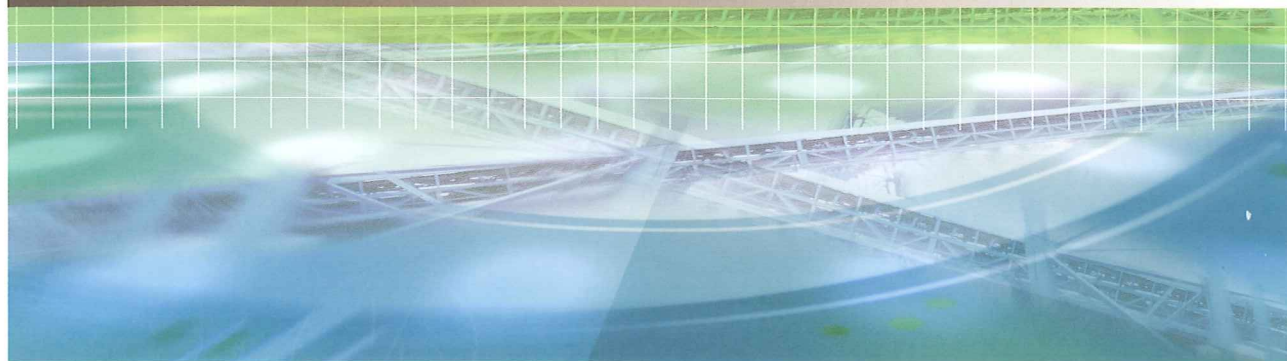


MAGNETIC TYPE SPEED RELAY



The Speed Relay is a magnetic type motion sensor specifically designed to detect the speed of a rotating shaft in machinery.

If an overload causes a shaft speed to decrease abnormally, or to increase dangerously, the Speed Relay will immediately output an alarm signal to prevent problems.



ESRK-100

No power supply is required.

The Speed Relay is actuated when the setting speed is mechanically detected.

No maintenance is required.

The Speed Relay can be operated continuously over a long period without lubrication or inspection.

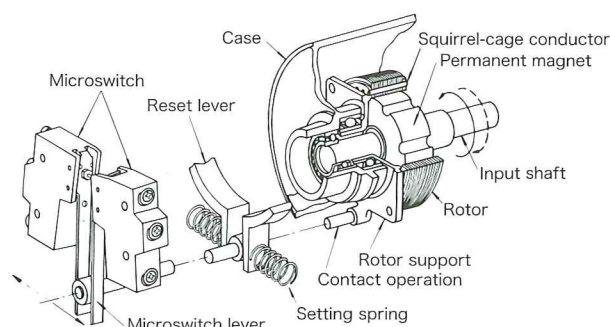
Superior durability is secured by its rigid structure.

More than 45,000 installations show that the speed relay is high-quality and field-proven.

Structures and Operation

- The Speed Relay consists of a permanent magnet that rotates together with the shaft, a rotor generating a torque proportional to the rotational speed of the shaft, two micro switches to be actuated depending on the rotation direction, and an actuating rotational speed adjustment mechanism.
- The metal rotor easily allows penetration of the magnetic line of force, and is fixed with two rotor supports that allow it to operate smoothly. The contact operating lever installed below the rotor supports is centrally supported (as shown) with setting springs to prevent the rotor from running idle.
- When the permanent magnet rotates, an induced current proportional to the rotational speed flows in the squirrel-cage conductor which has been incorporated inside the rotor. This current is induced in the same principle as a squirrel-cage motor, so that a torque with the same direction as the permanent magnet is produced in the rotor.
- The higher the shaft speed, the larger the torque. The rotor operates beyond the force of the setting spring, and switches the microswitch contact.

- As the rotational speed of the shaft decreases, the setting spring pushes the contact operating lever back to the center position to reset the switch. In other words, the actuating rotational speed will vary depending on the force of the setting spring.




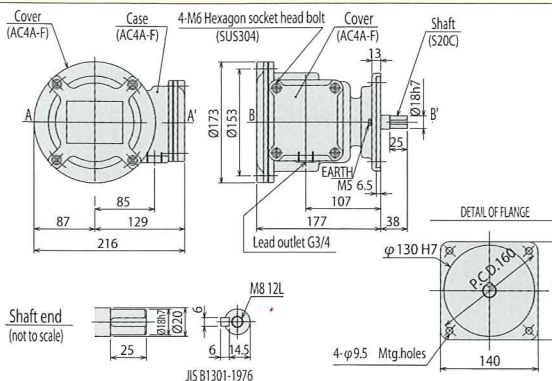
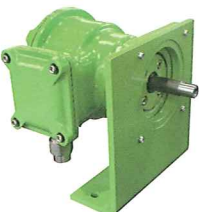
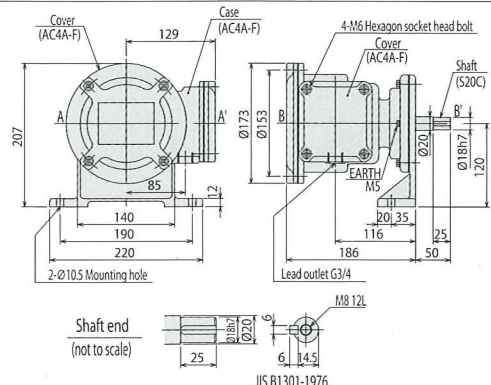

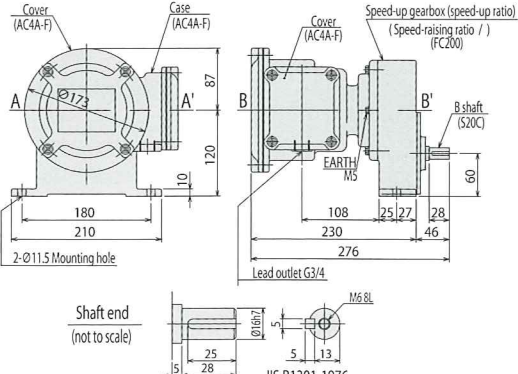
Magnetic type motion sensor

Speed Relay

Standard model

Appearance and Dimensional Drawing

Type	Application	Dimensional Drawings																																																																																																										
Touch roller type ESRW-□□□	<p>Applicable belt width</p> <table><tr><th>Belt width mm</th><th>ESRW -102</th><th>ESRW -122</th><th>ESRW -302</th><th>ESRW -322</th></tr><tr><td>600</td><td></td><td></td><td></td><td></td></tr><tr><td>750</td><td></td><td></td><td></td><td></td></tr><tr><td>900</td><td></td><td></td><td></td><td></td></tr><tr><td>1050</td><td></td><td></td><td></td><td></td></tr><tr><td>1200</td><td></td><td></td><td></td><td></td></tr><tr><td>1400</td><td></td><td></td><td></td><td></td></tr><tr><td>1600</td><td></td><td></td><td></td><td></td></tr><tr><td>1800</td><td></td><td></td><td></td><td></td></tr><tr><td>2000</td><td></td><td></td><td></td><td></td></tr><tr><td>2200</td><td></td><td></td><td></td><td></td></tr></table> <p>Applicable belt speed</p> <table><tr><th>Speed m/min</th><th>ESRW -102</th><th>ESRW -122</th><th>ESRW -302</th><th>ESRW -322</th></tr><tr><td>35~53</td><td></td><td></td><td></td><td></td></tr><tr><td>53~300</td><td></td><td></td><td></td><td></td></tr></table>	Belt width mm	ESRW -102	ESRW -122	ESRW -302	ESRW -322	600					750					900					1050					1200					1400					1600					1800					2000					2200					Speed m/min	ESRW -102	ESRW -122	ESRW -302	ESRW -322	35~53					53~300					<table><tr><th>Type</th><th colspan="4">Dimension (mm)</th><th>Mass</th></tr><tr><th></th><th>φ a</th><th>b</th><th>c</th><th>d</th><th></th></tr><tr><td>ESRW-102</td><td>130</td><td>306</td><td>19</td><td>38</td><td>15kg</td></tr><tr><td>-122</td><td>200</td><td>306</td><td>21</td><td>42</td><td>15kg</td></tr><tr><td>-302</td><td>130</td><td>456</td><td>19</td><td>38</td><td>15kg</td></tr><tr><td>-322</td><td>200</td><td>456</td><td>21</td><td>42</td><td>16kg</td></tr></table>	Type	Dimension (mm)				Mass		φ a	b	c	d		ESRW-102	130	306	19	38	15kg	-122	200	306	21	42	15kg	-302	130	456	19	38	15kg	-322	200	456	21	42	16kg
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Note 3) Flange-type ESRK-100 with shaft end key Mass: 4.4 kg	<table><tr><td>Max. Allowable speed</td><td>1800 rpm</td></tr><tr><td>Speed up</td><td>Min. Rated speed 60 rpm</td></tr><tr><td></td><td>Min. Actuating speed 78 rpm</td></tr><tr><td>Speed down</td><td>Min. Rated speed 86 rpm</td></tr><tr><td></td><td>Min. Actuating speed 60 rpm</td></tr></table>	Max. Allowable speed	1800 rpm	Speed up	Min. Rated speed 60 rpm		Min. Actuating speed 78 rpm	Speed down	Min. Rated speed 86 rpm		Min. Actuating speed 60 rpm	<p>Shaft end (not to scale)</p> <p>JIS B1301-1976</p>																																																																																																
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Base-type ESRB-100 with shaft end key Mass: 7.0 kg	<table><tr><td>Max. Allowable speed</td><td>1800 rpm</td></tr><tr><td>Speed up</td><td>Min. Rated speed 60 rpm</td></tr><tr><td></td><td>Min. Actuating speed 78 rpm</td></tr><tr><td>Speed down</td><td>Min. Rated speed 86 rpm</td></tr><tr><td></td><td>Min. Actuating speed 60 rpm</td></tr></table>	Max. Allowable speed	1800 rpm	Speed up	Min. Rated speed 60 rpm		Min. Actuating speed 78 rpm	Speed down	Min. Rated speed 86 rpm		Min. Actuating speed 60 rpm	<p>Shaft end</p> <p>JIS B1301-1976</p>																																																																																																
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Low-speed type ESRL-100 with shaft end key Mass: 9.5 kg	<table><tr><td>Max. Allowable speed</td><td>100 rpm</td></tr><tr><td>Speed up</td><td>Min. Rated speed 10 rpm</td></tr><tr><td></td><td>Min. Actuating speed 13.5 rpm</td></tr><tr><td>Speed down</td><td>Min. Rated speed 14.3 rpm</td></tr><tr><td></td><td>Min. Actuating speed 10 rpm</td></tr></table>	Max. Allowable speed	100 rpm	Speed up	Min. Rated speed 10 rpm		Min. Actuating speed 13.5 rpm	Speed down	Min. Rated speed 14.3 rpm		Min. Actuating speed 10 rpm	<p>Shaft end (not to scale)</p> <p>JIS B1301-1976</p>																																																																																																
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Dust-ignition proof type SDP-13 Flange type ESRDP-200K with shaft end key Mass: 5.5 kg	 <table><tr><td>Max. Allowable speed</td><td colspan="2">1800 rpm</td></tr><tr><td rowspan="2">Speed up</td><td>Min. Rated speed</td><td>60 rpm</td></tr><tr><td>Min. Actuating speed</td><td>78 rpm</td></tr><tr><td rowspan="2">Speed down</td><td>Min. Rated speed</td><td>86 rpm</td></tr><tr><td>Min. Actuating speed</td><td>60 rpm</td></tr></table>	Max. Allowable speed	1800 rpm		Speed up	Min. Rated speed	60 rpm	Min. Actuating speed	78 rpm	Speed down	Min. Rated speed	86 rpm	Min. Actuating speed	60 rpm	 <p>Technical drawing of the SDP-13 Flange type microswitch. It includes front, side, and shaft end views. Key dimensions include: front view (87, 129, 216, 85, 173, 177, 107, 38, 140, 140, 140), side view (13, 8', 25, 177, 107, 38, 140, 140, 140), and shaft end view (M8 12L, 25, 14.5, 6, 14.5, 6, 14.5). The drawing also shows the cover (AC4A-F), case (AC4A-F), 4-M6 Hexagon socket head bolt (SUS304), shaft (S20C), and lead outlet G3/4. A detail of the flange is shown with a PCD 160 and 4-φ9.5 Mtg holes.</p>
Max. Allowable speed	1800 rpm														
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Dust-ignition proof type SDP-13 Base type ESRDP-200B with shaft end key Mass: 7.5 kg	 <table><tr><td>Max. Allowable speed</td><td colspan="2">1800 rpm</td></tr><tr><td rowspan="2">Speed up</td><td>Min. Rated speed</td><td>60 rpm</td></tr><tr><td>Min. Actuating speed</td><td>78 rpm</td></tr><tr><td rowspan="2">Speed down</td><td>Min. Rated speed</td><td>86 rpm</td></tr><tr><td>Min. Actuating speed</td><td>60 rpm</td></tr></table>	Max. Allowable speed	1800 rpm		Speed up	Min. Rated speed	60 rpm	Min. Actuating speed	78 rpm	Speed down	Min. Rated speed	86 rpm	Min. Actuating speed	60 rpm	 <p>Technical drawing of the SDP-13 Base type microswitch. It includes front, side, and shaft end views. Key dimensions include: front view (207, 129, 85, 140, 190, 220, 2, 140, 140, 140), side view (173, 177, 107, 38, 140, 140, 140), and shaft end view (M8 12L, 25, 14.5, 6, 14.5, 6, 14.5). The drawing also shows the cover (AC4A-F), case (AC4A-F), 4-M6 Hexagon socket head bolt (SUS304), shaft (S20C), and lead outlet G3/4. A detail of the flange is shown with a PCD 160 and 4-φ9.5 Mtg holes.</p>
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Dust-ignition proof type SDP-13 Ascent gearbox type ESRDP-200U with shaft end key, Mass: 9.0 kg	 <table><tr><td>Max. Allowable speed</td><td colspan="2">80 rpm</td></tr><tr><td rowspan="2">Speed up</td><td>Min. Rated speed</td><td>12 rpm</td></tr><tr><td>Min. Actuating speed</td><td>15.6 rpm</td></tr><tr><td rowspan="2">Speed down</td><td>Min. Rated speed</td><td>17.2 rpm</td></tr><tr><td>Min. Actuating speed</td><td>12 rpm</td></tr></table>	Max. Allowable speed	80 rpm		Speed up	Min. Rated speed	12 rpm	Min. Actuating speed	15.6 rpm	Speed down	Min. Rated speed	17.2 rpm	Min. Actuating speed	12 rpm	 <p>Technical drawing of the SDP-13 Ascent gearbox type microswitch. It includes front, side, and shaft end views. Key dimensions include: front view (180, 210, 120, 10, 173, 177, 107, 38, 140, 140, 140), side view (13, 8', 25, 177, 107, 38, 140, 140, 140), and shaft end view (M6 8L, 25, 14.5, 6, 14.5, 6, 14.5). The drawing also shows the cover (AC4A-F), case (AC4A-F), 4-M6 Hexagon socket head bolt (SUS304), shaft (S20C), and lead outlet G3/4. A detail of the flange is shown with a PCD 160 and 4-φ9.5 Mtg holes.</p>
Max. Allowable speed	80 rpm														
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	Min. Actuating speed	15.6 rpm													
Speed down	Min. Rated speed	17.2 rpm													
	Min. Actuating speed	12 rpm													

Note 1) A-A' and B-B' of the drawings should be horizontal from the viewpoint of internal structure.

Note 2) Specifications and dimensions are subject to change for product improvement. Flame proof type d2G4 can be also manufactured.

Note 3) Flange type can be used as IP 55 by sealing the front of the mounting base.

Standard Specifications

- Contact capacity : AC 250 V 5 A Resistance load
DC 125 V 0.5 A Resistance load
- Ambient temperature : -10°C ~ +50°C
- Protection class : IP 55 (flange type IP 40), see Note 3)

- Coating color : Munsell 7.5 GY 6/10
- Tolerance : +/-10%
- Shaft : New JIS Key

Necessary Specifications

- Type
- Rated speed : rpm or m/min
- Actuating speed
Actuation at speed up : rpm or m/min
Actuation at speed down : rpm or m/min
- Contact type : NC contact (zero speed : ON)
NO contact (zero speed : OFF)

How to decide setting speed (actuating speed)
(in condition of standard microswitch)

A Speed up : 70% or less of rated speed

B Speed down : 130% or more of rated speed

Selection of Actuating Speed

The actuating speed of speed relay is different between at speed up and at speed down. When determining this specification, designate the speed up or speed down actuation. In addition, refer to the following criteria when determining the actuating speed. When selecting an actuating speed that is not included in the following criteria, the speed relay may not actuate due to MD (Movement Differential: 20~25%).

Overspeed detection

Actuation at speed up: The actuating speed should be 130% or more of the rated speed.

Belt slip detection

Actuation at speed down: The actuating speed should be 70% or less of the rated speed.

Speed-down actuation

When the microswitch actuates at 70% against the rated speed 100%, the rotation speed at which the microswitch recovers is 90 - 95%(MD: Movement Differential) while the speed is increasing after actuation.

Speed-up actuation

When the microswitch actuates at 130% against the rated speed 100%, the speed at which the microswitch recovers is 105 - 110%(MD: Movement Differential) while the speed is decreasing after actuation.

* Contact us if the DC type switch is required because it needs more MD(Movement Differential) for recovery.

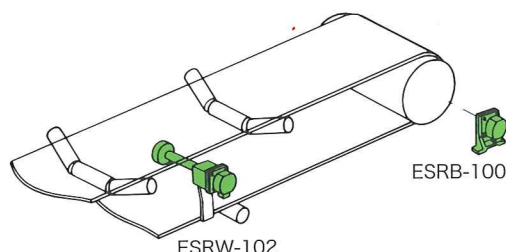


Figure 1 Mounting image

Examples of Application

Belt conveyor slip detection (refer to Figure 2)

Overload/fault detection in machine (refer to Figure 2)

Press the START button to activate the motor(M). Because the contact SS of the speed relay is OFF at this time, set the timer contact TR to ON until the speed rises and the contact SS turns ON.

When the speed drops, the contact SS of the speed relay will turn OFF and the motor will stop. Usually, the control circuit incorporates a circuit that outputs the alarm in synchronization with the motor stopping.

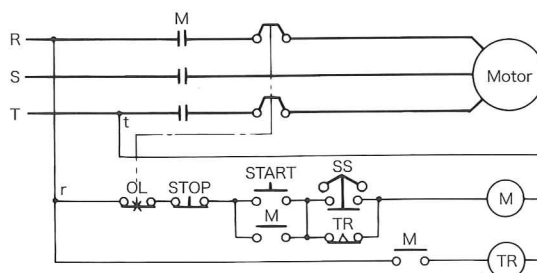


Figure 2 Example of circuit for slip detection and overload detection

Control for sequential activation and deactivation of the conveyor (refer to Figure 3)

Press the START button to activate the motor(1M). When the rotational speed of the motor exceeds 90-95% of the rated speed, the contact 1SS of the speed relay will turn ON and the motor(2M) will be activated. The other four motors are activated in the same way.

Press the STOP button to sequentially turn OFF the timers from 4TR to 1TR, and to deactivate the motors from M4 to M1 in sequence.

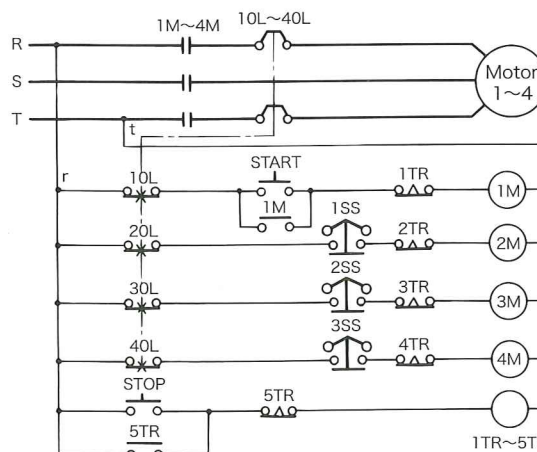


Figure 3 Example of control circuit for sequential activation and deactivation



Caution
● Read the instructions to ensure correct and suitable application of products.
● Contact our nearest sales office when using our products for any systems used in situations which may be life threatening.

*Specifications are subject to change without notice.

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