

MECHANICAL SENSORS / LIMIT SWITCHES

The reliable and flexible way to stop your machines

For the detection of machine part movement especially for the detection of end positions, the mechanical and optical limit switches provide accurate and reliable operation with a large variety of actuation possibilities optimized for a widest range of application and usage requirements. The easy positioning and intuitive installation, the high immunity to changing environmental influences (electromagnetic fields, sunlight, temperatures, etc.) as well as the possibility to directly switch loads with up to 15A make these sensors ideal for a wide range of conveying and handling applications.








D4N Limit switch



see page 122

- Wide range of actuators (plunger, lever)
- Direct opening mechanism
- Terminal block (with conduit sizes M20, PG13.5, etc.) and M12 connector models
- Up to 10A switching capacity
- Plastic housing
- IP67

SPECIAL MODELS

SPECIAL MODELS				
Heat resistant	Cold resistant	Small force / size detection	High precision multi detection	Highest precision measurement
				
WL-_-TH, TZ	WL-_-TC	D5C	D5B	ZX-T
Up to 400°C	Down to -40°C	Detects minimal contact force e.g. thin wire or foil	<ul style="list-style-type: none"> • X, Y, Z action • Several µm switching accuracy • M5, M8, M10 sizes 	Measurement resolution up to 0.1µm
see DVD for more information	see DVD for more information	see DVD for more information	see DVD for more information	see Quality Control & Inspection Guide

Basic housing protection for subassemblies:

Z	EE-SX
	
see page 127	see page 67

Smaller compact housing:

D4C

see page 126

Metal housing:

D4B-_N

see page 124

SPECIAL MODELS

Mounting shape variations



WL, HL, D4MC, etc.

Different mounting shapes e.g. popular in countries around the world

see DVD for more information

Safety limit switches



D4 Safety

- Mechanical form lock
- Manual reset
- Door hinge switches

see Machine Safety Guide



Limit switch with plastic housing

The D4N-family is a complete line-up of limit switches. They are available with one, two or three built-in contacts and a wide range of head and actuator types. The limit switches intuitive to set up, install and maintain.

- Direct opening mechanism
- Wide range of actuators
- Double insulation
- M12 connector or terminal blocks (with M20, PG13,5 conduit)



FULL SIZE



COMPACT



SPECIAL SHAPE

Ordering information

Switches		Connection method		Order code			
				1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)	2NC/1NO (slow-action)
				Order code	Order code	Order code	Order code
	Roller lever (resin lever, resin roller)	1-conduit	M20 ^{*1}	D4N-4120	D4N-4A20	D4N-4B20	D4N-4C20
			M12 connector	D4N-9120	D4N-9A20	D4N-9B20	–
		2-conduit	M20 ^{*1}	–	–	–	D4N-8C20
	Plunger	1-conduit	M20 ^{*1}	D4N-4131	D4N-4A31	D4N-4B31	–
			M12 connector	D4N-9131	D4N-9A31	D4N-9B31	–
		2-conduit	M20 ^{*1}	D4N-8131	D4N-8A31	D4N-8B31	–
	Roller plunger	1-conduit	M20 ^{*1}	D4N-4132	D4N-4A32	D4N-4B32	D4N-4C32
			M12 connector	D4N-9132	D4N-9A32	D4N-9B32	–
		2-conduit	M20 ^{*1}	D4N-8132	D4N-8A32	D4N-8B32	D4N-8C32
	One-way roller arm lever (horizontal)	1-conduit	M20 ^{*1}	D4N-4162	D4N-4A62	D4N-4B62	D4N-4C62
			M12 connector	D4N-9162	D4N-9A62	D4N-9B62	–
		2-conduit	M20 ^{*1}	D4N-8162	D4N-8A62	D4N-8B62	D4N-8C62
	One-way roller arm lever (vertical)	1-conduit	M20 ^{*1}	D4N-4172	D4N-4A72	D4N-4B72	–
	Adjustable roller lever, form lock (metal lever, resin roller)	1-conduit	M20 ^{*1}	D4N-412G	D4N-4A2G	D4N-4B2G	–
			M12 connector	D4N-912G	D4N-9A2G	D4N-9B2G	–
	Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20 ^{*1}	D4N-412H	D4N-4A2H	D4N-4B2H	–
			M12 connector	D4N-912H	D4N-9A2H	D4N-9B2H	–

*1. Conduit sizes 1/2-14NPT, G1/2 and PG13.5 are also available.

bold = safety limit switch, mechanical form lock

Switches with two contacts and MBB contacts

MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed (NC) contact opens the normally open (NO) contact closes.

Actuator		Connection method		Order code	
				1NC/1NO (slow-action)	2NC/1NO (slow-action)
	Roller lever (resin lever, resin roller)	1-conduit	M20 ^{*1}	D4N-4E20	D4N-4F20
			M12 connector	D4N-9E20	–
		2-conduit	M20 ^{*1}	D4N-8E20	D4N-8F20
	Roller plunger	1-conduit	M20 ^{*1}	D4N-4E32	D4N-4F32
			M12 connector	D4N-9E32	–
		2-conduit	M20 ^{*1}	D4N-8E32	D4N-8F32
	One-way roller arm lever (horizontal)	1-conduit	M20 ^{*1}	D4N-4E62	D4N-4F62
			M12 connector	D4N-9E62	–
		2-conduit	M20 ^{*1}	D4N-8E62	D4N-8F62

*1. Conduit sizes 1/2-14NPT, G1/2 and PG13,5 are also available.

For safe control systems see MACHINE SAFETY GUIDE

For M12 cable connectors see page 135

General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories
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Specifications

Durability ^{*1}	Mechanical	15,000,000 operations min./Fork lever 10,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4-1120)
Operating frequency		30 operations/minute max.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x0.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I _{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing
Degree of protection		IP67 (EN60947-5-1)

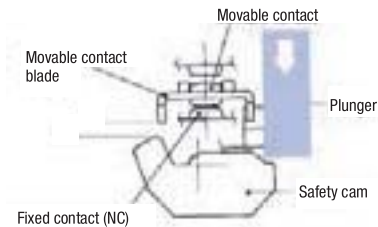
^{*1} The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40 to 70%. For more details, consult your Omron representative.

1NO/1NC Contact (Snap-action)

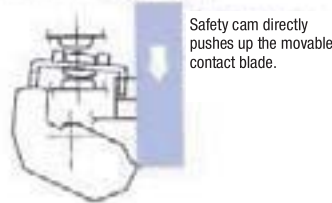
If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

safety cam or plunger engages part A of the movable contact blade. When the safety cam or plunger is moved in the direction of the arrow, the Limit Switch releases.

1. When metal deposition occurs.



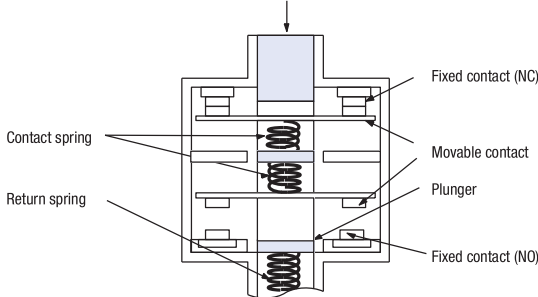
2. When contacts are being pulled apart.



3. When contacts are completely pulled apart.



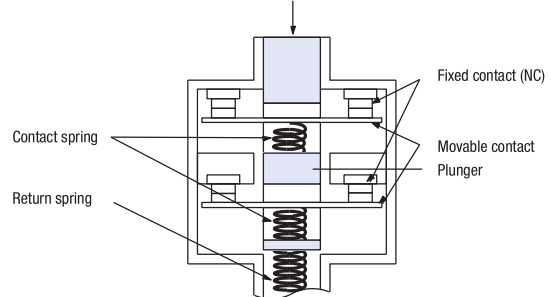
1NC/1NO Contact (Slow-action)



Conforms to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

2NC Contact (Slow-action)



Conforms to EN60947-5-1

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

is marked on the product to indicate approval of direct opening.

For safe control systems see MACHINE SAFETY GUIDE					For M12 cable connectors see page 135
General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories



Limit switch with metal housing

The D4BN family is a complete line-up of limit switches in metal housing. They are available with two built-in contacts and a wide range of head and actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20, are provided.

- Direct opening mechanism
- Various actuators
- Robust metal housing
- Terminal block with M20 conduit



FULL SIZE



COMPACT



SPECIAL SHAPE



Ordering information

		Order code				
		Switches (EN50041)			3-conduit Switch	
		1NC/1NO (snap-action)	1NC/1NO (slow-action)	2NC (slow-action)	1NC/1NO (snap-action)	2NC (slow-action)
	Roller lever	D4B-4111N	D4B-4511N	D4B-4A11N	D4B-8111N	–
	Adjustable roller lever	D4B-4116N	D4B-4516N	D4B-4A16N	D4B-8116N	–
	Adjustable rod lever	D4B-4117N	D4B-4517N	D4B-4A17N	D4B-8117N	–
	Plain	D4B-4170N	D4B-4570N	D4B-4A70N	–	–
	Roller	D4B-4171N	D4B-4571N	D4B-4A71N	D4B-8171N	D4B-8A71N
	Coil spring	D4B-4181N	–	–	–	–
	Plastic rod	D4B-4187N	–	–	–	–

Note: The above models provide terminal block with M20 conduit. Conduit sizes G1/2 and PG 13.5 are also available.

bold = safety limit switch, mechanical form lock

Specifications

Item		Snap-action	Slow-action
Durability *1	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency		Mechanical: 120 operations/min Electrical: 30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I _{th})		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature		Operating: -40 to 80°C (with no icing) *2	
Degree of protection		IP67 (EN60947-5-1)	

*1 The durability is for an ambient temperature of 5 to 35°C and ambient humidity of 40 to 70%. For further conditions, consult your Omron sales representative.

*2 -25 to 80°C for the flexible-rod type.

For safe control systems see
MACHINE SAFETY GUIDE

General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories
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1NO/1NC Contact (Snap-action)

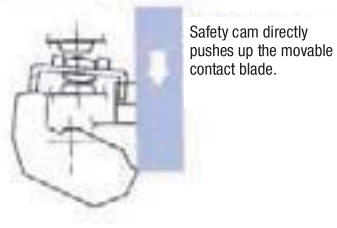
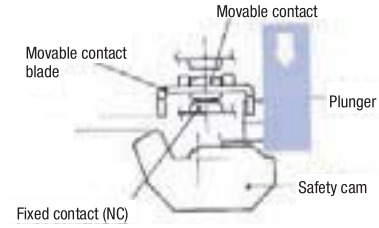
If metal deposition between mating contacts occurs on the NC contact side, they can be pulled apart by the shearing force and tensile force generated when part B of the

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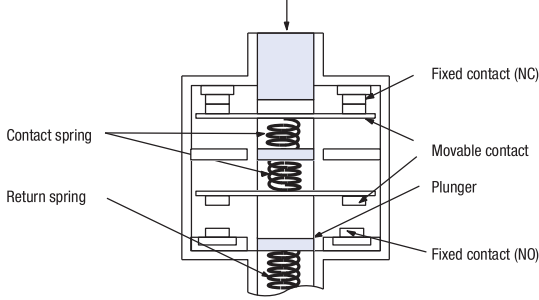
1. When metal deposition occurs.

2. When contacts are being pulled apart.

3. When contacts are completely pulled apart.



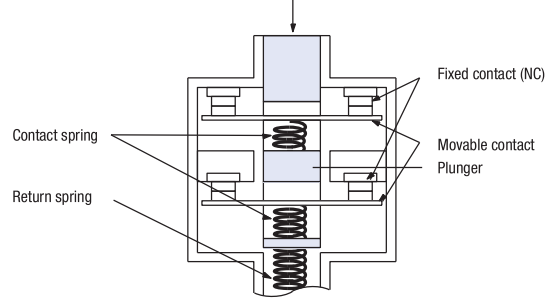
1NC/1NO Contact (Slow-action)



Conforms to EN60947-5-1 Direct Opening

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

2NC Contact (Slow-action)



Conforms to EN60947-5-1

When metal deposition occurs, the contacts are separated from each other by the plunger being pushed in.

is marked on the product to indicate approval of direct opening.

For safe control systems see MACHINE SAFETY GUIDE

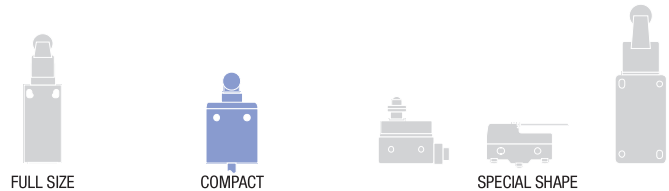
General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories
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Compact, 16 mm thin limit switch



The D4C range of switches offers a wide choice of actuators. All switches are liquid and dust resistant, conforming to IEC IP67.

- Enclosed compact limit switch, only 16 mm thin
- Metal housing with triple-sealed construction
- LED indicator for easy monitoring
- Ganged mounting for multiple switching possible
- Mechanical life expectancy = 10 million operations



Ordering information

Actuator	Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Order code	
							3 m prewired	M12 connector
Pin plunger	11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	15.7±1 mm	D4C-1201	D4CC-3001
Roller plunger	11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5±1 mm	D4C-1202	D4CC-3002
Plastic rod	1.47 N	—	15°	—	—	—	D4C-1250	D4CC-3050
Roller lever	5.69 N	1.47 N	25°	40°	3°	—	D4C-1220	D4CC-3024
Center roller lever plunger	6.67 N	1.47 N	10±3°	50°	3°	—	D4C-1260	D4CC-3060

Note: For other product specifications please refer to the datasheet

Specifications

Order code	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
D4C-1	125 VAC	5 A	5 A	1.5 A	0.7 A	3 A	3 A	1.3 A	1.3 A
	250 VAC	5 A	5 A	1 A	0.5 A	2 A	2 A	1.5 A	0.8 A
	8 VDC	5 A	5 A	2 A	2 A	5 A	4 A	3 A	3 A
	14 VDC	5 A	5 A	2 A	2 A	4 A	4 A	3 A	3 A
	30 VDC	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A
	125 VDC	0.4 A	0.4 A	0.05 A	0.4 A	0.4 A	0.4 A	0.05 A	0.05 A
D4CC	30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A

Note: For other loads, please refer to the datasheet

Durability	Mechanical: 10,000,000 operations min. Electrical: 200,000 operations min. (5A at 250 VAC, resistive load)
Operating speed	0.1 mm to 0.5 m/s (in case of plunger) 1 mm to 1 m/s (in case of roller lever)
Operating frequency	Mechanical: 120 operations/min Electrical: 30 operations/min
Short-circuit protective device	10 A fuse type gG (IEC269)
Ambient temperature	Operating: -10 to 70°C (with no icing)
Degree of protection	IP67

For M12 cable connectors see page 135

General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories
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Limit switch with basic plastic housing



Z basic switches provide a large switching capacity of 15 A with very high repeat accuracy. With the basic plastic housing they are ideally suited for applications in un-critical environments or when used in separately encased subassemblies.

- Basic plastic housing for subassemblies
- High-precision switching
- A wide range of actuators



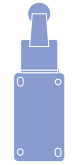
FULL SIZE



COMPACT



SPECIAL SHAPE



Ordering information

Ratings	Contact gap	Actuator	Order code	Solder terminal	
				Solder terminal	Screw terminal
15 A	0.5 mm	Pin plunger	Z-15G	Z-15G-B	Z-15G-B
		Short spring plunger	Z-15GD	Z-15GD-B	Z-15GD-B
		Leaf spring (high OF)	Z-15GL	Z-15GL-B	Z-15GL-B
		Reverse hinge lever	Z-15GM	Z-15GM-B	Z-15GM-B
		Reverse hinge roller lever	Z-15GM2	Z-15GM2-B	Z-15GM2-B
		Panel mount plunger (medium OP)	Z-15GQ	Z-15GQ-B	Z-15GQ-B
		Slim spring plunger	Z-15GS	Z-15GS-B	Z-15GS-B
		Hinge lever (low OF)	Z-15GW	Z-15GW-B	Z-15GW-B
		Hinge roller lever	Z-15GW2	Z-15GW2-B	Z-15GW2-B

Note: Many other types are also available, please refer to the full datasheet.

Specifications

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC		15 A	3 A	1.5 A		15 A	5 A	2.5 A
250 VAC		15 A	2.5 A	1.25 A		15 A	3 A	1.5 A
8 VDC		15 A	3 A	1.5 A		15 A	5 A	2.5 A
14 VDC		15 A	3 A	1.5 A		10 A	5 A	2.5 A
30 VDC		6 A	3 A	1.5 A		5 A	5 A	1 A
125 VDC		0.5 A	0.5 A	0.5 A		0.05 A	0.05 A	0.03 A
Durability	Mechanical: 10,000,000 operations min. Electrical: 500,000 operations min.							
Operating speed	0.01 mm to 1 m/s (in case of plunger)							
Operating frequency	Mechanical: 240 operations/min Electrical: 20 operations/min							
Ambient operating temperature	-25 to 80°C (with no icing)							
Degree of protection	IP00							

For M12 cable connectors see page 135

General purpose	Food, Beverage and Pharma	Automotive	Semiconductor	Material handling	Accessories
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