WHEN RELIABLE SWITCHING MATTERS

The switching solution for all your applications!

Wherever mechanical, operator or electrical driven switching needs to be performed we offer a wide range of solutions. For example: for high frequency switching applications the best solution is with our solid state relays. Furthermore, we offer monitoring relays, which on threshold conditions, take the proper switching action.

Switching components – Table of contents

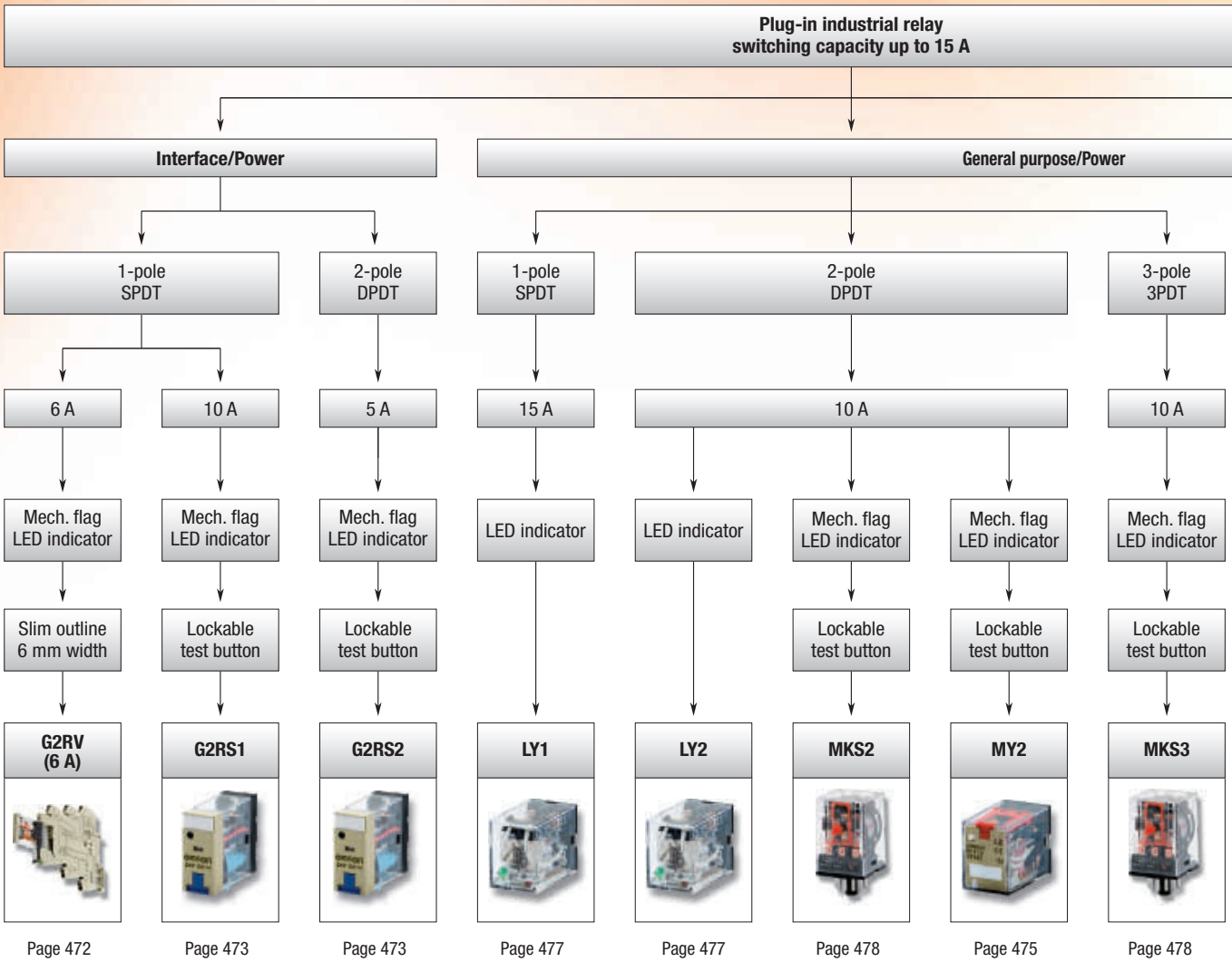
NON-BENDABLE!

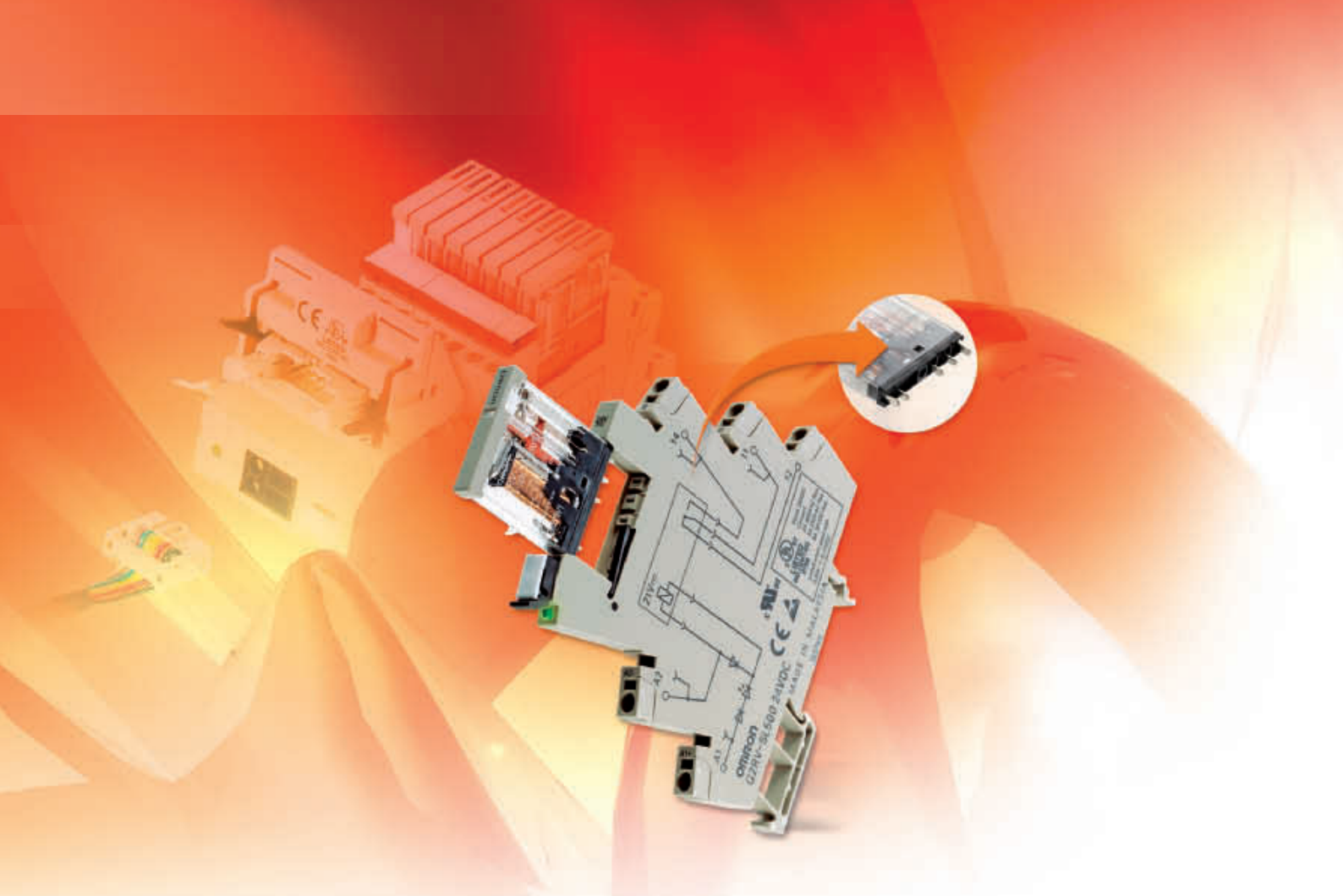
G2RV-SL500 – Reduce wiring time by using push-in technology and cross bars

With the G2RV-SL500 series only 2 steps are required to achieve a reliable connection between wire and terminal. Just remove the isolation and push in the wire. Cross bars make your life even easier, as they can be tailored by breaking pins away to meet your configuration requirements.

- No tools required
- Fits stranded wires (with ferrules) 0.5 - 2.5 mm²
- Fits solid wires 0.5 - 4.0 mm²

Request your free sample at:
www.omron-industrial.com/Slimrelay





DC-switching

3-pole 3PDT

4-pole 4PDT

SPST-NO, SPST-NO/ SPST-NC

10 A

10 A

5 A

10 A

LED indicator

LED indicator

Mech. flag LED indicator

Operation indicators

Lockable test button

Lockable test button

LY3

LY4

MY4

MKS(X)

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High power relays up to 40 A

1/2-pole SPST/DPDT

4-pole, 4PST-NO 3PST-NO/SPST-NC DPST-NO/DPST-NC

30 A

25 A

40 A

Momentary test button

Mirror contact

G7L

G7J

G7Z

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Selection table

	Category	Interface/Power			General purpose/Power		
							
Selection criteria	Family	G2RV	G2R-_-S		MY		
	1-pole	■	■	–	–	–	–
	2-pole	–	–	■	■	–	–
	3-pole	–	–	–	–	–	–
	4-pole	–	–	–	–	■	■
	Contact configuration	SPDT	SPDT	DPDT	DPDT	4PDT	4PDT bifurcated
	Contact material	AgSnIn	AgSnIn	AgSnIn	Ag	AgNi + Au	AgNi + Au
	Max. switching Current	6 A	10 A	5 A	10 A	5 A	5 A
	Min. switching Current	10 mA at 5 VDC	100 mA at 5 VDC	10 mA at 5 VDC	1 mA at 5 VDC	1 mA at 1 VDC	0.1 mA at 1 VDC
	Gold clad/plate	–	□	□	–	■	■
	Width max. (Relay only)	5.2 mm	13.0 mm	13.0 mm	21.5 mm	21.5 mm	21.5 mm
Features	LED indication	■	□	□	□	□	□
	Mechanical flag	■	■	■	■	■	■
	Momentary testbutton	–	–	–	–	–	–
	Momentary/ Lockable testbutton	–	□	□	□	□	□
	Label	□	□	□	□	□	□
	Diode (DC coil)	■	□	□	□	□	□
	Varistor (AC coil)	–	–	–	–	–	–
	CR network (AC coil)	■	–	–	□	□	□
Wiring to socket	Screw	□	□	□	□	□	□
	Box clamp	□	–	–	□	□	□
	Screw-less clamp	□	□	□	□	□	□
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	Category	High power relays								
										
Selection criteria	Family	G7J				G7L		G7Z		
	1-pole	–	–	–	–	■	–	–	–	–
	2-pole	–	–	–	–	–	■	–	–	–
	3-pole	–	–	–	–	–	–	–	–	–
	4-pole	■	■	■	■	–	–	■	■	■
	Contact configuration	4PST-NO	4PST-NO	3PST-NO/ SPST-NC	DPST-NO/ DPST-NC	SPST-NO	DPST-NO	4PST-NO	3PST-NO/ SPST-NC	DPST-NO/ DPST-NC
	Max. switching current	25 A	25 A	25 A	25 A	30 A	25 A	40 A	40 A	40 A
	Min. permissible load	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 24 VDC	100 mA at 5 VDC	100 mA at 5 VDC	2 A at 24 VDC	2 A at 24 VDC	2 A at 24 VDC
	Auxilary contact block Mirror contact	–	–	–	–	–	–	■	■	■
	Momentary testbutton	–	–	–	–	□	□	–	–	–
Relay terminals	Screw	□	□	□	□	□	□	□	□	□
	Quick-connect	□	□	□	□	□	□	–	–	–
	PCB terminals	□	□	□	□	□	□	–	–	–
Mounting	Screw	–	–	–	–	–	–	□	□	□
	DIN rail	–	–	–	–	–	–	□	□	□
	Clip (screw)	□	□	□	□	□	□	–	–	–
	Flange (screw)	□	□	□	□	□	□	–	–	–
	DIN rail (adapter)	–	–	–	–	□	□	–	–	–
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	Category	General purpose/Power								
Selection criteria										
	Family	LY					MKS		MKS(X)	
	1-pole	■	–	–	–	–	–	–	■	–
	2-pole	–	■	■	–	–	■	–	–	■
	3-pole	–	–	–	■	–	–	■	–	–
	4-pole	–	–	–	–	■	–	–	–	–
	Contact configuration	SPDT	DPDT	DPDT bifurcated	3PDT	4PDT	DPDT	3PDT	SPST-NO	SPST-NO/ SPST-NC
	Contact material	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn	AgSnIn
	Max. switching Current	15 A	10 A	7 A	10 A	10 A	10 A	10 A	10 A, 220 VDC; 15 A, 250 VAC	5 A, 220 VDC; 15 A, 250 VAC
	Min. switching Current	100 mA at 5 VDC	100 mA at 5 VDC	10 mA at 5 VDC	100 mA at 5 VDC	100 mA at 5 VDC	10 mA at 1 VDC	10 mA at 1 VDC	10 mA at 24 VDC	10 mA at 24 VDC
	Gold clad/plate	–	□	■	–	–	–	–	–	–
	Width max. (Relay only)	21.5 mm	21.5 mm	21.5 mm	31.5 mm	41.5 mm	34.5 mm	34.5 mm	34.5 mm	34.5 mm
Features	LED indication	□	□	□	□	□	□	□	□	□
	Mechanical flag	–	–	–	–	–	■	■	–	–
	Momentary testbutton	–	–	–	–	–	–	–	–	–
	Momentary/ Lockable testbutton	–	–	–	–	–	□	□	□	□
	Label	–	–	–	–	–	□	□	–	–
	Diode (DC coil)	□	□	□	□	□	□	□	Optional for socket	Optional for socket
	Varistor (AC coil)	–	–	–	–	–	□	□	–	–
	CR network (AC coil)	–	□	□	–	–	–	–	–	–
Wiring to socket	Screw	□	□	□	□	□	□	□	□	□
	Box clamp	–	–	–	–	–	□	□	–	–
	Screw-less clamp	–	–	–	–	–	–	–	–	–
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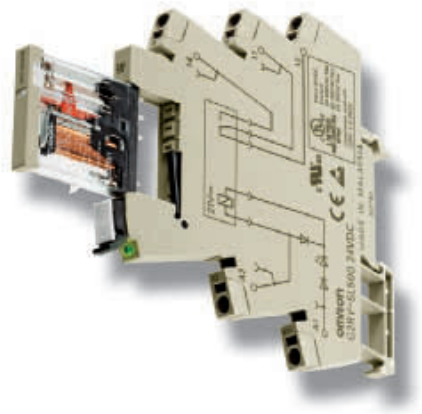
■ Standard □ Available – No/not available



Non-bendable! First 6 mm relay with strong mechanical pins

Drawing on years of experience, G2RV industrial slim relays have been added to the product portfolio. With a width of 6 mm, they offer significant space saving without compromising relay reliability or features. Push-in terminals and a full range of accessories are available for simplifying wiring and saving time

- Large plug-in pins – excellent connection
- LED / mechanical flag – check operation
- Transparent housing – check condition
- Slim outline – space saving
- Push-in / accessories – simple wiring

Ordering information

Input voltage	Order code	
	Screw terminals	Push-in terminals
12 VDC	G2RV-SL700-12 VDC	G2RV-SL500-12 VDC
24 VDC	G2RV-SL700-24 VDC	G2RV-SL500-24 VDC
24 VAC/VDC	G2RV-SL700-24 VAC/VDC	G2RV-SL500-24 VAC/VDC
48 VAC/VDC	G2RV-SL700-48 VAC/VDC	G2RV-SL500-48 VAC /VDC
110 VAC	G2RV-SL700-110 VAC	G2RV-SL500-110 VAC
230 VAC	G2RV-SL700-230 VAC	G2RV-SL500-230 VAC

Accessories

Type	Description	Order code
Cross bar	2-pole	P2RVM-020_
Cross bar	3-pole	P2RVM-030_
Cross bar	4-pole	P2RVM-040_
Cross bar	10-pole	P2RVM-100_
Cross bar	20-pole	P2RVM-200_
PLC interface	Connect 8 relays and PLC output	P2RVC-8-O-F
Label	Plastic, for mounting on socket	R99-15 for G2RV
Label (Sticker)	Paper for mounting on socket or relay	R99-16 for G2RV
Separating plate	Provides isolation between adjacent relays to achieve 400 V isolation	P2RV-S
Relay only	Maintenance part for G2RV-SL-series 12 VDC	G2RV-1-S DC11
Relay only	Maintenance part for G2RV-SL-series 24 VDC and 24 VAC/VDC	G2RV-1-S DC21
Relay only	Maintenance part for G2RV-SL-series 48 VAC/VDC and 110, 230 VAC	G2RV-1-S DC48

Note: _Select colour: R=Red, S=Blue, B=Black

Specifications

Coil ratings

Contact form	SPDT
Input voltage	DC 12, 24, AC/DC 24, 48, AC 110, 230
Rated load	6 A at 250 VAC 6 A at 30 VDC
Max. switching voltage	400 VAC
Max. switching current	6 A
Max. switching power	1500 VA / 180 W
Min. permissible load	10 mA at 5 VDC
Mechanical durability	5 Million operations
Electrical durability (rated load)	100 K operations (typical)
Dielectric strength	4 kV
Ambient temperature	-40 to 55°C
Approved standards	CE, VDE, cULus
Size in mm (HxWxD)	92.7x106.3x6.2 (push-in type) & 97.4x106.3x6.2 (screw type)

Plug-in relay with enhanced features covers a wide range of applications

G2RS series, which comes as standard with mechanical indicator and nameplate covers a wide range interface applications.
Optionally available with gold clad contacts and diode, whilst the socket and crossbar range are offering a maximum of flexibility during installation.

- SPDT type 10A / DPDT type 5 A
- Mechanical Flag, led indicator and momentary / lockable testbutton optional
- Transparent housing
- Screwless clamp terminal sockets available
- Space saving – 16 mm width (including sockets)

Ordering information

Contact form	Diode	LED indicator	Test button	Gold clad 3 µm	Order code		
					(___ = coil voltage + AC/DC)	Common coil voltages *1	
						DC	AC
SPDT (1-pole)	no	no	no	no	G2R-1-S___(S)	24	230
		yes			G2R-1-SN___(S)	12, 24	24, 110, 230
			yes		G2R-1-SNI___(S)	12, 24	12, 24, 110, 230
				yes	G2R-1-SNI-AP3___(S)	–	230
	yes		no	no	G2R-1-SND___(S)	12, 24	–
			yes		G2R-1-SNDI___(S)	24	–
				yes	G2R-1-SNDI-AP3___(S)	24	–
DPDT (2-pole)	no	no	no	no	G2R-2-S___(S)	24	24, 110, 240
		yes			G2R-2-SN___(S)	12, 24, 48	24, 110, 230
				yes	G2R-2-SN-AP3___(S)	24	–
			yes	no	G2R-2-SNI___(S)	12, 24	12, 24, 110, 230
				yes	G2R-2-SNI-AP3___(S)	–	230
	yes	no	no	no	G2R-2-SD___(S)	–	–
		yes			G2R-2-SND___(S)	12, 24	–
				yes	G2R-2-SND-AP3___(S)	24	–
			yes	no	G2R-2-SNDI___(S)	12, 24	–
				yes	G2R-2-SNDI-AP3___(S)	24	–

*1 Other coil voltages available. Please see specifications.

Sockets & accessories

For type	Order code						
	DIN rail						PCB
	Screwless clamp					Screw	Soldering
	Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate	Socket	Socket
G2R-1-S	P2RF-05-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-05-E	P2R-05P
G2R-2-S	P2RF-08-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-08-E	P2R-08P

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
AC	24 V, 110 V, 120 V, 230 V, 240 V	80% max.	30% max.	110%	0.9 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V	70% max.	15% max.	110%	0.53 W

Contact ratings

Number of poles	1-pole		2-pole	
Load	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)
Rated load	10 A at 250 VAC 10 A at 30 VDC	7.5 A at 250 VAC 5 A at 30 VDC	5 A at 250 VAC 5 A at 30 VDC	2 A at 250 VAC 3 A at 30 VDC
Rated carry current	10 A		5 A	
Max. switching voltage	440 VAC, 125 VDC		380 VAC, 125 VDC	
Max. switching current	10 A		5 A	
Max. switching power	2,500 VA, 300 W	1,875 VA, 150 W	1,250 VA, 150 W	500 VA, 90 W
Failure rate (reference value)	100 mA at 5 VDC		10 mA at 5 VDC	
Mechanical life	AC: 10,000,000 operations min., DC: 20,000,000 operations min.			
Electrical life	100,000 operations min.			

Technical data

Item	1-pole	2-pole
Contact material	AgSnIn	
Operating time	15 ms max.	15 ms max.
Release time	AC: 10 ms max., DC: 5 ms max.	AC: 15 ms max., DC: 10 ms max.
Dielectric strength	5,000 VAC (coil-contact)	5,000 VAC (coil-contact)
Ambient temperature	Operating: -40 to 70°C (no icing or condensation)	
Size in mm (HxWxD)	35.5x13x29	

Versatile plug-in relay that sets the standard

Over 500 million pieces of this mini power relay have been manufactured since introduction and successfully been used in many different applications. Bifurcated contacts optionally are available to achieve reliable low current switching during the entire electrical life. Full range of sockets covering mounting by screw, box clamp and screw less clamp method.

- DPDT type 10 A / 4PDT type 5 A
- Mechanical flag, led indicator and momentary / lockable testbutton optional
- Transparent housing
- Low power switching (1 mA at 5 VDC) / Bifurcated 4PDT (0.1 mA at 1 VDC)
- Screwless clamp terminal sockets available

Ordering information

Contact form	Diode	LED indicator	Lockable test button	Order code (___ = coil voltage + AC/DC)			
				Standard coil polarity	Reversed coil polarity	Common coil voltages *1	
						DC	AC
DPDT	no	no	no	MY2___(S)	–	12, 24	12, 24, 48/50, 110/120, 220/240
DPDT		yes		MY2N___(S)	–	12, 24	24, 110/120, 220/240
DPDT	yes			MY2N-D2___(S)	–	24	–
DPDT	no		yes	MY2IN___S)	–	12, 24, 48	12, 24, 110/120, 220/240
DPDT				–	MY2IN1___(S)	12, 24	–
DPDT	yes			MY2IN-D2___(S)	–	24	–
DPDT				–	MY2IN1-D2___(S)	24	–
4PDT	no	no	no	MY4___(S)	–	12, 24, 48, 100/110, 125	12, 24, 48/50, 110/120, 220/240
4PDT		yes		MY4N___(S)	–	12, 24, 48, 100/110	24, 110/120, 220/240
4PDT	yes			MY4N-D2___(S)	–	12, 24	–
4PDT	no		yes	MY4IN___(S)	–	12, 24, 48	12, 24, 48/50, 110/120, 220/240
4PDT				–	MY4IN1___(S)	12, 24, 48	–
4PDT	yes			MY4IN-D2___(S)	–	24	–
4PDT				–	MY4IN1-D2___(S)	24, 48	–

*1 Other coil voltages available. Please see specifications.

Note: - MY4 also available with bifurcated contacts => example MY4Z
- MY2 and MY4 AC 110/120, 220/240 types also available with suppression => example MY4N-CR

Sockets & accessories

Input terminals separated from output terminals

	Order code								
	Screw-less clamp					Box clamp			
For type	Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate	Socket	Metal spring clip	Plastic holding clip	Label
MY2	PYF08S	PYCM-08S	PYDM-08SR	PYDM-08SB	R99-11	PYF14-ESS	PYC-0	PYC-35	PYCTR1
MY4	PYF14S	PYCM-14S	PYDM-14SR	PYDM-14SB	R99-11	PYF14-ESS	PYC-0	PYC-35	PYCTR1

Combined input/output terminals

	Order code						
	Screw terminal			Box clamp			
Order code	Socket	Clip (set = 2 pcs)	Clip for MY2IN (set = 2 pcs)	Socket	Metal spring clip	Plastic holding clip	Label
MY2	PYF08A-N	PYC-A1	PYC-E1	PYF14-ESN	PYC-0	PYC-35	PYCTR1
MY4	PYF14A-N	PYC-A1		PYF14-ESN	PYC-0	PYC-35	PYCTR1

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
AC	6 V, 12 V, 24 V, 48/50 V	80% max	30% min.	110%	1.0 to 1.2 VA (60 Hz)
	110/120 V, 220/240 V				0.9 to 1.1 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100/110 V		10% min.		0.9 W

Contact ratings

Item	2-pole		4-pole		4-pole (bifurcated)	
	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)	Resistive load (cosφ = 1)	Inductive load (cosφ = 0.4; L/R = 7)
Rated load	5 A at 250 VAC	2 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC
	5 A at 30 VDC	2 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC
Rated carry current	10 A		5 A			
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC			
Max. switching current	10 A		5 A			
Max. switching power	2,500 VA, 300 W	1,250 VA, 300 W	1,250 VA, 150 W	500 VA, 150 W	1,250 VA, 150 W	500 VA, 150 W
Failure rate (reference value)	5 VDC at 1 mA		1 VDC at 1 mA		1 VDC at 100 μA	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.				20,000,000 operations min.	
Electrical life	500,000 operations min.		200,000 operations min.		100,000 operations min.	

Technical data

Item	2-pole	4-pole
Contact Material:	Ag	AgNi + Au
Operating time	20 ms max.	
Release time	20 ms max.	
Dielectric strength	2,000 VAC	
Ambient temperature	Operating: -55 to 70°C (no icing)	
Size in mm (HxWxD)	28x21.5x36	

Miniature 15 A power relay

LY-series comes in SPDT, DPDT, 3PDT and 4PDT types covering depending on number of poles 10 or even 15A rated load. Bifurcated contacts available for DPDT configuration only, whilst the optional Diodes for DC and CR circuit for AC coils are available for all plug-in types.

- SPDT type 15 A / DPDT, 3PDT and 4PDT type 10 A
- Led indicator optional
- Transparent housing
- Suppression by optional Built-in Diodes (DC only) or CR network (AC-types)
- DIN rail mounting by socket. PCB and Flange mounting available

Ordering information

Contact form	LED indicator	Diode	Terminals			Order code *1 (___ = coil voltage + AC/DC)	Common coil voltages*2	
			Plug-in/solder	PCB	Upper-mounting plug-in/solder		DC	AC
SPDT (1 pole)	no	no	yes	no	no	LY1___	24	–
SPDT (1 pole)	yes	yes				LY1N-D2___	24	–
DPDT (2 pole)	no	no				LY2___	12, 24, 100/110	24, 100/110, 110/120, 220/240
DPDT (2 pole)			no		yes	LY2F___	–	220/240
DPDT (2 pole)	yes	yes	yes		no	LY2N-D2___	24	–
3PDT (3 pole)	no	no				LY3___	24	–
4PDT (4 pole)						LY4___	12, 24, 100/110, 125	24, 100/110, 230
4PDT (4 pole)	yes	yes				LY4N-D2___	24	–

*1 For other options like CR suppression, please see specifications.
*2 Other coil voltages available. Please see specifications.

Sockets & accessories

	Order code			
	DIN rail		PCB	
	Screw		Soldering	
For type	Socket	Clip (set = 2 pcs)	Socket	Clip (set = 2 pcs.)
LY1/LY2	PTF08A-E	PYC-A1	PT08-0	PYC-P
LY2 CR-type	PTF08A-E	Y92H-3	PT08-0	PYC-1
LY3	PTF11A-E	PYC-A1	PT11-0	PYC-P
LY4	PTF14A-E	PYC-A1	PT14-0	PYC-P

Specifications

Coil ratings

Poles	Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
			% of rated voltage			
1 or 2	AC	6 V, 12 V, 24 V, 50 V	80% max.	30% min.	110%	1.0 to 1.2 VA (60 Hz)
		100/110 V, 110/120 V, 200/220 V, 220/240 V				0.9 to 1 VA (60 Hz)
	DC	6 V, 12 V, 24 V, 48 V, 100/110 V		10% min.		0.9 W
3	AC	6 V, 12 V, 24 V, 50 V, 100/110 V, 200/220 V	80% max.	30% min.	110%	1.6 to 2.0 VA (60 Hz)
	DC	6 V, 12 V, 24 V, 48 V, 100/110 V		10% min		1.4 W
4	AC	6 V, 12 V, 24 V, 50 V, 100/110 V, 200/220 V	80% max.	30% min.	110%	1.95 to 2.5 VA (60 Hz)
	DC	6 V, 12 V, 24 V, 48 V, 100/110 V		10% min		1.5 W

Technical data

Contact material	AgSnIn
Operating time	25 ms max.
Release time	25 ms max.
Dielectric strength	1,000 VAC
Ambient temperature *1	-25 to 70°C

*1 See datasheet for more details.

Contact ratings

Relay	Single contact 1-pole		Single contact 2-, 3- or 4-pole		Bifurcated contacts 2-pole	
Load	Resistive load ($\cos\varphi$ = 1)	Inductive load ($\cos\varphi$ = 0.4; L/R = 7)	Resistive load ($\cos\varphi$ = 1)	Inductive load ($\cos\varphi$ = 0.4; L/R = 7)	Resistive load ($\cos\varphi$ = 1)	Inductive load ($\cos\varphi$ = 0.4; L/R = 7)
Rated load	110 VAC at 15 A	110 VAC at 10 A	110 VAC at 10 A	110 VAC at 7.5 A	110 VAC at 5 A	110 VAC at 4 A
	24 VDC at 15 A	24 VDC at 7 A	24 VDC at 10 A	24 VDC at 5 A	24 VDC at 5 A	24 VDC at 4 A
Rated carry current	15 A		10 A		7 A	
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC		250 VAC, 125 VDC	
Max. switching current	15 A		10 A		7 A	
Max. switching power	1,700 VA	1,100 VA	1,100 VA	825 VA	550 VA	440 VA
	360 W	170 W	240 W	120 W	120 W	100 W
Failure rate (reference value)	100 mA at 5 VDC		100 mA at 5 VDC		10 mA at 5 VDC	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.					
Electrical life	1-, 3-, 4-pole: 200,000 operations min., 2-pole: 500,000 operations min.					

Exceptionally reliable general purpose relay with 8 or 11 plug-in pins for round sockets

MK relay breaks compared to its size relatively large currents. The AgSnIn contacts ensure long electrical lifetime (min. 100,000 operations). Wide switching range from 10 mA at 1 VDC upto 10 A at 250 VAC.

- 8-pin DPDT and 11-pin 3PDT contact types
- Switching current up to 10 A
- Lockable test button for easy testing
- Temperature rating from -40°C up to 60°C

Ordering information

Contact form	Mechanical indicator & lockable test button	LED indicator	Diode	Order code *1 (___ = coil voltage + AC/DC)	Common coil voltages *2	
					DC	AC
DPDT (2-pole)	yes	no	no	MKS2PI	12, 24, 110	24, 110, 230
		yes		MKS2PIN	24	24, 230
3PDT (3-pole)		no		MKS3PI-5	12, 24, 48, 110	12, 24, 110, 230
			yes	MKS3PI-D-5	24	N/A
		yes	no	MKS3PIN-5	12, 24	24, 110, 230
			yes	MKS3PIN-D-5	24	N/A

*1 Many various terminal arrangements possible, please see specifications.
*2 Other coil voltages available. Please see specifications.

Sockets & accessories

	Order code			
	DIN rail			
	Screw		Box clamp	
For type	Socket	Clip (set= 2 pcs.)	Socket	
MKS2	PF083A-E	PFC-A1	-	PF083A-D
MKS3	PF113A-E	PFC-A1	PF113A-N	PF113A-D

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
AC	6 V, 12 V, 24 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V	80% max.	30% min.	110%	2.3 VA (60 Hz)
					2.7 VA (50 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100 V, 110 V		15% min.		1.4 W

Contact ratings

Load	2- or 3-pole	
	Resistive load ($\cos\varphi$ = 1)	Inductive load ($\cos\varphi$ = 0.4; L/R = 7)
Contact material	AgSnIn	
Rated load	NO: 10 A at 250 VAC NC: 5 A at 30 VDC	7 A at 250 VAC
Rated carry current	10 A	
Max. switching voltage	250 VAC, 250 VDC	–
Max. switching current	10 A	
Max. switching power	2,500 VA/ 300 W	1,250 VA/150 W
Mechanical life	5,000,000 operations min.	
Electrical life	100.000 operations min.	

Technical data

Operating time	AC: 20 ms max., DC: 30 ms max.
Release time	20 ms max. (40 ms max. for built-in Diode relays)
Dielectric strength	2,500 VAC (coil-contact)
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Size in mm (HxWxD)	34.5x34.5x53.3

Power relay that can switch 220 VDC, 10 A (resistive load)

The MK-S(X) is the smallest relay in the world that can switch 220 VDC 10 A resistive load. Applications in loads are encountered.

- Suitable for DC-switching
- DC load switching up to 10 A; 220 VDC (resistive load)
- AC load models are capable of switching up to 15 A; 250 VAC (resistive load)
- SPST-NO/SPST-NC contact form enables contact welding detection
- Lockable test button for easy testing

Ordering information

Models for DC loads

Contact form	LED indicator & lockable test button	Order code (___ = coil voltage + AC/DC)	Common coil voltages *1	
			DC	AC
SPST-NO (1-pole)	yes	MKS1XTIN-10	12, 24, 48, 110, 220	24, 110, 230
SPST-NO/SPST-NC (2-pole)	yes	MKS2XTIN-11	12, 24, 48, 110, 220	24, 110, 230

*1 Other coil voltages available. Please see specifications.

Models for AC loads

Contact form	LED indicator & lockable test button	Order code (___ = coil voltage + AC/DC)	Common coil voltages *1	
			DC	AC
SPST-NO (1-pole)	yes	MKS1TIN-10	12, 24, 48	24, 110, 230
SPST-NO/SPST-NC (2-pole)	yes	MKS2TIN-11	12, 24, 48	24, 110, 230

*1 Other coil voltages available. Please see specifications.

Sockets & accessories

Order code				
DIN rail			PCB	
Screw			Soldering	
Socket		Clip (set= 2 pcs.)	Socket	Clip (set= 2 pcs.)
No built-in diode	Built-in diode			
P7MF-06	P7MF-06-D	PYC-A2	P7M-06P	PYC-A2

Specifications

Coil ratings

Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
	% of rated voltage			
AC: 24 V, 100 V, 110 V, 120 V, 200 V, 220 V, 230 V, 240 V	80% max.	30% min. (60 Hz)	110%	2.3 VA (60 Hz)
		25% min. (50 Hz)		2.7 VA (50 Hz)
DC: 12 V, 24 V, 48 V, 110 V, 220 V		15% min.		1.5 W

Contact ratings

Model		Models for DC Loads						Models for AC Loads	
		MKS1XT(I)(N)-10			MKS2XT(I)(N)-11			MKS1T(I)(N)-10	MKS2T(I)(N)-11
Contact form		SPST-NO			SPST-NO/SPST-NC			SPST-NO	SPST-NO/SPST-NC
Load		Resistive load	Inductive load L/R = 7 ms	Inductive load DC13 class	Resistive load	Inductive load L/R = 7 ms	Inductive load DC13 class	Resistive load	Resistive load
Contact configuration	NO	Double-break			Double-break			Double-break	Double-break
	NC	–			Single-break			–	Single-break
Contact material		AgSnIn			AgSnIn			AgSnIn	AgSnIn
Rated load	NO	10 A, 220 VDC	5 A, 220 VDC	0.4 A, 220 VDC	5 A, 220 VDC	3 A, 220 VDC	0.2 A, 220 VDC	15 A, 250 VAC	15 A, 250 VAC
	NC	–			2 A, 220 VDC	0.3 A, 220 VDC	0.1 A, 220 VDC	–	5 A, 250 VAC
Rated carry current	NO	10 A			5 A			15 A	15 A
	NC	–			2 A			–	5 A
Max. switching voltage	NO	220 VDC			220 VDC			250 VAC	250 VAC
	NC	–						–	
Max. switching current	NO	10 A			5 A			15 A	15 A
	NC	–			2 A			–	5 A
Max. switching capacity (reference value)	NO	2,200 W	–	–	1,100 W	–	–	3,750 VA	3,750 VA
	NC	–			440 W	–	–	–	1,250 VA

Note: These values apply to a switching frequency of 30 times per minute for DC Load models and 20 times per minute for AC Load models.

Technical data

Operating time	AC: 20 ms max., DC: 30 ms max.
Release time	20 ms max.
Dielectric strength	2,500 VAC (coil-contact)
Ambient temperature	Operating: -40 to 60°C (with no icing or condensation)
Size in mm (HxWxD)	34.5x34.5x52.1
Mechanical endurance	1,000,000 operations min. (at 18,000 operations/hr)
Electrical endurance*1	100.000 operations min. (at rated load and maximum switching frequency)

*1 Measured at an ambient temperature of 23°C

High capacity, high dielectric strength 4 pole power relay

G7J series developed for switching resistive, inductive as well as motor loads.
No contact chattering for momentary voltage drops up to 50% of rated voltage.
High dielectric strength (4KV) between coil and contacts as well as between different polarity contacts.

- 25 A Rated current
- 4PST-NO, 3PST-NO / SPST-NC or DPST-NO / DPST-NC
- Bifurcated contacts optional
- Terminals: Screw, Quick-connect or PCB pins
- Mounting by insertion into a clip or just by screws (flange type)

Ordering information

Contact form	Mounting		Terminal			Order code *1 (___= coil voltage + AC/DC)	Common coil voltages *2	
	PCB	W-bracket mounting	PCB	Quick-connect	Screw		DC	AC
4PST-NO	yes	no	yes	no	no	G7J-4A-P___	12, 24	200/240
	no	yes	no		yes	G7J-4A-B___	24	–
				yes	no	G7J-4A-T___	12, 24	200/240
3PST-NO/SPST-NC	yes	no	yes	no		G7J-3A1B-P___	24	–
	no	yes	no		yes	G7J-3A1B-B___	24	–
DPST-NO/SPST-NC				yes	no	G7J-3A1B-T___	24	200/240
DPST-NO/DPST-NC	yes	no	yes	no		G7J-2A2B-P___	24	–

*1 For other options like bifurcated contacts, please see specifications.
*2 Other coil voltages available. Please see specifications.

Accessories

For type	Order code
	W-bracket
G7J Screw terminal type	R99-04 for G5F
G7J Quick Connect type	

Specifications

Coil ratings

Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
AC	24, 50, 100 to 120, 200 to 240	75% max.	15% min.	110%	1.8 to 2.6 VA
DC	6, 12, 24, 48, 100		10% min.		2.0 W

Contact ratings

Item	4-pole		
	Resistive load cosφ = 1	Inductive load cosφ = 0.4	Resistive load
Rated load	NO: 25 A at 220 VAC (24 A at 230 VAC) NC: 8 A at 220 VAC (7.5 A at 230 VAC)		NO: 25 A at 30 VDC NC: 8 A at 30 VDC
Rated carry current	NO: 25 A (1 A), NC: 8 A (1 A)		
Max. switching voltage	250 VAC		125 VDC
Max. switching current	NO: 25 A (1 A), NC: 8 A (1 A)		
Mechanical life	1,000,000 operations min.		
Electrical life	100,000 operations min.		

Note: Values between () indicate bifurcated contact specification.

Technical data

Contact material	Ag alloy
Operating time	50 ms max.
Release time	50 ms max.
Dielectric strength	4,000 VAC
Ambient temperature	Operating: -25 to 60°C (no icing)

High capacity, high dielectric strength 1 or 2 pole general purpose power relay

G7L fits many applications from motor driver and power supply switching in office equipment to switching controller for air-conditioning compressor. No contact chattering for momentary voltage drops up to 50% of rated voltage. G7L series can be mounted on DIN-rail by using separate adaptor, whilst relay is connected by screw or quick-connect terminals.

- SPST-NO – 30 A
- DPST-NO – 25 A
- Wide input range AC coils 100-120, 200-240 V at either 50 or 60 Hz
- Terminals: Screw, Quick-connect or PCB pins
- Mounting by insertion into a clip, by screws (flange type) or by DIN-rail adaptor

Ordering information

Contact form	Mounting					Terminals			Order code*1 (___ = Coil Voltage + AC/DC)	Common Coil Voltages*2	
	PCB	DIN-rail front connecting socket	DIN Rail adaptor	Flange (screw)	E-bracket mounting	PCB	Quick-connect	Screw		DC	AC
SPST-NO	no	yes	yes	no	yes	no	yes	no	G7L-1A-T___	24	100/120, 200/240
DPST-NO									G7L-2A-T___	12, 24	24, 100/120, 200/240
SPST-NO		no	no	yes	no				G7L-1A-TUB___	–	100/120, 200/240
DPST-NO									G7L-2A-TUB___	24	24, 200/240
							no	yes	G7L-2A-BUB___	–	200/240
	yes			no		yes		no	G7L-2A-P___	24	–

*1 For other options like bifurcated contacts, please see specifications.
*2 Other coil voltages available. Please see specifications.

Accessories

For type	Order code			
	DIN-rail front connecting socket	DIN Rail adaptor	E-Bracket mounting	Coverplate electric shock protection
G7J Screw terminal type	–	P7LF-D	R99-07G7L	P7LF-C
G7J Quick Connect type	P7LF-06	P7LF-D	R99-07G7L	–

Specifications

Coil Ratings

Rated voltage		Rated current	Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC (~)	12 V	142 mA	–	75% max.of rated voltage	15% min. of rated voltage	110% of rated voltage	1.7 to 2.5 VA (60 Hz)
	24 V	71 mA	–				
	50 V	34 mA	–				
	100 to 120 V	17.0 to 20.4 mA	–	74 V	18 V	132 V	
	200 to 240 V	8.5 to 10.2 mA	–	150 V	36 V	264 V	
DC (=)	6 V	317 mA	18.9 Ohm	75% max. of rated voltage	15% min. of rated voltage	110% of rated voltage	1.9 W
	12 V	158 mA	75 Ohm				
	24 V	79 mA	303 Ohm				
	48 V	40 mA	1220 Ohm				
	100 V	19 mA	5260 Ohm				

Note: 1. The rated current and coil resistance are measured at a coil temperature of 23°C with tolerances of ±15%/20% for AC rated current and ±15% for DC coil resistance.
2. Performance characteristic data are measured at a coil temperature of 23°C.
3. ~ indicates AC and = indicates DC (IEC417 publications).

Contact Ratings

Model	G7L-1A-TJ/G7L-1A-BJ		G7L-2A-TJ/G7L-2A-BJ		G7L-1A-P/G7L-2A-P	
	Resistive load (cos φ = 1)	Inductive load (cos φ = 0.4)	Resistive load (cos φ = 1)	Inductive load (cos φ = 4.4)	Resistive load (cos φ = 1)	Inductive load (cos φ = 4.4)
Rated load	30 A, 220 VAC (~)	25 A, 220 VAX (~)	25 A, 220 VAC (~)		20 A, 220 VAC (~)	
Rated carry current	30 A		25 A		20 A	
Max. switching voltage	250 VAC (~)					
Max. switching current	30 A		25 A		20 A	
Max. switching power	6,600 VAC (~)	5,500 VAC (~)	5,500 VAC (~)		4,400 VAC (~)	
Failure rate*1 (reference value)	100 mA, 5 VDC (=)					

*1 P level: $\lambda 60 = 0.1 \times 10^{-6}$/operation

Compact 160 Amp Power Relay

G7Z series provides a compact, cost efficient solution for applications such as inverters, UPS, solar and fuel-cell battery circuits. Relay in combination with auxiliary contact block meets EN 60947-4-1. Coil ratings are available in 12 and 24 VDC. Power consumption is less than 4 watts.

- Switching current 160 A (40 A rating / 4-pole / IEC-AC1)
- Switching voltage 440 VAC
- Safety function with mirror contacts in various configurations
- Power consumption less than 4 Watts
- Low Switching Noise (70 dB)

Ordering information

Relay with Auxiliary Contact Block (for Screw Terminals)

Contact configuration		Rated voltage	Order code
Relay	Auxiliary contact block		
4PST-NO	DPST-NO	12, 24 VDC	G7Z-4A-20Z
	SPST-NO/SPST-NC		G7Z-4A-11Z
	DPST-NC		G7Z-4A-02Z
3PST-NO/SPST-NC	DPST-NO		G7Z-3A1B-20Z
	SPST-NO/SPST-NC		G7Z-3A1B-11Z
	DPST-NC		G7Z-3A1B-02Z
DPST-NO/DPST-NC	DPST-NO		G7Z-2A2B-20Z
	SPST-NO/SPST-NC		G7Z-2A2B-11Z
	DPST-NC		G7Z-2A2B-02Z

Specifications

Coil ratings

Rated voltage	Rated current	Coil resistance	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
			% of rated voltage			
12 VDC	333 mA	39 Ω	75% max.	10% min.	110%	Approx. 3.7 W
24 VDC	154 mA	156 Ω				

Note: - Rated current and coil resistance were measured at a coil temperature of 23°C with coil resistance of ±15%.

- Operating characteristics were measured at a coil temperature of 23°C.
- The maximum allowable voltage is the maximum value of the fluctuation range for the Relay coil operating power supply and was measured at an ambient temperature of 23°C.

Contact Ratings - Relay

Item		G7Z-4A-_Z, G7Z-3A1B-_Z, G7Z-2A2B-_Z		
		Resistive load	Inductive load cos phi = 0.3	Resistive load L/R = 1 ms
Contact structure		Double break		
Contact material		Ag alloy		
Rated load	NO	40 A at 440 VAC	22 A at 440 VAC	5 A at 110 VDC
	NC	25 A at 440 VAC	10 A at 440 VAC	5 A at 110 VDC
Rated carry current	NO	40 A	22 A	5 A
	NC	25 A	10 A	5 A
Maximum contact voltage		480 VAC		125 VDC
Maximum contact current	NO	40 A		
	NC	25 A		
Maximum switching capacity	NO	17,600 VA	9,680 VA	550 W
	NC	11,000 VA	4,400 VA	550 W
Failure rate P value (reference value)		2 A at 24 VDC		

Note: The ratings for the auxiliary contact block mounted on the G7Z are the same as those for the G73Z auxiliary contact block.

Contact Ratings - Auxiliary Contact Block

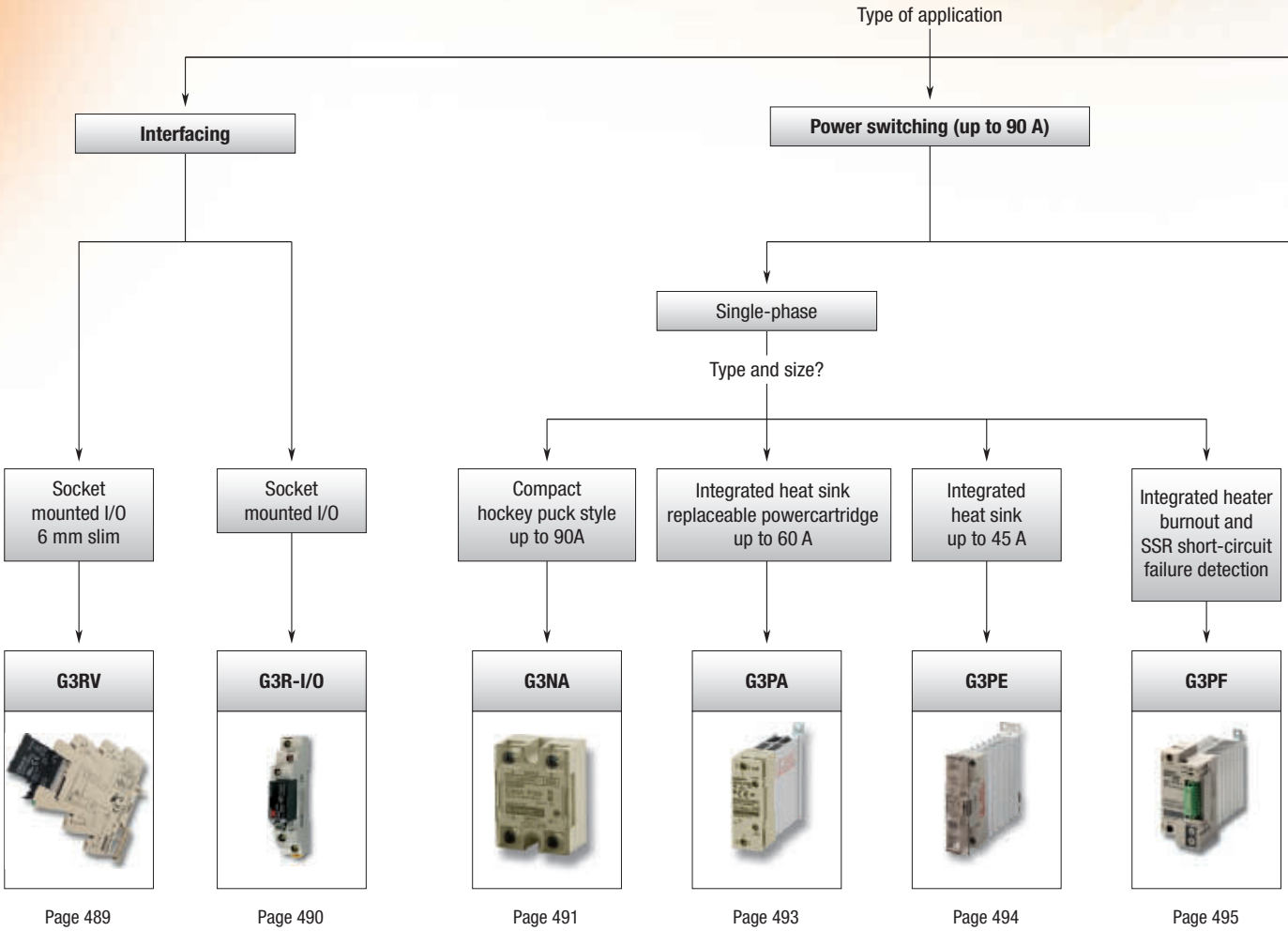
Item	G7Z-4A-_Z, G7Z-3A1B-_Z, G7Z-2A2B-_Z		
	Resistive load	Inductive load cos phi = 0.3	Resistive load L/R = 1 ms
Contact structure	Double break		
Contact material	Au clad + Ag		
Rated load	1 A at 440 VAC	0.5 A at 440 VAC	5 A at 110 VDC
Rated carry current	1 A		
Maximum contact voltage	480 VAC		125 VDC
Maximum contact current	1 A		
Maximum switching capacity	440 VA	220 VA	110 W
Failure rate P value (reference value)	1 mA at 5 VDC		

COMPACT SOLID STATE RELAYS

G3_ series – Reliable interfacing and power switching

With a wide variety of output currents and voltages, our control-panel mounted types of power switching SSRs are available with (G3PE) and without (G3NA) built-in heat-sink. The compact SSRs for I/O Interfacing G3RV & G3R offer high-speed models (G3R).

- Industrial 6 mm 'slim' SSR which is G2RV compatible (G3RV)
- G2RS compatible high-speed interface solutions (G3R-I/O)
- G3NA with 5-90 A output current, G3PB up to 45 A
- Output voltages up to 480 VAC / 200 VDC available on G3NA
- Effectively absorbing of external surge thanks to the built-in varistor



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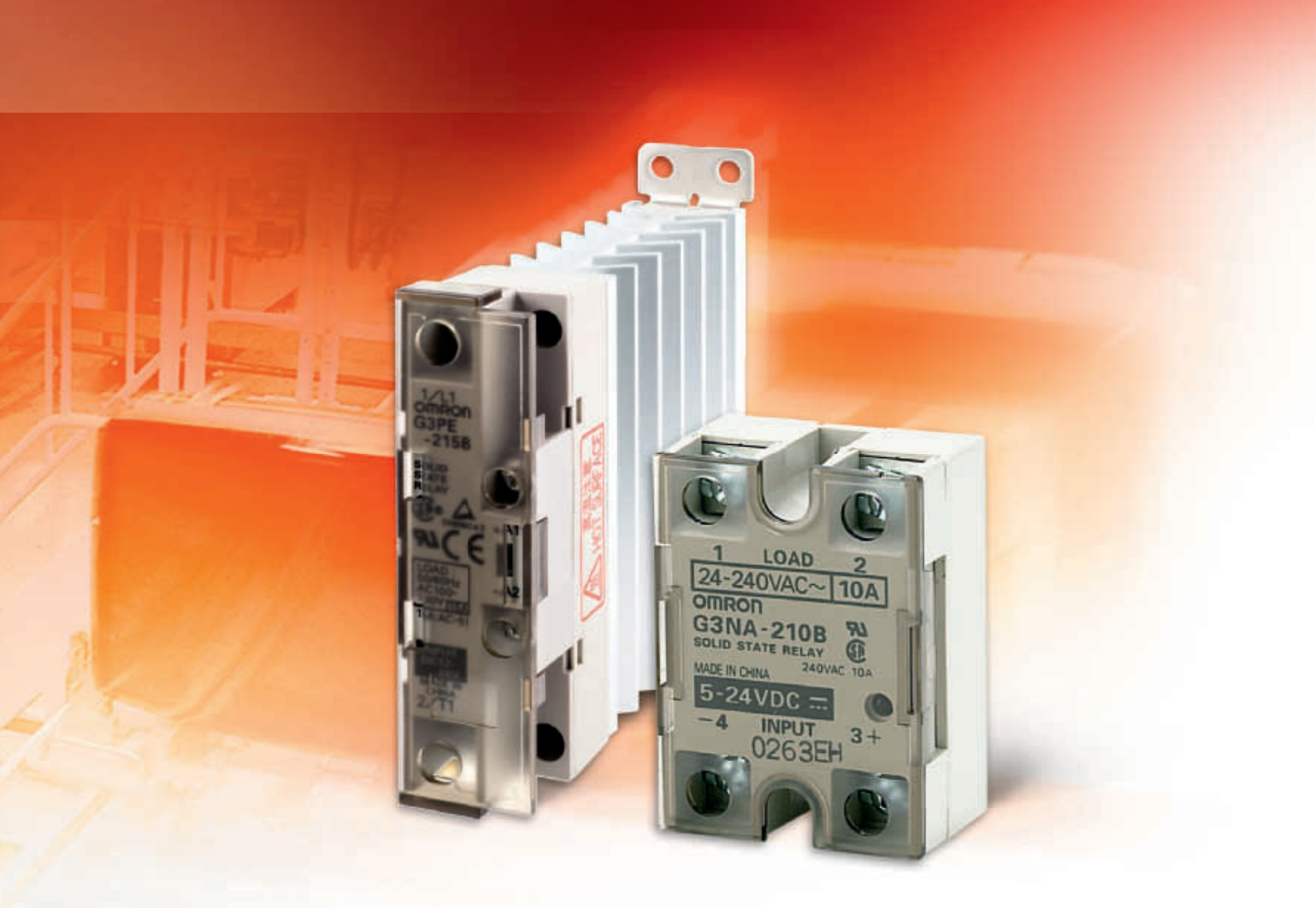

Power controlling

- Three-phase
  - Integrated heat sink up to 45 A
    - **G3PE**
      - 
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- Single phase
  - Integrated heat sink up to 60 A
    - **G3PW**
      - 
      - Page 496
- Multi channel up to 8 solid state relays
  - **G3ZA**
    - 
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Selection table

	Category	Control panel mounting type			
					
	Model	G3RV	G3R-I/O		G3NA
Selection criteria	Type of load	Output module	Input Module	Output Module	Normal resistors Middle and long wave IR heater Transformers and inductors
	1-phase control	–	–	–	■
	2-phase control	–	–	–	–
	3-phase control	–	–	–	–
	Function	Signal switching	Signal switching	Signal switching	Heater control, motor control
	Max. current rating	2 A (AC); 3 A (DC)	100 mA	2 A	90 A
Load voltage/ current [VAC]	24 to 240	–	–	–	■
	100 to 240	■	–	■	–
	200 to 480	–	–	–	■
Load voltage/ current [VDC]	5 to 200	3 to 26.4	4 to 32	■	■
Input voltages [VDC or VAC]	5 to 24 VDC	–	■	■	■
	12 to 24 VDC	12 VDC ±10%; 24 VDC ±10%	■	–	–
	24 VAC	■ 24 VAC/DC ±10%	–	–	–
	100 to 120 VAC	■ 110 VAC ±10%	■	–	■
	200 to 240 VAC	■ 230 VAC ±10%	■	–	■
	Analogue input	–	–	–	–
Features	Built-in heat sink	–	–	–	–
	Zero-cross	□	–	□	■
	Built-in varistor	–	–	–	■
	LED operation indicator	■	■	■	■
	Protective cover	NA	NA	NA	■
	3-phase loads via 3 single-phase SSRs	NA	NA	NA	■
	Replaceable power cartridge	–	–	–	–
	Alarm output	NA	NA	NA	–
	Built-in failure detection	NA	NA	NA	–
	SSR open circuits detection	NA	NA	NA	–
	SSR short circuits detection	NA	NA	NA	–
Mounting	DIN-rail	■	–	–	■
	Screw	–	–	–	■
	Mounting socket	■	■	■	–
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Control panel mounting type				Power regulator	
					
G3PA	**G3PE**	**G3PE**	**G3PF**	**G3PW**	**G3ZA**
Normal resistors Middle and long wave IR heater Transformers and inductors	Normal resistors Middle and long wave IR heater	Normal resistors	Normal resistors	Alloy heater Pure metal heater, nonmetal heater (Constant-current models recommended.)	Depends on the SSR used Distributes loop/control output levels (mV%) to SSRs
■	■	–	■	■	Depends on the SSR used
–	–	■	–	–	Depends on the SSR used
–	–	■	–	–	Depends on the SSR used
Heater control	Heater control	Heater control	Heater control and diagnostics	Single-phase power control	Intelligent power control
60 A	45 A	45 A	35 A	60 A	Depends on the SSR used
■	–	–	–	–	–
–	■	■	■	■	■
■	■	■	■	–	■ 400 to 480
–	–	–	–	–	–
■	–	–	–	–	–
■	■	■	■	–	–
■	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	–	–
–	–	–	–	4 to 20 mA DC, 1 to 5 VDC	–
■	■	□	■	■	–
■	□	■	■	□	–
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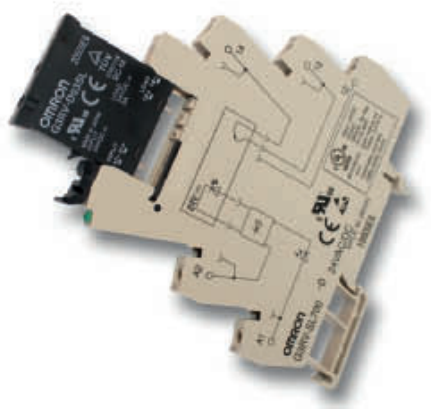
■ Standard □ Available – No/not available NA Not applicable



The World's First Industrial Slim Relay

- G2RV compatible
- LED indicator built in SSR
- Push-in terminals and accessories for easy wiring

Ordering information

Zero cross function	Input						Output			Type of connection	Order code
	Rated voltage (operating voltage)	Rated current			Must operate voltage	Must release voltage	Rated load voltage (load voltage range)	Load current	Inrush current		
		AC		DC							
		50 Hz	60Hz								
-	24 VAC/DC (21.6 to 26.4 VAC/DC)	10.7 mA	11.1 mA	4.3 mA	21.6 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-D AC/DC24
-	24 VAC/DC (21.6 to 26.4 VAC/DC)	10.7 mA	11.1 mA	4.3 mA	21.6 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-D AC/DC24
Yes	24 VAC/DC (21.6 to 26.4 VAC/DC)	20 mA	21 mA	11 mA	21.6 V	1 V	100 to 240 VAC (75 to 264 VAC)	0.1 A to 2 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-A AC/DC24
Yes	24 VAC/DC (21.6 to 26.4 VAC/DC)	20 mA	21 mA	11 mA	21.6 V	1 V	100 to 240 VAC (75 to 264 VAC)	0.1 A to 2 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-A AC/DC24
-	230 VAC (207 to 253 VAC)	6.8 mA	8.1 mA	-	207 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Screw	G3RV-SL700-D AC230
-	230 VAC (207 to 253 VAC)	6.8 mA	8.1 mA	-	207 V	1 V	5 to 24 VDC (3 to 26.4 VDC)	100 µA to 3 A	30 A (60 Hz, 1 cycle)	Push-in	G3RV-SL500-D AC230

Note: Ratings at an ambient temperature of 25°C

Accessories

Type	Description	Order code
Cross bar	2-pole	P2RVM-020_
Cross bar	3-pole	P2RVM-030_
Cross bar	4-pole	P2RVM-040_
Cross bar	10-pole	P2RVM-100_
Cross bar	20-pole	P2RVM-200_
PLC interface	Connect 8 relays and PLC output	P2RVC-8-0-F
Label	Plastic, for mounting on socket	R99-15 for G2RV
Label (Sticker)	Paper for mounting on socket or relay	R99-16 for G2RV
Separating plate	Provides isolation between adjacent relays to achieve 400 V isolation	P2RV-S

Note: _ Select colour: R=Red, S=Blue, B=Black

Specifications

Order code		G3RV-SL700/500-A	G3RV-SL700/500-D
Isolation		Triac	Mosfet
Output ON voltage drop		1.6 V rms max.	0.9 V max.
Leakage current		5 mA max. (at 200 VAC 50/60 Hz)	10 µA max. (at 24 VDC)
Operating indicator		Yes	
Ambient temperature	Storage	-30~+100°C (with no icing or condensation)	
	Operating	-30~+55°C (with no icing or condensation)	

Compact SSR for I/O interface with high dielectric strength requirements

High-speed models with optimum input ratings for a variety of sensors are available, as well as input and output modules that can be used instead of the G2RS. Use a coupler conforming to VDE 0884 and assuring an I/O dielectric strength of 4,000V.

- 1.5 and 2A output current
- 5 to 200VDC/100 to 240VAC output voltages
- Compatible with G2RS electromechanical relays
- DIN-rail mounting via sockets
- Operation indicator to confirm input

Ordering information

Input module

Response speed	Input				Output			
	Rated voltage (operating voltage)	Input current	Must operate voltage	Must release voltage	Logic level supply voltage	Logic level supply current	Size in mm (HxWxD)	Order code
–	100 to 240 VAC (60 to 264 VAC)	15 mA max.	60 VAC max.	20 VAC min.	4 to 32 VDC	0.1 to 100 mA	29x13x28 (90.5x16x61 in combination with P2RF-05-E mounting socket)	G3R-IAZR1SN-UTU
High-speed (1 kHz)	5 VDC (4 to 6 VDC)	8 mA max.	4 VDC max.	1 VDC min.				G3R-IDZR1SN-UTU
	12 to 24 VDC (6.6 to 32 VDC)		6.6 VDC max.	3.6 VDC min.				
Low-speed (10 Hz)	5 VDC (4 to 6 VDC)		4 VDC max.	1 VDC min.				G3R-IDZR1SN-1-UTU
	12 to 24 VDC (6.6 to 32 VDC)		6.6 VDC max.	3.6 VDC min.				

Note: Ratings at an ambient temperature of 25°C

Output module

Zero cross function	Input				Output				
	Rated voltage (operating voltage)	Input current	Must operate voltage	Must release voltage	Rated load voltage (load voltage range)	Load current*1	Inrush current	Size in mm (HxWxD)	Order code
Yes	5 to 24 VDC (4 to 32 VDC)	15 mA max.	4 VDC max.	1 VDC min.	100 to 240 VAC (75 to 264 VAC)	0.05 to 2 A	30 A (60 Hz, 1 cycle)	29x13x28 (90.5x16x61 in combination with P2RF-05-E mounting socket)	G3R-OA202SZN-UTU
No									G3R-OA202SLN-UTU
–		8 mA max.			5 to 48 VDC (4 to 60 VDC)	0.01 to 2 A	8 A (10 ms)		G3R-ODX02SN-UTU
–					48 to 200 VDC (40 to 200 VDC)	0.01 to 1.5 A	8 A (10 ms)		G3R-OD201SN-UTU

Note: Ratings at an ambient temperature of 25°C
*1 The minimum current value is measured at 10°C min.

Socket & accessories

Order code						
DIN rail						PCB
Screwless clamp					Screw	Soldering
Socket	Clip	Cross bar AC type	Cross bar DC type	Name plate	Socket	Socket
P2RF-05-S	P2CM-S	P2RM-SR	P2RM-SB	R99-11	P2RF-05-E	P2R-05P

Specifications

	Input module			Output module			
Order code	G3R-IAZR1SN-UTU	G3R-IDZR1SN-UTU	G3R-IDZR1SN-1-UTU	G3R-OA202SZN-UTU	G3R-OA202SLN-UTU	G3R-ODX02SN-UTU	G3R-OD201SN-UTU
Isolation	Photocoupler			Phototriac		Photocoupler	
Operate time	20 ms max.	0.1 ms max.	15 ms max.	1/2 of load power source cycle + 1 ms max.	1 ms max.	1 ms max.	1 ms max.
Release time	20 ms max.	0.1 ms max.	15 ms max.	1/2 of load power source cycle + 1 ms max.		2 ms max.	2 ms max.
Response frequency	10 Hz	1 kHz	10 Hz	20 Hz	20 Hz	100 Hz	100 Hz
Output ON voltage drop	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	1.6 V max.	2.5 V max.
Leakage current	5 μA max.	5 μA max.	5 μA max.	1.5 mA max.	1.5 mA max.	1 mA max.	1 mA max.
Operation indicator	Yes						
Ambient temperature	Operating: -30 to 80°C (with no icing)						

Hockey puck style SSR with 5-90 A output currents

All models feature the same compact dimensions to provide a uniform mounting pitch. A built-in varistor effectively absorbs external surges. The operation indicator enables monitoring operation.

- 5-90 A output current
- 24-480 VAC/5-200VDC output voltages
- Built-in varistor
- Operation indicator (red LED)
- Protective cover for greater safety

Ordering information

Applicable output load		Zero cross function	Isolation	Rated input voltage	Must operate voltage	Must release voltage	Load current with/without heatsink at 40 °C	Order code
24 to 240 VAC	5 A	Yes	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 5 A/0.1 to 3 A	G3NA-205B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-205B-UTU AC100-120
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-205B-UTU AC200-240
	10 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 10 A/0.1 to 4 A	G3NA-210B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-210B-UTU AC100-120
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-210B-UTU AC200-240
	20 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 20 A/0.1 to 4 A	G3NA-220B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-220B-UTU AC100-120
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-220B-UTU AC200-240
	40 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 40 A/0.1 to 6 A	G3NA-240B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-240B-UTU AC100-120
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-240B-UTU AC200-240
	50 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 50 A/0.1 to 6 A	G3NA-250B-UTU DC5-24
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-250B-UTU AC100-120
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-250B-UTU AC200-240
	75 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 75 A/1 to 7 A	G3NA-275B-UTU DC5-24
			Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-275B-UTU AC100-240
	90 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 90 A/1 to 7 A	G3NA-290B-UTU DC5-24
			Photocoupler	100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-290B-UTU AC100-240
5 to 200 VDC	10 A	No	Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 to 10 A/0.1 to 4 A	G3NA-D210B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-D210B-UTU AC100-240
200 to 480 VAC	10 A	Yes		5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 to 10 A/0.2 to 4 A	G3NA-410B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-410B-UTU AC100-240
	25 A			5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 to 20 A/0.2 to 4 A	G3NA-425B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-425B-UTU AC100-240
	50 A			5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 to 40 A/0.2 to 6 A	G3NA-450B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-450B-UTU AC100-240
	75 A			5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 75 A/1 to 7 A	G3NA-475B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-475B-UTU AC100-240
	90 A			5 to 24 VDC	4 VDC max.	1 VDC min.	1 to 90 A/1 to 7 A	G3NA-490B-UTU DC5-24
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-490B-UTU AC100-240

Accessories

Name	Applicable SSRs	Order code
One-touch mounting plates	–	R99-12 FOR G3NA
Mounting bracket	G3NA-240B-UTU	R99-11 FOR G3NA
Slim models enabling DIN-rail mounting	G3NA-205B-UTU, G3NA-210B-UTU, G3NA-D210B-UTU, G3NA-410B-UTU	Y92B-N50
	G3NA-225B-UTU, G3NA-440B-UTU	Y92B-N100
	G3NA-240B-UTU, G3NA-440B-UTU	Y92B-N150
Slim models enabling DIN-rail mounting	G3NA-450B-UTU	Y92B-P250
	G3NA-275B-UTU, G3NA-290B-UTU, G3NA-475B-UTU, G3NA-490B-UTU	Y92B-P250NF
Low-cost models	G3NA-205B-UTU, G3NA-210B-UTU, G3NA-D210B-UTU, G3NA-220B-UTU, G3NA-410B-UTU, G3NA-425B-UTU	Y92B-A100
	G3NA-240B-UTU, G3NA-440B-UTU	Y92B-A150N
	G3NA-450B-UTU	Y92B-A250

Specifications

Operating voltage range	5 to 24 VDC: 4 to 32 VDC 100 to 120 VAC: 75 to 132 VAC 200 to 240 VAC: 150 to 264 VAC
Output ON voltage drop	G3NA-2: 1.6 V (RMS) max. G3NA-4: 1.8 V (RMS) max. G3NA-D2: 1.5 V max.
Leakage current	5 mA (100 V)/10 mA (200 V) G3NA-D2: 5 mA max. (200 VDC)
Load voltage range	200 to 480 VAC: 180 to 528 VAC 24 to 240 VAC: 19 to 264 VAC 5 to 200 VDC: 4 to 220 VDC
Ambient temperature	Operating: -30 to 80°C
Operate & release time	1/2 of load power source cycle + 1 ms max. (DC input) 1/2 of load power source cycle + 1 ms max. (DC input)
G3NA-D2	1 ms max. (DC input; release 5 ms), 30 ms max. (AC input)
Size in mm (HxWxD)	58x43x27

Solid State Relays with exchangeable power cartridge

Optimum design of the heat sink has contributed to the downsizing of this product. The power element cartridges of G3PA are easily replaceable for easy maintenance. G3PA can be mounted on a DIN-rail or using screws.

- 10-60 A output current
- 24-480 VAC output voltages
- Applicable with 3-phase loads
- Replaceable power element cartridges

Ordering information

Rated output load		Zero cross function	Rated input voltage	Operating voltage range	Input current impedance	Voltage level		Size in mm (HxWxD)	Order code
						Must operate voltage	Must release voltage		
24 to 240 VAC	10 A	Yes	5 to 24 VDC	4 to 30 VDC	7 mA max.	4 VDC max.	1 VDC min.	100x27x100	G3PA-210B-VD DC5-24
	20 A							100x37x100	G3PA-220B-VD DC5-24
	40 A							100x47x100	G3PA-240B-VD DC5-24
	60 A							100x110x100	G3PA-260B-VD DC5-24
	10 A		24 VAC	19.2 to 26.4 VAC	1.4 kΩ ±20%	19.2 VAC max.	4.8 VAC min.	100x27x100	G3PA-210B-VD AC24
	20 A							100x37x100	G3PA-220B-VD AC24
	40 A							100x47x100	G3PA-240B-VD AC24
	60 A							100x110x100	G3PA-260B-VD AC24
180 to 400 VAC	20 A		12 to 24 VDC	9.6 to 30 VDC	7 mA max.	9.2 VDC max.	1 VDC min.	100x37x100	G3PA-420B-VD DC12-24
	30 A							100x47x100	G3PA-430B-VD DC12-24
200 to 480 VAC	20 A							100x37x100	G3PA-420B-VD-2 DC12-24
	30 A							100x47x100	G3PA-430B-VD-2 DC12-24
	50 A							100x110x100	G3PA-450B-VD-2 DC12-24

Accessories

Replacement parts: Power device cartridges			
Load voltage range	Carry current	Applicable SSR	Order code
19 to 264 VAC	10 A	G3PA-210B-VD DC5-24	G32A-A10-VD DC5-24
		G3PA-210B-VD AC24	G32A-A10-VD AC24
	20 A	G3PA-220B-VD DC5-24	G32A-A20-VD DC5-24
		G3PA-220B-VD AC24	G32A-A20-VD AC24
	40 A	G3PA-240B-VD DC5-24	G32A-A40-VD DC5-24
		G3PA-240B-VD AC24	G32A-A40-VD AC24
	60 A	G3PA-260B-VD DC5-24	G32A-A60-VD DC5-24
		G3PA-260B-VD AC24	G32A-A60-VD AC24
150 to 440 VAC	20 A	G3PA-420B-VD DC12-24	G32A-A420-VD DC12-24
	30 A	G3PA-430B-VD DC12-24	G32A-A430-VD DC12-24
180 to 528 VAC	20 A	G3PA-420B-VD-2 DC12-24	G32A-A420-VD-2 DC12-24
	30 A	G3PA-430B-VD-2 DC12-24	G32A-A430-VD-2 DC12-24
	50 A	G3PA-450B-VD-2 DC12-24	G32A-A450-VD-2 DC12-24

G32A-D__ enables 2 line switching of 3 phase configurations		
Current flow	Applicable SSR	Order code
10 A	G3PA-210B-VD, G3PA-210BL-VD, G3PA-220B-VD, G3PA-220BL-VD, G3PA-420B-VD, G3PA-420B-VD-2	G32A-D20
20 A		
30 A	G3PA-430B-VD, G3PA-430B-VD-2, G3PA-240B-VD, G3PA-240BL-VD	G32A-D40
40 A		

Specifications

Isolation	Phototriac coupler
Indicator	Yes
Ambient temperature	Operating: -30 to 80°C
Load voltage range	200 to 480 VAC: 180 to 528 VAC 24 to 240 VAC: 19 to 264 VAC 180 to 400 VAC: 150 to 440 VAC
Output ON drop	1.6 V (RMS) max.
Operate time	0.5 of load power source cycle + 1 ms max. (DC input, -B models) 1.5 of load power source cycle + 1 ms max. (AC input) 1 ms max. (-BL models)
Release time	0.5 of load power source cycle + 1 ms max. (DC input) 1.5 of load power source cycle + 1 ms max. (AC input)

Omron's G3PE compact industrial SSR with outstanding surge endurance

The G3PE features an original surge-pass circuit that gives outstanding surge endurance and protects the semiconductor device against voltages in excess of 30 kV.

- Single and three phase, 15-45 A output current
- 100-240 VAC and 200-480 VAC output voltages
- Models available without zero cross
- Improved surge dielectric strength for output circuits
- Terminal cover with finger protection
- Mount to DIN track or with screws

Ordering information

Phases	Rated voltage (operating voltage)	Rated output load	Permissible I^2t (half 60 Hz wave)	Applicable heater capacity AC1: resistive load)	Size in mm (HxWxD)	Number of poles	Order code
1	100 to 240 VAC (75 to 264 VAC)	15 A (at 40°C)	121 A^2s	3 kW (at 200 VAC)	100x22.5x100	1	G3PE-215B DC12-24
		25 A (at 40°C)	260 A^2s	5 kW (at 200 VAC)		1	G3PE-225B DC12-24
		35 A	1,260 A^2s	7 kW (at 200 VAC)	100x44.5x100	1	G3PE-235B DC12-24
		45 A		9 kW (at 200 VAC)		1	G3PE-245B DC12-24
	200 to 480 VAC (180 to 528 VAC)	15 A (at 40°C)	128 A^2s	6 kW (at 400 VAC)	100x22.5x100	1	G3PE-515B DC12-24
		25 A (at 40°C)	1,350 A^2s	10 kW (at 400 VAC)		1	G3PE-525B DC12-24
		35 A		14 kW (at 400 VAC)	100x44.5x100	1	G3PE-535B DC12-24
		45 A	6,600 A^2s	18 kW (at 400 VAC)		1	G3PE-545B DC12-24
3	200 to 480 VAC (180 to 528 VAC)	15 A (at 40°C)	260 A^2s	12.5 kW (at 480 VAC)	100x80x155	3	G3PE-515B-3N DC12-24
						2	G3PE-515B-2N DC12-24
		25 A (at 40°C)		20.7 kW (at 480 VAC)	120x80x155	3	G3PE-525B-3N DC12-24
					100x80x155	2	G3PE-525B-2N DC12-24
		35 A	1,260 A^2s	29 kW (at 480 VAC)	140x80x155	3	G3PE-535B-3N DC12-24
					120x80x155	2	G3PE-535B-2N DC12-24
		45 A		37.4 kW (at 480 VAC)	140x110x155	3	G3PE-545B-3N DC12-24
					140x80x155	2	G3PE-545B-2N DC12-24

Specifications

Rated input voltage	12 to 24 VDC
Operating voltage range	9.6 to 30 VDC
Rated input current (impedance)	7 mA max. (zero cross models); 15 mA max. (models without zero cross)
Zero cross function	Yes
Must operate voltage	9.6 VDC max.
Must release voltage	1 VDC min.
Isolation method	Phototriac coupler
Operation indicator	Yes (yellow)
Load voltage range	200 to 480 VAC models: 180 to 528 VAC 100 to 240 VAC models: 75 to 264 VAC
Operate time	1/2 of load power source cycle +1 ms max.
Release time	1/2 of load power source cycle +1 ms max.
Leakage current	10 mA (at 200 VAC)
Ambient temperature	Operating: -30 to 80°C

"Intelligent" SSR with Built-in current transformer which enables Heater Burnout and SSR Shortcircuit Failure Detection.

- Built-in Current Transformer (CT) helps reduce wiring steps.
- Detects the burnout of any one of a group of heaters.
- Detects the burnout of 3-phase heaters.
- Detects SSR short-circuit failures.
- Error detection level can be easily set with a switch.
- Three types of input terminals available: M3 terminals, screwless clamp terminals (detachable), or compact slotted screw terminals (detachable).
- Zero cross function.
- Operation indicator.

Ordering information

Applicable output load (See note.)		Input terminals	Alarm output	Size in mm (HxWxD)	Model
100 to 240 VAC	2 to 25 A	M3 terminals	1 output (Heater Burnout Detection, SSR Short-circuit Failure Detection, Common)	100x45x110	G3PF-225B
	2 to 35 A			100x55x130	G3PF-235B
200 to 480 VAC	2 to 25 A			100x45x110	G3PF-525B
	2 to 35 A			100x55x130	G3PF-535B
100 to 240 VAC	2 to 25 A	Screwless clamp terminals (detachable)	2 outputs (Heater Burnout Detection, SSR Short-circuit Failure Detection)	100x45x117	G3PF-225B-CTB
	2 to 35 A			100x55x137	G3PF-235B-CTB
200 to 480 VAC	2 to 25 A			100x45x117	G3PF-525B-CTB
	2 to 35 A			100x55x137	G3PF-535B-CTB

Note: The load current depends on the ambient temperature. Refer to datasheet for details.

Specifications

Order code		G3PF-225B	G3PF-235B	G3PF-525B	G3PF-535
Rated load voltage		100 to 240 VAC (50/60 Hz)		200 to 480 VAC (50/60 Hz)	
Operating voltage range		75 to 264 VAC, 50/60 Hz		180 to 528 VAC, 50/60 Hz	
Applicable load current*1		25 A (at 40°C)	35 A (at 40°C)	25 A (at 40°C)	35 A (at 40°C)
Minimum load current		2 A			
Inrush current resistance		220 A (60 Hz, 1 cycle)	430 A (60 Hz, 1 cycle)	220 A (60 Hz, 1 cycle)	430 A (60 Hz, 1 cycle)
Operate time		1/2 of load power source cycle + 1 ms max.			
Release time		1/2 of load power source cycle + 1 ms max.			
Main circuit	Output ON voltage drop	1.6 V (RMS) max.		1.8 V (RMS) max.	
	Leakage current	10 mA max. (at 200 VAC)		20 mA max. (at 480 VAC)	
Alarm output	Output ON voltage drop	1.5 V max.			
	Leakage current	1 mA max.			
Isolation resistance		100 MΩ min. (at 500 VDC)			
Dielectric strength		2,500 VAC, 50/60 Hz for 1 min.			
Vibration resistance		Destruction: 10 to 55 to10 Hz, 0,35-mm single amplitude (0,7-mm double amplitude)			
Shock resistance		Destruction: 294 m/s²			
Ambient storage temperature		-30 to 70°C (with no icing or condensation)			
Ambient operating temperature		-20 to 60°C (with no icing or condensation)			
Ambient operating humidity		45% to 85%			
Weight		Approx. 400 g	Approx. 630 g	Approx. 400 g	Approx. 630 g

*1 The load current depends on the ambient temperature.

Thyristor type single-phase power controller that enables precise temperature control

Compact and the possibility for side-by-side mounting for multiple units are the basics for this new generation of power controllers. Process value can be easily monitored via the 7-segment display on the front panel.

- Precise heater burnout detection
- Phase control or optimum cycle control
- RS-485 communications to set manipulated variables and monitor load current
- Total runtime monitoring
- Application with various loads: constant load resistance, variable load resistance

Ordering information

Applicable output load		Type	Contact terminal block	Heater burnout detection	Communications	Order code
100 to 240 VAC	20 A	Standard	Screwless clamp terminal block	No	No	G3PW-A220EU-C
	45 A					G3PW-A245EU-C
	60 A					G3PW-A260EU-C
	20 A	Constant current		Yes	Yes	G3PW-A220EC-C-FLK
	45 A					G3PW-A245EC-C-FLK
	60 A					G3PW-A260EC-C-FLK
	20 A	Standard	Terminal block with small slotted screws	No	No	G3PW-A220EU-S
	45 A					G3PW-A245EU-S
	60 A					G3PW-A260EU-S
	20 A	Constant current		Yes	Yes	G3PW-A220EC-S-FLK
	45 A					G3PW-A245EC-S-FLK
	60 A					G3PW-A260EC-S-FLK

Accessories (Order separately)

Name	Resistive value	Display	Model
External Variable Resistor	2 kΩ	202	G32X-V2K

Specifications

Order code			Standard Models	Constant-current Models
			G3PW-A2__EU-_	G3PW-A2__EC-__-FLK
Control method			Analogue input: Phase control or optimum cycle control Voltage ON/OFF input: ON/OFF control	
Maximum load capacity			Phase control: Linear (resistive) load, transformer primary-side control (flux density: 1.25 T max.)	
			Optimum cycle control: Linear (resistive) load (Transformer primaryside control is not supported.)	
Output mode	Analogue input	Phase control	Proportional to phase angle (same as G3PX), proportional to square voltage, proportional to voltage	Proportional to phase angle (same as G3PX), proportional to square voltage, proportional to voltage, constant-current control
		Optimum cycle control	Optimum cycle control (Output is switched to 100% or 0% each half cycle.)	
	Voltage ON/OFF input	ON/OFF control	Proportional to voltage control	

Multi-channel power controller for smarter SSR usage

The G3ZA receives manipulated variables generated by control loops or manual settings via a simple-to-wire RS-485. It regulates the heater power with high precision by driving up to eight standard SSRs. Moreover, the offset control reduces peak power in the supply net.

- Multi-channel power controller
- Controls up to eight standard solid state relays
- Easy integration with PLC
- Compact size
- Available with heater alarms (four channels) or without (eight channels)

Ordering information

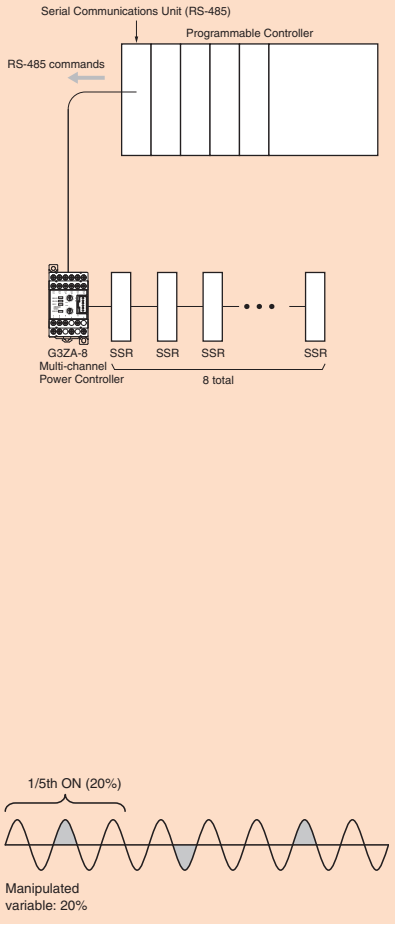
Name	Number of control channels	Heater alarm	Load power supply voltage	Order code
Multi-channel power controller	4	Supported	100 to 240 VAC	G3ZA-4H203-FLK-UTU
			400 to 480 VAC	G3ZA-4H403-FLK-UTU
	8	Not supported	100 to 240 VAC	G3ZA-8A203-FLK-UTU
			400 to 480 VAC	G3ZA-8A403-FLK-UTU

Accessories

Name	Hole diameter	Order code
Current transformer (CT)	5.8 dia.	E54-CT1
	12.0 dia.	E54-CT3

Specifications

Item	Load power supply voltage range	
	100 to 240 VAC	400 to 480 VAC
Power supply voltage	100 to 240 VAC (50/60 Hz)	
Operating voltage range	85 to 264 VAC	
Power consumption	16 VA max.	
Load power supply voltage	100 to 240 VAC	400 to 480 VAC
Load power supply voltage range	75 to 264 VAC	340 to 528 VAC
Manipulated variable input	0.0 to 100.0% (via RS-485 communications)	
Current transformer input	Single-phase AC, 0 to 50 A (primary current of CT)	
Trigger output	One voltage output for each channel, 12 VDC ±15%, max. load current: 21 mA (with built-in short-circuit protection circuit)	
Alarm output	NPN open collector, one output Max. applicable voltage: 30 VDC Max. load current: 50 mA Residual voltage: 1.5 V max. Leakage current: 0.4 mA max.	
Indications	LED indicators	
Ambient operating temperature	-10 to 55°C (with no icing or condensation)	
Ambient operating humidity	25 to 85%	
Storage temperature	-25 to 65°C (with no icing or condensation)	
Performance		
Current indication accuracy	±3 A (for models with heater burnout detection)	
Insulation resistance	100 MΩ min. (at 500 VDC) between primary and secondary	
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between primary and secondary	
Vibration resistance	Vibration frequency: 10 to 55 Hz, acceleration: 50 m/s^2 in X, Y, and Z directions	
Shock resistance	300 m/s^2 three times each in six directions along three axes	
Weight	Approx. 200 g (including terminal cover)	
Degree of protection	IP20	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
Installation environment	Overvoltage category III, pollution degree 2 (according to IEC 60664-1)	
Approved standards	UL508 (Listing), CSA22.2 No. 14 EN50178 EN61000-6-4 (EN55011: 1998, A1: 1999 Class A, Group 1) EN61000-6-2: 2001	
Size in mm (HxWxD)	76x45x111	



Optimum cycle control

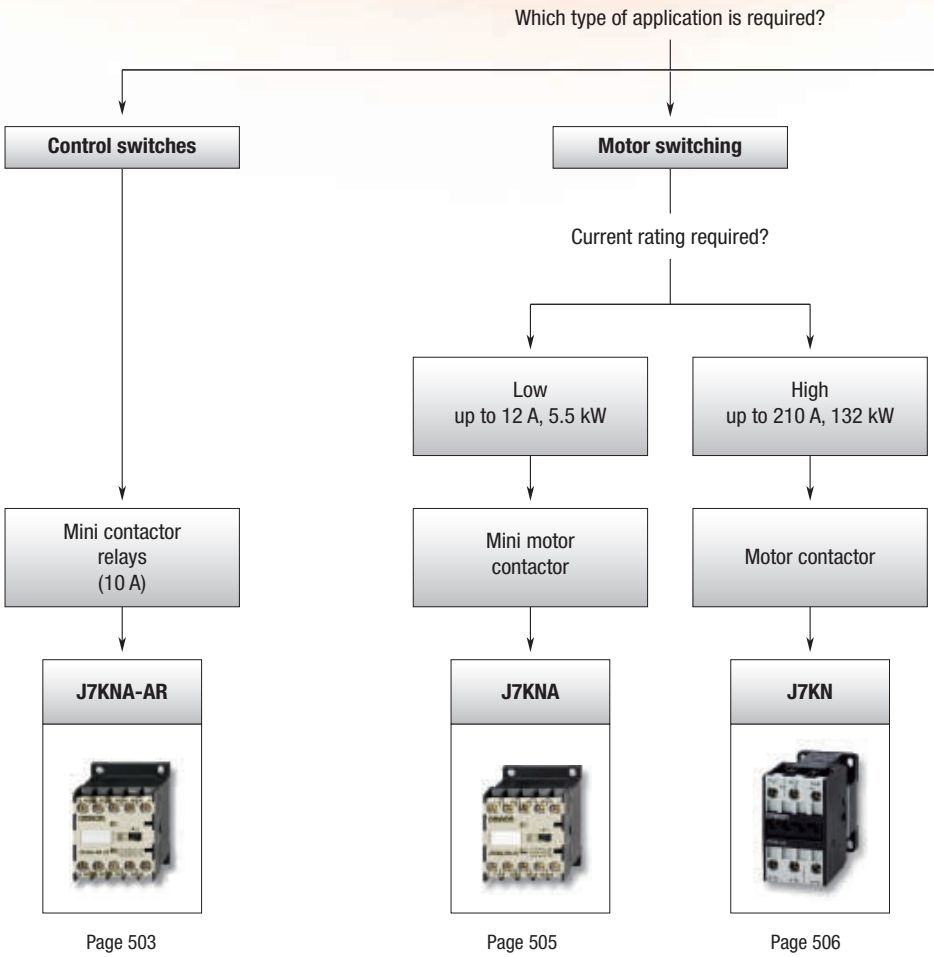
- Optimum cycle control is performed by driving SSRs according to load power detection and trigger signals. (Zero-cross SSRs are used.)
- Noise is suppressed while ensure high-speed response by turning outputs ON and OFF each half cycle to achieve high-precision temperature control.

DIRECT CONTROL DC CONTACTOR

J7KNG – Low-power consumption DC contactors

Now it is possible to control contactors directly from a PLC with electronic output.
Our new J7KNG models consume only 3 W inrush/sealed power up to 22 A contactors and 4 W inrush/sealed power up to 40 A contactors!

- Low inrush & sealed control circuits
- Control terminals on both sides
- Wide range up to 22 A with built-in auxiliary contact and up to 40 A



Motor protection

Which kind of protection is needed?

Protection with fuse	Fuseless
Thermal overload relays (0.12 to 220 A)	Motor protection circuit breakers (0.12 to 220 A)
J7TKN	**J7MN**
	
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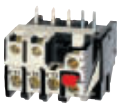
Selection table

	Category		Motor protection circuit breaker				
MPCB			 				
	Type		J7MN-3P/3R				
	Setting range current		0.16 - 32 A				
	Number of ranges		16				
	Auxiliary contact external		front 1 NO and 1 NC or 2 NO, side 1 NO and NC or 2 NO or 2 NC				
	Page		510				

	Category		Contactors				
Contactors							
	Type		J7KNA-AR	J7KNA-09/12	J7KN(G)-10	J7KN(G)-14	J7KN(G)-18	J7KN(G)-22
	Maximum power AC3-380/415 V		–	4 kW or 5 kW	4 kW	5.5 kW	7.5 kW	11 kW
	Rated current AC3-380/415 V		10 A th	9/12 A	10 A	14 A	18 A	22 A
	Main contacts		4 in 4 configurations	3 or 4	3 or 4			
	Auxiliary contacts	Included	–	1	1 NO or 1 NC			
		External	4 in different combinations		4 contacts*1			
	Page		503	505	506		506	

	Category		Thermal overload	
Thermal overload				
	Type		J7TKN-A	J7TKN-B
	Setting range D.O.L.		0.12 - 14 A	0.12 - 32 A
	Number of ranges		13	16
	Auxiliary contacts included		1 NO and 1 NC	1 NO and 1 NC
	Page		508	508

*1 Using J7KN-*D double wiring coils 1 aux. less

Motor protection circuit breaker

J7MN-6R

Over lapping area

J7MN-3P/3R

	J7MN-6R	J7MN-9R
	26 - 63 A	63 - 100 A
	5	4
front 1 NO and 1 NC or 2 NO, side 1 NO and NC or 2 NO or 2 NC		
	510	

Contactors

J7KN(G)-24	J7KN(G)-32	J7KN(G)-40	J7KN-50	J7KN-62	J7KN-74	J7KN-85	J7KN-110
11 kW	15 kW	18.5 kW	22 kW	30 kW	37 kW	45 kW	55 kW
24 A	32 A	40 A	50 A	62 A	74 A	85 A	110 A
3			3			3	
–			–			2 NO and 2 NC	
front and side 8-contacts*1			front and side 8-contacts*1			–	
506			506			506	

Thermal overload

J7TKN-C	J7TKN-D	J7TKN-E
28 - 42 A	40 - 74 A	60 - 120 A
1	3	2
1 NO and 1 NC	1 NO and 1 NC	1 NO and 1 NC
508	508	508

*1 Using J7KN-*D double wiring coils 1 aux. less

Selection table

	Category	Motor protection circuit breaker	
MPCB			
	Type		
	Setting range current		
	Number of ranges		
	Auxiliary contact external		
	Page		

	Category	Contactors		
Contactors				
	Type	J7KN-151	J7KN-176	J7KN-200
	Maximum power AC3-380/415 V	75 kW	90 kW	110 kW
	Rated current AC3-380/415 V	150 A	175 A	200 A
	Main contacts	3 or 4		3
	Auxiliary contacts Included	–		2 NO and 1 NC
	Auxiliary contacts External	front and side 8-contacts[-1]		2 NO and 2 NC
	Page	506		

	Category	Thermal overload	
Thermal overload			
	Type	J7TKN-E	J7TKN-F
	Setting range D.O.L.	60 - 120 A	100 - 220 A
	Number of ranges	2	2
	Auxiliary contacts included	1 NO and 1 NC	1 NO and 1 NC
	Page	508	

Main mini contactor relay, 4-pole

Three basic units can be combined with different additional auxiliary contacts. 4-pole, 6-pole and 8-pole versions in different configurations are possible as well as different coil voltages (AC and DC). Accessories such as suppressors are available.

- Mirror contacts
- Screw fixing and snap fitting (35 mm DIN-rail)
- Rated current = 10 A (I_{th})
- Suitable for electronic devices (DIN 19240)
- Finger proof (BGV A2)

Ordering information

Operation	Contacts		Distinctive number according to DIN EN 50011	Ratings		Thermal rated current	Order code	Coil voltage *1, replace ___ with:				
	NO	NC		AC15 230 V A	400 V A	I_{th}, A						
4-pole, with screw terminals								VAC			VDC	
AC	4	0	40 E	3	2	10	J7KNA-AR-40___	24	110	230	–	–
	3	1	31 E	3	2	10	J7KNA-AR-31 ___	24	110	230	–	–
	2	2	22 E	3	2	10	J7KNA-AR-22 ___	24	110	230	–	–
DC solenoid	4	0	40 E	3	2	10	J7KNA-AR-40 ___	–	–	–	24D	110D
	3	1	31 E	3	2	10	J7KNA-AR-31 ___	–	–	–	24D	110D
	2	2	22 E	3	2	10	J7KNA-AR-22 ___	–	–	–	24D	110D
DC solenoid with diode	4	0	40 E	3	2	10	J7KNA-AR-40 ____	–	–	–	24VS	–
	3	1	31 E	3	2	10	J7KNA-AR-31 ____	–	–	–	24VS	–
	2	2	22 E	3	2	10	J7KNA-AR-22 ____	–	–	–	24VS	–

*1 Other coil voltages available on request

Accessories

Contacts		Ratings		Thermal rated current	Order code
NO	NC	AC15 230 V A	400 V A	I_{th}, A	
1	1	3	2	10	J73KN-A-11
0	2	3	2	10	J73KN-A-02
4	0	3	2	10	J73KN-A-40
2	2	3	2	10	J73KN-A-22
0	4	3	2	10	J73KN-A-04

Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage U_s range for			
	50 Hz	60 Hz	50 Hz		60 Hz	
	V	V	min. V	max. V	min. V	max. V
24	24	24	22	24	24	24
110	110 to 115	120 to 125	110	115	120	125
230	220 to 230	240	220	230	240	250
Size in mm (HxWxD)	57.5x45x49					

Motor contactors from 4 to 5.5 kW for normal duty switching

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts (top mounting). Reversed versions, including integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- 4 kW and 5.5 kW versions are available
- Different coil voltages (AC and DC)
- Mini and normal-size versions are available
- The contactors can be mounted with screw fixing and snap fitting on a DIN-rail
- All components are finger proof

Ordering information

Operation	Poles	Rating AC2, AC3			Rated current		Auxiliary contact		Overload relay	Size in mm (HxWxD)	Order code	Coil voltage *1, replace ___ with:				
		380 V 400 V 415 V kW	500 V kW	660 V 690 V kW	AC3 400 V A	AC1 690 V A	NO	NC				VAC				VDC
AC/DC solenoid	3	4	4	4	9	20	1	0	J7TKN-A	57.5x45x49	J7KNA-09-10___	24	110	230	400	24D
							0	1	J7TKN-A		J7KNA-09-01___	24	110	230	400	24D
		5.5	5.5	5.5	12	20	1	0	J7TKN-A		J7KNA-12-10___	24	110	230	400	24D
							0	1	J7TKN-A		J7KNA-12-01___	24	110	230	400	24D
	4	4	4	4	9	20	0	0	J7TKN-A		J7KNA-09-4___	24	110	230	400	24D
DC solenoid with diode	3	4	4	4	9	20	1	0	J7TKN-A		J7KNA-09-10___	–	–	–	–	24VS
							0	1	J7TKN-A		J7KNA-09-01___	–	–	–	–	24VS
		5.5	5.5	5.5	12	20	1	0	J7TKN-A		J7KNA-12-10___	–	–	–	–	24VS
							0	1	J7TKN-A		J7KNA-12-01___	–	–	–	–	24VS
AC/DC solenoid	3 reversing contactors	4	4	4	9	20	0	1	J7TKN-A	57.5x94.5x50	J7KNA-09-01 R___	24	110	230	400	24D
		5.5	5.5	5.5	12	20	0	1	J7TKN-A		J7KNA-12-01 R___	24	110	230	400	24D
DC solenoid with diode		4	4	4	9	20	0	1	J7TKN-A		J7KNA-09-01 R___	–	–	–	–	24VS
		5.5	5.5	5.5	12	20	0	1	J7TKN-A		J7KNA-12-01 R___	–	–	–	–	24VS

*1 Other coil voltages available on request

Accessories

Auxiliary contacts				
Contacts		Rated current		Order code
NO	NC	AC15 230 V	400 V	
1	1	3 A	2 A	J73KN-AM-11
0	2	3 A	2 A	J73KN-AM-02
2	2	3 A	2 A	J73KN-AM-22
Auxiliary contacts for reversing contactors				
1	1	3 A	2 A	J73KN-AM-11V
1	1	3 A	2 A	J73KN-AM-11X
Link modules between MPCB & contactors				
For MPCB J7MN-3P/J7MN-3R				J77MN-VKA-3
Insulated wiring system for J7KNA				
Reversing or parallel contactors				J75-WK11
Star-delta combination				J75-WK12

Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage U_s range for			
	50 Hz	60 Hz	50 Hz		60 Hz	
	V	V	min. V	max. V	min. V	max. V
24	24	24	22	24	24	24
110	110 to 115	120 to 125	110	115	120	125
230	220 to 230	240	220	230	240	250

Main contacts		J7KNA-09-___	J7KNA-12-___
Rated insulation voltage U_i		690 VAC	690 VAC
Making capacity Ieff	at U_e = 690 VAC	165 A	165 A
Breaking capacity I_{eff} cosϕ = 0,65	400 VAC	100 A	100 A
	500 VAC	90 A	90 A
	690 VAC	80 A	80 A
Mechanical life AC operated		5×106	5×106
DC operated		15×106	15×106
Short time current	10 s current	96 A	120 A

Motor contactors from 4-110 kW for normal and heavy-duty switching

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts. DC-DC versions, integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- Basic units can be combined with auxiliary contacts (top/side mounting)
- 3-main-pole and 4-main-pole versions are possible
- The power range covers 4 to 110 kW
- Different coil voltages (AC and DC)

Ordering information

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3			Rated current	Auxiliary contact		Overload relay	Size in mm (HxWxD)	Order code	Coil voltage *1, replace ___ with:					
			380 V 400 V 415 V kW	500 V kW	660 V 690 V kW	AC1 690 V A	NO	NC				VAC				VDC	
AC/DC	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67x45x82.5	J7KN-10-10___	24	110	230	400	24D	110D
			4	5.5	5.5	25	0	1			J7KN-10-01___	24	110	230	400	24D	110D
		14 A	5.5	7.5	7.5	25	1	0			J7KN-14-10___	24	110	230	400	24D	110D
			5.5	7.5	7.5	25	0	1			J7KN-14-01___	24	110	230	400	24D	110D
		18 A	7.5	10	10	32	1	0			J7KN-18-10___	24	110	230	400	24D	110D
			7.5	10	10	32	0	1			J7KN-18-01___	24	110	230	400	24D	110D
		22 A	11	10	10	32	1	0			J7KN-22-10___	24	110	230	400	24D	110D
			11	10	10	32	0	1			J7KN-22-01___	24	110	230	400	24D	110D
		24 A	11	15	15	50	0	0	J7TKN-C	78x45x104.5	J7KN-24___	24	110	230	400	24D	110D
		32 A	15	18.5	18.5	65	0	0			J7KN-32___	24	110	230	400	24D	110D
		40 A	18.5	18.5	18.5	80	0	0			J7KN-40___	24	110	230	400	24D	110D
		50 A	22	30	30	110	0	0	J7TKN-D	112x60x113	J7KN-50___	24	110	230	400	24D	110D
		62 A	30	37	37	120	0	0			J7KN-62___	24	110	230	400	24D	110D
		74 A	37	45	45	130	0	0			J7KN-74___	24	110	230	400	24D	110D
		85 A	45	55	55	150	2	2	J7TKN-E	134x90x119	J7KN-85-22___	24	110	230	400	–	–
											J7KN-85-21___	–	–	–	–	24D	110D
		110 A	55	75	55	170	2	2			J7KN-110-22___	24	110	230	400	–	–
											J7KN-110-21___	–	–	–	–	24D	110D
DC operated solenoid motor contactor	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67x45x82.5	J7KNG-10-10___	–	–	–	–	24D	110D
			4	5.5	5.5	25	0	1			J7KNG-10-01___	–	–	–	–	24D	110D
		14 A	5.5	7.5	7.5	25	1	0			J7KNG-14-10___	–	–	–	–	24D	110D
			5.5	7.5	7.5	25	0	1			J7KNG-14-01___	–	–	–	–	24D	110D
		18 A	7.5	10	10	32	1	0			J7KNG-18-10___	–	–	–	–	24D	110D
			7.5	10	10	32	0	1			J7KNG-18-01___	–	–	–	–	24D	110D
		22 A	11	10	10	32	1	0			J7KNG-22-10___	–	–	–	–	24D	110D
			11	10	10	32	0	1			J7KNG-22-01___	–	–	–	–	24D	110D
		24 A	11	15	15	50	0	0	J7TKN-B J7TKN-C	78x45x104.5	J7KNG-24___	–	–	–	–	24D	110D
		32 A	15	18.5	18.5	65	0	0			J7KNG-32___	–	–	–	–	24D	110D
		40 A	18.5	18.5	18.5	80	0	0			J7KNG-40___	–	–	–	–	24D	110D
AC/DC		150 A	75	75	75	230	0	0	J7TKN-F	170x110x162	J7KN-151___	24	110	230	400	24	110
		175 A	90	90	90	250	0	0			J7KN-176___	24	110	230	400	24	110
		200 A	110	132	132	350	2	2		202x130x190	J7KN-200-21___	24	110	230	400	24	110
AC for fuseless load feeders	3	10 A	4	5.5	5.5	25	1	0	–	67x45x82.5	J7KN-10-10___VKN-3	24	110	230	400	24D	110D
			4	5.5	5.5	25	0	1			J7KN-10-01___VKN-3	24	110	230	400	24D	110D
		14 A	5.5	7.5	7.5	25	1	0			J7KN-14-10___VKN-3	24	110	230	400	24D	110D
			5.5	7.5	7.5	25	0	1			J7KN-14-01___VKN-3	24	110	230	400	24D	110D
		18 A	7.5	10	10	32	1	0			J7KN-18-10___VKN-3	24	110	230	400	24D	110D
			7.5	10	10	32	0	1			J7KN-18-01___VKN-3	24	110	230	400	24D	110D
		22 A	11	10	10	32	1	0			J7KN-22-10___VKN-3	24	110	230	400	24D	110D
			11	10	10	32	0	1			J7KN-22-01___VKN-3	24	110	230	400	24D	110D

*1 Other coil voltages available on request

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3		Rated current	Auxiliary contact		Overload relay	Size in mm (HxWxD)	Order code	Coil voltage *1, replace ___ with:					
			380 V 400 V 415 V kW	AC1 400 V kW	AC1 690 V A	NO	NC				VAC				VDC	
AC	4	10 A	4	17.5	25	0	0	–	67x45x82.5	J7KN-10-4___	24	110	230	400	–	
		14 A	5.5	17.5	25	0	0			J7KN-14-4___	24	110	230	400		
		18 A	7.5	22	32	0	0			J7KN-18-4___	24	110	230	400		
		22 A	11	22	32	0	0			J7KN-22-4___	24	110	230	400		
DC solenoid motor contactor	4	10 A	4	17.5	25	0	0	–	67x45x82.5	J7KNG-10-4___	–				24D	110D
		14 A	5.5	17.5	25	0	0			J7KNG-14-4___					24D	110D
		18 A	7.5	22	32	0	0			J7KNG-18-4___					24D	110D
		22 A	11	22	32	0	0			J7KNG-22-4___					24D	110D
AC/DC		150 A	75	159	230	0	0		170x110x162	J7KN-151-4___	24	110	230	400	24	110
		175 A	90	173	250	0	0			J7KN-176-4___	24	110	230	400	24	110

*1 Other coil voltages available on request

Accessories

Auxiliary contact blocks	Rated operational current			Contacts		Order code
Suitable for:	AC15 230 V A	AC15 400 V A	AC1 690 V A	NO	NC	
J7KN-10… to -74…	3	2	10	1	–	J73KN-B-10
	3	2	10	–	1	J73KN-B-01
	3	2	10	–	–	J73KN-B-10U
	3	2	10	–	–	J73KN-B-01U
	6	4	25	1	–	J73KN-B-10A
	6	4	25	–	1	J73KN-B-01A
J7KN-151… to -176…	3	2	10	1	1	J73KN-D-11F
	3	2	10	2	2	J73KN-D-22F
	3	2	10	1	1	J73KN-D-11S
J7KN-24… to KN-110 and J7KN-200	3	2	10	1	1	J73KN-C-11S
	3	2	10	2	2	J73KN-E-22

Pneumatic timers	Function	Time range	Contacts		Order code
Suitable for:			NO	NC	
J7KN-10... to -40…	ON-delay	0.1 to 40 s	1	–	J74KN-B-TP40DA
	ON-delay	10 to 180 s	1	–	J74KN-B-TP180DA
	OFF-delay	0.1 to 40 s	–	1	J74KN-B-TP40IA
	OFF-delay	10 to 180 s	–	1	J74KN-B-TP180IA

Mechanical interlocks	Interlocks contactor with contactor	Order code
Mounting	Order code + Order code	
Horizontal	J7KN-10 to -40 + J7KN-10 to -40	J74KN-B-ML
	J7KN-24 to -74 + J7KN-24 to -74	J74KN-C-ML
	J7KN-85 to -110 + J7KN-85 to -110	J74KN-D-ML
	J7KN-151 to -176 + J7KN-151 to -176	J74KN-E-ML

Suppressor units	Type		Applicable coil voltage	Order code
Suitable for contactors				
J7KNA	AC/DC	Varistor snap-on coil terminals	110 to 230 V	J74KN-A-VG230
J7KN10-J7KN22	AC/DC		250 to 415 V	J74KN-A-VG400
J7KN10-J7KN74	AC/DC	Varistor snap-on top of contactor	110 to 230 V	J74KN-B-VG230
	AC/DC		250 to 415 V	J74KN-B-VG400
J7KNA	AC/DC	RC-unit snap-on contactor	12 to 48 V	J74KN-D-RC24
	AC/DC		48 to 127 V	J74KN-D-RC110
	AC/DC		110 to 230 V	J74KN-D-RC230
J7KN10-J7KN74	AC/DC	RC-unit snap-on contactor	12 to 48 V	J74KN-C-RC24
	AC/DC		48 to 127 V	J74KN-C-RC110
	AC/DC		110 to 230 V	J74KN-C-RC230
J7KN85-J7KN110	AC/DC	RC-unit to fix via fixing band or adhesive strip with contactor	12 to 24 V	J74KN-B-RC48
	AC/DC		110 to 250 V	J74KN-B-RC230
	AC/DC		250 to 415 V	J74KN-B-RC400

Additional terminals single pole	Cable cross-sections to clamp (mm^2)			Order code
Suitable for contactors	Solid or stranded	Flexible	Flexible with multi-core cable end	
J7KN50 - KN74	4 to 35	6 to 25	4 to 25	J74KN-LG-9030
J7KN151 - KN176	16 to 120	–	16 to 95	J74KN-LG-11224

Terminal covers	Specification	Order code
Suitable for contactors		
J7KN151 - KN176	One unit	J74KN-LG-10404

Marking systems	Specification	Order code
Description		
Marking plate	2-section without marking, divisible	J74KN-P487-1
Marking plate	4-section without marking, divisible	J74KN-P245-1

Specifications

Coil voltages	Suffix to contactor type:								
Contactor type	20	24	48	90	110	180	230	400	500
J7KN-10 to J7KN-74	–	yes	yes	–	yes	yes	yes	yes	yes
J7KN-85 to J7KN-110	yes	yes	yes	yes	yes	yes	yes	yes	yes
J7KN-151 to J7KN-200	–	yes	yes	–	yes	–	yes	yes	–

Thermal overload relays for J7 contactors

J7TKN relays protect motors against thermal overload. They can be mounted on the contactor or separately. The relays comply with IEC 947 (single-phase sensitivity).

- Series of overload relays covering a setting range from 0.24 A to 220 A
- All components are finger proof

Ordering information

Applicable contactors	Setting range		Size in mm (HxWxD)	Order code
	D.O.L. (A)	Star-delta (A)		
J7KNA-09…, J7KNA-12…	0.12 to 0.18	–	38.8x48.5x77	J7TKN-A-E18
	0.18 to 0.27	–		J7TKN-A-E27
	0.27 to 0.4	–		J7TKN-A-E4
	0.4 to 0.6	–		J7TKN-A-E6
	0.6 to 0.9	–		J7TKN-A-E9
	0.8 to 1.2	–		J7TKN-A-1E2
	1.2 to 1.8	–		J7TKN-A-1E8
	1.8 to 2.7	–		J7TKN-A-2E7
	2.7 to 4	–		J7TKN-A-4
	4 to 6	7 to 10.5		J7TKN-A-6
	6 to 9	10.5 to 15.5		J7TKN-A-9
	8 to 11	14 to 19		J7TKN-A-11
	10 to 14	18 to 24		J7TKN-A-14
J7KN-10… to J7KN-40…	0.12 to 0.18	–	63.5x45x70	J7TKN-B-E18
	0.18 to 0.27	–		J7TKN-B-E27
	0.27 to 0.4	–		J7TKN-B-E4
	0.4 to 0.6	–		J7TKN-B-E6
	0.6 to 0.9	–		J7TKN-B-E9
	0.8 to 1.2	–		J7TKN-B-1E2
	1.2 to 1.8	–		J7TKN-B-1E8
	1.8 to 2.7	–		J7TKN-B-2E7
	2.7 to 4	–		J7TKN-B-4
	4 to 6	7 to 10.5		J7TKN-B-6
	6 to 9	10.5 to 15.5		J7TKN-B-9
	8 to 11	14 to 19		J7TKN-B-11
	10 to 14	18 to 24		J7TKN-B-14
	13 to 18	23 to 31		J7TKN-B-18
	17 to 24	30 to 41		J7TKN-B-24
	23 to 32	40 to 55		J7TKN-B-32
J7KN-24… to J7KN-40…	28 to 42	48 to 73	47x67x90	J7TKN-C-42
J7KN-50… to J7KN-74…	40 to 52	70 to 90	57x69x93	J7TKN-D-52
	52 to 65	90 to 112		J7TKN-D-65
	60 to 74	104 to 128		J7TKN-D-74
J7KN-85… to J7KN-150…	60 to 90	104 to 156	101x107x102	J7TKN-E-90
	80 to 120	140 to 207		J7TKN-E-120
J7KN-175… to J7KN-200…	100 to 150	175 to 260	113x190x176	J7TKN-F-150
	140 to 220	240 to 380		J7TKN-F-210

Accessories

Busbar sets		
For overload relays	For contactors	Order code
J7TKN-F-150	J7KN-151, J7KN-176	J74TK-SU-176
J7TKN-F-210	J7KN-200	J74TK-SU-200

Sets for single mounting				
For overload relays	Cable cross-section to clamp (mm^2)			Order code
	Solid or stranded	Flexible	Flexible with multi-core cable	
J7TKN-A	0.75 to 6	0.75 to 4	0.5 to 4	J74TK-M
J7TKN-B	0.75 to 6	0.75 to 4	0.5 to 4	J74TK-SM

Specifications

Type		J7TKN-A	J7TKN-B	J7TKN-C	J7TKN-D	J7TKN-E	J7TKN-F
Rated insulation voltage U_i		690 VAC					
Permissible ambient temperature	Operation	-25 to 60°C					
	Storage	-50 to 70°C					
Trip class according to IEC 947-4-1		10 A				20 A	
Cable cross-section Main connector	Solid or stranded mm^2	0.75 to 6 0.75 to 2.5	0.75 to 6	0.75 to 10	4 to 35	–	–
	Flexible mm^2	0.75 to 4 0.5 to 2.5	1 to 4	0.75 to 6	6 to 25	–	–
	Flexible with multi-core cable end mm^2	0.5 to 2.5 0.5 to 1.5	0.75 to 4	0.75 to 6	4 to 25	–	–
Cables per clamp	Number	1 + 1	2	2	1	–	–
Auxiliary connector	Solid mm^2	0.75 to 2.5					
	Flexible mm^2	0.5 to 2.5					
	Flexible with multi-core cable end mm^2	0.5 to 1.5					
Cables per clamp	Number	2					
Auxiliary contacts							
Rated insulation voltage U_i	same potential	690 VAC					
	different potential	440 VAC		250 VAC		440 VAC	
Rated operational current I_e Utilization category AC15	24 V	5 A	3 A	4 A		5 A	
	230 V	3 A	2 A	2.5 A	2.5 A	3 A	3 A
	400 V	2 A	1 A	1.5 A	1.5 A	2 A	2 A
	690 V	0.6 A	0.5 A	0.6 A			
Rated operational current I_e Utilization category DC13	24 V	1.2 A	1 A	1.2 A			
	110 V	0.15 A					
	220 V	0.1 A					
Short circuit protection (without welding 1 kA)	Highest fuse rating gL (gG)	6 A	4 A	6 A			
Setting range		to 23 A	All	28 to 42 A	52 to 65 A	All	–
Power loss per current path (max.)	Minimum setting value	1.1 W	1.1 W	1.3 W	2.9 W	1.1 W	–
	Maximum setting value	2.3 W	2.3 W	3.3 W	4.5 W	2.5 W	–

J7MN motor protection circuit breakers from 0.10 A to 100 A

J7MN starters protect motors against thermal overload and short circuit. The J7MN can be equipped with additional auxiliary contacts, tripping indicator (alarm), undervoltage release and/or shunt release. All models can be locked for safe maintenance.

- Rated operational currents of 32 A for the rocker type
- Rated operational currents of 32 A, 63 A and 100 A for the rotary types
- Switching capacity is 100 kA/415 V up-to 13 A and 50 kA/415 V up-to 100 A
- Electrical/mechanical link modules available up-to 11 kW motor protection units
- All components are finger proof

Ordering information

Rated current in A	Suitable for motors 3 ~ 400 V kW	Current setting range		Short-circuit breaking capacity at 3 ~ 400 V kA	Size in mm (HxWxD)	Order code
		Thermal overload release A	Instantaneous short-circuit release A			
0,16	–	0.10 - 0.16	2,1	100	98x45x75	J7MN-3P-E16
0,25	0,06	0.16 - 0.25	3,3	100		J7MN-3P-E25
0,4	0,09	0.25 - 0.4	5,2	100		J7MN-3P-E4
0,63	0,18	0.4 - 0.63	8,2	100		J7MN-3P-E63
1	0,25	0.63 - 1	13	100		J7MN-3P-1
1,6	0,55	1 - 1.6	20,8	100		J7MN-3P-1E6
2,5	0,75	1.6 - 2.5	32,5	100		J7MN-3P-2E5
4	1,5	2.5 - 4	52	100		J7MN-3P-4
6	2,2	4 - 6	78	100		J7MN-3P-6
8	3	5 - 8	104	100		J7MN-3P-8
10	4	6 - 10	130	50		J7MN-3P-10
13	5,5	9 - 13	169	50		J7MN-3P-13
17	7,5	11 - 17	221	20		J7MN-3P-17
22	7,5	14 - 22	286	15		J7MN-3P-22
26	11	18 - 26	338	15		J7MN-3P-26
32	15	22 - 32	416	15		J7MN-3P-32
0,16	–	0.10 - 0.16	2,1	100	98x45x100	J7MN-3R-E16
0,25	0,06	0.16 - 0.25	3,3	100		J7MN-3R-E25
0,4	0,09	0.25 - 0.4	5,2	100		J7MN-3R-E4
0,63	0,18	0.4 - 0.63	8,2	100		J7MN-3R-E63
1	0,25	0.63 - 1	13	100		J7MN-3R-1
1,6	0,55	1 - 1.6	20,8	100		J7MN-3R-1E6
2,5	0,75	1.6 - 2.5	32,5	100		J7MN-3R-2E5
4	1,5	2.5 - 4	52	100		J7MN-3R-4
6	2,2	4 - 6	78	100		J7MN-3R-6
8	3	5 - 8	104	100		J7MN-3R-8
10	4	6 - 10	130	100		J7MN-3R-10
13	5,5	9 - 13	169	100		J7MN-3R-13
17	7,5	11 - 17	221	50		J7MN-3R-17
22	7,5	14 - 22	286	50		J7MN-3R-22
26	11	18 - 26	338	50		J7MN-3R-26
32	15	22 - 32	416	50		J7MN-3R-32
26	12,5	18 - 26	338	50	140x55x144	J7MN-6R-26
32	15	22 - 32	416	50		J7MN-6R-32
40	18,5	28 - 40	520	50		J7MN-6R-40
50	22	34 - 50	650	50		J7MN-6R-50
63	30	45 - 63	819	50		J7MN-6R-63
63	30	45 - 63	819	50	165x70x171	J7MN-9R-63
75	37	55 - 75	975	50		J7MN-9R-75
90	45	70 - 90	1170	50		J7MN-9R-90
100	–	80 - 100	1300	50		J7MN-9R-100

Accessories

Description	Version		For circuit breaker	Order code
Transverse auxiliary contact block				
Contact block	1 NO + 1 NC		All	J7MN-11F
	2NO			J7MN-20F
	2NC			J7MN-02F
Auxiliary contact block for left hand side mounting (max. 2 pc. per circuit breaker)				
Contact block (9 mm)	1 NO + 1 NC		All	J7MN-11S
	2NO			J7MN-20S
	2NC			J7MN-02S
Signalling switch for left hand side mounting (max. 1 pc. per circuit breaker)				
Signalling switch (18 mm)	1 NO + 1 NC any tripping condition		–	J7MN-TA-11S
	1 NO + 1 NC short circuit tripping condition		–	J7MN-T-11S
Undervoltage releases for right hand side mounting (max 1 pc. per circuit breaker)				
Trips the circuit breaker when the voltage is interrupted. Prevents the motor from being restarted accidentally when the voltage is restored, suitable for EMERGENCY STOP according to VDE 0113	AC 50 Hz	AC 60 Hz	All	–
	24 V	28 V		J7MN-U-24
	110-127 V	120 V		J7MN-U-110
	220-230 V	240-260 V		J7MN-U-230
	240 V	277 V		J7MN-U-240
	380-400 V	440-460 V		J7MN-U-400
	415-440 V	460-480 V		J7MN-U-415
Shunt releases for right hand side mounting (max 1 pc. per circuit breaker)				
Trips the circuit breaker when the release coil is energized	AC 50 Hz	AC 60 Hz	All	–
	24 V	28 V		J7MN-S-24
	110-127 V	120 V		J7MN-S-110
	220-230 V	240-260 V		J7MN-S-230
	240 V	277 V		J7MN-S-240
	380-400 V	440-460 V		J7MN-S-400
	415-440 V	460-480 V		J7MN-S-415
Terminal block				
Terminal block	Up to 600 V according to UL 489 not for transverse auxiliary contact block		J7MN-3R	J7MN-TB32
			J7MN-9R	J7MN-TB100

Specifications

Type		J7MN-3P	J7MN-3R	J7MN-6R	J7MN-9R
Number of poles		3	3	3	3
Max. rated current Inmax (= max. rated operational current I_e)	**A**	32	32	63	100
Permissible ambient temperature	**Storage/transport**	-50 to 80°C			
	Operation	-20 to 60°C			
Rated operational voltage U_e	**V**	690			
Rated frequency	**Hz**	50/60			
Rated insulation voltage U_i	**V**	690			
Rated impulse withstand voltage U_{imp}	**kV**	6			
Utilization category	**IEC 60 947-2 (circuit breaker)**	A			
	IEC 60 947-4-1 (motor starter)	AC-3			
Class	**According to IEC 60 947-4-1**	10			
Degree of protection	**According to IEC 60 529**	IP20	IP20	IP20	IP20
Phase failure sensitivity	**According to IEC 60 947-4-1**	Yes			
Explosion protection	**According to EC Directive 94191EC**	Yes			
Isolator characteristics	**According to IEC 60 947-3**	Yes			
Main and EM. STOP switch characteristics	**According to IEC 60 204-1 (VDE113)**	Yes			
Safe isolation between main and auxiliary circuits According to DIN VDE 0106 Part 101	**Up to 400 V + 10%**	Yes			
	Up to 415 V + 5%	Yes			
Mechanical endurance	**Operating cycles**	100,000	100,000	50,000	50,000
Electrical endurance		100,000	100,000	25,000	25,000
Max. operating frequency per hour (motor starts)	**1/h**	25	25	25	25

THE COMPLETE MONITORING RANGE

K8 series – The smart way to protect your system

The K8 series offers you a flexible and complete one-stop shopping solution!
This monitoring range can be split into models for single-phase current and voltage control, three-phase voltage control, conductive level control and a temperature alarm unit.

- 1-phase: full-span of range setting, all models with timer function
- 3-phase: wide range of global voltage settings
- Easy-to-set parameters

What type of monitoring is required?

Single-phase control

Current

Voltage

What type of control is required?

Over/under

K8AB-AS

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Over/under

K8AB-VS

Page 517

Window

K8AB-VW

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Three-phase control

Voltage

Sequence/ phase loss

K8AB-PH

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Multi-function

K8AB-PM

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Sequence/phase loss/asymmetry

K8AB-PA

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Window

K8AB-PW

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Temperature

K8AB-TH

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Level control

Single- or two-point

Which mounting method is required?

Plug-in

DIN-rail

AC power supply

DC power supply

DC power supply

61F-GP-N8

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61F-GPN-BT/ -BC

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61F-D21T

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Leakage

Which function is required?

Standard

Disconnection detection

K7L-AT50

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K7L-AT50D

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Selection table

	Category	1-phase current	1-phase voltage		Phase-sequence phase-loss	3-phase phase-sequence phase-loss	3-phase asymmetry and phase-sequence phase-loss
Selection criteria							
	Model	K8AB-AS	K8AB-VS	K8AB-VW	K8AB-PH	K8AB-PM	K8AB-PA
	Specialty	Ideal for current monitoring for industrial heaters and motors.	Ideal for voltage monitoring for industrial facilities and equipment.	Ideal for voltage monitoring for industrial facilities and equipment.	Ideal for phase-sequence and phase-loss monitoring for industrial facilities and equipment.	Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Ideal for 3-phase voltage asymmetry monitoring for industrial facilities and equipment.
	Sensing range (configurable)	20 mA to 10 A, current transformer: 100/200 A	60 mV to 600 V	60 mV to 600 V	Same as supply voltage		
Supply voltage AC	24 VAC	■	■	■	–	–	–
	100 VAC	–	–	–	–	–	–
	110 VAC	–	–	–	–	–	–
	115 VAC	■	■	■	–	–	–
	120 VAC	–	–	–	–	–	–
	200 VAC	–	–	–	–	–	–
	220 VAC	–	–	–	–	–	–
	230 VAC	■	■	■	–	–	–
	240 VAC	–	–	–	–	–	–
	200 to 500 VAC	–	–	–	■	–	–
	200 to 240 VAC	–	–	–	–	■ (-PM1, 3-wire)	■ (-PA1, 3-wire)
	115 to 138 VAC	–	–	–	–	■ (-PM1, 4-wire)	■ (-PA1, 4-wire)
	380 to 480 VAC	–	–	–	–	■ (-PM2, 3-wire)	■ (-PA2, 3-wire)
	220 to 277 VAC	–	–	–	–	■ (-PM2, 4-wire)	■ (-PA2, 4-wire)
Supply voltage DC	24 VDC	■	■	■	–	–	–
	12 to 24 VDC	–	–	–	–	–	–
Control output	Transistor NPN	–	–	–	–	–	–
	Transistor PNP	–	–	–	–	–	–
	Relay	■ (1 SPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)
Features	LED operation indicator	■	■	■	■	■	■
	Adjustable sensitivity	–	–	–	–	–	–
	Electrode types	–	–	–	–	–	–
	Page	516	517	518	519	520	521

3-phase voltage	Conductive level controller				Liquid leakage sensor amplifier	
						
K8AB-PW	**61F-GP-N8**	**61F-GPN-BT**	**61F-GPN-BC**	**61F-D21T**	**K7L-AT50**	**K7L-AT50D**
Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Single or two-point	AC sine wave between electrodes for stable detection with no electrolysis	AC sine wave between electrodes for stable detection with no electrolysis	Ideal for level control for industrial facilities and equipment	Sensor amplifier, AC sine wave between electrodes for stable detection with no electrolysis	Sensor amplifier with disconnection detection function
Same as supply voltage	4 to 50 kΩ	0 to 100 kΩ	1 to 100 kΩ	10 to 100 kΩ	0 to 50 MΩ	1 to 50 MΩ
–	□	–	–	■	–	–
–	□			–		
–	□			–		
–	–			■		
–	□			–		
–	□			–		
–	□			–		
–	□			■		
–	□			–		
–	–			–		
■ (-PW1, 3-wire)	–			–		
■ (-PW1, 4-wire)	–			–		
■ (-PW2, 3-wire)	–			–		
■ (-PW2, 4-wire)	–			–		
–	–	■	■	–	–	–
–	–	–	–	–	□	□
–	–	–	■	–	■	■
–		–	–	–	■	■
■ (2 SPDT)	■	■	■	■	–	–
■	■	■	■	■	■	■
–	–	■	■	–	■	■
–	Electrode holder: PS-_S, PS-31, BF-1 and BS-1			–	Liquid leakage sensor band F03-16PE	
522	523	525		526	527	

■ Standard □ Available – No/not available

Single-phase current relay

These single-phase current relays monitor over- and undercurrents. Manual resetting and automatic resetting are supported by one relay. The start-up lock and operating time can be set separately. The relay warning status is easily monitored with the LED indicator.

- Single-phase current relay
- In 22.5 mm wide industrial housing
- Under or over control
- Supply voltages: 24 VAC/24 VDC/115 VAC/230 VAC
- Easy wiring with ferrules

Ordering information

Measuring current	Supply voltage	Order code
2 to 20 mA AC/DC, 10 to 100 mA AC/DC, 50 to 500 mA AC/DC	24VAC/DC	K8AB-AS1 24VAC/DC
	100 to 115 VAC	K8AB-AS1 100-115 VAC
	200 to 230 VAC	K8AB-AS1 200-230 VAC
0.1 to 1 A AC/DC, 0.5 to 5 A AC/DC, 0.8 to 8 A AC/DC	24VAC/DC	K8AB-AS2 24VAC/DC
	100 to 115 VAC	K8AB-AS2 100-115 VAC
	200 to 230 VAC	K8AB-AS2 200-230 VAC
10 to 100 A AC, 20 to 200 A AC	24VAC/DC	K8AB-AS3 24VAC/DC
	100 to 115 VAC	K8AB-AS3 100-115 VAC
	200 to 230 VAC	K8AB-AS3 200-230 VAC

Accessories

Current transformer	Input range	Applicable relay	Order code
	10 to 100 A AC, 20 to 200 A AC	K8AB-AS3	K8AC-CT200L

Note: The K8AB-AS3 is designed to be used in combination with the K8AC-CT200L (direct input not possible)

Specifications

Ambient temperature		Operating: -20 to 60°C (with no condensation or icing), storage: -40 to 70°C (with no condensation or icing)
Operating voltage range		85 to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays (SPDT)	Resistive load	6 A at 250 VAC ($\cos\phi$ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC ($\cos\phi$ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Life expectancy	Mechanical: 10,000,000 operations, electrical: Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Operating power	**Isolated power supply**	24 VAC (3 VA)/24 VDC (1 W), 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
Operate (SV)	**Operating value setting range**	10 to 100% of maximum rated input value
	Operating value	100% operation at set value
Reset (HYS.)	**Hysteresis**	5 to 50% of operating value
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s (value when input rapidly changes from 0 to 120%)
Operating power ON lock (LOCK)		0 to 30 s (value when input rapidly changes from 0 to 120%, lock timer starts upon input 30% of SV)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		K8AB-AS1/-AS2: DC input, 45 to 65 Hz; K8AB-AS3: 45 to 60 Hz
Continuous input	**K8AB-AS1/-AS2**	Continuous input: 115% of maximum input, 10 s max.: 125% of maximum input
	K8AB-AS3	Continuous input: 240 A, 30 s max.: 400 A, 1 s max.: 1,200 A
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM): Red LED
Size in mm (HxWxD)		90x22.5x100

Single-phase voltage relay

These single-phase voltage relays are for monitoring over- and undervoltages. Manual resetting and automatic resetting are supported by one relay. Relay warning status can easily be monitored using the LED indicator.

- Single-phase voltage relay
- In 22.5 mm wide industrial housing
- Under or over control
- Supply voltages: 24 VAC/24 VDC/115 VAC/230 VAC
- Easy wiring with ferrules

Ordering information

Measuring voltage	Supply voltage	Order code
6 to 60 mV AC/DC, 10 to 100 mV AC/DC, 30 to 300 mV AC/DC	24VAC/DC	K8AB-VS1 24VAC/DC
	100 to 115 VAC	K8AB-VS1 100-115 VAC
	200 to 230 VAC	K8AB-VS1 200-230 VAC
1 to 10 VAC/VDC, 3 to 30 VAC/VDC, 15 to 150 VAC/VDC	24VAC/DC	K8AB-VS2 24VAC/DC
	100 to 115 VAC	K8AB-VS2 100-115 VAC
	200 to 230 VAC	K8AB-VS2 200-230 VAC
20 to 200 VAC/VDC, 30 to 300 VAC/VDC, 60 to 600 VAC/VDC	24VAC/DC	K8AB-VS3 24VAC/DC
	100 to 115 VAC	K8AB-VS3 100-115 VAC
	200 to 230 VAC	K8AB-VS3 200-230 VAC

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-40 to 70°C (with no condensation or icing)
Operating voltage range		85 to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays	**Resistive load**	6 A at 250 VAC ($\cos\phi = 1$), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC ($\cos\phi = 0.4$), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Operating power	**Isolated power supply**	24 VAC (4 VA)/24VDC (1 W, 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
Operate (SV)	**Operating value setting range**	10 to 100% of maximum rated input value
	Operating value	100% operation at set value
Reset (HYS.)	**Hysteresis**	5 to 50% of operating value
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s (value when input rapidly changes from 0 to 120%)
Power ON lock (LOCK)		1 s or 5 s error ±0.5 s (value when input rapidly changes from 0 to 100%. The operating time is the shortest at this point)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		40 to 500 Hz
Input impedance		K8AB-VS1: 9 kΩ min., K8AB-VS2: 100 kΩ min., K8AB-VS3: 1 MΩ min.
Indicators		LED power (PWR): Green LED, relay output (RY): Yellow LED, alarm output (ALM): Red LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load)
Size in mm (HxWxD)		90x22.5x100

Single-phase voltage relay, window type

For monitoring over- and undervoltages simultaneously. Manual resetting and automatic resetting are supported by one relay. Separate settings and outputs are supported for over- and undervoltages. Relay warning status can easily be monitored with the LED indicator.

- Single-phase voltage window relay
- In 22.5 mm wide industrial housing
- Under and over, low/low or high/high control
- Supply voltages: 24 VAC/24 VDC/115 VAC/230 VAC
- Easy wiring with ferrules

Ordering information

Measuring voltage	Supply voltage	Order code
6 to 60 mV AC/DC, 10 to 100 mV AC/DC, 30 to 300 mV AC/DC	24VAC/DC	K8AB-VW1 24VAC/DC
	100 to 115 VAC	K8AB-VW1 100-115 VAC
	200-230 VAC	K8AB-VW1 200-230 VAC
1 to 10 V AC/DC, 3 to 30 V AC/DC, 15 to 150 V AC/DC	24VAC/DC	K8AB-VW2 24VAC/DC
	100 to 115 VAC	K8AB-VW2 100-115 VAC
	200 to 230 VAC	K8AB-VW2 200-230 VAC
20 to 200 V AC/DC, 30 to 300 V AC/DC, 60 to 600 V AC/DC	24VAC/DC	K8AB-VW3 24VAC/DC
	100 to 115 VAC	K8AB-VW3 100-115 VAC
	200 to 230 VAC	K8AB-VW3 200-230 VAC

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-40 to 70°C (with no condensation or icing)
Operating voltage range		85 to 110% of rated operating voltage
Rated power supply frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays (SPDT)	**Resistive load**	6 A at 250 VAC (cosϕ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Operating power	**Isolated power supply**	24 VAC (4 VA)/24VDC (1 W), 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
Operation (AL1 and AL2)	**Operating value setting range**	10 to 100% of maximum rated input value
	Operating value	100% operation at set value
Reset (HYS.)	**Hysteresis**	5% of operating value (fixed)
	Resetting method	Manual reset/automatic reset (switchable) Manual reset: Turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s (value when input rapidly changes from 0 to 120%)
Power ON lock (LOCK)		1 s or 5 s error ±0.5 s (value when input rapidly changes from 0 to 100%)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		40 to 500 Hz
Input impedance		K8AB-VW1: 9 kΩ min., K8AB-VW2: 100 kΩ min., K8AB-VW3: 1 MΩ min.
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Output relays		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON)
Size in mm (HxWxD)		90x22.5x100

3-phase sequence, phase loss relay

The K8AB-PH1 monitoring relay is designed to monitor 3-phase 3-wire supplies. It simultaneously monitors phase sequence and phase loss during start up as well as phase loss during operation. The output relay releases when alarm conditions are detected, and the warning status can easily be monitored using the LED indicator. Suitable for industrial facilities and equipment.

- Monitors phase sequence and phase-loss simultaneously
- Measuring range: 200 to 500 VAC
- Power supply voltage is the same as measuring voltage
- Operation reaction time: 0.1 s maximum

Ordering information

Rated input voltage	Order code
200 to 500 VAC	K8AB-PH1

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-40 to 70°C (with no condensation or icing)
Altitude		2,000 m max.
Input frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays	**Resistive load**	6 A at 250 VAC (cosϕ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Terminal screw tightening torque		0.54 N·m
Degree of protection		Finger protection
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		110 g
Mounting		Mounted to DIN-rail or via M4 screws (tightening torque: 1.2 N·m)
Rated input voltage		Three-phase, three-wire mode, 200 to 500 VAC
Reversed phase and phase loss operating time		0.1 s max.
Resetting method		Automatic reset
Input frequency range		45 to 65 Hz
Overload capacity		Continuous input: 115% of maximum input, 10 s max.: 125% of maximum input
Fixed Phase Asymmetry Monitoring		Output relay releases when one phase-phase voltage drops below 80% of the other phase-phase voltage
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load)
Size in mm (HxWxD)		90x22.5x100

3-phase voltage, phase sequence, phase loss relay

K8AB-PM monitors overvoltages, undervoltages, phase sequence and phase loss for 3-phase, 3-wire or 4-wire power supplies, in one unit. This relay features a switch setting for 3-phase, 3-wire or 3-phase, 4-wire power supply.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: Operation reaction time 0.1 s maximum
- Overvoltages or undervoltages: Operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Easy wiring with ferrules

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AB-PM1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AB-PM2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Ambient operating humidity		25 to 85%
Voltage fluctuation range		85 to 110% of rated input voltage
Input frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays	**Resistive load**	6 A at 250 VAC (cosϕ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Rated input voltage	**K8AB-PM1**	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AB-PM2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage or undervoltage)	**Operating value setting range**	Overvoltage = -30 to 25% of maximum rated input voltage *1 Undervoltage = -30 to 25% of maximum rated input voltage *1
	Operating value	100% operation at set value
Reset (HYS.)	**Hysteresis**	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	**Overvoltage/undervoltage**	0.1 to 30 s (value when input rapidly changes from 0 to 120%)
	Phase-sequence, phase-loss	0.1 s max. (value when input rapidly changes from 0 to 100%)
Power ON lock (LOCK)		1 s or 5 s error ±0.5 s (value when input rapidly changes from 0 to 100%. The operating time is the shortest at this point)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 kΩ min.
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Output relays		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON) (separate outputs possible for overvoltages and undervoltages)
Size in mm (HxWxD)		90x22.5x100

*1 The rated input voltage is switched with a switch

3-phase asymmetry, phase sequence, phase loss relay

Monitors voltage asymmetry, phase sequence and phase loss for 3-phase 3-wire or 4-wire power supplies, in one unit.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: Operation reaction time 0.1 s maximum
- Asymmetry: Operation time setting from 0.1 to 30 s
- Reset method: Automatic
- Power ON lock: 1 s or 5 s

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AB-PA1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AB-PA2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-40 to 70°C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation range		85 to 110% of rated input voltage
Input frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays	**Resistive load**	6 A at 250 VAC (cosϕ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Rated input voltage	**K8AB-PA1**	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AB-PA2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Asymmetry operation (ASY.)	**Operating value setting range**	Asymmetry rate: 2 to 22%
	Operating value	100% operation at set value Asymmetry operating value = rated input voltage x asymmetry set value [%] The asymmetry operation will function when the difference between the highest and lowest voltage phases equals or exceeds the asymmetry operating value
Reset (HYS.)	**Hysteresis**	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	**Asymmetry**	0.1 s to 30 s (value when input rapidly changes from 0 to 120%)
	Phase-sequence, phase-loss	0.1 s max. (value when input rapidly changes from 0 to 100%)
Power ON lock (LOCK)		1 s or 5 s (value when input rapidly changes from 0 to 100%. The operating time is the shortest at this point)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 kΩ min.
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load), normally closed operation (normally ON)
Size in mm (HxWxD)		90x22.5x100

3-phase voltage relay

Monitors overvoltages and undervoltages for 3-phase 3-wire or 4-wire power supplies, in one unit. Switch setting for 3-phase 3-wire or 3-phase 4-wire power supply.

- Overvoltages or undervoltages: Operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Separate outputs possible for overvoltages and undervoltages
- Reset method: Automatic
- Power ON lock: 1 s or 5 s

Ordering information

Rated input		Order code
3-phase 3-wire mode	200, 220, 230, 240 VAC	K8AB-PW1
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	K8AB-PW2
3-phase 4-wire mode	220, 230, 240, 277 VAC	

Specifications

Ambient operating temperature		-20 to 60°C (with no condensation or icing)
Storage temperature		-40 to 70°C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation rang		85 to 110% of rated input voltage
Input frequency		50/60 Hz ±5 Hz (AC power supply)
Output relays	**Resistive load**	6 A at 250 VAC (cosϕ = 1), 6 A at 30 VDC (L/R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ = 0.4), 1 A at 30 VDC (L/R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm^2, two crimp terminals of 1.5 mm^2 with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case colour		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Rated input voltage	**K8AB-PW1**	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AB-PW2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage and undervoltage)	**Operating value setting range**	Overvoltage = -30 to 25% of maximum rated input voltage *1 Undervoltage = -30 to 25% of maximum rated input voltage *1
	Operating value	100% operation at set value
Reset (HYS.)	**Hysteresis**	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	**Overvoltage/undervoltage**	0.1 to 30 s (value when input rapidly changes from 0 to 120%)
Power ON lock (LOCK)		1 s or 5 s (value when input rapidly changes from 0 to 100%. The operating time is the shortest at this point)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 kΩ min.
Indicators		Power (PWR): Green LED, relay output (RY): Yellow LED, alarm outputs (ALM 1/2): Red LED
Output relays		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON) (separate outputs possible for overvoltages and undervoltages)
Size in mm (HxWxD)		90x22.5x100

*1 The rated input voltage is switched with a switch

Compact plug-in (8-pin) level controller

The 61F-GP-N8 can be used for single- or two-point level control of conductive materials, both liquids and solids. These products are equipped with a red LED operation indicator.

- Low-voltage (AC) electrodes (8 VAC or 24 VAC)
- Operation range: 4 to 15 kΩ, 70 to 300 kΩ
- Detection method: Conductive
- Probes need to be ordered separately
- Conforms to EMC and LVD directives, UL/CSA approved

Ordering information

Application	Type		Order code
Ordinary purified water or sewage water	General purpose type		61F-GP-N8 24AC
			61F-GP-N8 110AC
			61F-GP-N8 230AC
Ordinary purified water, where the distance between sewage pumps and water tanks or between receiver tanks and supply tanks is long or where remote control is required	Long-distance type	2 km	61F-GP-N8L 24AC 2KM
			61F-GP-N8L 110AC 2KM
			61F-GP-N8L 230AC 2KM
		4 km	61F-GP-N8L 24AC 4KM
			61F-GP-N8L 110AC 4KM
			61F-GP-N8L 230AC 4KM
Liquids with high specific resistance such as distilled water	High sensitivity type		61F-GP-N8H 24AC
			61F-GP-N8H 110AC
			61F-GP-N8H 230AC
Liquids with low specific resistance such as salt water, sewage water, acid chemicals, alkali chemicals	Low sensitivity type		61F-GP-N8D 24AC
			61F-GP-N8D 110AC
			61F-GP-N8D 230AC
Ordinary purified or sewage water, with two-wired-type electrode holder (incorporating a resistor of 6.8 kΩ)	Two-wired type		61F-GP-N8R 24AC
			61F-GP-N8R 110AC
			61F-GP-N8R 230AC
DIN-rail mounting socket			PF083A-E
Back-connecting socket			PL08

Accessories

Electrode holders

Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1,000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1

Electrode separators

Number of electrodes	Order code
1	F03-14 1P
3	F03-14 3P

Electrodes, connecting, and lock nuts

Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Item	61F-GP-N8	61F-GP-N8L	61F-GP-N8H	61F-GP-N8D	61F-GP-N8R
Supply voltage	24, 100, 110, 120, 200, 220, 230 or 240 VAC; 50/60 Hz				
Operating voltage range	85 to 110% of rated voltage				
Interelectrode voltage	8 VAC		24 VAC	8 VAC	
Interelectrode current	Approx. 1 mA AC max.		Approx. 0.4 mA AC max.	Approx. 1 mA AC max.	
Power consumption	Approx. 3.5 VA max.				
Response time	Operate: 80 ms max., release: 160 ms max.				
Cable length	1 km max.	2 km max. 4 km max.	50 m max.	1 km max.	800 m max.
Control output	1 A, 250 VAC (inductive load: Cosϕ = 0.4), 3 A, 250 VAC (resistive load)				
Ambient temperature	Operating: -10 to 55°C				
Life expectancy	Electrical: 100,000 operations min., mechanical: 5,000,000 operations min				
Size in mm (HxWxD)	49.9x38x70				

Compact plug-in (11-pin) level controller (DC supply)

This controller is for single- or two-point level control. 24 VDC supply allows for usage in locations without AC power supply. Relay contact chattering usually caused by waves has been eliminated by using open collector output, reducing contact wear.

- Adjustable sensitivity: Operation range: 0 to 100 kΩ
- Red LED for operation indicator
- Conforms to EMC and LVD directives
- UL/CSA approved
- Probes need to be ordered separately

Ordering information

Product name	Output	Order code
Conductive level controller	Open collector (NPN)	61F-GPN-BT 24VDC
	Relay contact (SPST-NO)	61F-GPN-BC 24VDC
Front socket		PF113A-E

Accessories

Electrode holders

Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1

Electrode separators	Number of electrodes	Order code
	1	F03-14 1P
	3	F03-14 3P

Electrodes, connecting, and lock nuts

Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Item	61F-GPN-BT	61 F-GPN-BC
Rated voltage	24 VDC	
Allowable voltage range	85 to 110% of the rated voltage	
Interelectrode voltage	5 VAC max.	
Error	For scale of 0: +10 kΩ, for scale of 100: ±10 kΩ	
Release resistance	200% max. of the operation resistance	
Switching between supply and drainage	Terminals 7 and 8 open: Automatic drainage operation; terminals 7 and 8 shorted: Automatic supply operation	
Output specifications	Open collector (NPN) 30 VDC, 100 mA max.	SPST-NO; 5 A, 240 VAC (resistive load) 2 A, 240 VAC (inductive load: cosϕ = 0.4)
Life expectancy	–	Electrical: 100,000 operations min. Mechanical: 20,000,000 operations min.
Wiring distance	100 m max.	
Ambient operating temperature	-10 to 55°C	
Response time	Operating: 1.5 s max., releasing: 3.0 s max.	
Size in mm (HxWxD)	49.9x38x70	

22.5 mm wide conductive level controller

The 61F-D21T is a conductive level controller in a 22.5 mm wide industrial housing. Via DIP switches its function (supply or drainage) can be selected. This product is for single- or two-point level control.

- Time delay function up to 10 s
- Supply voltages: 24 VAC/DC and 100-240 VAC
- Control output: Relay 6 A at 250 VAC resistive load
- Probes cable length: Max. 100 m from controller
- LED indicator: Green for power ON, yellow for output relay

Ordering information

Supply voltage	Order code
24 VAC/VDC	61F-D21T-V1 24 VAC/DC
100 to 240 VAC	61F-D21T-V1 100 to 240 VAC

Accessories

Electrode holders

Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Order code
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70°C	3	PS-3S
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	PS-31-300MM PS-31-1000MM
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150°C (without water drips or vapour on the electrode holder surface)	1	BF-1
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250°C (without water drips or vapour on the surface of the electrode holder)	1	BS-1

Electrode separators

Number of electrodes	Order code
1	F03-14 1P
3	F03-14 3P

Electrodes, connecting, and lock nuts

Applicable liquids	Material	Component	Indication mark	Inscription	Order code
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line	–	F03-01 SUS201
		Connecting nut	–	–	F03-02 SUS201
		Lock nut	–	–	F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines	–	F03-01 SUS316
		Connecting nut	–	6	F03-02 SUS316
		Lock nut	–	316	F03-03 SUS316

Specifications

Rated voltage		24 VAC, 24 VDC, 100 to 240 VAC
Operating voltage range		85 to 110% of rated voltage
Voltage between electrodes		6 VAC p-p (approx. 20 Hz)
Power consumption	**24 VDC**	2 W max.
	24 VAC	4 VA max.
	100 to 240 VAC	5 VA max.
Operating resistance		10 kΩ to 100 kΩ (variable)
Reset resistance		250 kΩ max.
Response time		Approx. 0.1 to 10 s (variable)
Cable length		100 m max. with completely insulated (600 V) cabtire cable with 3 conductors (0.75 mm^2)
Control output		6 A at 250 VAC for resistive load at 20°C, 1 A at 250 VAC for inductive load cosϕ = 0.4 at 20°C
Indicators		Green LED: Power, yellow LED: Control output
Ambient temperature		Operating: -20 to 60°C, storage: -30 to 70°C (with no condensation or icing)
Size in mm (HxWxD)		90x22.5x100

Ultra-miniature liquid leakage sensor amplifier

This very compact plug-in leakage controller fits into Omron's G2R 8-pin sockets (P2RF-08-E). K7L detects a wide variety of liquids, ranging from water to liquid chemicals with low conductivity.

- Operation range: Up to 50 MΩ
- Four sensing ranges available
- Detection method: Conductive
- Two LEDs: Green for power supplied, red for output indication
- Conforms to EMC and LVD Directives, UL/CSA approved

Ordering information

Product name	Characteristics	Order code
Liquid leakage sensor amplifier	Standard	K7L-AT50
	With disconnection function set	K7L-AT50D
	With disconnection function sensor amplifier only	K7L-AT50D-S

Product name		Characteristics	Order code
Sensors	Sensing band	Standard model (material: Polyethylene)	F03-16PE 5M
		For temperature and chemical resistance (material: Polyethylene PTFE)	F03-16PT 5M
		For flexibility and superior workability (material: Plastic fiber braided cable)	F03-16SF 5M
		For flexibility and visual confirmation of leakage (material: Plastic fiber braided cable)	F03-16SFC 5M
	Point sensor	Easier to wipe off than the band type	F03-16PS
		Electrodes have PTFE coating to resist chemicals	F03-16PS-F

Accessories

Product name	Characteristics	Order code
Terminal blocks (10 pcs)		F03-20
DIN-rail mounted socket	With finger protection	P2RF-08-E
	Without finger protection	P2RF-08

Product name		Characteristics	Order code
Mounting brackets and stickers	Sensing band stickers	Used for F03-16SF(C)	F03-25
		Used for F03-16PE (adhesive tape)	F03-26PES
		Used for F03-16PE (screws) (30 pcs)	F03-26PEN
		Used for F03-16PT (screws)	F03-26PTN
	Point sensor mounting brackets	Used for F03-16PS	F03-26PS

Specifications

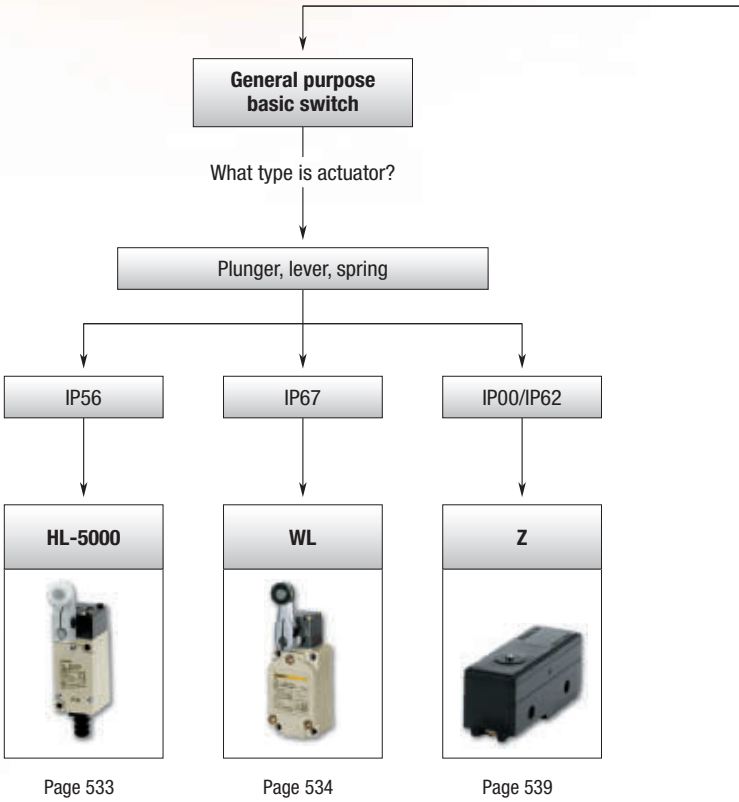
Rated power supply voltage	12 to 24 VDC (allowable voltage fluctuation range: 10 to 30 VDC)
Operate resistance	0 Ω to 50 MΩ, variable Range 0: 0 to 250 kΩ Range 1: 0 to 600 kΩ Range 2: 0 to 5 MΩ Range 3: 0 to 50 MΩ
Release resistance	105% min. of operate resistance
Output configuration	NPN open-collector transistor output with 100 mA at 30 VDC max.
Wiring distance	Connecting cable: 50 m max. Sensing band length: 10 m max.
Ambient temperature	Operating: -10 to 55°C
Power consumption	1 W max.
Response time	Operate: 800 ms max., release: 800 ms max.
Weight	Approx. 14 g
Disconnection detection function (K7L-AT50D & K7L-AT50D-S only)	Detection signal: 10 VDC max., 200 ms, detection time: 10 s max. Release: By resetting the power supply
Size in mm (HxWxD)	28.8x12.8x46

DOWNSIZE WITHOUT COMPROMISE

D4C – Compact, flat, high performing switches

With only a width of 16 mm these compact & flat switches will contribute to the demand to down-sizing without compromising on specifications. The changeover contact inside can switch up to 5 A/250 VA resistive load. A full range of actuators is available to meet all your mechanical requirements.

- Slim, compact body sizes
- Wide range of actuators
- Strong metal housing with IP67 rating



Which type of switch is needed?

Miniature switch

What type is actuator?

Plunger, lever

IP67

D4C

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D4CC

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Enclosed switch

What type is actuator?

Plunger, lever

IP67

D4E-_N

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D4MC

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Selection table

			Type	General purpose basic switch	Two circuit limit switch	Enclosed switch	Miniature limit switch
Selection criteria							
			Model	HL-5000	WL	D4C	D4CC
			Category	General purpose switches	Special purpose switches		
	Degree of protection		IEC	IP65	IP67		
			JIS	Jet-proof	Immersion-proof		
	Rated current [A]		5 VDC	–	–	–	–
			12 to 24 VDC	–	–	–	–
			30 VDC	5	–	4	1
			125/250 VDC	–	–	–	–
			24 VAC	–	–	–	–
			115 VAC	–	–	–	–
			125 VAC	5	10	5	1
			100 to 240 VAC	–	–	–	–
			250 VAC	5	10	5	–
			480 VAC	–	10	–	–
			500 VAC	–	10	–	–
Features			Microload type	–	0.1 A	0.1 A	–
			Operation indicator	–	■	■	■
Actuators			Adjustable rod lever	■	–	–	–
			Adjustable roller lever	■	–	–	–
			Bevel plunger	–	–	■	■
			Center roller lever	–	–	–	■
			Coil spring	■	–	–	
			Cross roller plunger	–	–	■	■
			Fork lever lock	–	■	–	–
			Hinge lever	–	–	–	–
			Hinge roller lever	–	–	–	–
			Hinge cross roller lever	–	–	–	–
			Horizontal plunger	–	■	–	–
			Horizontal roller plunger	–	■	–	–
			Horizontal ball plunger	–	■	–	–
			Leaf spring	–	–	–	–
			Long hinge lever	–	–	–	–
			Low force hinge lever	–	–	–	–
			Low force wire hinge lever	–	–	–	–
			One-way action hinge roller lever	–	–	–	–
			One-way action short hinge roller lever	–	–	–	–
			One-way action roller lever	–	–	–	–
			Panel mount plunger	–	–	■	–
			Panel mount pin plunger	–	–	■	■
			Panel mount roller plunger	–	–	■	■
			Panel mount cross roller plunger	–	–	■	■
			Pin plunger	–	–	■	■
			Plastic rod	–	–	–	■
			Reverse hinge lever	–	–	–	–
			Reverse hinge roller lever	–	–	–	–
			Reverse short hinge roller lever	–	–	–	–
			Roller leaf spring	–	–	–	–
			Roller lever	–	–	–	–
			Roller lever	■	–	■	–
			Roller plunger	–	–	■	■
			Sealed cross roller plunger	–	–	■	■
			Sealed plunger	■	–	■	■
			Sealed plunger roller	■	■	■	■
			Short hinge cross roller lever	–	–	–	–
			Short hinge lever	–	–	–	–
			Short hinge roller lever	–	–	–	–
			Short spring plunger	–	–	–	–
			Side plunger	–	■	–	–
			Side roller plunger horizontal	–	■	–	–
			Side roller plunger vertical	–	■	–	–
			Slim spring plunger	–	–	–	–
			Spring plunger	–	–	–	–
			Top ball plunger	–	■	–	–
			Top plunger	–	■	–	–
			Unidirectional short hinge roller lever	–	–	–	–
			Variable rod lever	■	–	–	–
			Variable roller lever	■	■	–	–
			Page	533	534	535	536

			Type	Small sealed switch	Enclosed switch	General purpose basic switch	
Selection criteria							
			Model	D4E-_N	D4MC	Z	
			Category	Special purpose switches		General purpose switches	
	Degree of protection		IEC	IP67		IP00/IP62 (drip-proof)	
			JIS				
	Rated current [A]		5 VDC	–	–	–	
			12 to 24 VDC	–	–	–	
			30 VDC	1	6	–	
			125/250 VDC	–	–	–	
			24 VAC	–	–	–	
			115 VAC	–	0.5	–	
			125 VAC	5	10	15	
			100 to 240 VAC	–	–	–	
			250 VAC	–	10	15	
			480 VAC	–	3	0.1	
			500 VAC	–	–	–	
Features			Microload type	0.1 A	0.1 A	0.1 A	
			Operation indicator	–	–	–	
Actuators			Adjustable rod lever	–	–	–	
			Adjustable roller lever	–	–	–	
			Bevel plunger	–	–	–	
			Center roller lever	–	–	–	
			Coil spring	–	–	–	
			Cross roller plunger	–	–	–	
			Fork lever lock	–	–	–	
			Hinge lever	–	■	■	
			Hinge roller lever	–	■	■	
			Hinge cross roller lever	–	–	■	
			Horizontal plunger	–	–	–	
			Horizontal roller plunger	–	–	–	
			Horizontal ball plunger	–	–	–	
			Leaf spring	–	–	■	
			Long hinge lever	–	–	■	
			Low force hinge lever	–	–	■	
			Low force wire hinge lever	–	–	■	
			One-way action hinge roller lever	–	–	–	
			One-way action short hinge roller lever	–	■	–	
			One-way action roller lever	■	–	–	
			Panel mount plunger	–	■	■	
			Panel mount pin plunger	–			
			Panel mount roller plunger	–	■	■	
			Panel mount cross roller plunger	–	■	■	
			Pin plunger	■	–	■	
			Plastic rod	–	–	–	
			Reverse hinge lever	–	–	■	
			Reverse hinge roller lever	–	–	■	
			Reverse short hinge roller lever	–	–	■	
			Roller leaf spring	–	–	■	
			Roller lever	■	–	–	
			Roller lever	■	–	–	
			Roller plunger	■	–	–	
			Sealed cross roller plunger	■	–	–	
			Sealed plunger	■	–	–	
			Sealed plunger roller	■	–	–	
			Short hinge cross roller lever	–	–	■	
			Short hinge lever	–	■	■	
			Short hinge roller lever	–	–	■	
			Short spring plunger	–	–	■	
			Side plunger	–	–	–	
			Side roller plunger horizontal	–	–	–	
			Side roller plunger vertical	–	–	–	
			Slim spring plunger	–	–	■	
			Spring plunger	–	–	■	
			Top ball plunger	–	–	–	
			Top plunger	–	–	–	
			Unidirectional short hinge roller lever	–	–	■	
			Variable rod lever	–	–	–	
			Variable roller lever	–	–	–	
			Page	537	538	539	

■ Standard ☐ Available – No/not available

Economical, miniature limit switch

With a highly rigid, dust- and drip-proof construction, HL-5000 can be used in a variety of heavy industrial applications.

- Highly rigid construction (head and cover snugly fit in box)
- Smooth operation with greater overtravel
- Easy-to-wire conduit opening design
- Models with grounding terminals conform to the CE marking
- Jet-proof IP65

Ordering information

Application		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Size in mm (HxWxD) excl. actuator	Order code
Roller lever		7.35 N	0.98 N	20°	50°	12°	–	82.4x33x34	HL-5000G
Adjustable roller lever		7.35 N	0.98 N	20°	50°	12°	–	–	HL-5030G
Adjustable rod lever		7.35 N	0.98 N	20°	50°	12°	–	–	HL-5050G
Sealed plunger		8.83 N	1.47 N	1.5 mm	4 mm	1 mm	30 ±0.8 mm	60.6x33x34	HL-5100G
Sealed roller plunger		8.83 N	1.47 N	1.5 mm	4 mm	1 mm	40 ±0.8 mm	–	HL-5200G
Coil spring		1.47 N	–	30 mm	–	–	–	–	HL-5300G

Specifications

Ratings	Non-inductive load				Inductive load			
Rated voltage	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	5 A		1.5 A	0.7 A	3 A		2 A	1 A
250 VAC	5 A		1 A	0.5 A	3 A		1.5 A	0.8 A
12 VDC	5 A		3 A		4 A		3 A	
24 VDC	5 A		3 A		4 A		3 A	
Inrush current	NC				24 A max.			
	NO				12 A max.			
Degree of protection	IP65							
Life expectancy	Mechanical: 10,000,000 operations min. (under rated conditions)							
Operating speed	5 mm/s to 0.5 m/s (HL-5000)							
Operating frequency	Mechanical: 120 operations/min, electrical: 30 operations/min							
Rated frequency	50/60 Hz							
Ambient temperature	Operating: -5 to 65°C (with no icing)							
Ambient humidity	Operating: 95% max.							
Weight	Approx. 130 to 190 g							

Wide selection of two circuit limit switches

A wide selection of models is available, including overtravel models with greater OT, lamp equipped models for checking operation, low temperature and heat resistant models and micro-load models. Various plungers and levers are also available.

- Two circuit limit switch
- Direct and pre-wiring
- Metal housing, immersion-proof IP67
- Ground terminal models are approved by EN and IEC and bear the CE marking
- UL, CSA

Ordering information

Actuator		Order code	
		Ground terminal	
		No	Yes
Adjustable roller lever: Standard		WLCA12	WLCA12-G
Adjustable roller lever: Overtravel 90°		WLCA12-2N	WLCA12-2NG
Roller lever: Standard model (R38)		WLCA2	WLCA2-G
Roller lever: Overtravel 90°		WLCA2-2N	WLCA2-2NG
Roller lever: Standard, standard model (R50)		WLCA2-7	WLCA2-7G
Fork lever lock: Protective, WL-5A100		WLCA32-41	WLCA32-41G
Fork lever lock: Protective, WL-5A104		WLCA32-43	WLCA32-43G
Adjustable rod lever: Standard		WLCL	WLCL-G
Adjustable rod lever: Overtravel 90°, 25 to 140 mm		WLCL-2N	WLCL-2NG
Plunger: Top plunger		WLD	WLDG
Plunger: Top roller plunger		WLD2	WLD2-G
Plunger: Top ball plunger		WLD3	WLD3-G
Adjustable rod lever: Overtravel, high sensitivity, 80°, 350 to 380 mm		WLGL	WLGL-G
Flexible rod: Coil spring		WLNJ	WLNJ-G
Flexible rod: Coil spring, resin rod		WLNJ-2	WLNJ-2G
Flexible rod: Coil spring, multi-wire		WLNJ-30	WLNJ-30G
Flexible rod: Steel wire		WLNJ-S2	WLNJ-S2-G
Plunger: Horizontal roller plunger		WLSD2	WLSD2-G
Plunger: Horizontal ball plunger		WLSD3	WLSD3-G
Plunger: Horizontal plunger		WLSD	WLSD-G

Note: For other model please refer to the datasheet

Specifications

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		
480 VAC		15 A	1.5 A		
600 VAC		12 A	1.2 A		

Agency	Standard	File No.
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9551016
Size in mm (HxWxD)	68.7x40x42 (excluding the actuator)	

Type	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
Standard, overtravel (except high-sensitivity models), and high-precision models.	125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
	250 VAC	10 A		2 A	1 A	10 A		3 A	1.5 A
	500 VAC	10 A		1.5 A	0.8 A	3 A		1.5 A	0.8 A
	8 VDC	10 A		6 A	3 A	10 A		6 A	
	14 VDC	10 A		6 A	3 A	10 A		6 A	
	30 VDC	6 A		4 A	3 A	6 A		4 A	
	125 VDC	0.8 A		0.2 A	0.2 A	0.8 A		0.2 A	
	250 VDC	0.4 A		0.1 A	0.1 A	0.4 A		0.1 A	
Overtravel (high-sensitivity models)	125 VAC	5 A		–	–	–		–	
	250 VAC	5 A		–	–	–		–	
	125 VDC	0.4 A		–	–	–		–	
	250 VDC	0.2 A		–	–	–		–	

Compact, 16 mm thick cable type switch

The D4C range of switches offers a wide choice of actuators. All switches are liquid and dust resistant, conforming to IEC IP67. Various types are available: pre-wired, low temperature, viscosity resistant, etc.

- Enclosed miniature limit switch, only 16 mm thick
- Metal housing with triple-sealed construction
- LED indicator for easy monitoring
- Ganged mounting for multiple switching
- Mechanical life expectancy = 10 million, switching/min = 30

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 S-FLEX VCTF Cable 3 m
Pin plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	15.7±1 mm	D4C-1201
Sealed plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	24.9±1 mm	D4C-1231
Roller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5±1 mm	D4C-1202
Sealed roller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3±1 mm	D4C-1232
Crossroller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5±1 mm	D4C-1203
Sealed crossroller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3±1 mm	D4C-1233
Coil spring		1.47 N	–	15°	–	–	–	D4C-1250
Roller lever		5.69 N	1.47 N	25°	40°	3°	–	D4C-1220
Center roller lever plunger		6.67 N	1.47 N	10±3°	50°	3°	–	D4C-1260

Note: For other product specifications please refer to the datasheet

Specifications

Agency	Standard	File number
TÜV Rheinland	EN60947-5-1	R9451333/J9950970
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746

Order code	Rated voltage	Non-inductive load				Inductive load				Inrush current	
		Resistive load		Lamp load		Inductive load		Motor load			
		NC	NO	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	20 A max.	10 A max.
	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 VD	0.4 A	0.4 A	0.05 A	0.4 A	0.4 A	0.4 A	0.05 A	0.05 A		
	250 VDC	0.2 A	0.2 A	0.03 A	0.2 A	0.2 A	0.2 A	0.03 A	0.03 A		

Note: For other loads, please refer to the datasheet

Degree of protection	IP67
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 (SCPD)	10 A fuse type gG (IEC269)
Ambient temperature	Operating: -10 to 70°C (with no icing)
Weight	With 3 m VCTF cable: 360 g; with 5 m VCTF cable: 540 g
Size in mm (HxWxD)	49 or 51.5x34x16 (excluding the actuator)

Compact, 16 mm thick connector type switch

The D4CC family of limit switches comes as standard with a triple-seal construction (IP67), cable connectors for easy switch replacement and an operation indicator for easy monitoring.

- Miniature limit switch
- Various models including roller lever
- Switches are only 16 mm thick with connector
- Cable connectors for easy switch replacement
- Immersion proof; IEC IP67, UL and CSA (type 3, 4 and 13)

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	
								1 A at 125 VAC	1 A at 30 VDC
								Without indicator	Without indicator
Pin plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	15.7 ±1 mm	D4CC-1001	D4CC-3001
Roller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5 ±1 mm	D4CC-1002	D4CC-3002
Crossroller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5 ±1 mm	D4CC-1003	D4CC-3003
High-sensitivity roller lever		5.69 N	1.47 N	10 ±3°	50°	3°		D4CC-1024	D4CC-3024
Sealed pin plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	24.9 ±1 mm	D4CC-1031	D4CC-3031
Sealed roller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3 ±1 mm	D4CC-1032	D4CC-3032
Sealed crossroller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3 ±1 mm	D4CC-1033	D4CC-3033
Plastic rod		1.47 N	–	15°	–	–	–	D4CC-1050	D4CC-3050
Center roller lever		6.67 N	1.47 N	10 ±3°	50°	3°	–	D4CC-1060	D4CC-3060

Accessories

Type	Appearance	Number of conductors	Cable length	Order code
VAC	Straight 	4	2 m	XS2F-A421-D90-A
			5 m	XS2F-A421-G90-A
			10 m	XS2F-A421-J90-A
VDC			2 m	XS2F-D421-D80-A
			5 m	XS2F-D421-G80-A
			10 m	XS2F-D421-J80-A

Specifications

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	1.0 A	3.6 A	3.6 A	432 VA	72 VA

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746

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	1 A	1 A	1 A	0.7 A	1 A	1 A	1 A	1 A
30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A

Degree of protection	IP67
Durability	Mechanical: 10,000,000 operations min., electrical: 200,000 operations min. (1 A at 125 VAC, resistive load)
Operating speed	Plunger: 0.1 mm to 0.5 m/s, roller lever: 1 mm to 1 m/s
Operating frequency	Mechanical: 120 operations/min, electrical: 30 operations/min
Ambient temperature	Operating: -10 to 70°C (with no icing)
Weight	Approx. 120 g (in the case of D4CC-1002)
Size in mm (HxWxD)	57 or 59.5x34x16 (excluding the actuator)

Slim, compact sealed switch

D4E-_N comes with flat springs that improve the lever ratio of the built-in switch, ensuring smooth snap action and long life expectancy. Its one-touch connector eliminates the need for tedious wiring operations and reduces downtime.

- Protection cover protects the built-in switch from dust and oil
- Plunger incorporates a tough, long-lasting seal cap
- Minute load model with gold cladding is optimal for electronic control
- IP67

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		
								One-touch connector type		Screw terminal type
								General purpose		General purpose
								AC	DC	
Roller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	31.4 ±0.8 mm	D4E-1A00N	D4E-1A10N	D4E-1A20N
Crossroller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	31.4 ±0.8 mm	D4E-1B00N	D4E-1B10N	D4E-1B20N
Plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	25.4 ±0.8 mm	D4E-1C00N	D4E-1C10N	D4E-1C20N
Sealed roller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	41.3 ±0.8 mm	D4E-1D00N	D4E-1D10N	D4E-1D20N
Sealed crossroller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	41.3 ±0.8 mm	D4E-1E00N	D4E-1E10N	D4E-1E20N
Sealed plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	30 ±0.8 mm	D4E-1F00N	D4E-1F10N	D4E-1F20N
Roller lever		3.92 N	0.78 N	2 mm	4 mm	(0.3 mm)	23.1 ±0.8 mm	D4E-1G00N	D4E-1G10N	D4E-1G20N
One-way action roller lever		3.92 N	0.78 N	2 mm	4 mm	(0.3 mm)	34.3 ±0.8 mm	D4E-1H00N	D4E-1H10N	D4E-1H20N

Accessories

Type	Number of conductors	Current	Cable length	Applicable models	Order code
Straight	4	AC	2 m	D4E-__00N	XS2F-A421-D90-A
			5 m		XS2F-A421-G90-A
		DC	2 m	D4E-__10N	XS2F-D421-D80-A
			5 m		XS2F-D421-G80-A

Specifications

Rated voltage	Non-inductive load				Inductive load				Microload	
	Resistive load		Lamp load		Inductive load		Motor load		Resistive load	
	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	5 (1) A		1.5 (1) A		3 (1) A		2 (1) A	1 (1) A	0.1 A	
250 VAC	5 (1) A		1.5 (1) A		3 (1) A		1 A	0.5 A	–	
8 VDC	5 (1) A		–		1.5 (1) A		–		0.1 A	
14 VDC	5 (1) A		–		1.5 (1) A		–		0.1 A	
30 VDC	5 (1) A		–		1.5 (1) A		–		0.1 A	
125 VDC	0.5 A		–		0.05 A		–		–	
250 VDC	0.25 A		–		0.03 A		–		–	

Note: The above current ratings are for a standard current and the values in parentheses are for models with a connector

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9551015
Degree of protection	IP67	
Durability	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min. (5 A at 250 VAC, resistive load) 5,000,000 operations min. (10 mA at 24 VDC, resistive load)	
Operating speed	0.1 mm to 0.5 m/sec	
Operating frequency	Mechanical: 120 operations/min Electrical: 30 operations/min	
Ambient temperature	Operating: -10 to 80°C (with no icing)	
Weight	Approx. 86 g (in case of roller plunger)	
Size in mm (HxWxD)	32.9x18x57 (excluding the actuator)	

Economical, high utility enclosed switch

D4MC provides users with high precision and a long life (10,000,000 mechanical operations). It is sealed with a gasket diaphragm without use of any adhesive or pin, making it suitable for applications demanding higher mechanical strength and for dust-proof and drip-proof applications.

- Various models, plungers and levers available
- Panel-mount versions have the same operating position as the Z basic switch
- IP67, UL, CSA

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
Panel mount plunger		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	21.8 ±1.2 mm	D4MC-5000
Panel mount roller		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	33.4 ±1.2 mm	D4MC-5020
Panel mount crossroller		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	33.4 ±1.2 mm	D4MC-5040
Short hinge lever		2.55 N	0.34 N	–	2.5 mm	1.7 mm	25 ±1 mm	D4MC-1020
Hinge lever		1.67 N	0.25 N	–	4 mm	3 mm	25 ±1 mm	D4MC-1000
Hinge roller lever		1.96 N	0.39 N	–	5 mm	3 mm	40 ±1 mm	D4MC-2000
Short hinge roller		2.94 N	0.39 N	–	2 mm	1.5 mm	40 ±1 mm	D4MC-2020
One-way action short hinge roller		2.94 N	0.39 N	–	2 mm	1.5 mm	50 ±1 mm	D4MC-3030

Note: Use moulded terminal models when using the switch under one of the following conditions: dusty, high amount of dripping oil or high humidity

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	10 A		3 A	1.5 A	10 A		5 A	2.5 A
250 VAC	10 A		2.5 A	1.25 A	10 A		3 A	1.5 A
480 VAC	3 A		1.5 A	0.75 A	2.5 A		1.5 A	0.75 A
8 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A
14VDC	10 A		3 A	1.5 A	6 A0.75		5 A	2.5 A
30 VDC	6 A		3 A	1.5 A	5 A		5 A	2.5 A
125VDC	0.5 A		0.4 A		0.05 A		0.05 A	
250 VDC	0.25 A		0.2 A		0.03 A		0.03 A	

Rated voltage	Carry current	Current	
		Make	Break
120 VAC	10 A	60 A	6 A
240 VAC		30 A	3 A

Degree of protection	IP67 (NEMA250: 6.6P)
Life expectancy	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min.
Operating speed	0.05 mm/s to 0.5 m/s (at panel mount plunger)
Operating frequency	Mechanical: 120 operations/min, electrical: 20 operations/min
Pollution degree (operating environment)	3 (IEC947-5-1)
Protection against electric shock	Class II
PTI (tracking characteristics)	175
Switch category	D (IEC335)
Rated operating current (I_e)	10 A
Rated operating voltage (U_e)	250 VAC
Ambient temperature	Operating: -10 to 80°C (with no icing)
Weight	Approx. 71 g (at panel mount plunger)
Size in mm (HxWxD)	45x21.7x55 (excluding the actuator)

Standard high-precision switch

Z basic switches provide a large switching capacity of 15 A with very high repeat accuracy. They come in a wide range of variations in contact form for your selection: basic, split-contact, maintained-contact and adjustable-contact gap types.

- General purpose basic switch
- A series of standard models for micro loads is available
- High-precision switching
- A wide range of variations in contact
- Drip-proof IP00/IP62

Ordering information

Ratings	Contact gap	Actuator		Order code	
				Solder terminal	Screw terminal
15 A	0.5 mm	Pin plunger		Z-15G	Z-15G-B
		Short spring plunger		Z-15GD	Z-15GD-B
		Leaf spring (high OF)		Z-15GL	Z-15GL-B
		Roller leaf spring		Z-15GL2	Z-15GL2-B
		Reverse hinge lever		Z-15GM	Z-15GM-B
		Reverse hinge roller lever		Z-15GM2	Z-15GM2-B
		Reverse hinge short roller lever		Z-15GM22	Z-15GM22-B
		Panel mount plunger (medium OP)		Z-15GQ	Z-15GQ-B
		Panel mount plunger (low OP)		Z-15GQ3	Z-15GQ3-B
		Panel mount plunger (high OP)		Z-15GQ8	Z-15GQ8-B
		Panel mount cross roller plunger		Z-15GQ21	Z-15GQ21-B
		Panel mount roller plunger		Z-15GQ22	Z-15GQ22-B
		Slim spring plunger		Z-15GS	Z-15GS-B
		Hinge lever (low OF)		Z-15GW	Z-15GW-B
		Hinge roller lever		Z-15GW2	Z-15GW2-B
		Short hinge lever		Z-15GW21	Z-15GW21-B
		Short hinge roller lever		Z-15GW22	Z-15GW22-B
		Unidirectional short hinge roller lever (low OF)		Z-15GW2277	Z-15GW2277-B
		Hinge roller lever (large roller)		Z-15GW25	Z-15GW25-B
		Hinge lever (medium OF)		Z-15GW3	Z-15GW3-B
		Low-force hinge lever		Z-15GW4	Z-15GW4-B
		Hinge lever (high OF)		Z-15GW32	Z-15GW32-B
		Short hinge cross roller lever		Z-15GW49	Z-15GW49-B
		Hinge cross roller lever		Z-15GW54	Z-15GW54-B

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

Specifications

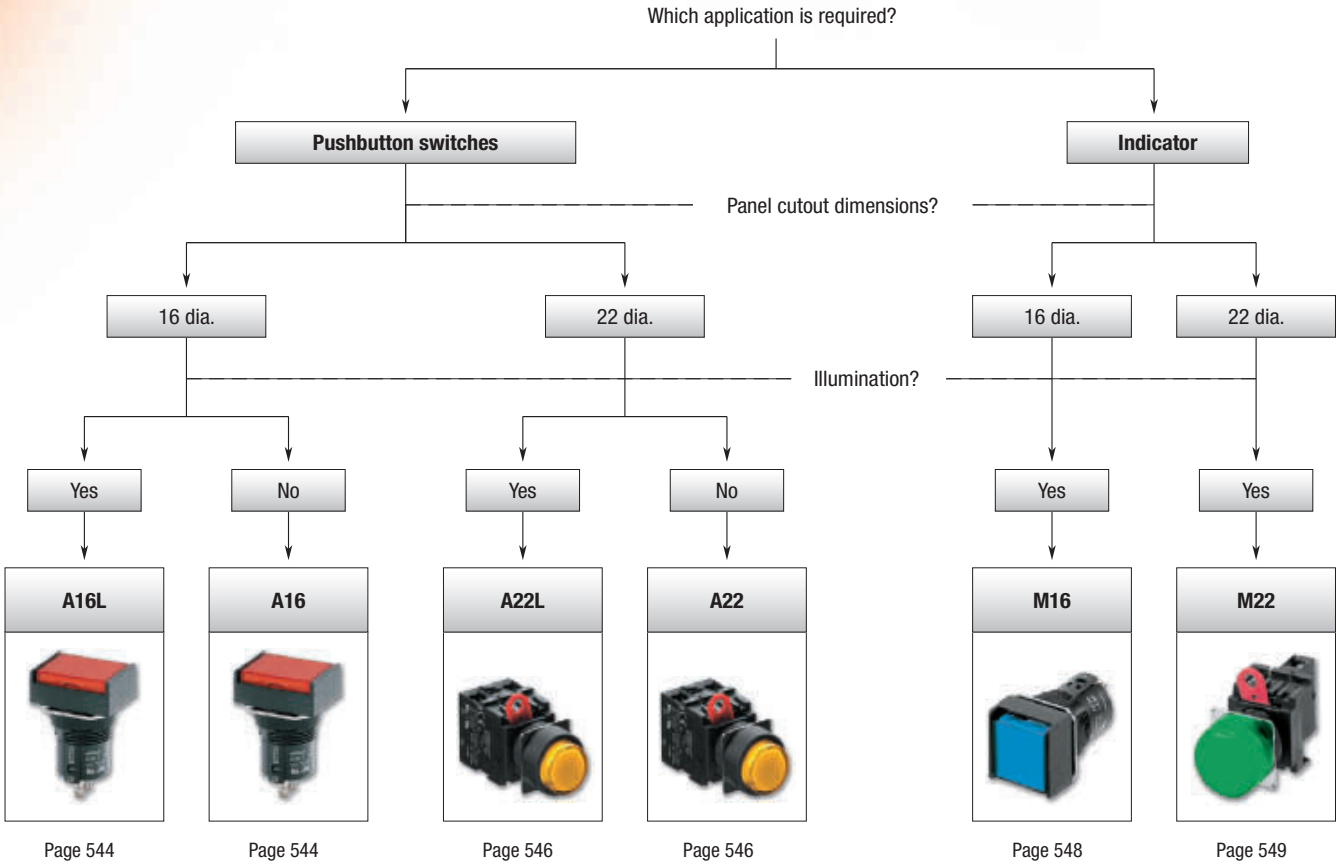
Agency	Standard	File number
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642
TÜV Rheinland	EN61058-1	R9451585
Degree of protection	General purpose: IP00, drip-proof: IP62	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Switch category	D (IEC335-1)	
Ambient operating temperature	General purpose: -25 to 80°C (with no icing) Drip-proof: -15 to 80°C (with no icing)	
Size in mm (HxWxD)	24.2x49.2x17.5 (excluding the actuator)	

16 MM SUB-ASSEMBLED PUSHBUTTON SWITCHES

A165 – Full range with IP65 rating

All our 16 mm pushbuttons are upgraded to IP65 rating. This will increase the reliability of your application. The pushbuttons are very easy to assemble due to their modular construction: Pushbutton + case + lamp (if applicable) + switch.

- Wide range of models: rectangular, square & round
- With or without lamp
- Easy assembly and installation

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Selection criteria		Category	Pushbutton switch		Indicator	
						
		Model	A16	A22	M16	M22
		Mounting	Nut-mounting			
		Size	16 mm	22 mm	16 mm	22 mm
		Shape	▭ □ ○	▭ □ ○	▭ □ ○	▭ □ ○
Pushbutton colour	Incandescent lamp-lighted	Red	■	■	■	■
		Yellow	■	■	■	■
		Pure yellow	■		■	–
		Green	■	■	■	■
		White	■	■	■	■
		Blue	■	■	■	■
	LED-lighted	Red	■	■	■	■
		Yellow	■	■	■	■
		Pure yellow	■		■	–
		Green	■	■	■	■
		White	■	■	■	■
		Blue	■	■	■	■
	Non-lighted	Red	■	■	–	–
		Yellow	■	■	–	–
		Green	■	■	–	–
		White	■	■	–	–
		Blue	■	■	–	–
		Black	■	■	–	–
Features		Momentary operation	■	■	–	–
		Self-holding	■	■	–	–
		Number of contacts	2	6	–	–
		IP rating	IP65			
		Legend plate	■	■	■	■
Switch ratings [A]		125 VAC	5	10	–	–
		250 VAC	3	6	–	–
		30 VDC	3	10	–	–
		Rated load	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC	–	–
Terminals		Solder	■	–	■	–
		PCB	–	–	■	–
		Screw-less Clamp	–	–	■	–
Operating voltage		5 VDC	■	■	■	■
		12 VDC	■	■	■	■
		24 VDC	■	■	■	■
Form		SPDT	■	–	–	–
		DPDT	■	–	–	–
		SPST-NO	–	■	–	–
		SPST-NC	–	■	–	–
		SPST-NO + SPST-NC	–	■	–	–
		DPST-NO	–	■	–	–
		DPST-NC	–	■	–	–
		Page	544	546	548	549

■ Standard □ Available – No/not available

16 mm pushbutton switch

These sub-assembled pushbutton switches have a modular construction: pushbutton + case + lamp (if applicable) + switch. A16 is a nut-mounted pushbutton switch with a short mounting depth of less than 28.5mm below panel.

- Wide variety of control and signal devices: lighted, non-lighted and buzzer
- Quick and easy assembly, snap-in switch
- Wide range of switching capacity from standard load to micro load
- High reliability, IP65
- UL, cUL, CSA and VDE approved, conforms to EN60947-5-1 and IEC947-5-1

Ordering information

Type	Colour	Order code		
		Degree of protection: Oil-resistant IP65		
		Rectangular	Square	Round
Non-lighted LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
Non-lighted	Black	A165L-JB	A165L-AB	A165L-TB
LED	Green	A165L-JGY	A165L-AGY	A165L-TGY
Non-lighted/incandescent lamp	Green	A165L-JG	A165L-AG	A165L-TG

Cases

Appearance	Classification		Order code
			Oil-resistant IP65
	Momentary operation	Rectangular (2-way guard)	A165-CJM
		Square	A165-CAM
		Round	A165-CTM
	Alternate operation	Rectangular (2-way guard)	A165-CJA
		Square	A165-CAA
		Round	A165-CTA

Switches

Appearance	Classification				Order code
	Lighted/ non-lighted (common use)	Standard load/ microload (common use)	SPDT	Solder terminal	A16-1
			DPDT		A16-2
			SPDT	PCB terminal	A16-1P
			DPDT		A16-2P
			DPDT	Screw-less clamp	A16-2S

Switches with reduced voltage lighting

Appearance	Classification				Order code
	100 V	Standard load/ microload (common use)	SPDT	Solder terminal	A16-T1-1
			DPDT		A16-T1-2
	100 V		DPDT	Screw-less clamp	A16-T1-2S
	200 V				A16-T2-2S

Lamps

Type	Colour	Order code		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White *1	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	**A16-5DA**	A16-12DA	A16-24DA
Type		**5 VAC/VDC**	**12 VAC/VDC**	**24 VAC/VDC**
Incandescent lamp		A16-5	A16-12	A16-24

*1 Use the white LED together with white or pure yellow pushbuttons.

Accessories

Name	Appearance	Classification	Remarks	Order code
Switch guards		For rectangular models	Cannot be used with the dust cover	A16ZJ-5050
		For square and round models		A16ZA-5050
Dust covers		For rectangular models	Cannot be used with the switch guard	A16ZJ-5060
		For square models		A16ZA-5060
		For round models		A16ZT-5060
Panel plugs		For rectangular models	Used for covering the panel cutouts for future panel expansion	A16ZJ-3003
		For square models		A16ZA-3003
		For round models		A16ZT-3003

Specifications

Allowable operating frequency	**Mechanical**	Momentary operation: 120 operations/minute max. Alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	**Mechanical**	Momentary operation: 2,000,000 operations min. Alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature		Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm (HxWxD)		Round/square: 18x18x28.5 rectangular: 18x24x28.5

Operating characteristics	**Pushbutton switch**	
	Oil-resistant IP65	
	SPDT	**DPDT**
Operating force (OF) max.	2.94 N	4.91 N
Releasing force (RF) min.	0.29 N	
Total travel (TT)	Approx. 3 mm	
Pretravel (PT) max.	2.5 mm	
Lock stroke (LTA) min.	0.5 mm	

Item		**Screw-less clamp**			
Recommended wire size		0.5 mm^2 twisted wire or 0.8 mm dia. solid wire			
Usable wires and tensile strength	Twisted wire	0.3 mm^2	0.5 mm^2	0.75 mm^2	1.25 mm^2
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.	
	Tensile strength	10 N	20 N	30 N	40 N
Length of exposed wire		10 ±1 mm			

22 mm pushbutton switch

A22 comes in a wide variety of shapes and colours and is installable in 22-dia. or 25-dia. panel cutouts. The switch unit can easily be mounted. A22 is mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.

- Finger-protection mechanism on switch unit provided as standard feature
- Increased wiring efficiency with three-row mounting of switch blocks
- IP65 oil-resistant (non-lighted models), IP65 (lighted models)
- Lighted and non-lighted, flat, projection and half- and full-guard versions
- EN60947-5-1, UL and cUL approved

Ordering information

Pushbutton

Illumination	Colour	Order code							
		Flat type	Projection type	Full-guard type	Half-guard type	Square/projection type	Square/ full-guard type	Round/mushroom type (30-dia. head)	Round/ mushroom type (40-dia. head)
									
Non-lighted	Red	A22-FR	A22-TR	A22-GR	A22-HR	A22-CR	A22-DR	A22-SR	A22-MR
	Green	A22-FG	A22-TG	A22-GG	A22-HG	A22-CG	A22-DG	A22-SG	A22-MG
	Yellow	A22-FY	A22-TY	A22-GY	A22-HY	A22-CY	A22-DY	A22-SY	A22-MY
	White	A22-FW	A22-TW	A22-GW	A22-HW	A22-CW	A22-DW	A22-SW	A22-MW
	Blue	A22-FA	A22-TA	A22-GA	A22-HA	A22-CA	A22-DA	A22-SA	A22-MA
	Black	A22-FB	A22-TB	A22-GB	A22-HB	A22-CB	A22-DB	A22-SB	A22-MB
Lighted	Red	–	A22L-TR	A22L-GR	A22L-HR	A22L-CR	A22L-DR	–	–
	Green	–	A22L-TG	A22L-GG	A22L-HG	A22L-CG	A22L-DG	–	–
	Yellow	–	A22L-TY	A22L-GY	A22L-HY	A22L-CY	A22L-DY	–	–
	White	–	A22L-TW	A22L-GW	A22L-HW	A22L-CW	A22L-DW	–	–
	Blue	–	A22L-TA	A22L-GA	A22L-HA	A22L-CA	A22L-DA	–	–
Buttonsize in mm		29.7 dia. x 12D	29.7 dia. x 19D	29.7 dia. x 19D	29.7 dia. x 12/18.5D	29.8 mm^2 x 18D	29.8 mm^2 x 18D	30 dia. x 32D	40 dia. x 32D

Switches

Switch operation	Contacts	Oder code			
		Non-lighted models	Lighted models		
		Without voltage reduction unit		With voltage reduction unit	
				110 VAC	220 VAC
					
Momentary	SPST-NO	A22-10M	A22L-10M	A22L-10M-T1	A22L-10M-T2
	SPST-NC	A22-01M	A22L-01M	A22L-01M-T1	A22L-01M-T2
	SPST-NO + SPST-NC	A22-11M	A22L-11M	A22L-11M-T1	A22L-11M-T2
	DPST-NO	A22-20M	A22L-20M	A22L-20M-T1	A22L-20M-T2
	DPST-NC	A22-02M	A22L-02M	A22L-02M-T1	A22L-02M-T2
Alternate	SPST-NO	A22-10A	A22L-10A	A22L-10A-T1	A22L-10A-T2
	SPST-NC	A22-01A	A22L-01A	A22L-01A-T1	A22L-01A-T2
	SPST-NO + SPST-NC	A22-11A	A22L-11A	A22L-11A-T1	A22L-11A-T2
	DPST-NO	A22-20A	A22L-20A	A22L-20A-T1	A22L-20A-T2
	DPST-NC	A22-02A	A22L-02A	A22L-02A-T1	A22L-02A-T2

Switch blocks

	Standard load	Order code
Switch blocks	SPST-NO	A22-10
	SPST-NC	A22-01
	DPST-NO	A22-20
	DPST-NC	A22-02

Lamp – LED

AC/DC	LED light	Order code			
		Operating voltage			
		6 V	12 V	24 V	24 V superbright
DC	Red	A22-6DR	–	–	–
	Green	A22-6DG	–	–	–
	Yellow *1	A22-6DY	–	–	–
	Blue	A22-6DA	–	–	–
AC	Red	A22-6AR	–	–	–
	Green	A22-6AG	–	–	–
	Yellow *1	A22-6AY	–	–	–
	Blue	A22-6AA	–	–	–
AC and DC	Red	–	A22-12AR	A22-24AR	A22-24ASR
	Green	–	A22-12AG	A22-24AG	A22-24ASG
	Yellow *1	–	A22-12AY	A22-24AY	A22-24ASY
	Blue	–	A22-12AA	A22-24AA	A22-24ASA

*1 Used when the pushbutton colour is yellow or white

Lamp - incandescent lamp

Order code		
Operating voltage		
5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
A22-5	A22-12	A22-24

Accessories

Item				Remarks	Order code
Lamp sockets	Direct lighting			Used when changing the lighting method (LED only)	A22-TN
	Voltage-reduction lighting		220 VAC		A22-T2
Mounting latches	For momentary models			Order mounting latches only when mounting switch blocks or lamp sockets are purchased individually	A22-3200
Legend plate frames	Large size	With snap-in legend plate, without text, black		Snap-in legend plate is acrylic	A22Z-3333
		Without snap-in legend plate			A22Z-3330
Sealing caps	For projection models			Used to prevent dust or water from entering the operation unit (pushbutton, etc.), colour: Opaque, material: Silicon	A22Z-3600T
Three-throw spacer				Used when mounting three non-lighted switches	A22Z-3003
Control boxes (enclosures)	Exclusively for A22		One hole	Do not use DPST-NO or DPST-NC switches, material: Polycarbonate resin	A22Z-B101
			Two holes		A22Z-B102
			Three holes		A22Z-B103
Snap-in legend plates	Standard size	Without text	White	Attached to the standard-size legend plate frame, material: Acrylic	A22Z-3443W
			Transparent		A22Z-3443C
		White text on black background	ON		A22Z-3443B-5
			OFF		A22Z-3443B-6
			DOWN		A22Z-3443B-8
			POWER ON		A22Z-3443B-9
	Large size	Without text	White	Attached to the large-size legend plate frame, material: Acrylic	A22Z-3453W
			Transparent		A22Z-3453C
	For emergency stop switch	60-dia. round plate with black letters on a yellow background		"EMERGENCY STOP" is engraved on the plate. Used as an emergency stop switch legend plate	A22Z-3466-1
		90-dia. round plate with black letters on a yellow background			A22Z-3476-1
Lamp extractor				Rubber tool used to easily replace lamps	A22Z-3901
Tightening wrench				Tool used to tighten nuts from the back of the panel	A22Z-3905

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515
–	EN60947-5-1	–

Contact ratings (standard load)

Rated carry current (A)	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10	–	–
	110 VAC	5	10	–	–
	220 VAC	3	6	–	–
	380 VAC	2	3	–	–
	440 VAC	1	2	–	–
	24 VDC	–	–	1,5	10
	110 VDC	–	–	0,5	2
	220 VDC	–	–	0,2	0,6
	380 VDC	–	–	0,1	0,2

Contacts (microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (resistive load)	1 mA at 5 VDC

LED indicators without voltage reduction unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC/VDC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Super-bright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 VAC/VDC
14 VAC/VDC	80 mA	12 VAC/VDC
28 VAC/VDC	40 mA	24 VAC/VDC
130 VAC/VDC	20 mA	100 VAC/VDC

Voltage-reduction lighting

Rated voltage	Operating voltage	Applicable lamp (BA8S/13_ gold)
110 VAC	95 to 115 VAC	LED Lamp (A22-24A_)
220 VAC	190 to 230 VAC	

Item		Pushbutton switches		Emergency stop switches		Knob-type selector switches		Key-type selector switch
		Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted
Allowable operating frequency	Mechanical	Momentary operation: 60 operations/minute max.		30 operations/minute max.		Manual release: 30 operations/minute max., automatic release: 30 operations/minute max.		
	Electrical	30 operations/minute max.				30 operations/minute max.		
Durability (number of operations min.)	Mechanical	Momentary operation: 5,000,000		Momentary operation: 300,000		500,000	100,000	500,000
	Electrical	500,000		300,000		500,000	100,000	500,000
Ambient temperature	Operating	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C	-20 to 55°C	-20 to 70°C
	Storage	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C	-40 to 70°C
Degree of protection		IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)
Size in mm (in-panel only)		34Hx34Wx54.7D, 34Hx34Wx72.7D for DPST switches						

Indicators with a mounting aperture of 16 mm

The M16 series of nut-mounted indicators comes in rectangular, square and round versions. Due to its modular construction, assembly is quick and easy. M16 comes in a wide variety of control and signal devices with a wide range of switching capacities, from general load to micro load.

- LED, incandescent and neon lamp
- Snap-in switch unit
- Short mounting depth, less than 28.5 mm below panel
- High reliability, IP65
- UL, CSA and VDE approved, conforms to EN60947-5-1

Ordering information

Pushbutton

Type	Display colour	Order code		
		IP65 oil-resistant		
		Rectangular	Square	Round
LED Incandescent lamp	Red	A165L-JR	A165L-AR	A165L-TR
	Yellow	A165L-JY	A165L-AY	A165L-TY
	Pure yellow	A165L-JPY	A165L-APY	A165L-TPY
	White	A165L-JW	A165L-AW	A165L-TW
	Blue	A165L-JA	A165L-AA	A165L-TA
LED Incandescent lamp	Green	A165L-JGY	A165L-AGY	A165L-TGY
	Green	A165L-JG	A165L-AG	A165L-TG

Lamp

Type	Colour	Order code		
		Operating voltage		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	A16-24DSR
	Yellow	A16-5DSY	A16-12DSY	A16-24DSY
	Green	A16-5DSG	A16-12DSG	A16-24DSG
	White	A16-5DSW	A16-12DSW	A16-24DSW
	Blue	A16-5DA	A16-12DA	A16-24DA
Type		5 VAC/VDC	12 VAC/VDC	24 VAC/VDC
Incandescent lamp		A16-5	A16-12	A16-24

Case

Classification		Order code
IP65 oil-resistant	Rectangular	A165-CJM
	Square	A165-CAM
	Round	A165-CTM

Socket

Classification			Order code
Solder terminals			M16-0
PCB terminals			M16-0P
Screw-less clamp			M16-S
Solder terminals	Voltage-reduction lighting	100 V	M16-T1
Screw-less clamp		100 V	M16-T1-S
		200 V	M16-T2-S

Specifications

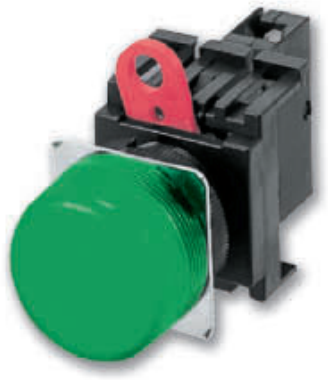
Allowable operating frequency	Mechanical	Momentary operation: 120 operations/minute max., alternate operation: 60 operations/minute max.
	Electrical	20 operations/minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min., alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Degree of contamination		3 (IEC947-5-1)
Ambient temperature		Operating: -10 to 55°C (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm		Round/square: 18Hx18Wx28.5D rectangular: 18Hx24Wx28.5D

Agency	Standards	File number
UL, cUL	UL508	E41515

Ratings

Superbright LED			
Rated voltage	Rated current	Operating voltage	Built-in limiting resistance
5 VDC	30 mA (15 mA)	5 VDC ±5%	33 Ω (68 Ω)
12 VDC	15 mA	12 VDC ±5%	270 Ω (560 Ω)
24 VDC	10 mA	24 VAC ±5%	1,600 Ω (2,000 Ω)

Incandescent lamp		
Rated voltage	Rated current	Operating voltage
6 VAC/VDC	60 mA	5 VAC/VDC
14 VAC/VDC	40 mA	12 VAC/VDC
28 VAC/VDC	24 mA	24 VAC/VDC



Nut-mounted, 22 mm indicator, with high visibility, illuminated buttons

The M22 series of indicators comes in 22 or 25 mm-diameter round versions. They can easily be mounted and removal of the socket unit is also easy. The finger protection mechanism on the lamp is provided as a standard feature. M22 indicators can be equipped with an LED or incandescent lamp.

- Available in 5 colours
- Super-bright LEDs for all versions
- Lamp sockets with or without transformers
- UL and cUL approved

Ordering information

Display

Appearance	IP65 oil-resistant	
	Colour of display	Order code
Round/flat	Red	M22-FR
	Green	M22-FG
	Yellow	M22-FY
	White	M22-FW
	Blue	M22-FA
Square/projection	Red	M22-CR
	Green	M22-CG
	Yellow	M22-CY
	White	M22-CW
	Blue	M22-CA

Socket unit

Order code	
Voltage-reduction circuits	
Without voltage reduction unit	With voltage reduction unit (220 VAC)
M22-00	M22-00-T2

Lamp

AC/DC	LED light	Operating voltage			
		6 V	12 V	24 V	24 V superbright
AC	Red	A22-6DR	–	–	–
	Green	A22-6DG	–	–	–
	Yellow	A22-6DY	–	–	–
	Blue	A22-6DA	–	–	–
DC	Red	A22-6AR	–	–	–
	Green	A22-6AG	–	–	–
	Yellow	A22-6AY	–	–	–
	Blue	A22-6AA	–	–	–
AC and DC	Red	–	A22-12AR	A22-24AR	A22-24ASR
	Green	–	A22-12AG	A22-24AG	A22-24ASG
	Yellow	–	A22-12AY	A22-24AY	A22-24ASY
	Blue	–	A22-12AA	A22-24AA	A22-24ASA

Incandescent lamp	6 VAC/VDC	12 VAC/VDC	24 VAC/VDC	100 VAC/VDC
	A22-5	A22-12	A22-24	A22-H1

Accessories

M22 uses the same accessories as A22. Please refer to the relevant information in the corresponding section for the A22.

Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515

LED lamp

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC ±5%
12 VAC/VDC	30 mA (10 mA)	12 VAC/VDC ±5%
24 VAC/VDC	15 mA (10 mA)	24 VAC/VDC ±5%

Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC/VDC	200 mA	5 V
14 VAC/VDC	80 mA	12 V
28 VAC/VDC	40 mA	24 V
130 VAC/VDC	20 mA	100 V

Superbright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC/VDC	15 mA	24 VAC/VDC ±5%

Voltage-reduction lighting

Rated voltage	Rated current	Operating voltage
110 VAC	95 to 115 VAC	LED lamp (A22-24_)
220 VAC	190 to 230 VAC	

Ambient temperature	Operating: -20 to 55°C, storage: -40 to 70°C
Degree of protection	IP65
Electric shock protection class	Class II
PTI (tracking characteristic)	175
Degree of contamination	3 (IEC947-5-1)
Size in mm	Button: 29.7 dia.x16D, switch: 34Hx34Wx54.7D