Processing

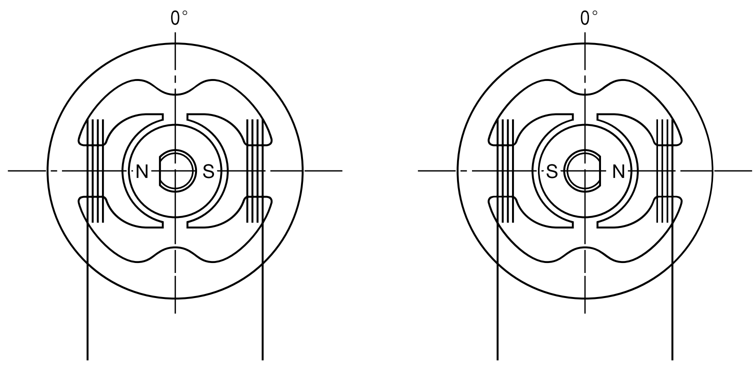
We use UL-certified products. Since each of our products has different standard specifications, please select the model which best fits your requirements.

❼ Heat-Resistant Class

Class E（120℃）is the standard for our products. We also offer specialized options such as Class H（180℃）.

4 INSTRUCTIONS [for models without built-in stops:]

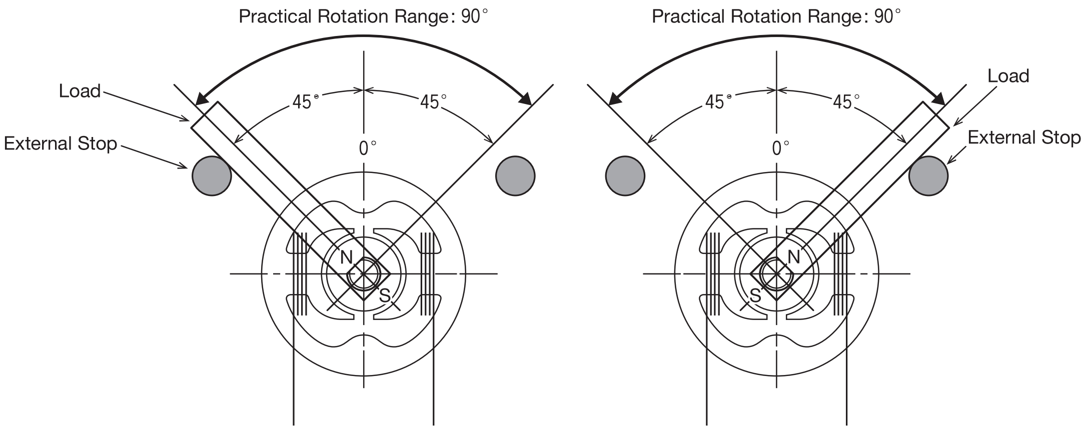
❶ When you receive your Takano bi-stable rotary solenoids, the relative positions of the magnet and the D-cut shaft will be as shown in the two figures below, in a stable and magnetically balanced state.



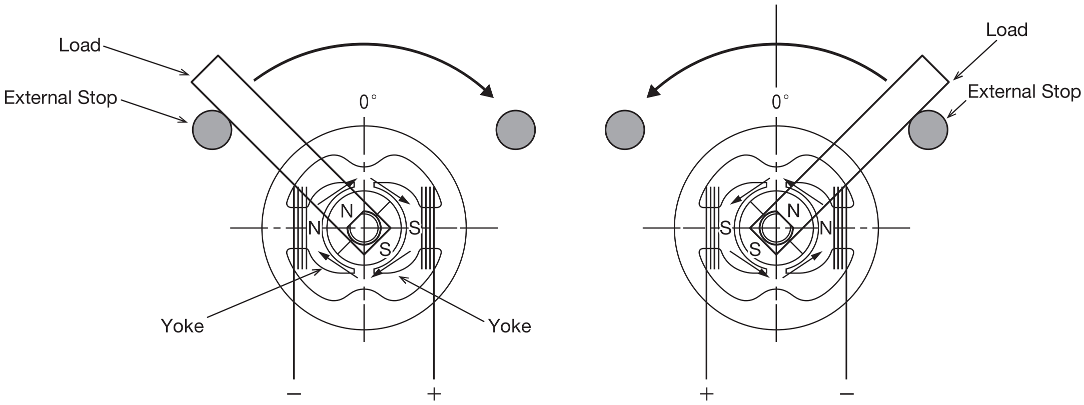
❷ Before using our product, turn the D-cut shaft from the as-delivered stable position and set the external stops. The midpoint between stops and the central point of rotation are both set to 0°, as shown in the “External Dimensions” diagram for each model.

Takano products have as their standard a practical rotation range of up to ±45° from the center point（a total travel angle of up to 90°）. Please set the external stops at your discretion

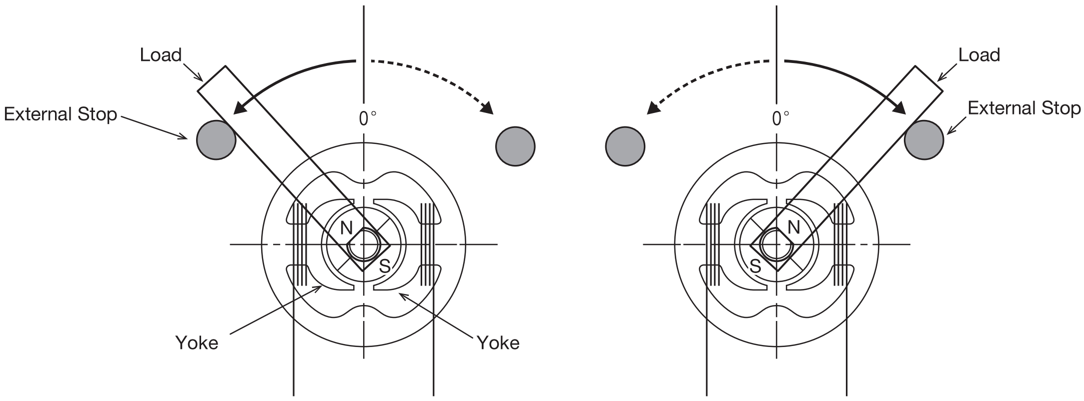
within this range.
Metal stops will have a strong impact on contact with a metal load, which could result in failure of the solenoid. For this reason, please use rubber or a similar buffer material for the stops.



❸ When the stops are set and power is supplied to the solenoid, electric current flows through the coil and the yoke becomes polarized, as shown in the figure below. The shaft will rotate due to the mutual repulsion of N-N and S-S in the magnet and yoke, and the attraction between N and S poles. When the polarity of the current is reversed, the polarity of the yoke changes as well, and the shaft will rotate in the opposite direction.



❹ When power is turned off, the electric current ceases to polarize the coil.
At the same time, the permanent magnet will generate force, and will try to return the load to its factory default position (i.e. its position before stops were set, as in ❶ above).
This is referred to as the magnet's holding force.



RSR 7/10-T010

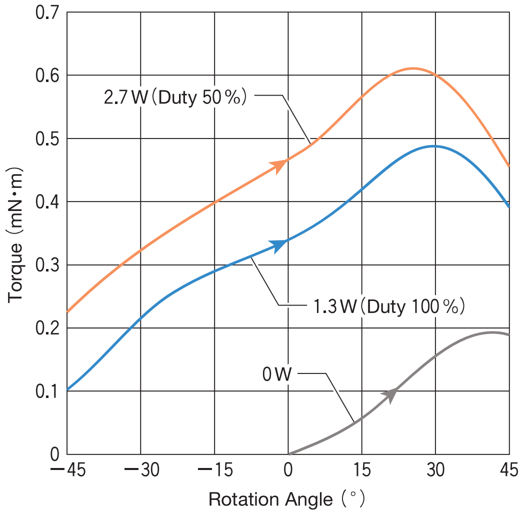
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 59 \times W$ (℃) $K \fallingdotseq 59$ (℃/watt)
Temperature Rise Time Constant τ	1 (minutes)
Insulation Resistance	500 V DC MEGA, 5 MΩ or more
Dielectric Strength	250 V AC, 50/60 Hz, 1 second
Rotor Inertia	0.0015 (g·cm^2)
Mass	1.5 (g)

◆Coil Data

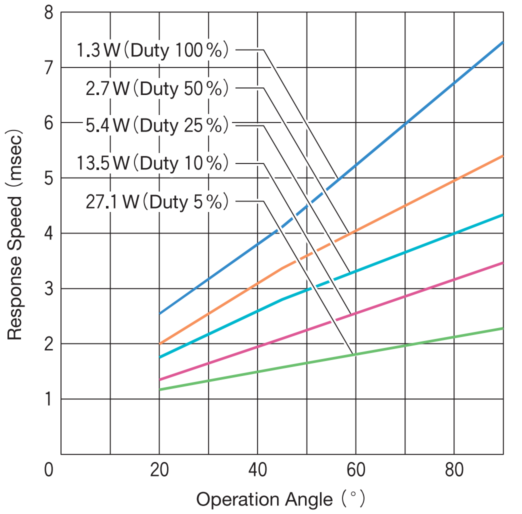
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	30.1	15.0	6.0	3.0
Power at 20℃ [W]	1.3	2.7	5.4	13.5	27.1
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
9.5 〈standard〉	3.5	5.0	7.1	11.3	16.0
12.0	3.9	5.6	8.0	12.7	18.0
15.2	4.4	6.4	9.0	14.3	20.2

◆Torque Data

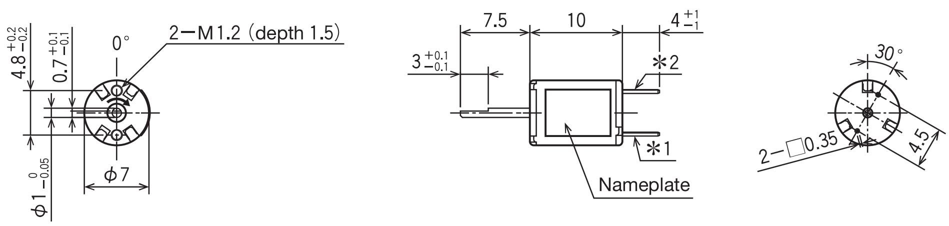


◆Response Data

(Load Inertia : 0.27 g·mm^2)



◆External Dimensions (mm)



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to ✻1 and a negative electrode (−) to ✻2, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 10/15-S

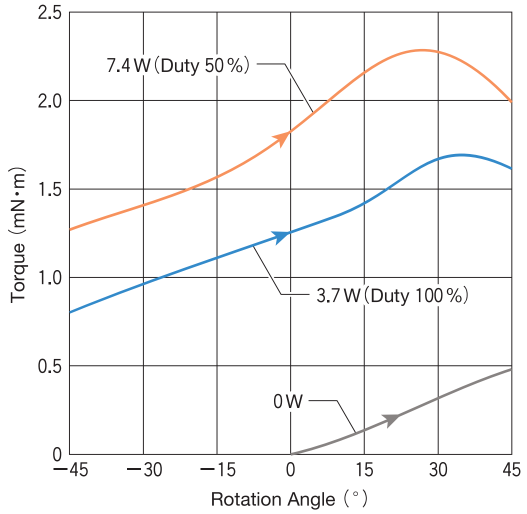
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 21.5 \times W$ (℃) $K \fallingdotseq 21.5$ (℃/watt)
Temperature Rise Time Constant τ	0.5 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	500 V AC, 50/60 Hz, 1 minute
Rotor Inertia	0.017 (g·cm^2)
Mass	8 (g)

◆Coil Data

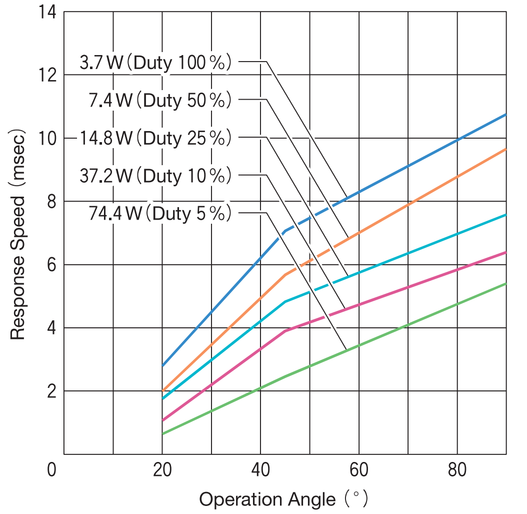
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	15.0	7.5	3.0	1.5
Power at 20℃ [W]	3.7	7.4	14.8	37.2	74.4
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
13.0 〈standard〉	6.9	9.8	13.8	21.9	31.0
39.0	12.0	16.9	24.0	38.0	53.8

◆Torque Data



◆Response Data

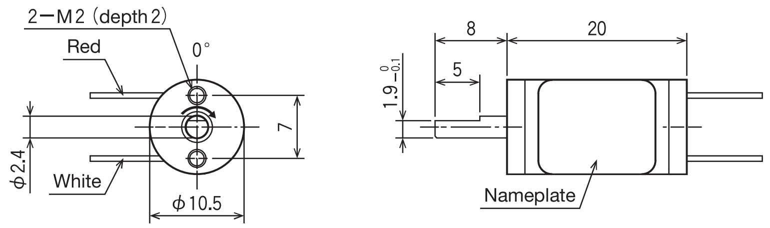
(Load Inertia : 0.45 g·cm^2)



◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm) : 320
AWG Size : 26



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSF 22/08-O 035

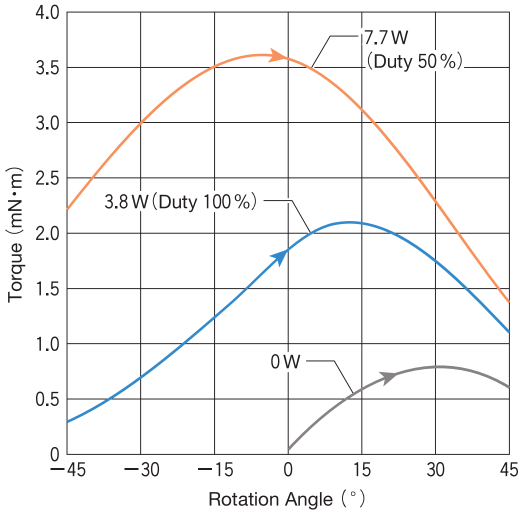
◆Main Specifications

Heat-Resistant Class	Class H (180℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 36 \times W$ (℃) $K \fallingdotseq 36$ (℃/watt)
Temperature Rise Time Constant τ	6 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	0.07 (g·cm^2)
Mass	20 (g)

◆Coil Data

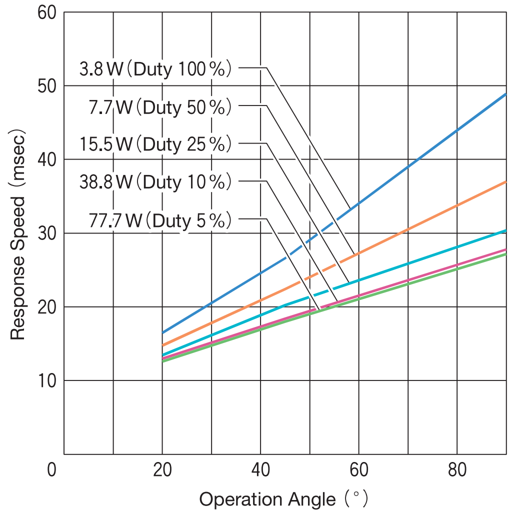
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	181.8	90.3	36.0	18.0
Power at 20℃ [W]	3.8	7.7	15.5	38.8	77.7
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
13.0	7.0	10.0	14.1	22.4	31.7
35.0 〈standard〉	11.5	16.4	23.2	36.8	52.1

◆Torque Data

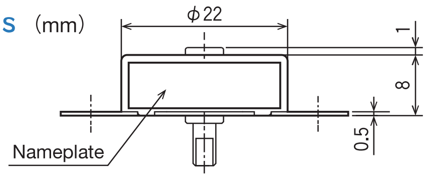


◆Response Data

(Load Inertia : 10.21 g·cm^2)

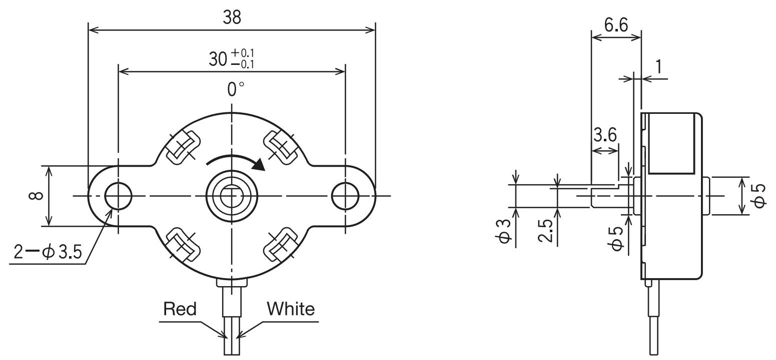


◆External Dimensions (mm)



Terminal Specifications

Lead Wire Length (mm): 320
AWG Size: 28



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 28/17-CAB 0 Series

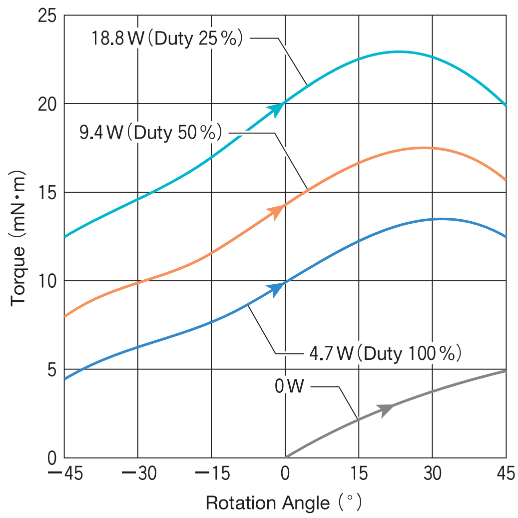
◆Main Specifications

Model Number	RSR28/17-CAB0-N008	RSR28/17-CAB0-N110
DC Resistance	8 (Ω)	110 (Ω)
Heat-Resistant Class	Class E (120℃)	
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s$ ≒ 17 × W (℃) K ≒ 17 (℃/watt)	
Temperature Rise Time Constant τ	5 (minutes)	
Insulation Resistance	500 V DC MEGA, 100 MΩ or more	
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute	
Rotor Inertia	1.8 (g·cm²)	
Mass	50 (g)	

◆Coil Data

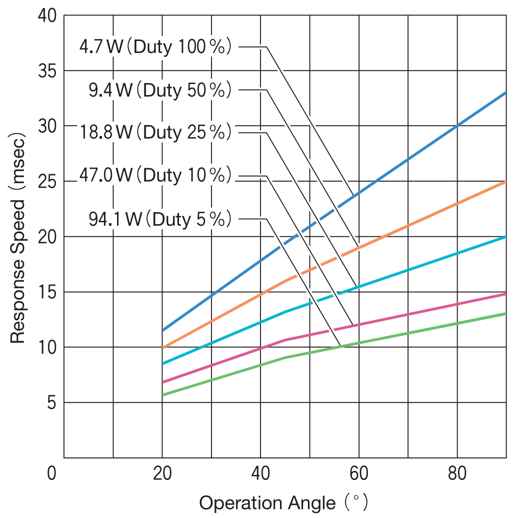
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	150.1	75.0	30.0	15.0
Power at 20℃ [W]	4.7	9.4	18.8	47.0	94.1
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
8.0 〈standard〉	6.1	8.6	12.2	19.3	27.4
27.5	11.3	16.0	22.7	35.9	50.8
53.0	15.7	22.3	31.5	49.9	70.6
110.0 〈standard〉	22.7	32.1	45.4	71.9	101.7

◆Torque Data

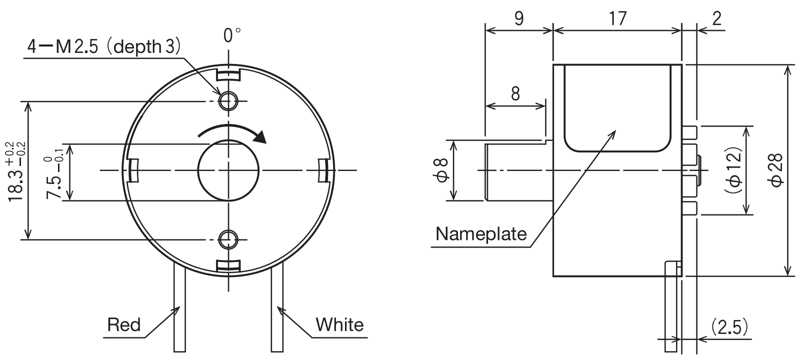


◆Response Data

(Load Inertia : 10.73 g·cm²)



◆External Dimensions (mm)



Terminal Specifications

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

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSU 14/10-SAP 1-T 115

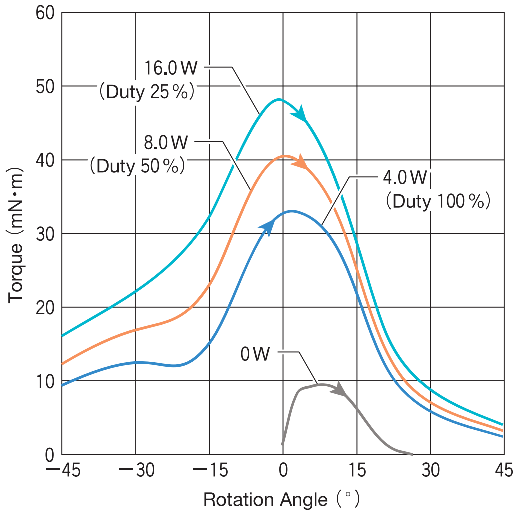
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s$ ≒ 20 × W (℃) K ≒ 20 (℃/watt)
Temperature Rise Time Constant τ	5 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	1.3 (g·cm^2)
Mass	70 (g)

◆Coil Data

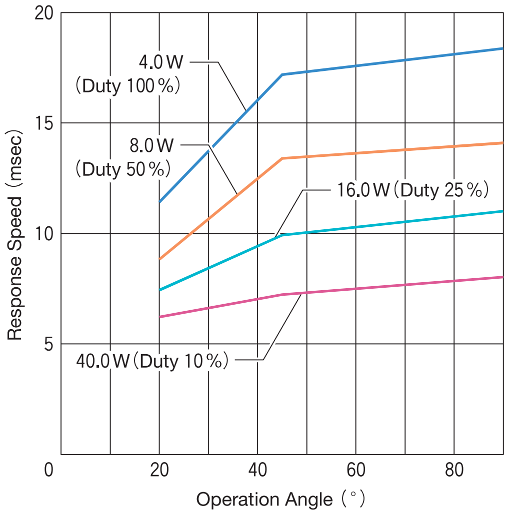
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	150.0	75.0	30.0	15.0
Power at 20℃ [W]	4.0	8.0	16.0	40.0	80.0
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
13.5	7.3	10.3	14.6	23.2	32.8
60.0	15.4	21.9	30.9	48.9	69.2
115.0 〈standard〉	21.4	30.3	42.8	67.8	95.9
140.0	23.6	33.4	47.3	74.8	105.8

◆Torque Data

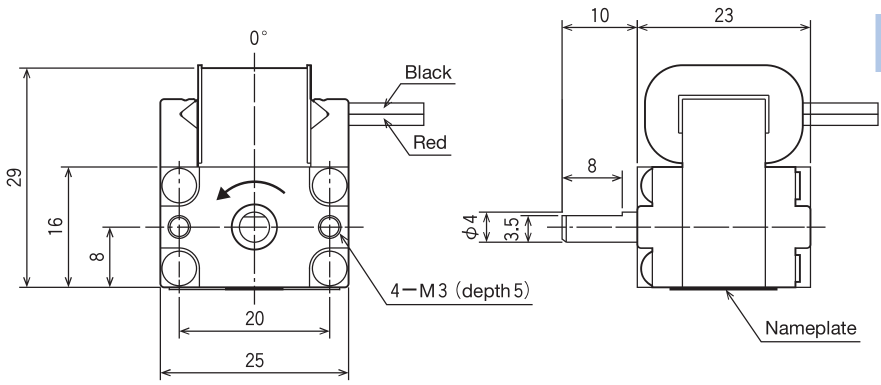


◆Response Data

(Load Inertia : 12.89 g·cm^2)



◆External Dimensions (mm)



Terminal Specifications

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

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the Black lead wire, the shaft rotates counter clockwise (in the direction shown by the arrow).

RSU 14/10-WAP 1-T 115

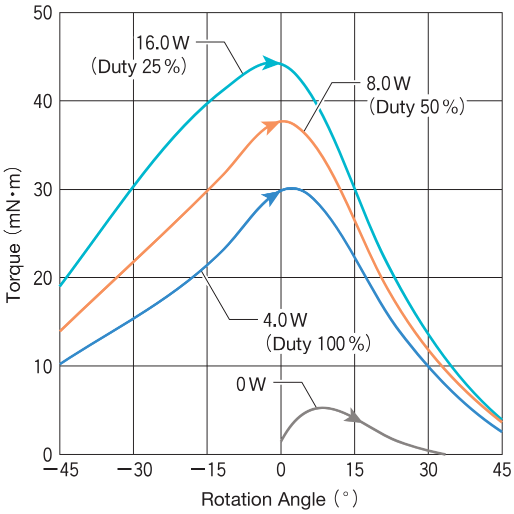
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 20 \times W$ (℃) $K \fallingdotseq 20$ (℃/watt)
Temperature Rise Time Constant τ	5 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	1.3 (g·cm^2)
Mass	70 (g)

◆Coil Data

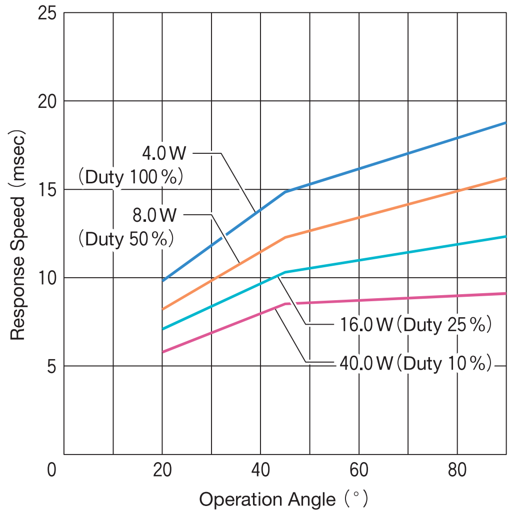
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	150.0	75.0	30.0	15.0
Power at 20℃ [W]	4.0	8.0	16.0	40.0	80.0
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
13.5	7.3	10.3	14.6	23.2	32.8
60.0	15.4	21.9	30.9	48.9	69.2
115.0 ⟨standard⟩	21.4	30.3	42.8	67.8	95.9
140.0	23.6	33.4	47.3	74.8	105.8

◆Torque Data

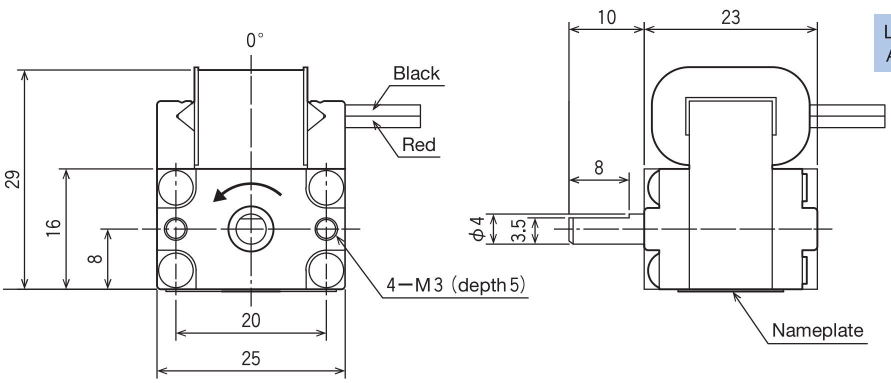


◆Response Data

(Load Inertia : 12.89 g·cm^2)



◆External Dimensions (mm)



Terminal Specifications

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

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the Black lead wire, the shaft rotates counter clockwise (in the direction shown by the arrow).

RSR 14/10-CAB 0

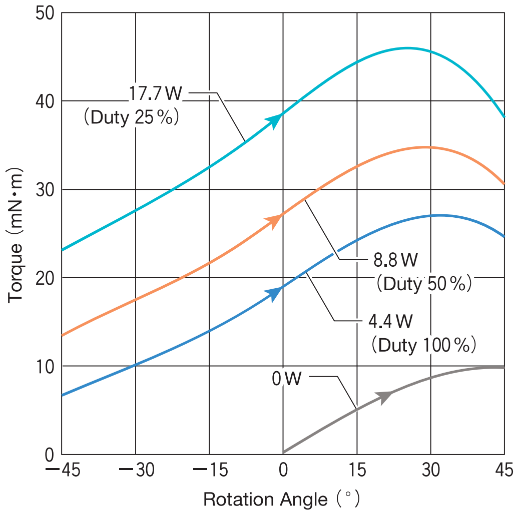
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s$ ≒ 18 × W (℃) K ≒ 18 (℃/watt)
Temperature Rise Time Constant τ	7 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	2.1 (g・cm^2)
Mass	70 (g)

◆Coil Data

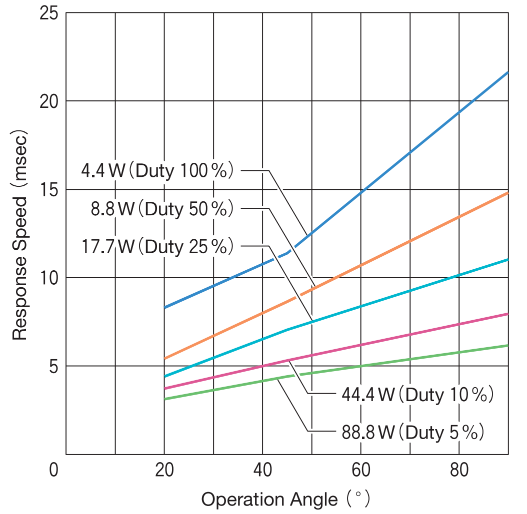
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	212.1	105.4	42.0	21.0
Power at 20℃ [W]	4.4	8.8	17.7	44.4	88.8
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
3.2	3.7	5.3	7.5	11.9	16.8
15.6 〈standard〉	8.2	11.7	16.6	26.3	37.2
60.0	16.2	22.9	32.5	51.6	72.9
125.0	23.4	33.1	47.0	74.4	105.3

◆Torque Data

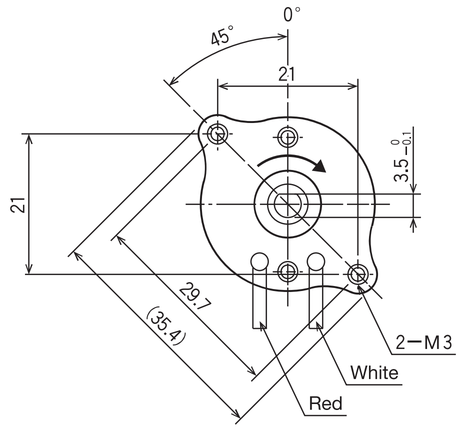


◆Response Data

(Load Inertia : 3.97 g・cm^2)

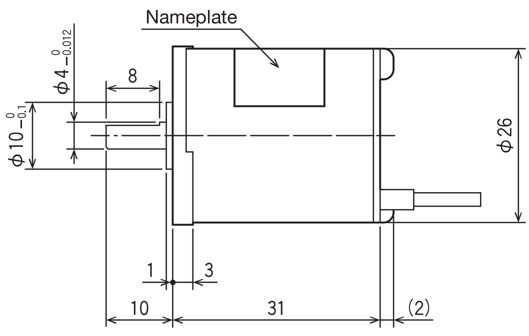


◆External Dimensions (mm)



Terminal Specifications

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



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 14/10-PAP 0-G 015

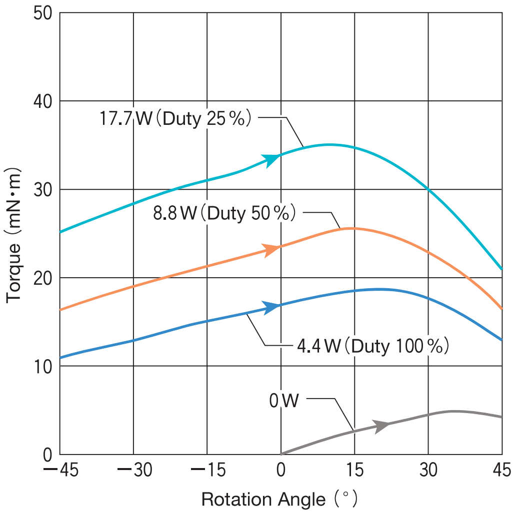
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 18 \times W$ (℃) $K \fallingdotseq 18$ (℃/watt)
Temperature Rise Time Constant τ	7 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	1.8 (g・cm^2)
Mass	70 (g)

◆Coil Data

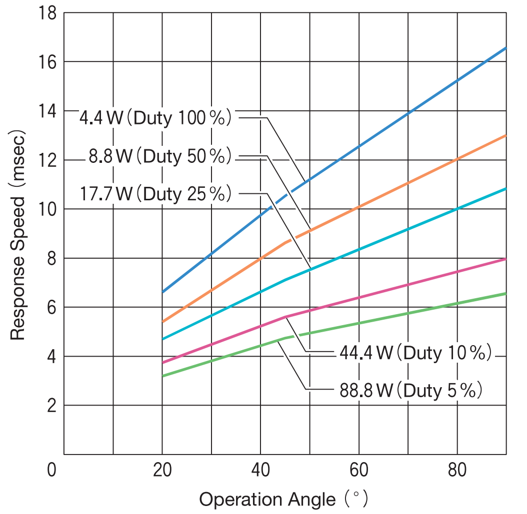
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	212.1	105.4	42.0	21.0
Power at 20℃ [W]	4.4	8.8	17.7	44.4	88.8
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
3.2	3.7	5.3	7.5	11.9	16.8
15.6 〈standard〉	8.2	11.7	16.6	26.3	37.2
60.0	16.2	22.9	32.5	51.6	72.9
125.0	23.4	33.1	47.0	74.4	105.3

◆Torque Data

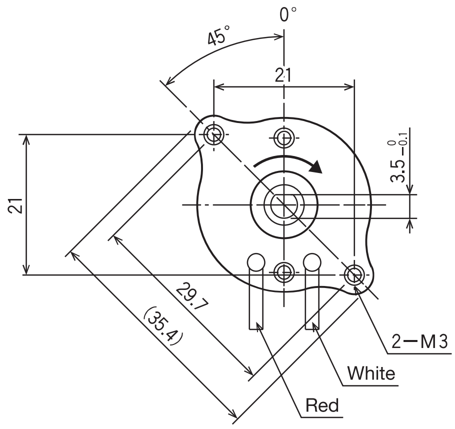


◆Response Data

(Load Inertia : 3.97 g・cm^2)

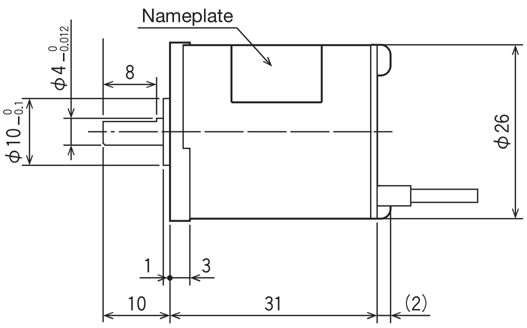


◆External Dimensions (mm)



Terminal Specifications

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



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 14/20-CT 2

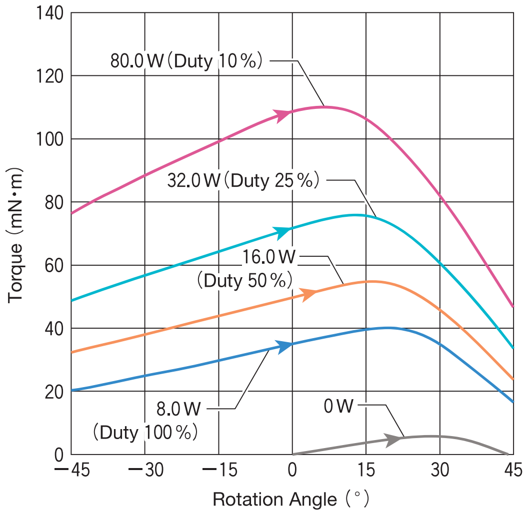
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 10 \times W$ (℃) $K \fallingdotseq 10$ (℃/watt)
Temperature Rise Time Constant τ	9 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	6.2 (g・cm^2)
Mass	135 (g)

◆Coil Data

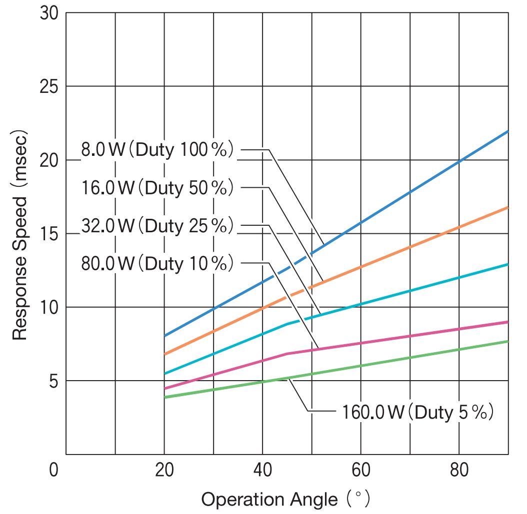
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	270.0	135.0	54.0	27.0
Power at 20℃ [W]	8.0	16.0	32.0	80.0	160.0
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
10	8.9	12.6	17.8	28.2	40.0
20 〈standard〉	12.6	17.8	25.2	40.0	56.5
30	15.4	21.9	30.9	48.9	69.2
32	16.0	22.6	32.0	50.5	71.5

◆Torque Data



◆Response Data

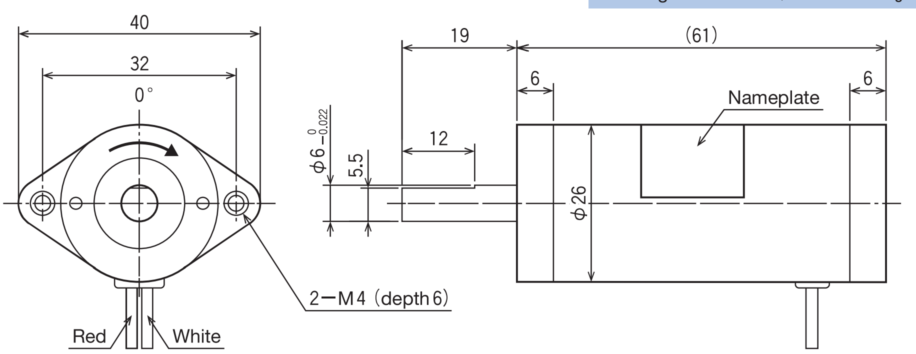
(Load Inertia : 10.94 g・cm^2)



◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm) : 300
Contact : 8230-4282 (Sumitomo Wiring Systems, Ltd.)
Housing : 6090-1031 (Sumitomo Wiring Systems, Ltd.)



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR14/20-CBB0-N032A

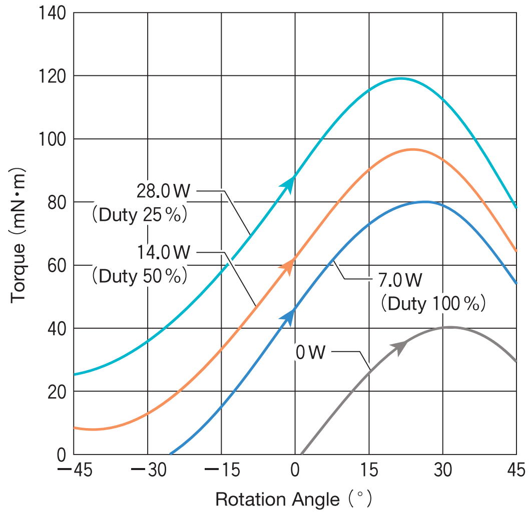
◆Main Specifications

Heat-Resistant Class	Class H (180℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 20 \times W$ (℃) K ≒ 20 (℃/watt)
Temperature Rise Time Constant τ	5 (minutes)
Insulation Resistance	500V DC MEGA, 100MΩ or more
Dielectric Strength	1000V AC, 50/60Hz, 1 minute
Rotor Inertia	2.1 (g·cm^2)
Mass	80 (g)

◆Coil Data

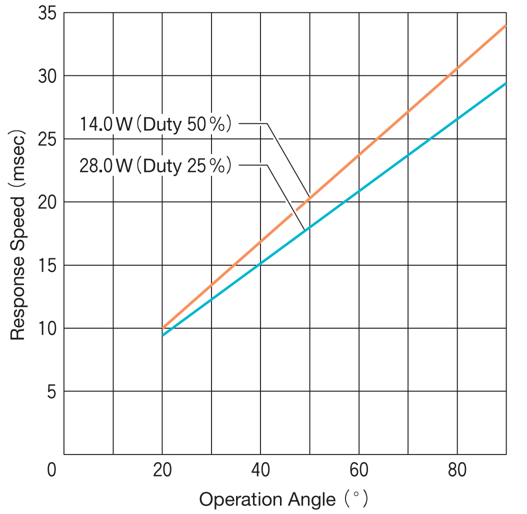
Duty Cycle	100%	50%	25%	10%	5%
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	150.0	75.0	30.0	15.0
Power at 20℃ [W]	7.0	14.0	28.0	70.0	140.0
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
10	8.3	11.8	16.7	26.4	37.4
20	11.8	16.7	23.6	37.4	52.9
30	14.4	20.4	28.9	45.8	64.8
32 〈standard〉	14.9	21.1	29.9	47.3	66.9

◆Torque Data

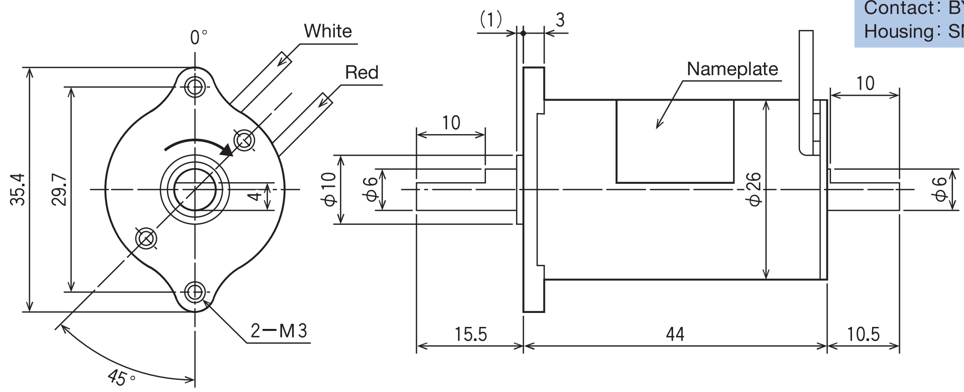


◆Response Data

(Load Inertia : 3.97g·cm^2)



◆External Dimensions (mm)



Terminal Specifications

Lead Wire Length (mm) : 70
Contact : BYM-001T-0.6 (JST)
Housing : SMR-02V-B (JST)

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 20/10-CAB 0

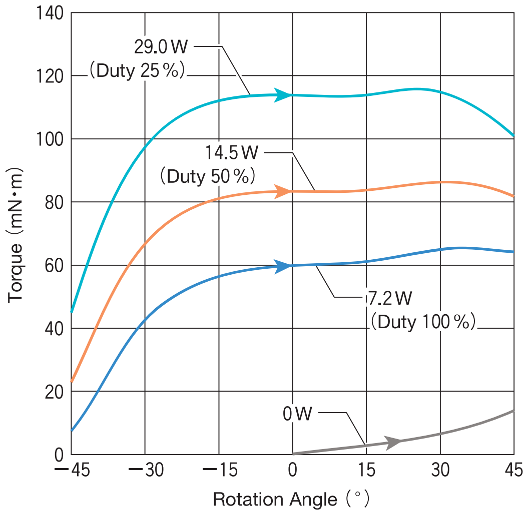
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \doteqdot 11 \times W$ (℃) $K \doteqdot 11$ (℃/watt)
Temperature Rise Time Constant τ	6 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	9 (g·cm^2)
Mass	185 (g)

◆Coil Data

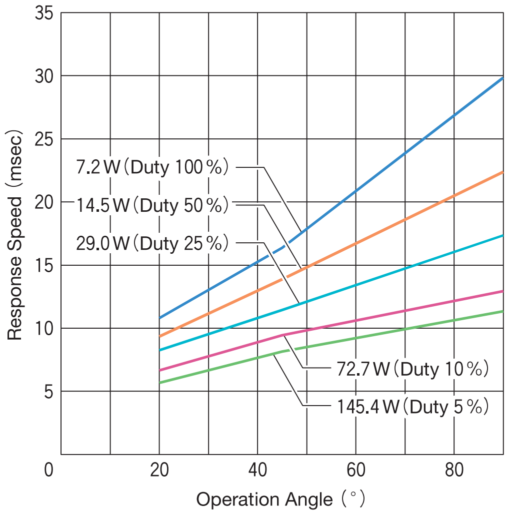
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	180.5	90.2	36.0	18.0
Power at 20℃ [W]	7.2	14.5	29.0	72.7	145.4
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
5.6	6.3	9.0	12.7	20.1	28.5
15.0 (standard)	10.3	14.7	20.8	33.0	46.7
23.0	12.8	18.2	25.8	40.8	57.8
58.0	20.4	29.0	41.0	64.9	91.8

◆Torque Data

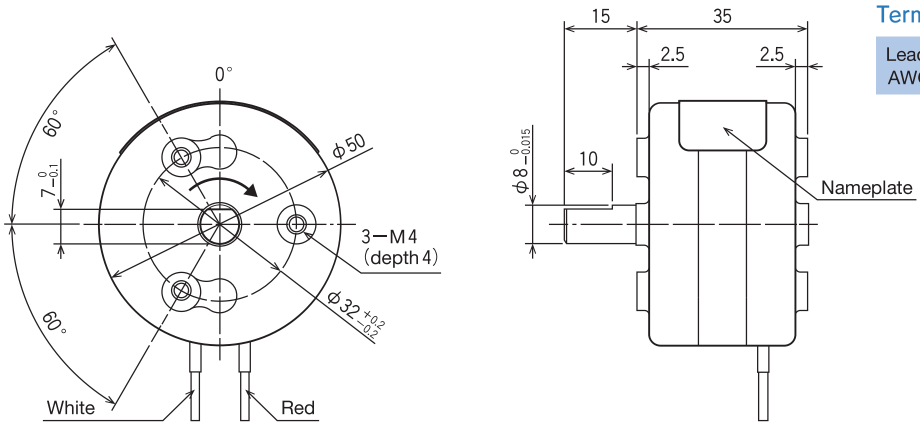


◆Response Data

(Load Inertia : 35.01 g·cm^2)



◆External Dimensions (mm)



Terminal Specifications

Lead Wire Length (mm) : 280
AWG Size : 22

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 20/20-CAB 0

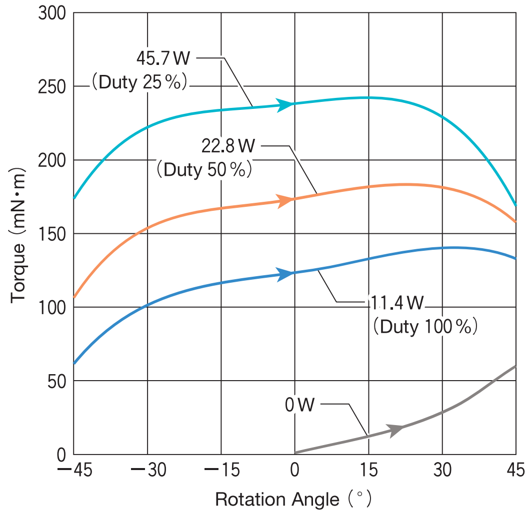
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 7.0 \times W$ (℃) K≒7.0 (℃/watt)
Temperature Rise Time Constant τ	7 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	18 (g·cm²)
Mass	280 (g)

◆Coil Data

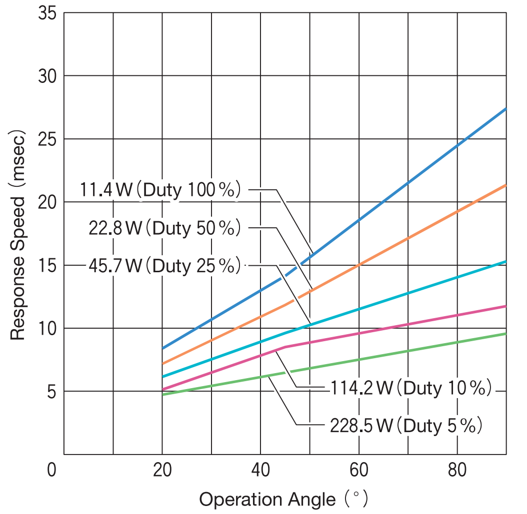
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	210.5	105.0	42.0	21.0
Power at 20℃ [W]	11.4	22.8	45.7	114.2	228.5
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
6.2 〈standard〉	8.4	11.8	16.8	26.6	37.6
12.0	11.6	16.5	23.4	37.0	52.3
25.0	16.8	23.8	33.8	53.4	75.5
44.0	22.3	31.6	44.8	70.8	100.2

◆Torque Data

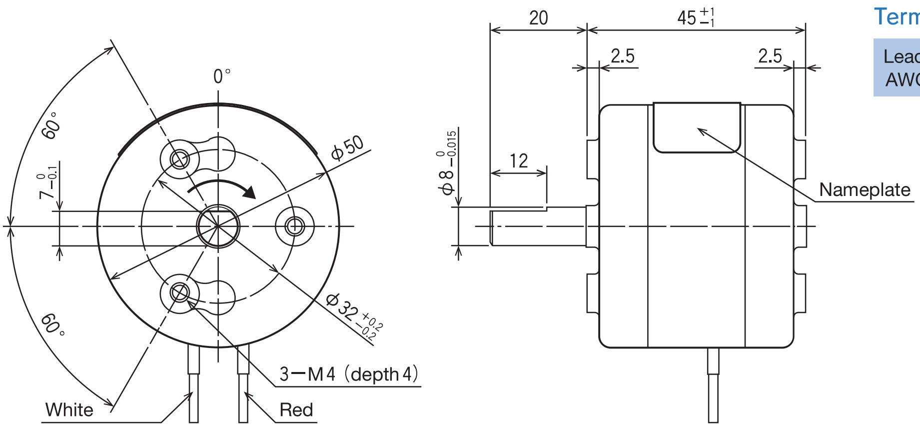


◆Response Data

(Load Inertia: 35.01 g·cm²)



◆External Dimensions (mm)



Terminal Specifications

Lead Wire Length (mm): 280
AWG Size: 22

The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR 20/40-CAB 0-N 036

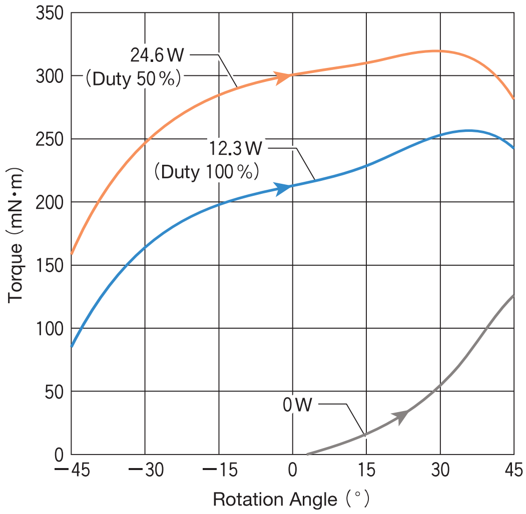
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 6.5 \times W$ (℃) $K \fallingdotseq 6.5$ (℃/watt)
Temperature Rise Time Constant τ	8 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	100 V AC, 50/60 Hz, 1 minute
Rotor Inertia	36 (g・cm^2)
Mass	500 (g)

◆Coil Data

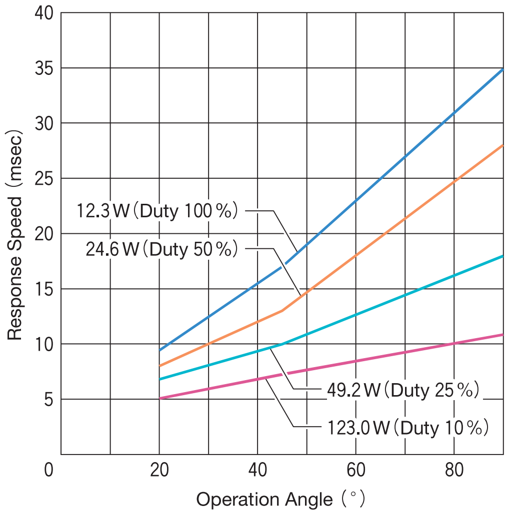
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	240.1	120.0	48.0	24.0
Power at 20℃ [W]	12.3	24.6	49.2	123.0	246.1
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
9.0	10.5	14.8	21.0	33.2	47.0
18.0	14.8	21.0	29.7	47.0	66.5
29.0	18.8	26.7	37.7	59.7	84.4
36.0 (standard)	21.0	29.7	42.0	66.5	94.1

◆Torque Data



◆Response Data

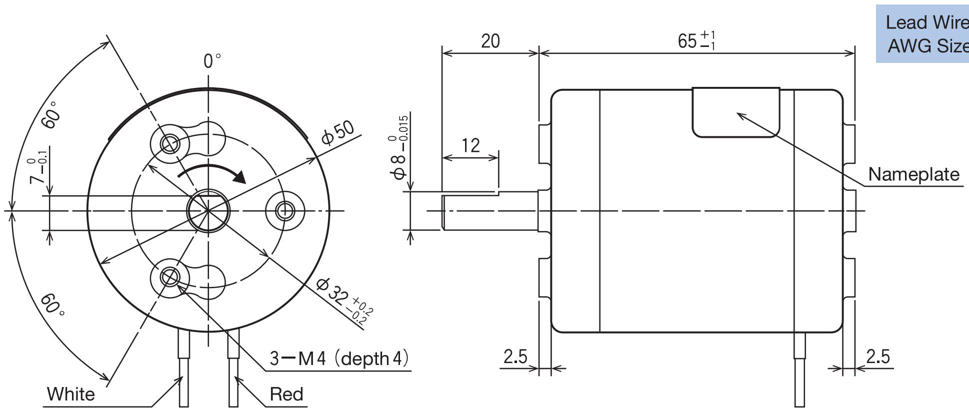
(Load Inertia : 35.01 g・cm^2)



◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm): 280
AWG Size: 22



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSR80/80-CAB0

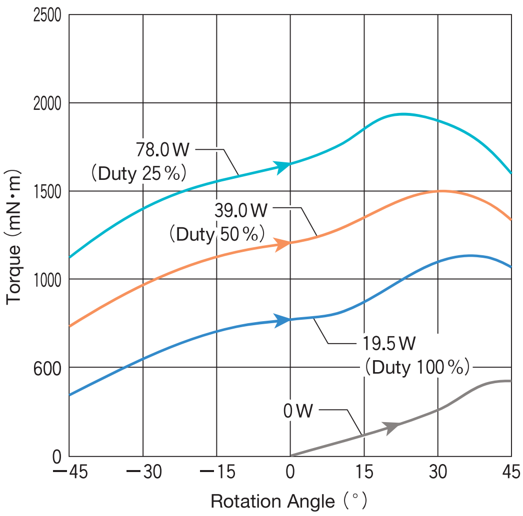
◆Main Specifications

Heat-Resistant Class	Class E (120℃)
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20℃)	$\Delta\theta_s \fallingdotseq 4.1 \times W$ (℃) $K \fallingdotseq 4.1$ (℃/watt)
Temperature Rise Time Constant τ	11 (minutes)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute
Rotor Inertia	350 (g·cm^2)
Mass	1,700 (g)

◆Coil Data

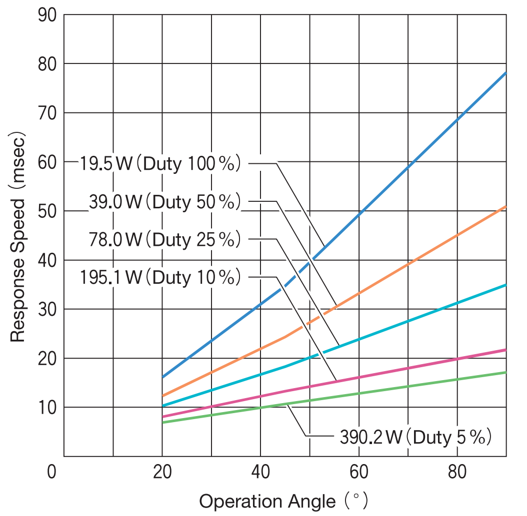
Duty Cycle	100 %	50 %	25 %	10 %	5 %
	Continuous	Intermittent			
Max. ON Time [sec.]	∞	330.2	165.1	66.0	33.0
Power at 20℃ [W]	19.5	39.0	78.0	195.1	390.2
Resistance at 20℃ [Ω]	Voltage [V_{DC}]				
3.0	7.6	10.8	15.2	24.1	34.2
6.0 (standard)	10.8	15.2	21.6	34.2	48.3

◆Torque Data



◆Response Data

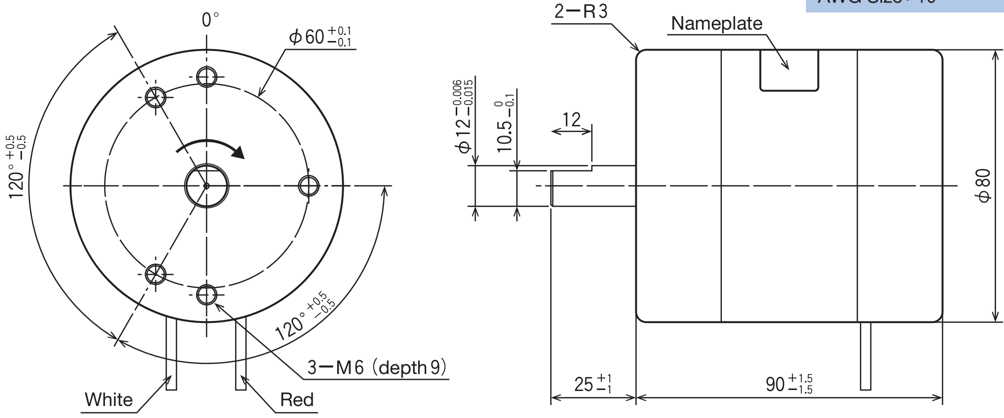
(Load Inertia : 425.41 g·cm^2)



◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm) : 230
AWG Size : 16



The above drawing shows the rotary shaft positioned in the center (0°) of its rotation range.
When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSE32/47 Series

◆Main Specifications

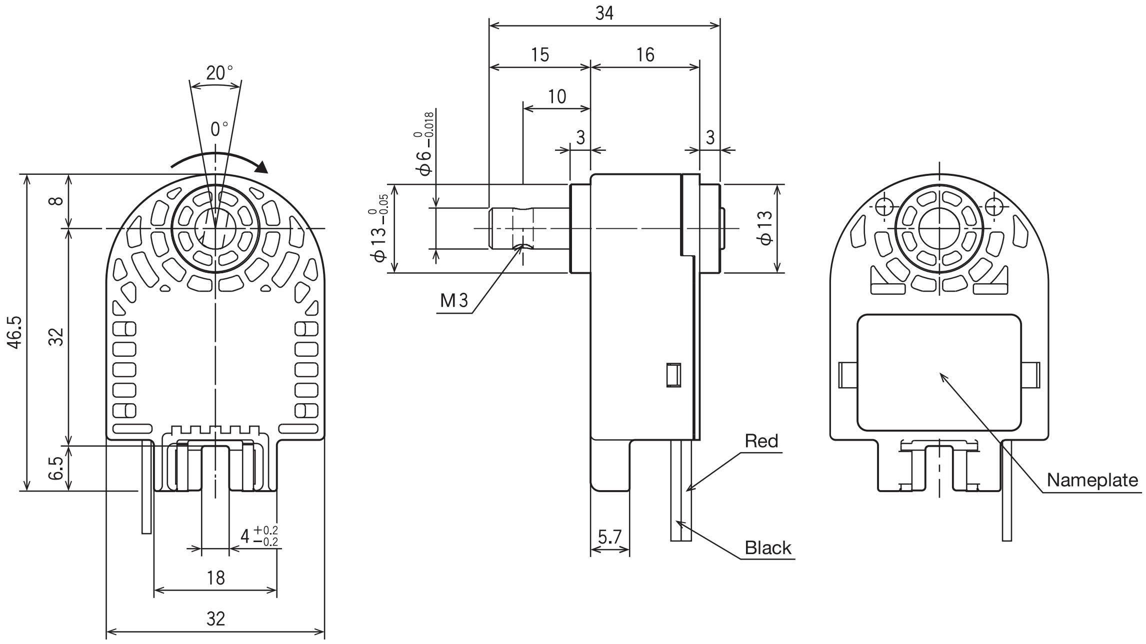
Model Number	RSE32/47-C020	RSE32/47-D038
Working Voltage	24 (V DC)	
DC Resistance	20 (Ω)	38 (Ω)
Duty Cycle	20 (%) or less	
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20 ℃)	$\Delta\theta_s$ ≒ 18 × W (℃) K ≒ 18 (℃/watt)	
Heat-Resistant Class	Class F (155 ℃)	
Insulation Resistance	500 V DC MEGA, 100 MΩ or more	
Dielectric Strength	600 V AC, 50/60 Hz, 1 second	
Mass	50 (g)	
Operating Angle	20 (°)	
Non-Excited Holding Force	0.015 (N・m)	
Starting Torque *1	0.02 (N・m)	
Life Cycle/Durability *2	10,000,000 (cycles)	
Response Speed *3	10 (msec) or less	12 (msec) or less

*1: when applied voltage = 24 V DC.
*2: durability conditions: measured by Takano Co. in a standard testing environment, with a load of inertia 30 g・cm^2, shaft in a horizontal position, duty cycle 20 %, applied voltage 24 V DC, using a Takano driver.
*3: measurement conditions: measured by Takano Co. in a standard testing environment, with a load of inertia 30 g・cm^2, shaft in a horizontal position, applied voltage 24 V DC.

◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm): 200
AWG Size: 26
Thermal Fuse: Nominal Operating Temperature: 145 ℃



When a positive electrode (+) is connected to the Red lead wire, and a negative (−) electrode to the Black lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

RSF 26/20-CS 38-G 020

◆Main Specifications

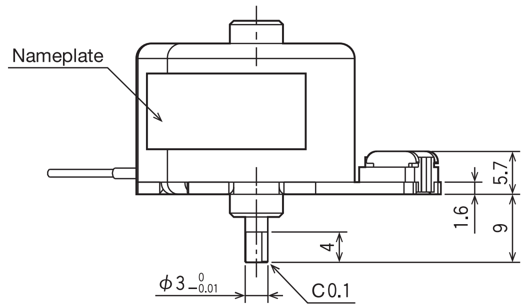
Working Voltage	24 (V DC)
DC Resistance	20 (Ω)
Duty Cycle	20 (%) or less
Coil Saturation Temperature Rise $\Delta\theta_s$ (at 20 ℃)	$\Delta\theta_s \fallingdotseq 18 \times W$ (℃) $K \fallingdotseq 18$ (℃/watt)
Heat-Resistant Class	Class F (155 ℃)
Insulation Resistance	500 V DC MEGA, 100 MΩ or more
Dielectric Strength	600 V AC, 50/60 Hz, 1 second
Mass	60 (g)
Operating Angle	37.5 (°)
Non-Excited Holding Force	0.01 (N・m)
Starting Torque *1	0.002 (N・m)
Life Cycle/Durability *2	10,000,000 (cycles)
Response Speed *3	15 (msec) or less

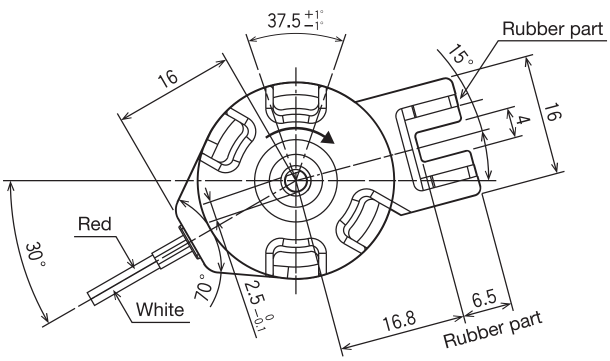
*1: when applied voltage = 24 V DC.
*2: durability conditions: measured by Takano Co. in a standard testing environment, with a load of inertia 4.2 g・cm^2, shaft in a horizontal position, duty cycle 20 %, applied voltage 24 V DC, using a Takano driver.
*3: measurement conditions: measured by Takano Co. in a standard testing environment, with a load of inertia 4.2 g・cm^2, shaft in a horizontal position, applied voltage 24 V DC.

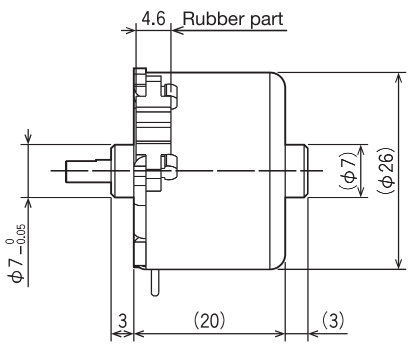
◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm): 300
AWG Size: 26
Thermal Fuse: Nominal Operating Temperature: 145 ℃







When a positive electrode (+) is connected to the Red lead wire, and a negative (−) electrode to the White lead wire, the shaft rotates clockwise (in the direction shown by the arrow).

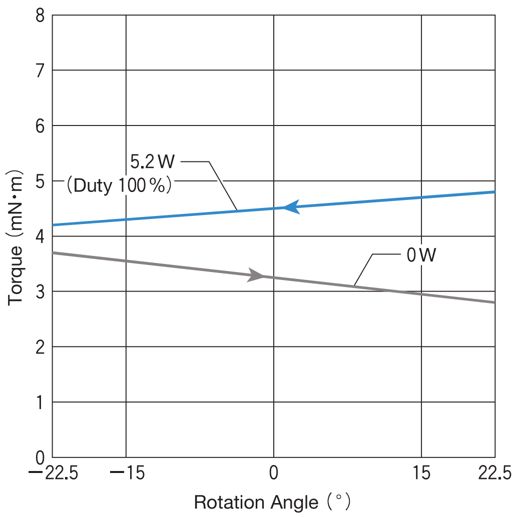
RSR 28/17-SR Series

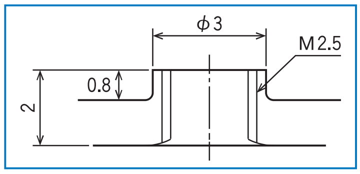
◆Main Specifications

Model Number *1	RSR 28/17-SR XX-27.5	RSR 28/17-SR XX-110
Rated Voltage	12 (V DC)	24 (V DC)
DC Resistance	27.5 (Ω)	110 (Ω)
Heat-Resistant Class	Class E (120℃)	
Direction of Plate Rotation	Clockwise (when power is on)	
Operating Angle	25 (°)/35 (°)/45 (°)	
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)	
Insulation Resistance	500 V DC MEGA, 100 MΩ or more	
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute	
Rotor Inertia	1.8 (g·cm^2)	
Mass	50 (g)	
Response Speed *2	25 (msec) or less	

*1: the "XX" portion represents the operating angle. You may choose 25°, 35°, or 45°.
*2: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage at the rated voltage amount.

◆Torque Data



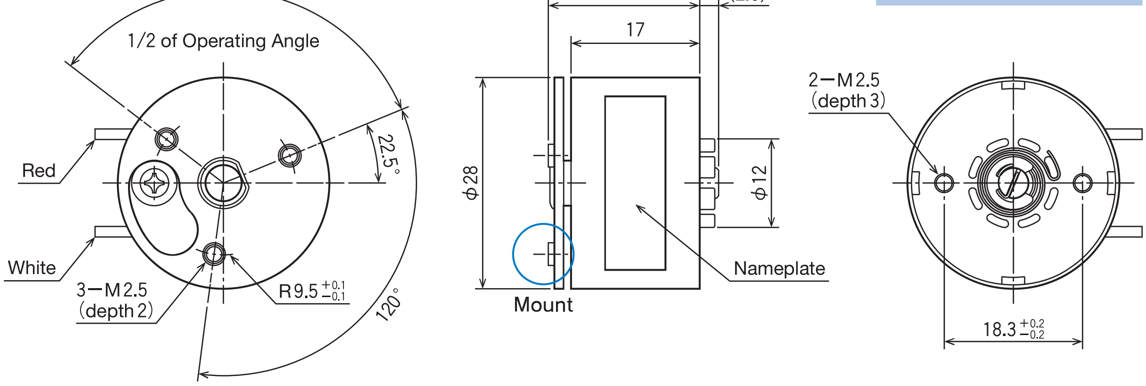


Mount Detail (mm)

◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm): 295
AWG Size: 26



When a positive electrode (+) is connected to the Red lead wire, and a negative electrode (−) to the White, the plate will rotate; when power is cut off, the plate will return to its original position by means of a spring.

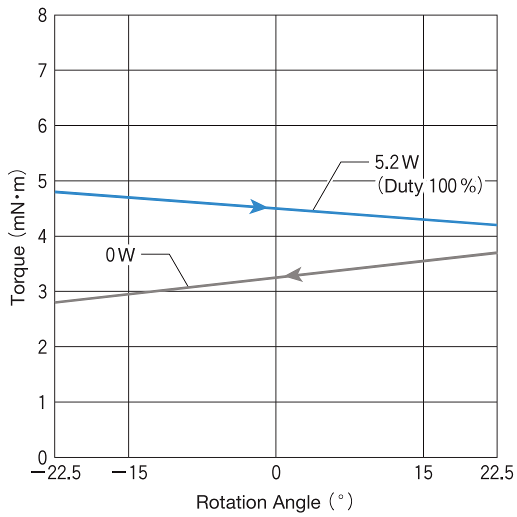
RSR 28/17-SL Series

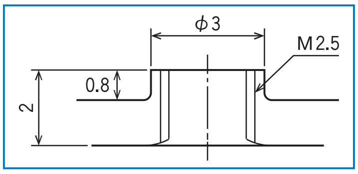
◆Main Specifications

Model Number *1	RSR 28/17-SL XX-27.5	RSR 28/17-SL XX-110
Rated Voltage	12 (V DC)	24 (V DC)
DC Resistance	27.5 (Ω)	110 (Ω)
Heat-Resistant Class	Class E (120℃)	
Direction of Plate Rotation	Counter-clockwise (when power is on)	
Operating Angle	25 (°)/35 (°)/45 (°)	
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)	
Insulation Resistance	500 V DC MEGA, 100 MΩ or more	
Dielectric Strength	1000 V AC, 50/60 Hz, 1 minute	
Rotor Inertia	1.8 ($g \cdot cm^2$)	
Mass	50 (g)	
Response Speed *2	25 (msec) or less	

*1: the "XX" portion represents the operating angle. You may choose 25°, 35°, or 45°.
*2: measurement conditions: measured by Takano Co. in a standard testing environment, with no load, shaft in a horizontal position, applied voltage at the rated voltage amount.

◆Torque Data



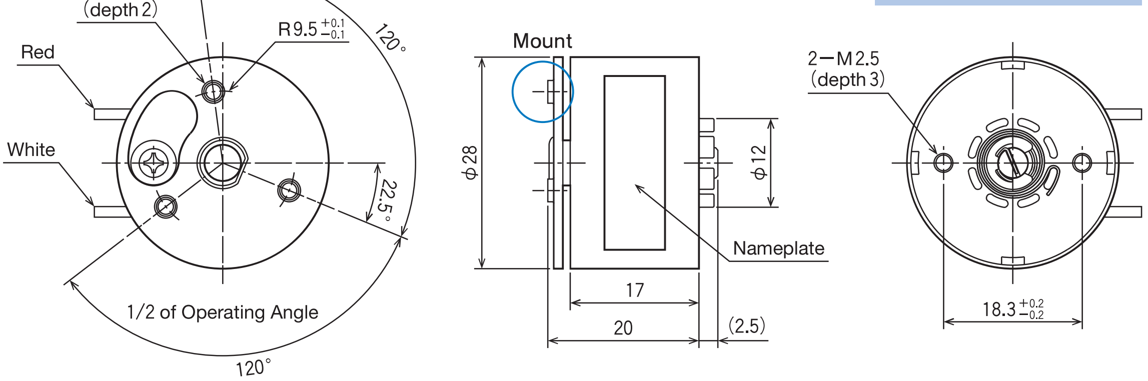


Mount Detail (mm)

◆External Dimensions (mm)

Terminal Specifications

Lead Wire Length (mm): 295
AWG Size: 26



When a positive electrode (−) is connected to the Red lead wire, and a negative electrode (+) to the White, the plate will rotate; when power is cut off, the plate will return to its original position by means of a spring.