

FUJIED & C TIMES

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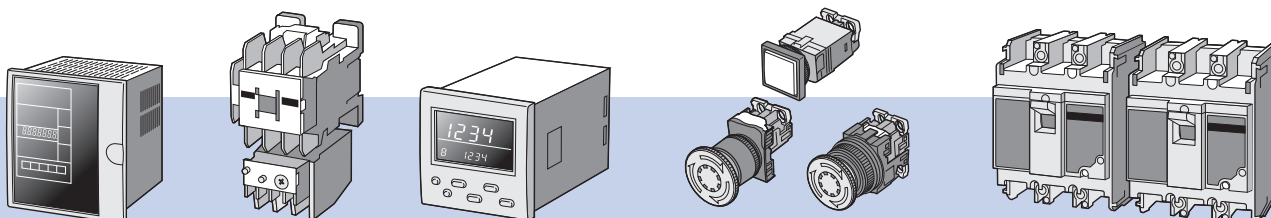
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Mini Contactors and Thermal Overload Relays SK Series, Types 06, 09, and 12

The Smallest Class of Magnetic Contactors and Thermal Overload Relays in the World.

■ Features

- International safety standards for standard models (IEC, GB, JIS, UL, and CSA).
- Models available with AC or DC operating coils (DC: 2.4W and 1.2W models only).
- Many optional units.
 - Auxiliary Contact Blocks (2-pole or 4-pole)
 - Coil Surge Suppression Units
 - Interlock Units
- Easier Thermal Overload Relay wiring.
 - The terminal arrangement separates main circuit wires and auxiliary circuit wires for easier wiring.



■ Ordering Information (Types)

- Magnetic Contactors

SK 06 A H - E 10
① ② ③ ④ ⑤ ⑥

- ① Series
- ② Frame size
- ③ Operating coil specification
- ④ Auxiliary contact specification
- ⑤ Coil voltage specification
- ⑥ Auxiliary contact arrangement

■ Types and Ratings

- Magnetic Contactors

Frame size ②	Max. motor capacity [kW]			Rated operational current [A]			Conventional free air thermal current [A] (Rated thermal current)	Operating coil specification ③	Auxiliary contact specification ④	Auxiliary contact arrangement ⑥	Type
	3-phase squirrel-cage motor (AC-3)			3-phase squirrel-cage motor (AC-3)							
	200-240V	380-440V	500-550V	200-240V	380-440V	500-550V					
6A [06]	1.5	2.2	3	6	6	5	20	AC-operated [A] DC-operated (2.4W) [G] DC-operated (1.2W) [L]	Bifurcated [blank] Single [H]	1NO [10] 1NC [01]	SK06A-□▲ SK06AH-□▲ SK06G-□▲ SK06GH-□▲ SK06L-□▲ SK06LH-□▲
9A [09]	2.2	4	4	9	9	7		AC-operated [A] DC-operated (2.4W) [G] DC-operated (1.2W) [L]	Bifurcated [blank] Single [H]		SK09A-□▲ SK09AH-□▲ SK09G-□▲ SK09GH-□▲ SK09L-□▲ SK09LH-□▲
12A [12]	3	5.5	5.5	12	12	9		AC-operated [A] DC-operated (2.4W) [G] DC-operated (1.2W) [L]	Bifurcated [blank] Single [H]		SK12A-□▲ SK12AH-□▲ SK12G-□▲ SK12GH-□▲ SK12L-□▲ SK12LH-□▲

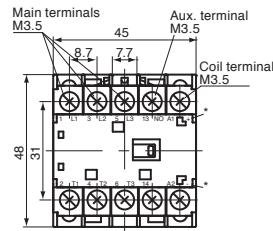
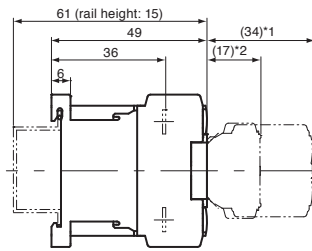
Note 1. "□" in the type column is replaced with the coil voltage code.
 Note 2. Numbers and letters in brackets [] are used in the product code.

- Coil voltage ⑤

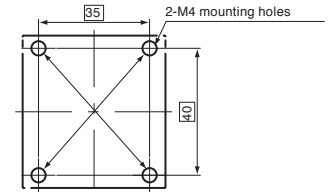
AC-operated	Order Voltage	24	48	100	110	120	200	220	240	380	400	440	500
	Product code	E	F	1	H	K	2	M	P	S	4	T	5
DC-operated (2.4W)	Order Voltage	12	24	48	60	100	110	120	200	210	220		
	Product code	B	E	F	G	1	H	K	2	Y	M		
DC-operated (1.2W)	Order Voltage	12	24	48									
	Product code	B	E	F									

■ Dimensions, mm

- Magnetic Contactors
SK06□, SK09□, SK12□



Mounting Hole Dimensions

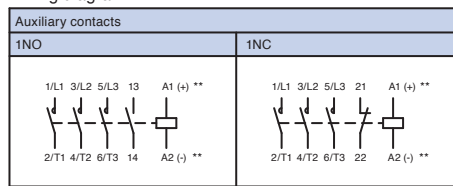


[NOTES]
*1 With SZ1KA□ Auxiliary Contact Blocks.
*2 With SZ1FA□ Auxiliary Contact Blocks.

[NOTE]
Mount the Auxiliary Overload Relay with two mounting holes in diagonally opposed corners.

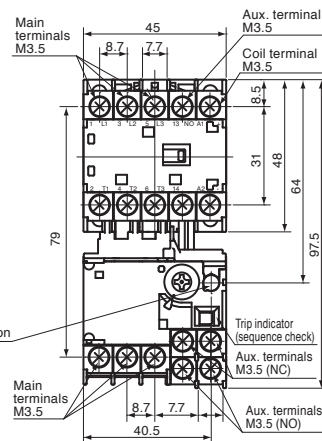
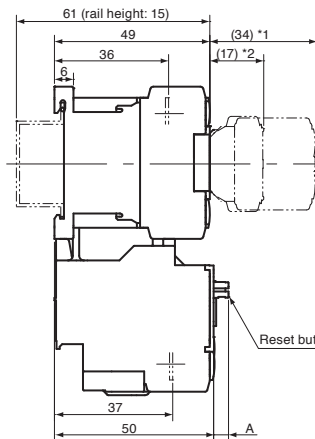
Mass : 0.14kg (For AC-operated models.)
0.17kg (For DC-operated models.)

Wiring diagram

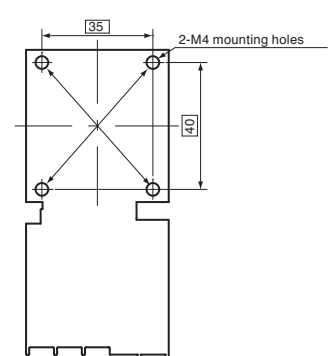


** For DC-operated models.

- Magnetic Starters (reference)
SK□ + TK12



Mounting Hole Dimensions



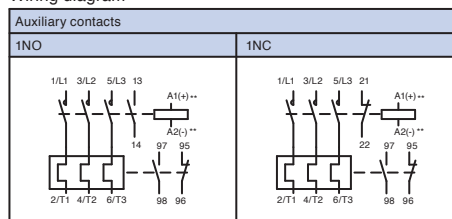
Dimension A
- Manually reset state: 5mm
- Automatically reset state: 2mm

[NOTES]
*1 With SZ1KA□ Auxiliary Contact Blocks.
*2 With SZ1FA□ Auxiliary Contact Blocks.

[NOTE]
Mount the Auxiliary Overload Relay with two mounting holes in diagonally opposed corners.

Mass : 0.24kg (AC-operated model)
0.27kg (DC-operated model)

Wiring diagram



** For DC-operated models.

Features

- International safety standards for standard models (IEC, GB, JIS, UL, and CSA).
- A terminal cover and dial cover are provided as standard features.
- Highly reliable 1NO1NC isolated auxiliary contacts to enable using NC and NO contacts at different potentials.
- Easily switch between manual and automatic reset.
- Parallel arrangement of main terminals and auxiliary terminals for easier wiring.



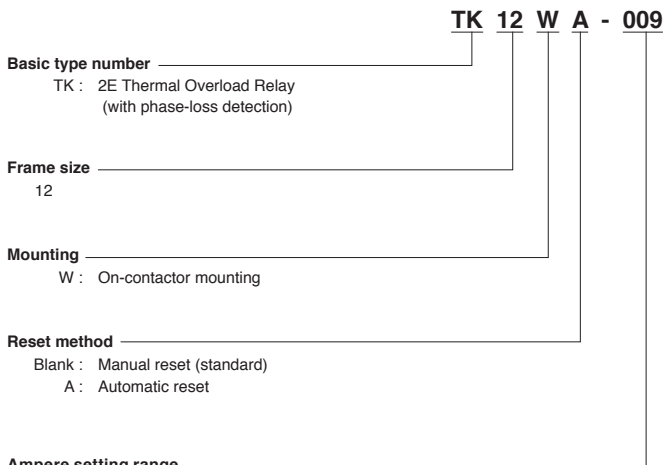
TK12

Ratings and Types

Type
TK12W□-■■■■

Note : "□" in the type column is replaced with the reset method code.
 "■■■■" is replaced by the specified code for the current setting range.

Type number nomenclature



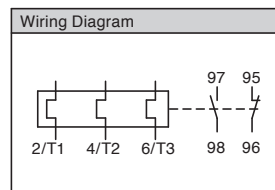
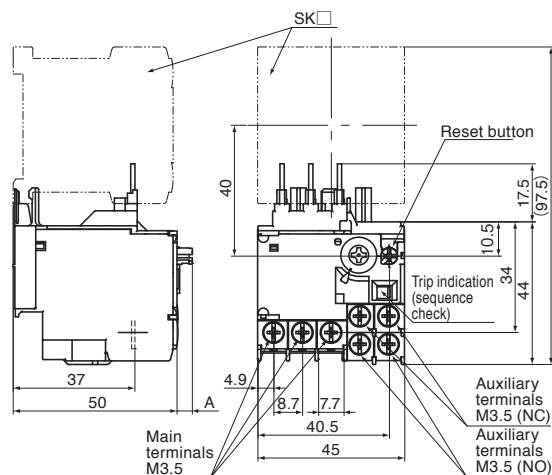
*Refer to Ampere setting range specification codes.

Ampere Setting Range Specification Codes

Ampere setting range [A]	Code	Applicable Magnetic Contactors		
0.1 - 0.15	P10	SK06	SK09	SK12
0.13 - 0.2	P13			
0.18 - 0.27	P18			
0.24 - 0.36	P24			
0.34 - 0.52	P34			
0.48 - 0.72	P48			
0.64 - 0.96	P64			
0.8 - 1.2	P80			
0.95 - 1.45	P95			
1.4 - 2.1	1P4			
1.7 - 2.6	1P7			
2.2 - 3.4	2P2			
2.8 - 4.2	2P8			
4 - 6	004			
5 - 7.5	005			
6 - 9	006			
7 - 10.5	007			
9 - 13	009			

Dimensions, mm

TK12



Mass: 0.1kg

Dimension A
 ·For manual reset: 5mm
 ·For automatic reset: 2mm

Option

Product name	Type	Main specifications	Applicable Types
Auxiliary Contact Blocks (head-on, double contacts)	SZ1KA40	Contact arrangement: 4NO	SK06 to SK12 *1 SKH4 *1
	SZ1KA31	Contact arrangement: 3NO+1NC	
	SZ1KA22	Contact arrangement: 2NO+2NC	
	SZ1KA13	Contact arrangement: 1NO+3NC	SK06 to SK12 SKH4
	SZ1KA04	Contact arrangement: 4NC	
	SZ1KA20	Contact arrangement: 2NO	
	SZ1KA11	Contact arrangement: 1NO+1NC	
SZ1KA02	Contact arrangement: 2NC		
Auxiliary Contact Blocks (head-on, single contacts)	SZ1KA40H	Contact arrangement: 4NO	SK06 to SK12 *1 SKH4 *1
	SZ1KA31H	Contact arrangement: 3NO+1NC	
	SZ1KA22H	Contact arrangement: 2NO+2NC	
	SZ1KA13H	Contact arrangement: 1NO+3NC	SK06 to SK12 SKH4
	SZ1KA04H	Contact arrangement: 4NC	
	SZ1KA20H	Contact arrangement: 2NO	
	SZ1KA11H	Contact arrangement: 1NO+1NC	
SZ1KA02H	Contact arrangement: 2NC		
Auxiliary Contact Blocks (small head-on, double contacts)	SZ1FA11	Contact arrangement: 1NO+1NC	SK06 to SK12 SKH4
Auxiliary Contact Blocks (small head-on, single contacts)	SZ1FA11H	Contact arrangement: 1NO+1NC	SK06 to SK12 SKH4
Interlock Units	SZ1KRM	For reversed assembly, mechanical interlock	SK06 to SK12
Power connection kit for reversing (Wiring)	SZ1KRW1W	Power connection kit for reversing for main circuit	SK06 to SK12
Main Circuit Surge Suppression Unit	*2 SZ-ZM2	Built-in CR (3-phase motor, 200V, 0.1 to 2.2kW)	SK06 to SK12
Stand-alone Installation Unit (for Main Circuit Surge Suppression Unit)	*2 SZ-ZMH	Main Circuit Surge Suppression Unit	SK-ZM2 SK-ZM2E
Coil Surge Suppression Units (surge Suppression only)	SZ1KZ1	Built-in varistor: 24 to 48V AC/DC	SK06 to SK12 SKH4
	SZ1KZ2	Built-in varistor: 48 to 125V AC/DC	
	SZ1KZ3	Built-in varistor: 100 to 250V AC/DC	
Coil Surge Suppression Units (with operation indicator)	SZ1KZ4	Built-in varistor and LED: 24 to 48V AC/DC	SK06 to SK12 SKH4
	SZ1KZ5	Built-in varistor and LED: 48 to 125V AC/DC	
Operation Indicator Unit	SZ1KL1	Built-in LED: 12 to 24V AC/DC	SK06 to SK12 SKH4
	SZ1KL2	Built-in LED: 24 to 48V AC/DC	
	SZ1KL3	Built-in LED: 48 to 125V AC/DC	
Thermal Overload Relay Reset Release	SZ-R1	Release length: 300mm	TK12
	SZ-R2	Release length: 500mm	
	SZ-R3	Release length: 700mm	
Connection Module	BZ0LRK12AA	For linking with Manual Motor Starter	SK06 to SK12
Power connection kit for reversing (Insert Molding)	SZ1KRW1M	Power connection kit for reversing (Insert Molding) for main circuit	SK06 to SK12

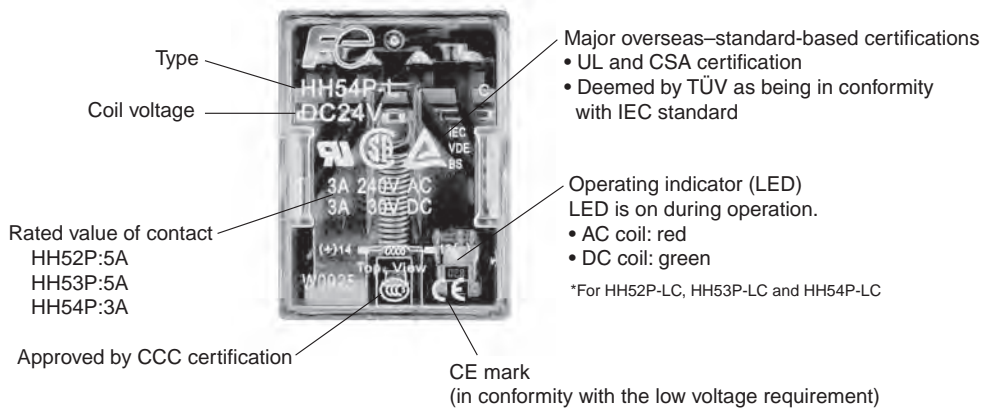
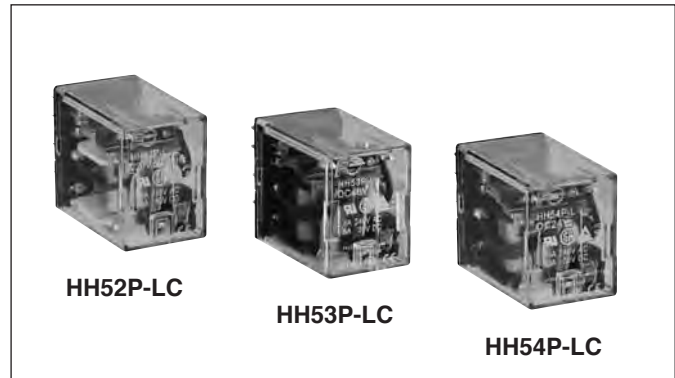
Types: *1 Not applicable to DC 1.2W Magnetic Contactors or Motor Starters (SK06 to SK12L) and SKH4L Auxiliary Relays.
*2 Use the SZ-ZMH Stand-alone Installation Unit together with the SZ-ZM2 Main Circuit Surge Suppression Unit.

Miniature control relays HH52-C, HH53-C, HH54-C Series

Miniature Control Relays with Special Sockets (2P, 3P and 4P) That Are Ideal for the China/Asian Market.

■ Features

- The products have obtained the CCC certification and can satisfy the market demands.
- Standard products have been approved by UL, CSA and TÜV.
- The series products are equipped with an operating indicator (LED), ensuring a clear glance of work status.
- The products are environmentally friendly and conformed to regulations on pollution control of electronic information products.



■ Type number nomenclature

HH 54 P - L C DC 24V

Basic type	
HH	Miniature control relay
Contact arrangement	
52	2PDT
53	3PDT
54	4PDT
Plug-in	
P	Plug-in

Rated coil voltage	
DC24V	24V DC coil
DC48V	48V DC coil
AC110V	110V AC coil
AC220V	220V AC coil
C	CCC certified product
L	With an operating indicator

■ Types

Contact arrangement	Rated thermal current (A)	Operating indicator	Rated coil voltage *1		Type	Applicable sockets
			AC coil	DC coil		
2PDT	5	Not equipped	AC110V	DC24V	HH52P-C	TP58X1-C
		Equipped	AC220V	DC48V	HH52P-LC	TP58X1-EC
3PDT	5	Not equipped			HH53P-C	TP511X1-C
		Equipped			HH53P-LC	TP511X1-EC
4PDT	3	Not equipped			HH54P-C	TP514X1-C
		Equipped			HH54P-LC	TP514X1-EC

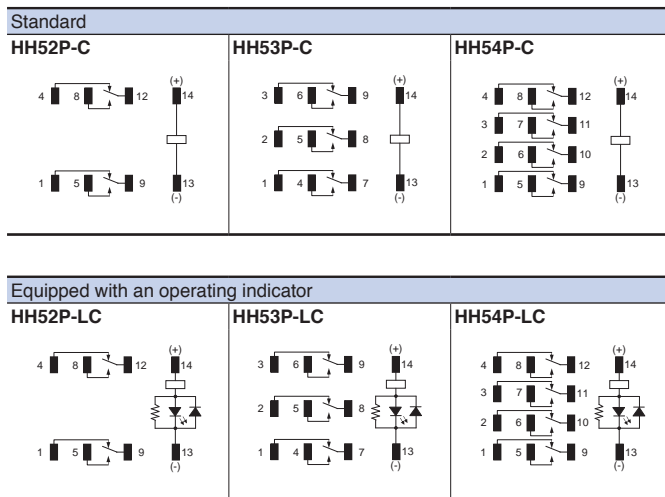
*1 Please consult our company for the voltage specifications of other coils not mentioned in the above table

■ Specifications

Item	Specifications	
Rated insulation voltage	250V	
Operating voltage	AC	80% of the rated voltage (20°C)
	DC	75% of the rated voltage (20°C)
Reset voltage	AC	30% of the rated voltage (20°C)
	DC	10% of the rated voltage (20°C)
Maximum voltage persistently applied	110% of the rated voltage	
Range of operating temperature	-25 to +60°C When 100% rated voltage is applied, no condensation or icing is observed.	
Dielectric strength	The coil contacts and c contacts are mutual voltage resistant.	AC2000V, 1 minute
	Among the contact clearance	AC1000V, 1 minute
	Among the socket terminal	AC2000V, 1 minute
Insulation resistance	Detected with a DC500V M meter; must be above 100MΩ	
Operating time	20ms or less	
Reset time	20ms or less	
Vibration	Malfunction	10 to 55 Hz, double amplitude 1mm
	Durability	10 to 55 Hz, double amplitude 1mm 2 hours for each of X, Y and Z direction, 6 hours in all
Shock	Malfunction	200m/s ²
	Durability	1000m/s ² , 3 times for each of X, Y and Z direction, 18 times in all.
Durability	Mechanical	AC ratings: 50 million operations DC ratings: 100 million operations
	Electrical	Please refer to table below
Contact resistance	50mΩ or less (Before use)	
Minimum applicable load (reference value) *	5V, 1mA	
Mass	HH52P-LC: Approx. 32g HH53P-LC: Approx. 33g HH54P-LC: Approx. 33g	

Note *: Reliability index $\lambda_{60}=0.1 \times 10^{-6}/\text{once}$
Referring to the minimum applicable load during the continual on-off when the relay is installed in a clean electrical cabinet. But this does not apply to the minimum applicable load during continual excitation work and etc.

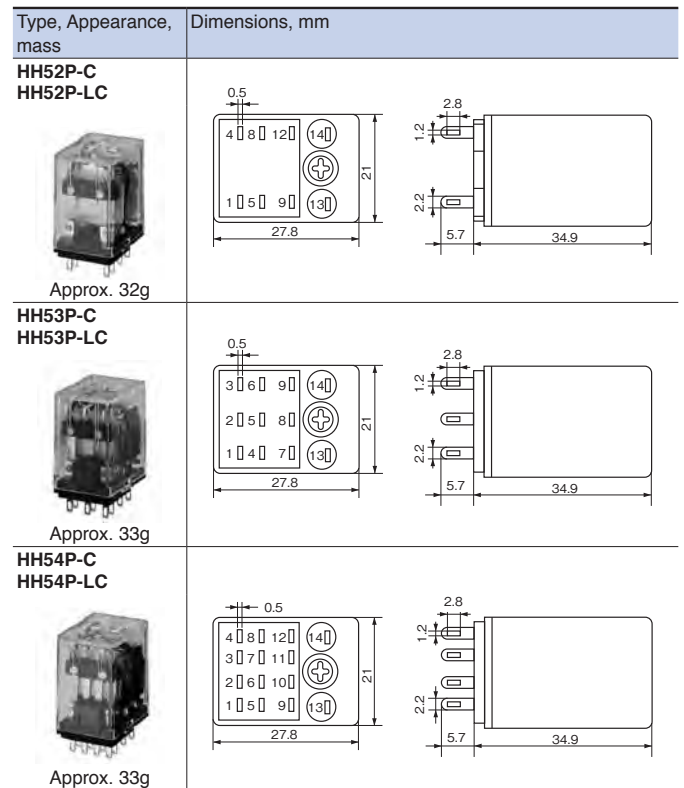
■ Internal wirings



■ Electrical durability

Voltage	Make		Break		Electrical life (million)	
	Current (A)	Power factor or time constant	Current (A)	Power factor or time constant	HH52P HH53P	HH54P
AC 200V (Ind. load)	10	cosφ=0.7	1	cosφ=0.3 to 0.4	0.4	0.08
	5		0.5		1	0.2
	3		0.3		1.7	0.33
	1		0.1		6	1.2
AC 100V (Ind. load)	10	cosφ=0.7	1	cosφ=0.3 to 0.4	0.7	0.13
	5		0.5		1.5	0.28
	3		0.3		2.8	0.5
	1		0.1		9	1.7
AC 200V (Res. load)	3	cosφ=1	3	cosφ=1	0.6	0.15
	1		1		2	0.5
AC 100V (Res. load)	0.3	cosφ=1	0.3	cosφ=1	8	2
	3		3		1	0.25
DC 100V (Ind. load)	1	T=15ms	1	T=15ms	3.4	0.9
	0.3		0.3		14	3.5
DC 24V (Ind. load)	0.2	T=15ms	0.2	T=15ms	0.4	0.15
	0.05		0.05		2.4	0.9
DC 100V (Res. load)	1	T=0ms	1	T=0ms	0.5	0.15
	0.2		0.2		4	1.2
DC 24V (Res. load)	0.5	T=0ms	0.5	T=0ms	0.6	0.15
	0.1		0.1		5	1.2
DC 24V (Res. load)	3	T=0ms	3	T=0ms	0.4	0.1
	1		1		1.6	0.4
	0.2		0.2		14	3.5

■ Dimensions, mm

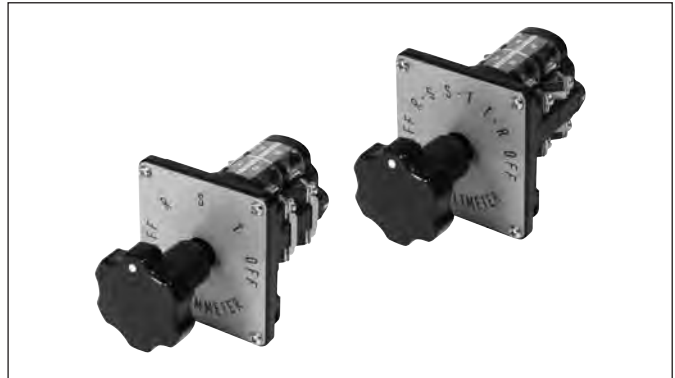


Instrument Panel Cam Switches AK8 Series

Switches to Switch Voltmeters and Ammeters

■ Features

- Compact and easily connectable from the back.
- External confirmation of contact operation.
- Sliding contacts used for highly reliable operation.



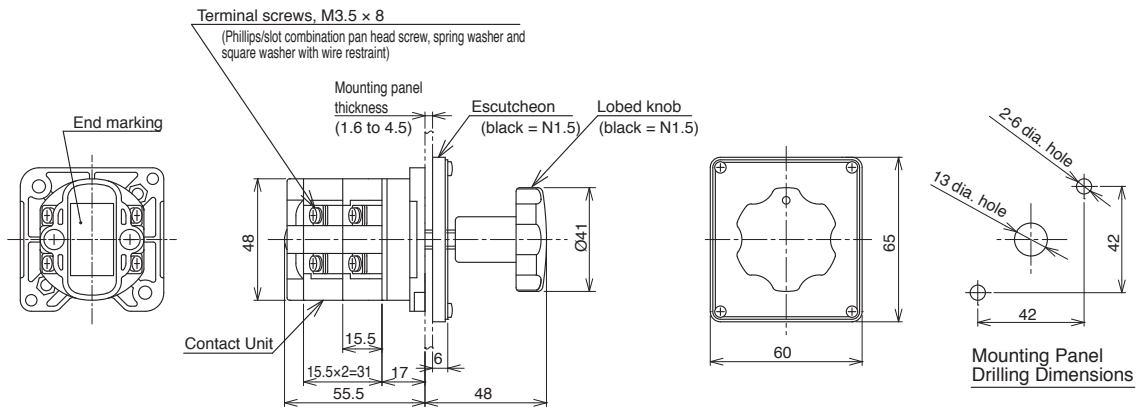
■ Types

Usage		Type	Elements	Notch symbols	No. of notches × Angle of rotation
Ammeters	3-phase, 3-wire, 2-CT	AK8-AS3	2	OFF/R/S/T/OFF	5×45°
	Single-phase, 3-wire, 2-CT	AK8-AS1	2	OFF/R/O/T/OFF	
Voltmeters	3-phase, 3-wire, 2-VT	AK8-VS3	2	OFF/R-S/S-T/T-R/OFF	
	Single-phase, 3-wire, 2-VT	AK8-VS1	2	OFF/R-O/O-T/T-R/OFF	

■ Ratings and Specifications

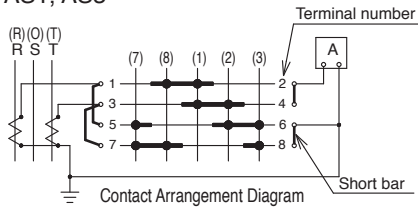
	Operating current [A]				Rated insulation voltage	600V
	AC		DC			
Operating voltage [V]	Resistive load	Inductive load, power factor of 0.4	Resistive load	Inductive load	Open thermal current (rated carry current)	15A
48	15	10.5	—	—	Dielectric strength	2,500V AC 1 min
110	10	6.5	—	—	Switching frequency	1,200 operations/h (usage rate: 40%)
220	7	4.5	—	—	Durability (mechanical and electrical)	250,000 operations
440	3	2	—	—	Ambient operating temperature	-20 to 60°C (with no icing or condensation)
					Ambient operating humidity	45% to 85% RH (at -5 to 40°C with no icing or condensation)
					Enclosure	IP40 enclosure

■ Dimensions, mm

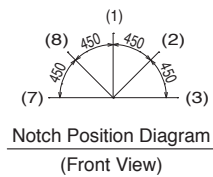
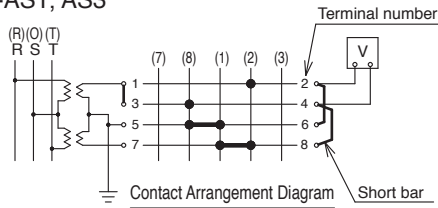


■ Wiring Diagram

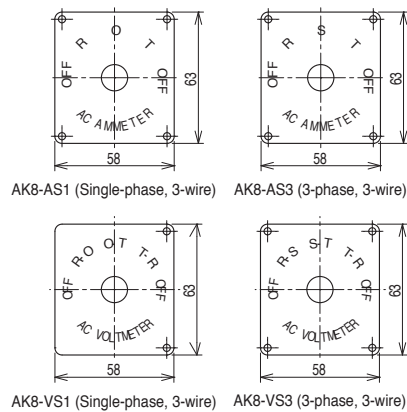
• AK8-AS1, AS3




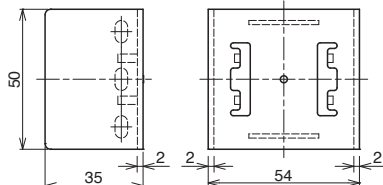
• AK8-AS1, AS3



Nameplate Details



■ Parts

Name and appearance	Type	Dimensions (unit: mm)
Charging Section Cover 	AKX102	

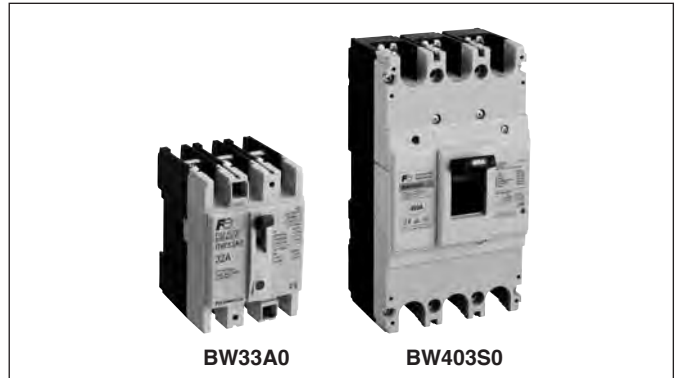
**New
Products**

BW0 series MCCB 32AF / 400AF

A Small 32AF Breaker Used in Branch Circuits Such as Those in Building and Control Panels.

■ Features

Focusing on assembly of easy wiring, maintenance check, reasonable price, and standardized distribution box or boards design, BW0 series MCCBs are designed mainly for civil building construction market and secondary distribution market.



● 32AF

Compact design

Cost and space saving for building a control panel.
AC 440V application

- Icu: 1.5kA at 440V AC, 2.5kA at 240V AC

Available accessories

Auxiliary switch, alarm switch and shunt trip device



Compliance to RoHS Directive

All materials used are compliant to RoHS Directive and the main components are easy to recycle.

● 400AF

Cassette type accessories

All accessories can be assembled by the user. Quickly adaptable to the many onsite changes in specifications.



Compliance to RoHS Directive

All materials used are compliant to RoHS Directive and the main components are easy to recycle.

Interchangeability

The design of the same external dimensions with G-TWIN circuit breaker.

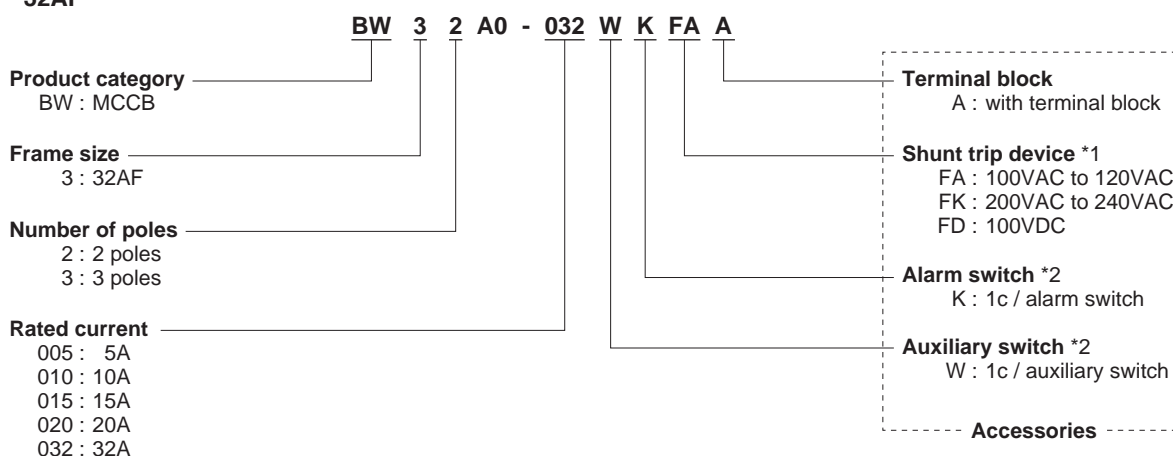
Just simply change the model when a customer suddenly changes the design (e.g. when changed to earth leakage circuit breaker).

Line up

Series	Breaker ampere frame	Type	Pole	Rated current (A)	Insulation voltage Ui (V)	Breaking capacity (kA) [Icu/Ics] IEC60947-2 AC		
						230V	380V	415V
BW0	32	BW32A0	2	5, 10, 15, 20, 32	440	2.5/2	1.5/1	1.5/1
		BW33A0	3	5, 10, 15, 20, 32	440	2.5/2	1.5/1	1.5/1
	400	BW402S0	2	250, 300, 350, 400	690	85/43	36/18	36/18
		BW403S0	3	250, 300, 350, 400	690	85/43	36/18	36/18

Type number nomenclature

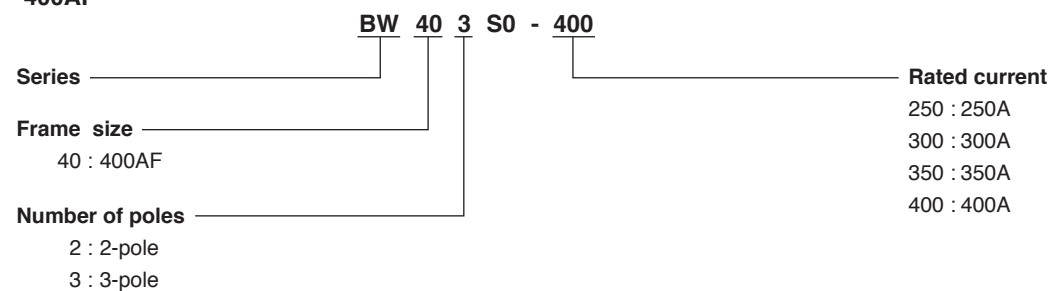
• 32AF



Notes

- *1 A shunt trip device can be added only to 3-pole models.
- *2 Only one of the following can be added to a 2-pole model: alarm switch or auxiliary switch.

• 400AF



Types and specifications

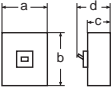
• 32AF

Frame	32A	
Pole	2	3
Type	BW32A0	BW33A0
Rated current (A)	5, 10, 15, 20, 32	
Rated insulation voltage (VAC)	440	
[IEC 60947-2] (VDC)	-	
Rated breaking capacity (kA)	500VAC	-
[IEC 60947-2]	440VAC	1.5/1
(Icu/Ics) *1	415VAC	1.5/1
	400VAC	1.5/1
	380VAC	1.5/1
	240VAC	2.5/1
	230VAC	2.5/1
	250VDC	-
Rated operating voltage [UL508] (VAC)	-	
Dimensions (mm)	a 36	54
	b 80	80
	c 60	60
	d 76	76
Mass (kg)	0.18	0.25
Tripping device	Thermal-magnetic	
Front mounting, front connection	●	●
Internal accessories		
Auxiliary switch (W)	▲	▲
Alarm switch (K)	▲	▲
Auxiliary switch + alarm switch (W+K)	-	▲
Shunt trip (F)	-	▲
Undervoltage trip (R)	-	-
External accessories		
Operating handle N-type	-	-
Operating handle V-type	-	-
Terminal cover Short	-	-
Terminal cover Long	BW9BTA0-L2	BW9BTA0-L3
Insulation barrier Interphase	-	-
Flat terminal	-	-
Block terminal	-	-
Handle locking device	-	-
IEC 35mm rail mounting	●	●

Notes: *1 Icu: Rated ultimate short-circuit breaking capacity
Ics: Rated service short-circuit breaking capacity

● Available ▲ Factory mounted accessory - Not available

• 400AF

Frame	400A	
Pole	2	3
Type	BW402S0	BW403S0
Rated current (A)	250, 300, 350, 400	
Rated insulation voltage (VAC)	690	
[IEC 60947-2] (VDC)	250	
Rated breaking capacity (kA)	500VAC 20/10	20/10
[IEC 60947-2]	440VAC 36/18	36/18
(Icu/Ics) *1	415VAC 36/18	36/18
	400VAC 36/18	36/18
	380VAC 36/18	36/18
	240VAC 85/43	85/43
	230VAC 85/43	85/43
	250VDC 20/10	20/10
Rated operating voltage [UL508] (VAC)	-	
Dimensions (mm)		
		
	a 140	140
	b 257	257
	c 103	103
	d 146	146
Mass (kg) Front mounting type	4.6	5.6
Tripping device	Thermal-magnetic	
Front mounting, front connection	●	●
Internal accessories		
Alarm switch (W)	BW9W1SHA	BW9W1SHA
Auxiliary switch (K)	BW9K1SHA	BW9K1SHA
Auxiliary switch + alarm switch (W+K)	-	-
Shunt trip (F)	BW9FHA-□	BW9FHA-□
Undervoltage trip (R)	BW9RHA-□	BW9RHA-□
External accessories		
Operating handle N-type	BW9N0HA	BW9N0HA
Operating handle V-type	BW9V0HA	BW9V0HA
Terminal cover Short	BW9BTHA-S3	BW9BTHA-S3
Terminal cover Long	BW9BTHA-L3	BW9BTHA-L3
Insulation barrier Interphase	B-43A	B-43A
Flat terminal	BW9SS0H0-2	BW9SS0H0-3
Block terminal	-	-
Handle locking device	-	-
IEC 35mm rail mounting	-	-

Notes: *1 Icu: Rated ultimate short-circuit breaking capacity
Ics: Rated service short-circuit breaking capacity

● Available – Not available

Miniature Circuit Breakers BE1 Series

This series of miniature circuit breaker is for the purpose of the protection of distribution equipment in the residential or similar facility, to protect against short circuit and overload damage.

■ Features

- Among the characteristics of overload protection, there are the Curve C characteristic for the protection of lighting electrical systems having 5 to 10In instantaneous tripping characteristic, and the Curve D characteristic for the protection of ordinary electrical system wires having 10 to 14In instantaneous tripping characteristic.
- ELCB is completed by combining a miniature circuit breaker with an earth leakage shunt trip device.
- As functional components can be installed such as auxiliary switch, alarm switch among others, it can monitor and control the electrical system.

■ Miniature Circuit Breaker Standards

● Application

- Curve C: Illumination distribution system
- Curve D: Industrial distribution system
- Overload and short circuit protection

● Standards and Certificates

- IEC 60898-1, GB 10963.1
- CE, CCC

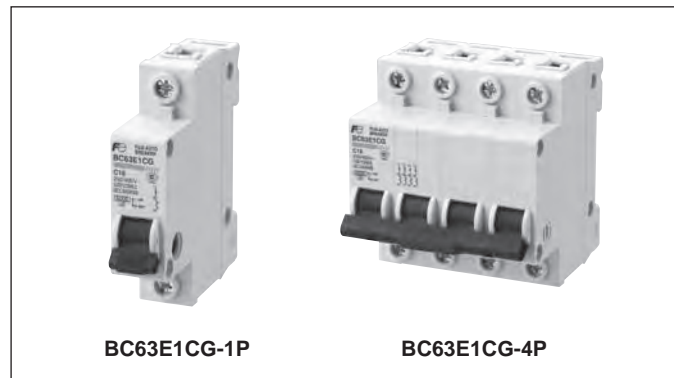
● Specifications

- Rated voltage: AC230/400V, 50/60Hz
- Rated current: curve C: 1 to 63A
curve D: 1 to 40A
- Mechanical life: 10000 times
- Tripping characteristic: curve C: 5 to 10In
curve D: 10 to 14In
- Breaking capacity

Tripping characteristic	Rated current (A)	Rated operational voltage (V)	Rated breaking capacity (kA)
Curve C	1 to 40	230/400	6
	50, 63	230/400	4.5
Curve D	1 to 40	230/400	4.5

● Types

Number of poles	Width (mm)	Type
1P	18	BC63E1CG-1P
2P	36	BC63E1CG-2P
3P	54	BC63E1CG-3P
4P	72	BC63E1CG-4P



■ Miniature Earth Leakage Circuit Breaker Standards

● Application

- Clip onto the right side of BC32E1, BC50E1 series MCB protection against earth leakage faults.

● Standards and Certificates

- IEC 61009-1, GB 16917.1
- CCC

● Specifications

- Rated voltage: AC230/400V(1PN, 2P) 50Hz
AC400V(3P, 3PN, 4P) 50Hz
- Rated current: 1 to 50A
- Rated residual operating current: 30mA
- Mechanical life: 20000 times
- Instantaneous tripping characteristic: curve C: 5 to 10In
- Breaking capacity

Tripping characteristic	Rated current (A)	Rated operational voltage (V)	Rated breaking capacity (kA)
Curve C	1 to 40	230/400	6
	50	230/400	4.5

● Types

Number of poles	Width (mm)		Type
	Miniature circuit breaker	Earth leakage shunt trip	
1N	18	27	BC32E1CL-1N
		37	BC50E1CL-1N
2P	36	27	BC32E1CL-2P
		37	BC50E1CL-2P
3P	54	36	BC32E1CL-3P
		51	BC50E1CL-3P
3N	54	45	BC32E1CL-3N
		64	BC50E1CL-3N
4P	72	45	BC32E1CL-4P
		64	BC50E1CL-4P

Miniature Circuit Breaker (1P+N)

● **Application**

- TT/TN-S grounding system
- Phase and neutral protection against short circuit and overload

● **Standards and Certificates**

- IEC 60898-1, GB 10963.1
- CCC

● **Specifications**

- Rated voltage: AC230V, 50/60Hz
- Mechanical life: 10000 times
- Tripping characteristic: C: 5 to 10In
- Breaking capacity: 4.5kA

● **Types**

Number of poles	Width (mm)	Type
1P+N	18	BC32E1CN-1P

Earth Leakage Circuit Breaker (1P+N)

● **Application**

- TT/TN-S grounding system
- Phase and neutral protection against short circuit and overload

● **Standards and Certificates**

- IEC 61009-1, GB 16917.1
- CCC

● **Specifications**

- Rated voltage: AC230V, 50Hz
- Mechanical life: 10000 times
- Tripping characteristic: C: 5 to 10In
- Rated residual operating current: 30mA
- Breaking capacity: 4.5kA

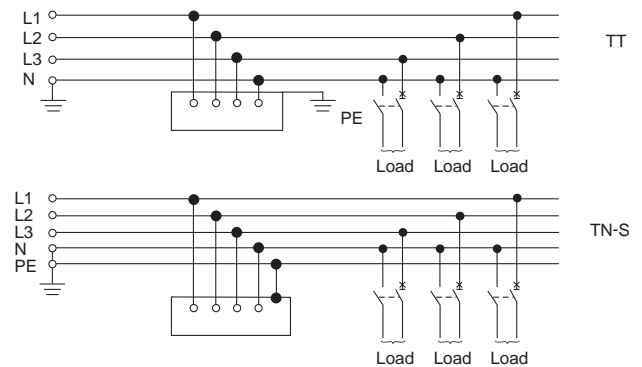
● **Type**

Number of poles	Width (mm)	Type
1P+N	36	BC32E1CLN-1P

Wiring Method

● **Use of phase line and neutral line series products in the TT / TN-S systems**

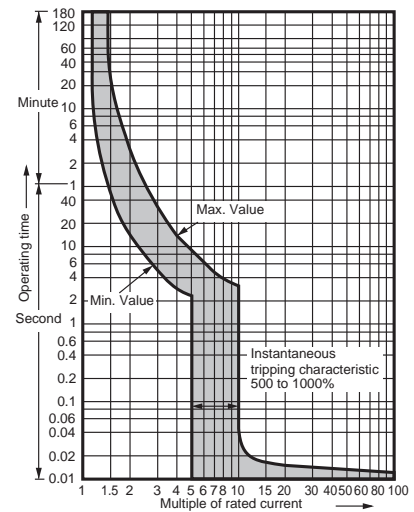
Phase line and neutral line are required to be switched in the TT (three-phase four-wire system)/TN-S (three-phase five-wire system) systems.



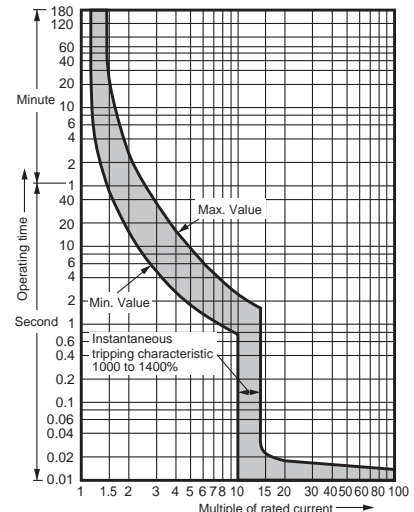
Characteristic Curves

● **BC32, BC50, BC63**

- Curve C (5 to 10In)



- Curve D (10 to 14In)



Air Circuit Breakers BT2 Series

New Models of 1600AF-6300AF Air Circuit Breakers That Comply with IEC Standards.

■ Features

• Breaking Capacity

Icu is equal to Ics up to 120kA at maximum and Icw is up to 100kA at maximum under 400VAC distribution.

• Compact size

BT2 series, Air Circuit Breakers, have five framesize and four physical dimension sizes.

• Installation

The bus bar terminal of the BT2 series, Air Circuit Breakers, can be simply installed as follows:

- Horizontal connection
- Vertical connection
- Composite connection

• Safety performance

BT2 series, Air Circuit Breakers, are reliable by the following aspects:

- Reliable assurance of the three positions:
 - Connected
 - Test
 - Separated

by the locked and automatically unlocked mechanism at the draw-out socket.

Clear indication of ready-for-switching-on to ensure safe manipulation and reliable operation.

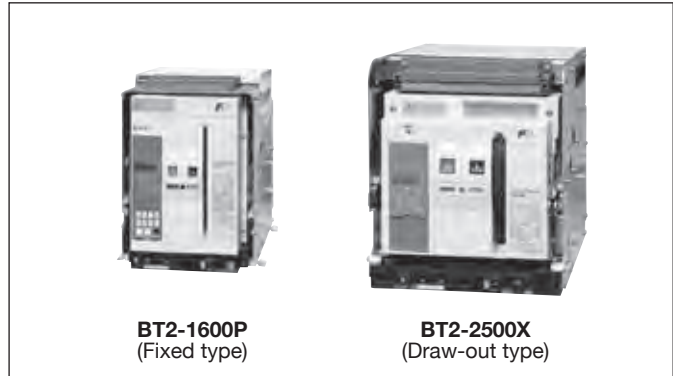
More reliable safety protection with secondary terminals of protection grade IP30

• Protection and selection

BT2 Series, Air Circuit Breakers, can implement selective interlock of ZSI Region to ensure comprehensive selection of various protection and reduce the copper bar's bearing of thermodynamic.

• Intelligent controller (OCR)

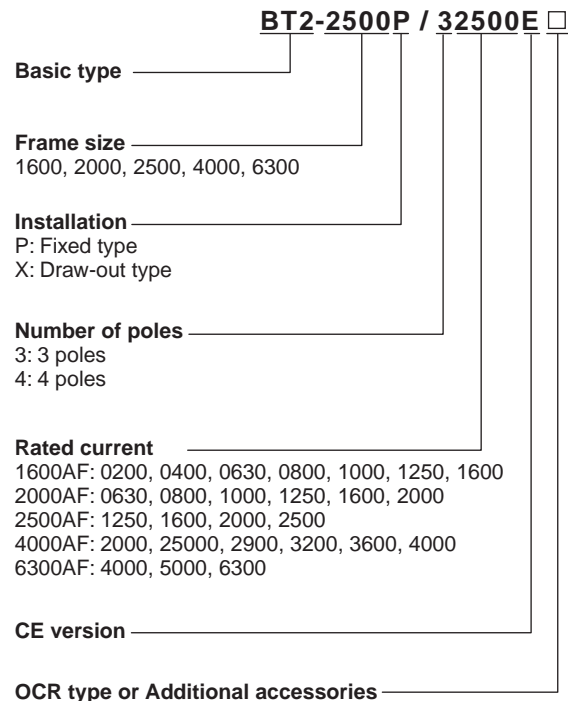
Selecting OCR's, it can be classified into six types.



BT2-1600P
(Fixed type)

BT2-2500X
(Draw-out type)

■ Type number nomenclature



Types and specifications

Frame size	1600A		2000A		2500A		4000A		6300A				
Basic type	BT2-1600		BT2-2000		BT2-2500		BT2-4000		BT2-6300				
No. of poles	3	4	3	4	3	4	3	4	3	4			
Rated current (A)	200, 400, 630, 800, 1000, 1250, 1600		630, 800, 1000, 1250, 1600, 2000		1250, 1600, 2000, 2500		2000, 2500, 2900, 3200, 3600, 4000		4000, 5000, 6300				
Rated current of the neutral pole (IN)	100% In		100% In		100% In		100% In		100% In				
Rated insulation voltage (Ui)	1000		1000		1000		1000		1000				
Rated operational volage (Ue)	690		690		690		690		690				
Rated ultimate short-circuit breaking capacity (Icu kA, sym)	690VAC *1	40	50		50		75		85				
	400VAC	50	80		85		100		120				
Rated service short-circuit breaking capacity (Ics kA, sym)	690VAC *1	25	50		50		75		85				
	400VAC	50	80		85		100		120				
Rated making current (kA, peak)	690VAC *1	84	105		105		165		187				
	400VAC	105	176		187		220		264				
Rated short time withstand current (Icw) (kA, rms)	690VAC *1	25 (0.5s)	40 (1s)		50 (1s)		75 (1s)		85 (1s)				
	400VAC	42 (0.5s)	60 (1s)		65 (1s)		85 (1s)		100 (1s)				
Rated impulse withstand voltage (Uimp) (kV)	12		12		12		12		12				
Installations													
	Fixed	P	●	●	●	●	●	●	●	●	●		
	Draw-out	X	●	●	●	●	●	●	●	●	●		
Main circuit terminal connection													
	Fixed	Horizontal	●	●	●	●	●	●	●	●	●		
		Vertical	●	●	●	●	-	-	●	●	●	●	
	Draw-out	Horizontal	●	●	●	●	●	●	●	●	●	●	
		Vertical	●	●	●	●	●	●	●	●	●	●	
Dimensions													
	Fixed	W	254	324	362	457	362	457	414	527	782	1008	
		H	320	320	395	395	395	395	395	395	395	395	395
		D	197	197	290	290	290	290	290	290	290	290	290
	Draw-out	W	248	318	347	442	347	442	401	514	767	993	
		H	351.5	351.5	438	438	438	438	438	438	438	475.5	475.5
		D	297	297	390	390	390	390	390	395	395	395	395

Note: *1 Cannot be used for an IT distribution system.

● Available

Intelligent controller (OCR)

Selecting OCR's, it can be classified into six types

Type	L25 Option	M25 Standard	M26 Option	H26 Option	P25 Option	P26 Option
Overcurrent protection (Long-time, Short-time, insantaneous)	●	●	●	●	●	●
Ground-fault protection	-	-	●	●	-	●
Load monitor function	-	○	○	○	○	○
Indication	Light Columnar	LED	LED	LED	LCD	LCD
Power, electric energy, power-factor, frequency indication	-	○	○	●	-	-
Alarm function (pre-trip alarm, overload alarm)	-	-	-	-	●	●
Test function	●	-	-	-	-	-
Contact Welding indication	●	●	●	●	●	●
Self-diagnosis function	-	●	●	●	●	●
MCR funciton	-	●	●	●	●	●
Fault-memory funciton	-	●	●	●	●	●
Current-imbalance indication	●	●	●	●	●	●
Thermo-analogue function	-	●	●	●	●	●
Harmonic analysis function	-	-	-	-	○	○
ZSI function	-	○	○	○	○	○
Communication function	-	-	-	●	○	○

Note: ● Represents fundamental functions, ○ Represents selective functions, - Represent no such functions

Transducers WS2 Series

Transducers That Mount to a 16-slot Base Unit with Individual Power Switches. A Tester Can Be Used While the Transducer Is Mounted.

■ Features

- Recommended for customers that line up many Transducers for instrumentation.
- Power switches are built into the multislot Base Unit. There's no need for separate switch boxes.
- CE Marking for most Types.



■ Types and Ratings

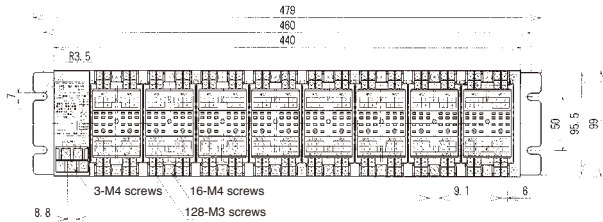
Type and name	Type	Input	Output 1	Output 2
Eight-slot Base Unit	WS2BA-08	—	—	—
Sixteen-slot Base Unit	WS2BA-16	—	—	—
DC-isolated Transducer (Isolator)	WS2DC	DC voltage or current	DC voltage or current	DC voltage or current
DC-isolated Transducer (High-speed Isolator)	WS2HS			
DC-isolated Transducer (Super-high-speed Isolator)	WS2US			
Isolated Distributor	WS2DY	4 to 20mA DC(24V DC)		
Thermocouple Transducer	WS2TC	B, R, S, K, E, J, T, or N thermocouple		
Resistance-bulb Transducer	WS2PT	PT100, 50, or JPT100Ω		
Potentiometer Transducer	WS2PM	From 0 to 100 to 10kΩ		
Tachogenerator Transducer	WS2TG	220V or 24V _{p-p} max., 0 to 1kHz		
AC Voltage Transducer	WS2CV	0 to 300V AC		
AC Current Transducer	WS2CA	0 to 5A AC		
Analog Signal Selector	WS2RP	4 to 20mA DC or 1 to 5V DC	4 to 20mA DC or 1 to 5V DC	4 to 20mA DC or 1 to 5V DC
Overspeed Detector (Monitor Relay)	WS2MR	No-voltage contacts, open-collector signal	Optical MOSFET, 1NO contacts	Optical MOSFET, 1NO contacts
Analog Output Setter (Manual Setter)	WS2MS	—	DC voltage or current	DC voltage or current
Zero-speed Detector for Pulse Input	WS2ZL	Power Generator Unit speed: 10kHz	Optical MOSFET, 1NO contacts	—
Zero-speed Detector for Sine Wave Input	WS2ZA	Power Generator Unit speed: 1kHz 50V or 24V _{p-p} max.	Optical MOSFET, 1NO contacts	Optical MOSFET, 1NO contacts
Slow-pulse (F/V) Transducer	WS2SP	0 to 10kHz	DC voltage or current	Open collector
Alarm Setter (2 sets of contacts)	WS2AS	DC voltage or current	Relay contacts	Relay contacts
Socket for Stand-alone Installation with 1 Output	WS211	—	—	—
Socket for Stand-alone Installation with 2 Outputs	WS212	—	—	—

Common Specifications

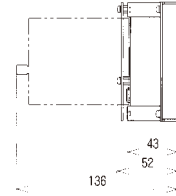
Item	Specification	
Auxiliary power supply inrush current (per unit)	Approx. 2.4A, 2.7ms max. at 24V DC, approx. 2.4A 1.0ms max. at 48V DC, approx. 2.2A 0.6ms max. at 110V DC, approx. 3.2A 0.6ms max. at 110V AC, and approx 6.3A 0.6ms max. at 220V AC	
Momentary overload capability	Input	2 times rated voltage for 10 s
	Auxiliary power supply	10 times rated current for 5 s
Continuous overload capability	Input	1.2 times rated voltage continuously
	Auxiliary power supply	1.2 times rated voltage continuously
Insulation resistance	Between all electric circuits and external case	50MΩ with 500V DC insulation resistance tester
	Between input and output terminals	
	Between I/O terminals and auxiliary power supply terminals	
	Between alarm output 1 and alarm output 2	
	Between output 1 and output 2	
Dielectric strength	Between all electric circuits and external case	2,000V AC (50/60Hz) 1 min
	Between input and output terminals	
	Between I/O terminals and auxiliary power supply terminals	However, 1,500V AC (50/60Hz) for 1 min between input and output terminals on the WH2HS or WH2US.
	Between alarm output 1 and alarm output 2	500V AC (50/60Hz) 1 min
	Between output 1 and output 2	2,000V AC (50/60Hz) 1 min
Lightning impulse withstand voltage	Between I/O terminals/selection signal terminals and auxiliary power supply	5kV 1.2/50μs 3 times each for positive and negative poles
	Between all electric circuits and external case	
Vibration resistance	16.7Hz, 4mm double amplitude 1 hour each in X, Y, and Z directions	
Shock resistance	294m/s ² 3 times each in both directions on X, Y, and Z axes	
Operating temperature and humidity ranges	-10 to 55°C, 5% to 90% RH (with no condensation)	
Storage temperature range	-20 to 70°C	
Exterior color	Munsell N1.5 (black)	
Case material	Fire-resistant ABS resin (V-0)	

Dimensions, mm

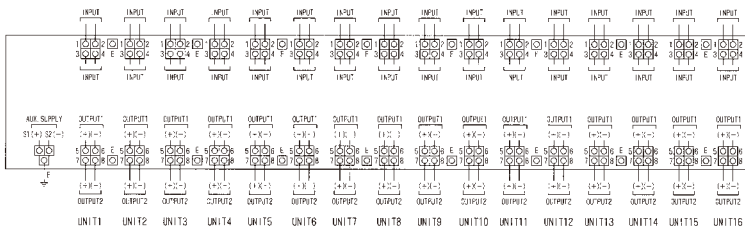
• WS2BA-16□Y-B00



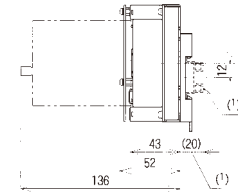
Wall Mounting



• External Wiring Diagram



Rail Mounting

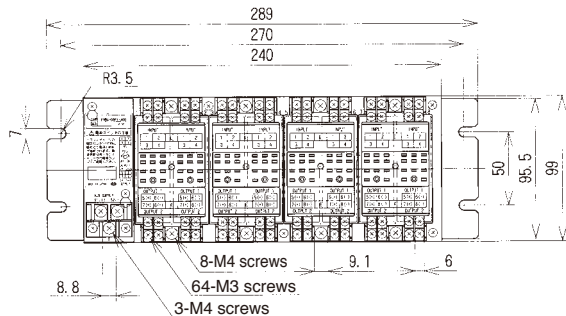


*1 This example is for IEC 35mm rail (height of 15).

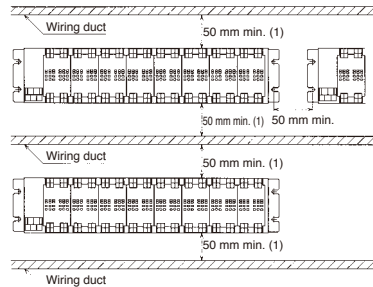
Use an IEC/DIN 35mm-wide reinforced rail. Recommended Product: TH35-15AL from Fuji Electric FA Components and Systems Co., Ltd.

*1 All ground terminals are internally connected. The ground terminals are insulated from the Base Unit (frame ground).
*2 Two Transducers are used for one WS2AS Alarm Setter.

• WS2BA-08□Y-B00



• WS2BA Connection Diagram



*2 To ensure proper heat dissipation, observe the dimensions in the above figure during installation. To use accessories or separately sold items, provide extra room to allow space for wiring.

**New
Products**

Fuji Electronic Meters

Three-phase Current/Voltage Meters WE1SA and 1SV

Ideal for Measuring Three-phase Currents and Voltages for Distribution, Busbars, and Feeders.

■ Features

- The same Type can be used for 3-phase 3-wire, single-phase, and single-phase 3-wire systems. Specifications in parentheses are the measurement specifications: Three-phase Ammeter (peak demand, demand, and instantaneous demand), Three-phase Voltmeter (voltage and frequency).
- Displays one bar graph and four digital measurements at the same time.
- Three analog output circuits and one alarm output circuit are available. Output element can be selected with a setting. (Optional)
- Resetting is possible from an external control input. (Optional) Also, a setting can be used to select the alarm output, the maximum/minimum value and alarm output, or the maximum/minimum value.
- Use either an 85 to 264V AC or 80 to 143V DC power supply.
- Mounting dimensions are compatibly with previous 110×110mm mechanical meters. Mounts to two holes on a diagonal line.



- Backlight provided as a standard feature. Set the backlight to light, not light, or go out automatically, and set the brightness (white light only). LED color: Green or white
- Types available for top-row and bottom-row mounting.
- All Types are RoHS compliant (EU Directive 2002/95/EC).

■ Types and Ratings

Product name	Type	Input circuit	Input range
Three-phase Ammeter	WE1SA-AF511-000	3-phase 3-wire Single-phase	5A
Three-phase Voltmeter	WE1SV-AFD11-000	Single-phase 3-wire common use	150、300V common use

■ Rating, Specifications, and Measurement Ranges

Ratings	Type	WE1SA Ammeter		WE1SV Voltmeter		
	Input circuit/input	3-phase 3-wire, single-phase 3-wire, or single-phase	5A AC 50/60Hz	3-phase 3-wire, single-phase 3-wire	110V or 220V common use, 50/60Hz	Single-phase 3-wire 100 to 200A AC*1 50/60Hz
Specifications	Measured element	Current		Voltage	Frequency	
	Measurement range/display specifications	Peak demand, demand, and instantaneous demand; 5A to 30kA AC		150V to 750kV AC	Range selected from 45 to 55Hz, 55 to 65Hz, or 45 to 65Hz.	
	Intrinsic error*2	Digital display	±0.5%	±0.5%	±0.5%	
		Analog outputs*3	±0.5%	±0.5%	±0.5%	
	Maximum measurement	○		○	○	
	Minimum measurement	○		○	○	
	Bar graph display	The main monitoring element can be set for a bar graph display and secondary monitoring elements can also be displayed.				
	Operating method	Current: Effective value calculation, Demand current: Calculation according to thermomotive Type		Voltage: Effective value calculation, Frequency: Zero-cross frequency calculation		
	Time setting	Demand current	0 s, 5 s, 10 s, 20 s, 30 s, 40 s, 50 s, 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 7 min, 8 min, 9 min, 10 min, 15 min, 20 min, 25 min, or 30 min (95% time)		-	
	Display-selectable elements	Main monitor	Current (each phase), demand current (each phase), or peak demand current (each phase)		Voltage (each phase and line) or frequency	
Secondary monitor (left)		Current (each phase)		Voltage (each phase and line)		
Secondary monitor (middle)		Current (each phase), demand current (each phase), or peak demand current (each phase)		Voltage (each phase and line)		
Secondary monitor (right)		Current (each phase), demand current (each phase), or peak demand current (each phase)		Voltage (each phase and line) or frequency		
Bar graph		Current (each phase), demand current (each phase), or peak demand current (each phase)		Voltage (each phase and line) or frequency		
Options	Analog outputs (3 circuits), 1 alarm output, and 1 external control input					
Remarks	Phase switched between R, S, and T.*4 Displayed separately from measurement ranges, and output range can be set.		Lines switched between RS, ST, and TR.*5		Frequency is 0.0Hz if input is less than 20% of measurement range. The output has a lower-limit limiter value (lower limit - 1%: percentage of output span).	

Type	WE1SA Ammeter		WE1SV Voltmeter		
Measurable ranges	Measured element	Current	Demand current	Voltage	
	Input	0 to 5A AC		0 to 150V AC [0 to 300V AC] *7	
	Display	120% of meter fullscale *6	200% of meter fullscale *6	101% of meter fullscale	45 to 55Hz, 55 to 65Hz, 45 to 65Hz
		Analog outputs	120% of output span	120% of output span	101% of output span

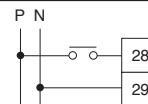
*1 The rated voltage for each phase and the N phase is 100V. However, if the fullscale input voltage is set to 150V, RN and TN are 150V and RT is 300V on the bar graph. If the fullscale input voltage is set to 300V, RN, TN, and RT are 300V on the bar graph.
 *2 Due to the operating principle, the error will increase if the following inverter outputs are measured directly. Cyclic control, SCR phase angle control, or PWM control.
 *3 The analog outputs, alarm output, and external control output are optional.
 *4 Displays are as follows: Single-phase 3-wire (R-T-N): R-T-N, single-phase 3-wire (R-S-N): R-S-N, single-phase 3-wire (S-T-N): S-T-N, and single-phase: No phase display.
 *5 Displays are as follows: Single-phase 3-wire (R-T-N): RN-TN-RT, single-phase 3-wire (R-S-N): RN-SN-RS, single-phase 3-wire (S-T-N): SN-TN-ST, and single-phase: No wire pair display.
 *6 If the number of display digits is exceeded, the maximum display value is 9,999 for a 4-digit display and 999 for a 3-digit display even if the value is within the measurement range.
 *7 Values in brackets [] are for 300V.

Optional Specifications

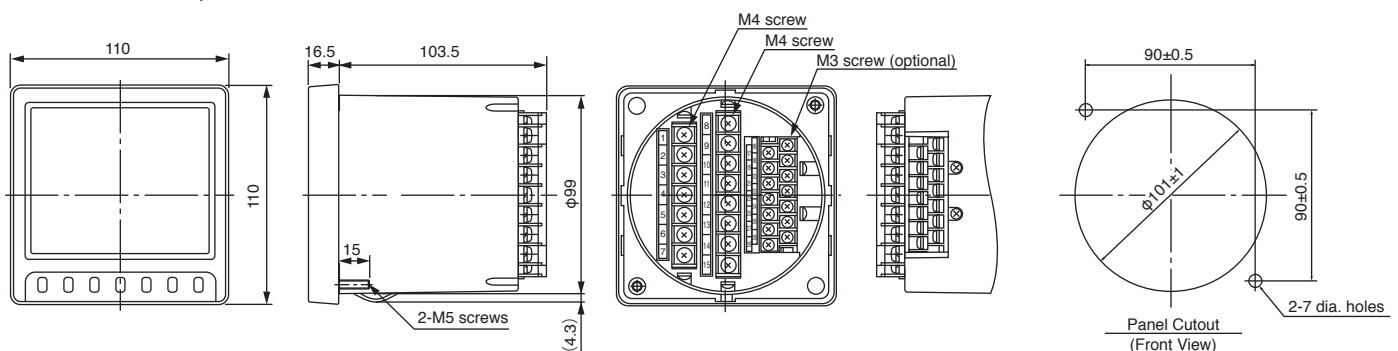
Type	WE1SA Ammeter		WE1SV Voltmeter		
Analog outputs	Number of outputs	3 circuits (negative common)			
	Output specifications	4 to 20mA DC (550Ω max.)			
	Outputable elements	Current (each phase), demand current (each phase), or peak demand current (each phase)	Voltage (each phase and line) or frequency		
	Response time	1 s max. (time required to reach ±1% of final steady-state value)			
Alarm output	Output ripple	Within two times the intrinsic error (percentage of output span)			
	Alarm element	Settable to demand current (OR of phases, individual phase, OR of phases except composite phases) or alarm OFF.	Settable to voltage (OR of lines (phases) or individual line (phase)) or alarm OFF.		
	Resetting method	Automatic reset or manual reset (setting)			
	Output contacts	No-voltage NO contacts			
	Contact capacity	250V AC 5A or 125V DC 0.3A for resistive load, 250V AC 2A or 125V DC 0.1A for inductive load			
	Alarm element	Item	Specification		
	WE1SA: Demand current, WE1SV: Voltage	Function	Alarm display and alarm output for demand current ≥ Upper-limit setting	Alarm display and alarm output for measured value ≥ Upper-limit setting	
		Setting accuracy	±0.5% (percentage of fullscale)	±0.5% (percentage of fullscale)	
Voltage	Setting range	5% to 100% of maximum scale value in 1% increments	30% to 150% when fullscale is 150% in 1% increments		
	Function	One of the following three functions (changed with setting) can be controlled by applying an external voltage signal.			
External control input	Alarm reset	Maximum/minimum reset	The maximum and minimum values are reset to the current instantaneous value.		
		Complete reset	The above alarm reset and maximum/minimum reset are both performed.		
		Minimum operating pulse width	300ms, Continuous application is possible.		
	Input ratings	The input ratings are the same as the auxiliary power supply ratings. 100/110V AC 0.4VA, 200/220V AC 1.4VA, or 100/110V DC 0.4W Accepts AC or DC. Contact capacity: Approx. 3mA at 100/110V AC/DC, approx. 6mA at 200/220V AC			

Precaution on External Display Selection Input (Optional)

The external power consumption is 0.4VA at 110V AC, 0.4W at 110V DC, and 1.4VA at 220V AC. If you use a relay or switch on the power supply, use one with a minimum applicable load of approx. 1mA.



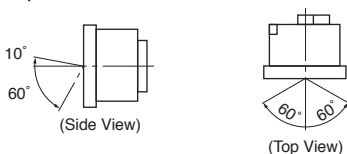
Dimensions, mm



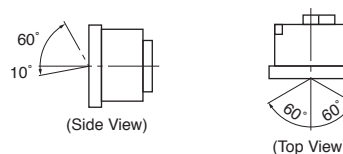
Precautions for Correct Use

Mounting: The contrast of the LCD depends on the view angle. Adjust the installation location for the best angle.

(1) Top-row Installation



(2) Bottom-row Installation



Energy Monitoring Units F-MPC Series

One-circuit AC Energy Monitoring Unit F-MPC04E

**A One-circuit AC Energy Monitoring Unit at an Affordable Price.
Even Easier Setup and Operation**

■ Features

- An in-panel F-MPC-series Energy Monitoring Unit for one circuit.
- Standard-feature RS-485 communications.
- The functionality of the F-MPC04S was refined to create a more affordable price.
- A compact, lightweight design that is 1/2 the size and 1/3 the weight of the F-MPC04S.
- Power consumption is also 30% less than the F-MPC04S.
- Easy setup with rotary and DIP switches.



- A separately sold Display enables in-panel display of measured data.



■ Types and Ratings

Product name	Type	
One-circuit Energy Monitoring Unit	UM05-AR3	
Display and Setup Unit	UM05X-S	
Split-type CT (Made by Fuji Electric Technica)	Primary rated current 5A	CC2D81-0057
	50A	CC2D81-0506
	100A	CC2D71-1004
	200A	CC2D65-2008
	400A	CC2D54-4009
800A	CC2D52-8009	



■ Specifications

• Basic Specifications

Item	Specification	
Ratings	Voltage	100 to 240V AC (allowable operating voltage range: 85 to 264V AC) (Same input terminals are used for measurement and control power supply. Control power supply is input across the U and V terminals.)
	Frequency	50/60Hz (allowable range :47.5 to 63Hz)
	Current (CT primary/secondary)	5A/7.34mA AC, 50A/73.4mA AC, 100A/33.3mA AC, 200A/66.7mA AC, 400A/133.3mA AC, and 800A/133.3mA AC
Power supply	Load VA	6VA
	Inrush current	30A, 3ms(240V) 15A, 3ms(100V)
Insulation resistance	Between all electric circuits and ground (case/DIN rail): 10MΩ min. Between all I/O circuits and ground: 10MΩ min. Between all electric circuits and all I/O circuits: 5MΩ min.	
Vibration resistance	10 to 58Hz, 0.075mm one-way amplitude, 58 to 150Hz, 10m/s ² constant acceleration 10 cycles for 8 min each in X, Y, and Z directions (with bracket to prevent shifting)	
Shock resistance	294m/s ² sine half wave for 11ms 3 times each in X, Y, and Z directions (with bracket to prevent shifting)	
Dielectric strength	Between all terminals and ground (case/DIN rail): 2,000V AC for 1 min Between all electric circuits and all I/O circuits: 2,000V AC for 1 min	
Noise immunity Criteria B	Damped oscillating waveform at 1 to 1.5MHz with peak voltage of 2.5 to 3kV for 2 s Square wave, 1.5kV, 1ns/1μs continuously for 10 min Radiated electromagnetic field: 20V/m *1 Static electricity: Air discharge: 8kV, Contact discharge (case): 4kV Burst noise: Control power supply: 2kV, CT input (clamp): 2kV, I/O (clamp): 1kV	
Overload capability	Current circuits	1.1 times maximum scale value (1.25 times rated current) for 2 hours
	Voltage circuits	1.1 times maximum scale value for 2 hours
Ambient operating temperature	-10 to 55°C	
Storage temperature	-20 to 70°C	
Relative humidity	20% to 90% (with no condensation)	
Atmosphere	No corrosive gas or excessive dust or dirt	
Permissible momentary power interruption time	20ms (Communications and measurements are interrupted.)	
Mass	Measurement Unit: Approx. 120g (without CT)	
	Display: Approx. 70g (without connecting cable)	

Note : Operation of the Energy Monitoring Unit may temporarily stop when subjected to strong radiowaves.

• Measurement Specifications

(1) Current Value Display

Item		Measurement range	Accuracy*1
Voltages	3-phase line voltages*2 (Vuv, Vvw, and Vwu)	85 to 264V	Vuv and Vvw : ±1.0% FS Vwu : ±2.5%FS
	3-phase current (Ir, Is, and It)*2	0.4% to 125% of rating (50A CT: 0.4% to 100%, 100A CT: 0.4% to 120%)	Ir and It : ±1.0% FS Is : ±2.5%FS
Active power*3	Reverse power flow is negative.	Depends on current and voltage measurement ranges (current × voltage × √3)	±1.0%FS
Reactive power*3	(Reactive power measurement method)	Same as above.	±1.5%FS
Active power consumption*3	Forward active power consumption	Display: 6 digits F-MPC-Net communications: 4 digits	Equivalent to JIS normal class. 2.0% at power factor of 1.0 and 5% to 120% of rated current
	Reverse active power consumption	MODBUS communications: 9 digits	2.5% at power factor of 0.5 and 10% to 120% of rated current
Power factor	(Reactive power measurement method)	0 to ±1.000	±3.0%FS (90° phase angle conversion)

Notes : • The accuracy does not include the error of an externally connected CT or VT.
 • A 3-phase 3-wire, single-phase 3-wire, or single-phase 2-wire system is automatically detected and measured. For a single-phase 2-wire system, Vvw, Vwu, Is, and It will be zero.
 • The active power, reactive power, and active power consumption are measured for the following ranges: 85 to 264V and 0.4% to 125% current.

(2) Period Measurement Values

Item	Display	Communications	Accuracy	Remarks
Voltages	Maximum period voltages (Vuv and Vvw)	○	±2.5%FS (VT error is not included.)	The maximum and minimum values are the actual values for one cycle of a commercial frequency. During the period (1 min), the previous maximum, average, and minimum values are retained.
	Average period voltages (Vuv and Vvw)			
	Minimum period voltages (Vuv and Vvw)			
Currents	Maximum period currents (Ir and It)	○	±2.5%FS (CT error is not included.)	
	Average period currents (Ir and It)			
	Minimum period currents (Ir and It)			

Note : The values for each minute are sent in communications responses. (They do not appear on the display.)

• Communications Specifications

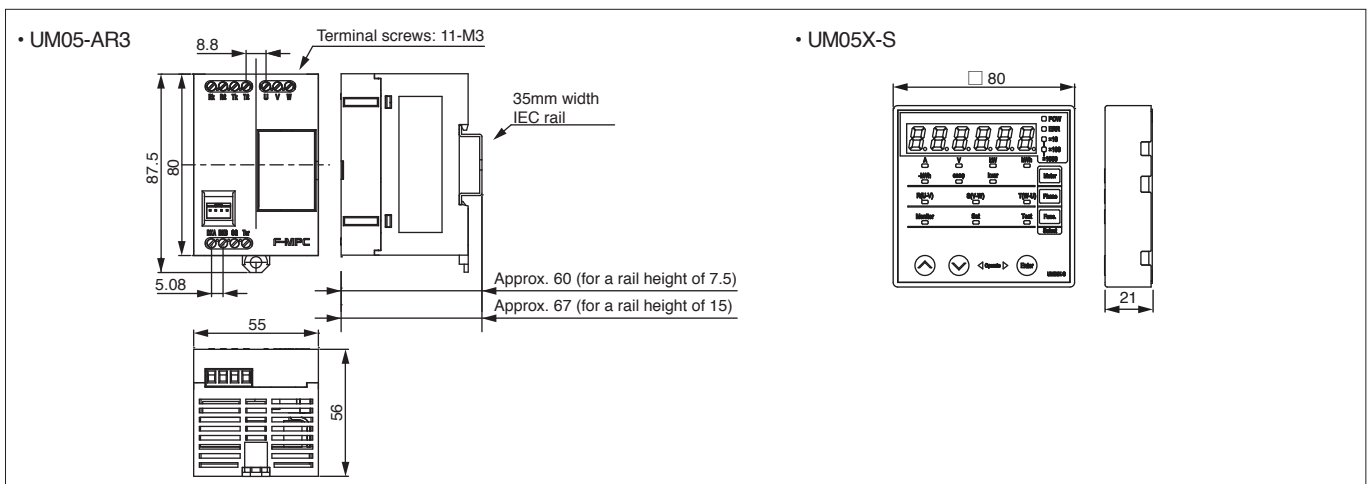
Either the F-MPC-Net or MODBUS/RTU protocol is selected for RS-485 communications.

Item	Specification		
	F-MPC-Net	MODBUS/RTU	
Standard	EIA-485		
Transmission method	Half-duplex, 2-wire		
Data transfer method	1:N (Energy Monitoring Unit), polling/selective		
Synchronization method	Start-stop		
Transmission distance	1,000m (total distance)		
No. of connected nodes	64 max.*1 per network (The master is counted as a node.)		
Baud rate	4,800, 9,600, 19,200, or 38,400 bps (selectable)		
Address setting	1 to 99*2 (MODBUS/RTU protocol: 1 to 99)		
Connection method	Terminal block		
RS-485 terminal names	DXA and DXB	Use DXA for the D1(+) connection and DXB for the D0(-) connection.	
Transmitted characters	ASCII	Binary	
Data format	Start bits	1 (fixed)	1 (fixed)
	Data length	7 or 8 bits (selectable)	8 bits (fixed)
	Parity bit	None, even, or odd (selectable)	None, even, or odd (selectable)
	Stop bits	1 (fixed)	No parity: 2 bits (fixed) Other: 1 bit (fixed)
	BCC	Even horizontal parity	CRC-16

Default settings: F-MPC-Net protocol, 19,200bps baud rate, 7-bit data length, and odd priority. (A UM05X-S Display and Setup Unit is required to change the default communications settings.)

- *1 If 32 device nodes are connected, each device node is counted as two nodes, reducing the maximum number of connected nodes.
- *2 Communications addresses are set on rotary switches. Even for MODBUS/RTU, set the address on the Energy Monitoring Unit to between 1 and 99. Communications are disabled if the communications address is set to 00.

■ Dimensions, mm



Energy Monitoring System F-MPC I/O Unit

Digital I/O Unit Now Available to Monitor Energy Usage (Electricity, Gas, Water, Etc.) and Equipment Operating Status. Include a F-MPC Web Unit to easily build a monitoring system.

■ Features

- The energy monitoring system uses the F-MPC-Net communications protocol to monitor ON/OFF status, measure pulse signals, output alarm relays, and read flow meters.
- Use the DI/DO Unit to input ON/OFF signals, count total pulses, and control the ON/OFF status of relay outputs.
- Use RS-485 2-wire communications to send input status to a host, control relay outputs with ON/OFF commands from the host, and more.



■ Type and Ratings

Product name	Specification	Type
DI/DO Unit	6 inputs (contact or transistor inputs) and 4 relay outputs (250V AC 1A)	UM11-D0604

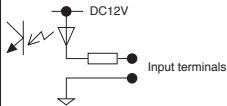
■ Specifications

• Basic Specifications

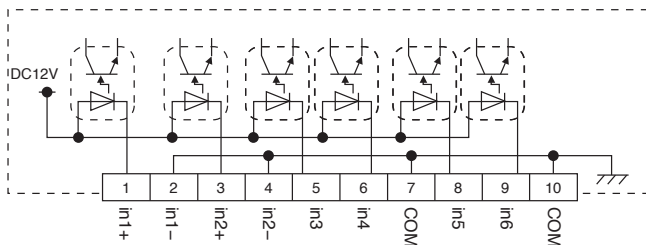
Item	Specification	
Control power supply	Ratings	100 to 240V AC (allowable range: 85 to 264VAC), 50/60Hz (allowable range: 47 to 63Hz)
	Consumed VA	Max. 8.5VA
	Inrush current	20A max.
Ambient temperature	-10 to 55°C	
Storage temperature	-20 to 70°C	
Relative humidity	20% to 90% (with no condensation)	
Atmosphere	No corrosive gas or excessive dust or dirt	
Enclosure	IP20	
Insulation resistance	Between all control power supply terminals and other terminals: 10MΩ min.	
Commercial frequency dielectric strength	Between all control power supply terminals and other terminals: 2,000V AC for 1 min	
Noise immunity	Damped oscillating waveform at 1 to 1.5MHz with peak voltage of 2.5 to 3kV for 2 s, square wave, 1.5kV, 1ns/1μs continuously for 10 min Burst noise: Control power supply: 2kV, communications line: 1kV; Surge: Control power supply: 2kV, communications line: 1kV	
Static electricity noise immunity	Air discharge: 8kV, Contact discharge (case): 4kV	
Shock resistance	294 m/s ² [30G] 3 times each in 3 directions (no malfunction for 147m/s ² [15G] in 2 directions)	
Vibration resistance	19.6m/s ² , 16.7Hz for 30 min each in X, Y, and Z directions	
Permissible momentary power interruption time	20ms (Operation continues.)	
Mounting method	Screw mounting or mounting to IEC 35mm rail	
Mass	250g	

• I/O Specifications
(1) DI (Digital Input)

There are 6 digital inputs, and they can be used to read ON/OFF status and count pulses. With 2 of the 6 digital inputs, pulse widths of 10 ms or longer can be counted. With the other 4 digital inputs, pulse widths of 50 ms or longer can be counted. ON/OFF status can also be sent via communications. The total count values for pulses can also be sent via communications.


Item	Specification	Remarks
Digital input type	Contact or transistor inputs	The service power supply voltage is always applied.
Minimum input signal width	in1 and in2: 10ms, in3 to in6: 50ms	For a pulse input, the ON period and OFF period must be the same or longer than the minimum input signal width.
Operating time measurement	Time error: $\pm 1.0\%$ (minimum value: $\pm 1s$)	The total ON time is calculated in seconds.
ON current	ON for 4mA or higher	While an input is ON, a current of approx. 5mA will flow.
OFF current	OFF for lower than 1mA	
Internal Circuits	Input circuit for 1 input 	There are two terminals each for the in1 and in2 inputs. The in3 and in4 inputs share a common, and the in5 and in6 inputs share a common. The ground terminal is internally connected to the common terminals.

• Circuit Configuration Diagram



(2) DO (Digital Output)

There are 4 digital outputs and their ON/OFF status can be controlled via communications.

Item	Specification	Remarks
Digital output type	Relay outputs (NO contacts)	Equivalent to RB105 card relays.
Continuous carry current	250V AC 1A (continuous carry current)	
Maximum switching frequency	1,800 times/h	
Switching life	600,000 operations at 220V AC 1A, resistive load 200,000 operations at 220V AC 1A, inductive load 900,000 operations at 110V AC 1A, resistive load 300,000 operations at 110V AC 1A, inductive load 600,000 operations at 24V DC 1A, resistive load 120,000 operations at 24V DC 1A, inductive load	Value for conduction factor of 40% with switching frequency of 1,800 times per hour. Inductive load time constant: L/R = 15ms
Internal circuits		There are two terminals for each output.

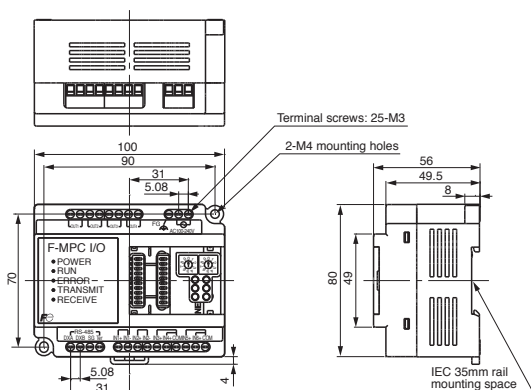
• Communications Specifications

Item	Specification	
	F-MPC-Net	MODBUS/RTU
Standard	EIA-485	
Transmission method	Half-duplex, 2-wire	
Data transfer method	1:N (I/O Unit), polling/selective	
Transmission distance	1,000m (total distance)	
No. of connected nodes	64 max. per network (The host is counted as a node.) (See note 1.)	
Baud rate	4,800, 9,600, 19,200, or 38,400 bps (selectable)	
Address setting	1 to 99 (See note 2.)	
RS-485 terminal names	DXA and DXB	Use DXA for the D1(+) connection and DXB for the D0(-) connection.
Transmitted characters	ASCII	Binary
Data format	Start bits	1 (fixed)
	Data length	7 or 8 bits (selectable)
	Parity bit	None, even, or odd (selectable)
	Stop bits	1 bit (fixed)
	BCC	Even horizontal parity
		CRC-16

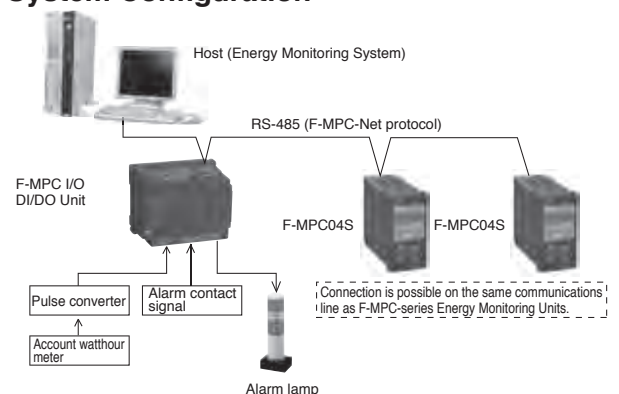
(See note 1.) If 32 device nodes are connected, the maximum number of connected nodes may be reduced.

(See note 2.) Communications addresses are set on rotary switches. Even for MODBUS/RTU, set the address on the I/O Unit to between 1 and 99. Communications are disabled if the communications address is set to 00.

• Dimensions



■ System Configuration



Split-type Current Transformers CC2D

Lineup Includes New 100A and 800A CTs for the F-MPC.

■ Features

Together with previous 5A, 50A, 200A, and 400A CTs, the six Types make it even easier to handle system needs. Special specifications just for the Fuji F-MPC-series Energy Monitoring Units.

- Clamp construction for easy installation.
- Large K to L indications to easily identify the primary conductor direction.
- Built-in clamping diode. The CT will not burn out even if the secondary circuit is open.



■ Types, Ratings, and Specifications

Series	Type	Rated primary current [A]	Rated secondary current [A]	Hole diameter	Rated frequency [Hz]	Overcurrent resistance	Rated load	Dielectric strength	Connection	Mass [g]
F-MPC	CC2D71-1004	100	33.33mA	16 dia.	50/60	1.0 In continuous	11.1mVA, load resistance: 10Ω	200V AC/1 min (between core and output)	Heat-resistant vinyl cable, AWG22×1,000mm included	Approx. 80
	CC2D52-8009	800	133.3mA	60 dia.	50/60	40 In continuous	0.177mVA, load resistance: 10Ω	200V AC/1 min (between core and output)	Heat-resistant vinyl cable, AWG22×1,000mm included	Approx. 500

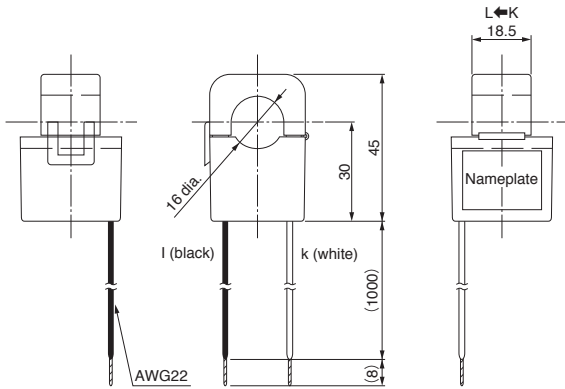
Note: Confirm the specifications of the F-MPC with which the CT is to be used.

■ Performance

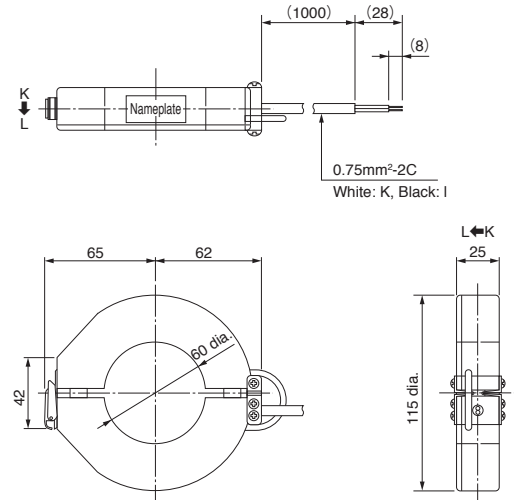
Series	Type	Relative phase difference (at 25°C)	Rated load	Dielectric strength	Connection	Ambient operating conditions
F-MPC	CC2D71-1004	±1.0%/In ±1.5%/0.2 In	1±1%/In 1±1.5%/0.2 In	500V DC/100MΩ min (between core and output lead)	7.5Vp built-in clamping diode	-20 to 75°C, 80% RH max. with no condensation
	CC2D52-8009	±1.0%/In ±1.5%/0.3 In	±60 min/In ±90 min/0.2In	500V DC/101MΩ min (between core and output lead)	3.0Vp built-in clamping diode	-20 to 75°C, 80% RH max. with no condensation

■ Dimensions, mm

• CC2D71



• CC2D52



AC Power Regulators APR-D Series

The APR-D Series is the successor to the APR-αB and APR-αC. A CPU has been mounted to greatly improve the functionality and performance of these space-saving, wire-reduction, low-cost AC Power Regulators.

Features

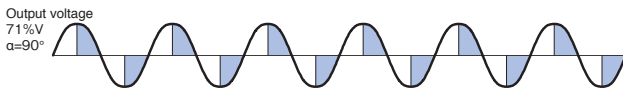
- **Continuous comb-teeth pulse control enables application with inductive loads, transformer primary control, and rectifier primary control.**

Optimum adjustment of LED illumination (phase control) is also possible.

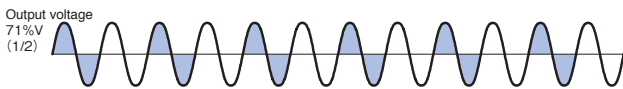
Note: The load current must be at least the minimum load current at the rated voltage.

- **The waveform control method can be changed between phase control, cyclic control, and phase angle proportional control.**

Phase Control (0% to 100%)

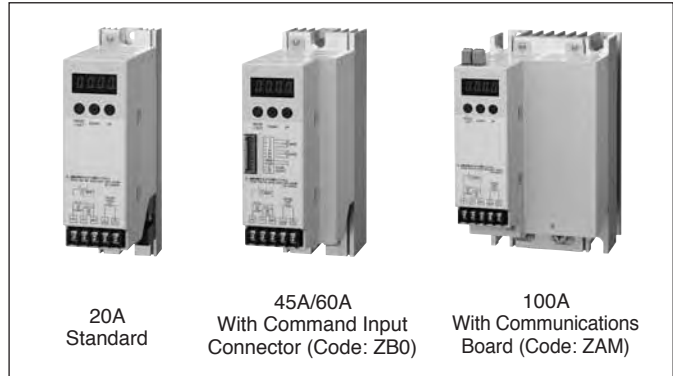
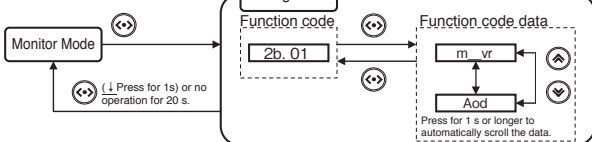


Cyclic Control (Intermittent Control)



- **The standard specifications are for no command input connector. (Reduces wiring and lowers the cost.)** For only automatic or manual settings, the function that is set for the command input terminal block can be changed to cover for the absence of the command input connector.
- **Smallest in the class: Space can be saved by tight placement (minimum spacing interval for width: 2mm).**
- **Digital settings and monitor functions are provided as standard features, including a base load setting and slope setting.**

Operation Example



- **The soft start, soft up, and soft down times can be individually set to 0 to 100.0 s.**
- **Power supply is automatically detected from 100 to 240V AC, 50/60Hz.**
- **Control methods include current-limiting control and fixed-current feedback control.** Heater burnouts can also be detected (load open state detected for cyclic control).
Note: Burnout detection is possible for one to three elements for heaters that use alloys or other elements for which temperature-dependent changes in resistance are limited.
- **Serial communications is available as an option.**
Main Unit Option Type:
ZAP: Parallel operation of up to 50 Regulators is possible. A flicker prevention function can be used for cyclic control.
ZAM: You can make settings and monitor values with RS485 (Modbus RTU) communications.
- **All Types have the CE Marking.**

Types and Ratings

Phases	Input voltage	Output current [A]	Type
Single-phase	100 to 240V common use	20	RPDE2020-T
			RPDE2020-A
		45	RPDE2045-T
			RPDE2045-A
		60	RPDE2060-T
			RPDE2060-A
100	RPDE2100-T		
	RPDE2100-A		

Note: Sets with Setup Device and main unit options are not included.

Types with control method B are available at the same price as Types with control method A.

Specifications

Item		Specifications				
Type		RPDE2020-□	RPDE2045-□	RPDE2060-□	RPDE2100-□	
Inputs	Main circuit/control circuit	Rated input voltage and frequency	Single-phase, 100 to 240V AC 50Hz/60Hz (Automatically detected.)			
		Input voltage range	±10% of rated voltage (Performance is maintained.) (See note 1.) ±15% of rated voltage (Operation is maintained.)			
		Input frequency range	50Hz/60Hz±2.5Hz			
	Control circuits	Input capacity	15VA max.			
Outputs	Rated current (at ambient temperature of 40°C) [A]	20	45	60	100	
	Cooling method	Natural cooling				
	Applicable load	Resistive load, inductive load, transformer primary control, or rectifier primary control (Only a resistive load (alloy) is supported for cyclic control.)				
	Minimum load current	0.5A (for 100% output at rated input voltage)				
	Generation loss (at rated current) [W]	30	55	70	110	
Controls	Waveform control method		Single-phase thyristor pure reverse parallel connection Phase control, cyclic control (intermittent), or phase angle proportional control			
	Output voltage adjustable range		0% to 100% of main circuit power supply voltage (effective value) (excluding thyristor voltage drop)			
	I/O characteristics		Effective value linearity characteristic: ±3% FS for phase control (with resistive load and 10% to 90% set signal) ±5% FS for cyclic control			
	Set signal	Automatic setting	Current signal: 4 to 20mA DC (Zin = 100Ω) Voltage signal: 0 to 5V DC, 1 to 5V DC (Zin = 11kΩ) SSC signal: 0V/12V DC (Zin = 11kΩ)			
		Manual setting	External variable resistor: 1kΩ (B characteristic of 1/2W min.)			
		Digital settings	Front key entry (Direct drive is possible.)			
	HIGH-LOW setting (two-position control)			Digital settings can be combined with an external variable resistor. Switching with external contact signals is possible with digital settings and the command input connector (main unit option).		
		Slope setting	Setting range	0% to 100% of output voltage		
	Base load setting	Setting device	Voltage signal setting with digital setting, external 1kΩ variable resistor, or command circuit terminal (5V-M0) (Supported only for 1 to 5 V DC.) A reverse slope characteristic is possible by combining with the base load setting.			
		Setting range	0% to 100% or output voltage			
	Soft start time Soft up time Start down time	Setting device	Digital setting. Each time is set individually.			
		Setting range	Types with T or A control method: 0 to 100 s Types with B control method: 0.5 to 100 s (See note 2.)			
	Feedback control method (phase control only)		AC CLR (Types with A control method) AC ACR + AC CLR (Types with A control method) (AC CLR is given priority in operation.)			
	Manual or automatic selection signal		No-voltage contacts			
Communications (See note 4)	Parallel operation master/slaves		Maximum number of nodes: 50, main unit option Type: ZAP (Not compatible with APR-N Series.)			
	Network communications		RS-485-compliant, 2-wire, half-duplex communications, start-stop synchronization, Modbus protocol; RTU-complaint communications, maximum number of nodes: 31, main unit option Type: ZAM			
Error detection and protection	CPU memory error		CPU memory errors are detected at startup.			
	Power supply errors		An error is detected if the control power supply is not between 45 and 65Hz.			
	No connection to automatic setting input		No connection to a current signal (4 to 20mA DC) or voltage signal (1 to 5V DC) is detected if automatic setting is specified.			
	No connection to manual setting input		No connection to a manual setting device (external variable resistor) is detected if manual setting is specified.			
	No connection to slope setting input		No connection to a slope setting device (external variable resistor or 1 to 5V DC) is detected.			
	Reversed phase detection		Negative-phase sequences are detected for the main circuit power supply and control power supply (main unit option Type Z45 only).			
	Data writing/setting errors		Read/write errors are detected for EEPROM.			
	Thyristor errors		Thyristor short-circuits are detected with an internal CT (Types with A or B control method).			
	Communications errors		Data transmission error are detected for parallel operation or network communications (main unit option Type ZAP or ZAM)			
	Current limit detection		Load currents that exceed the CLR set value are detected. The phase angle is switched to reduce the load current to within the CLR set value (Types with A or B control method).			
	Heater burnout		A burnout is detected if the APR output current goes below the burnout detection value (Types with A or B control method). (See note 3.)			
	Alarm output		Open collector, 24V DC/0.1A, 1 circuit			
	Operating environment	Ambient temperature		-10 to 55°C (Derate the load current against the rated current above 40°C and below 55°C.)		
Storage temperature		-20 to 60°C				
Ambient humidity		5% to 95% RH (with no condensation)				
Others		No corrosive gas (especially sulfidizing gas or ammonia gas), dust, or vibration. Indoors, altitude: 1,000 m max.				
Insulation	Dielectric strength (between main circuit and ground)		2,000V AC 1 min			
	Insulation resistance (against ground)		10MΩ with 500V DC insulation resistance tester			

- Notes: 1) "Performance maintained" means that the specifications are met and operation is possible. "Operation maintained" means that components are not damaged and operation is possible.
 2) The soft start, soft up, and soft down times for Types with a B control method will be invalid if they are shorter than the response speed of PI control.
 This is because PI control is given priority over the soft start, soft up, and soft down times.
 3) For cyclic control, an open load is detected.
 4) Just one of the Communications Board can be installed at the factory.

Dimensions

- Refer to catalog number HS170.

Three-phase Rail-mounting Power Filters RNFTD and RNFDS Series

Three-phase, Rail-mounting Power Filters for Output Circuits.

■ Features

- Mount either with 35mm width IEC rail or M4 screws. (No accessories are required.)
- Protection against losing terminal screws, finger protection, and terminal cover-free structure.
- Volume reduced to 61% and weight reduced to 71% of previous Fuji Electric Types.
- Greatly improve damping performance by combining RNFTD-series Input Circuit Power Filters with RNFDS-series Output Circuit Power Filters.



■ Types

● RNFTD-series Input Circuit Power Filters

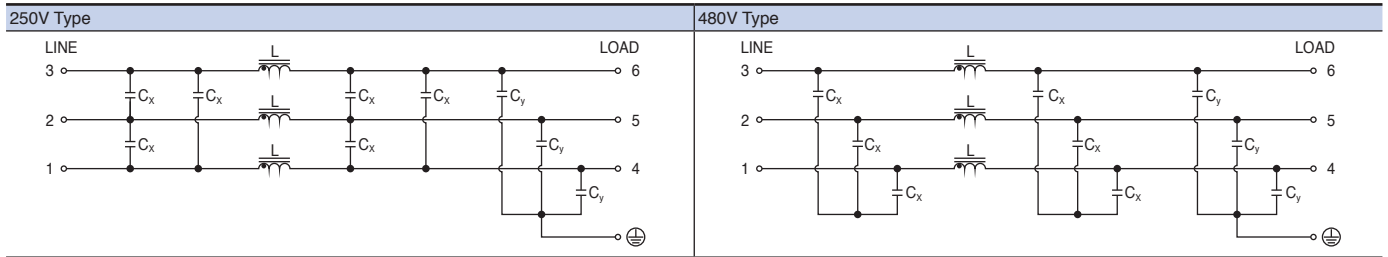
Type	Phases	Rated voltage [V]	Rated current [A]	Dielectric strength [V] (between line and ground)	Leakage current [mA]	Voltage drop [V]	Ambient operating temperature [°C]
RNFTD06-20	Three-phase	250	6	2,000V AC 1 min	1.0 max. with one phase grounded	1.0 max.	-10 to 50
RNFTD10-20			10				
RNFTD20-20			20				
RNFTD30-20			30				
RNFTD06-40			6				
RNFTD10-40	10						
RNFTD20-40	20						
RNFTD30-40	30						
	2.0 max. with neutral phase grounded						

● RNFDS-series Output Circuit Power Filters

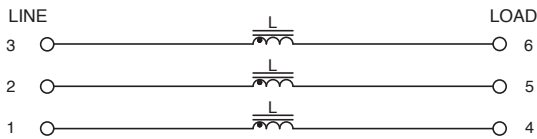
Type	Phases	Rated voltage [V]	Rated current [A]	Dielectric strength [V] (between line and ground)	Voltage drop [V]	Ambient operating temperature [°C]
RNFDS05-20	Three-phase	250	5	2,000V AC 1 min	1.0 max.	-10 to 50
RNFDS10-20			10			
RNFDS20-20			20			
RNFDS30-20			30			
RNFDS10-40			480			
RNFDS20-40	20					
RNFDS25-40	25					
RNFDS30-40	30					

■ Circuit Configurations

● RNFTD-series Input Circuit Power Filters

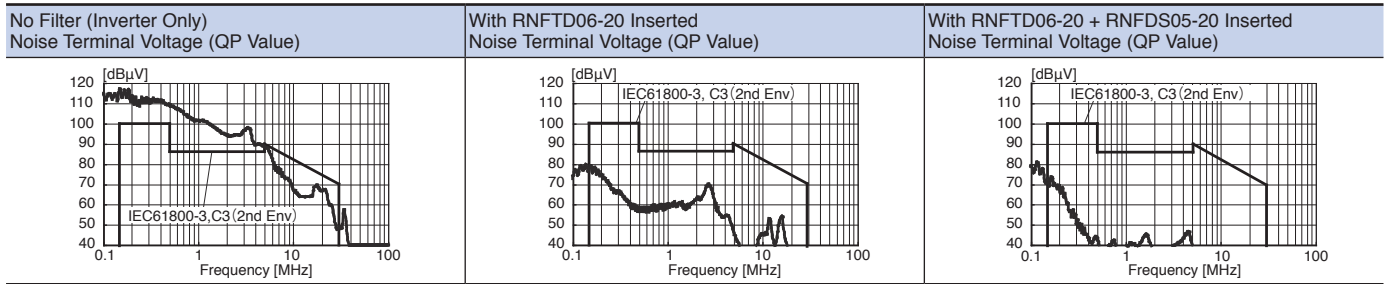


● RNFDS-series Output Circuit Power Filters

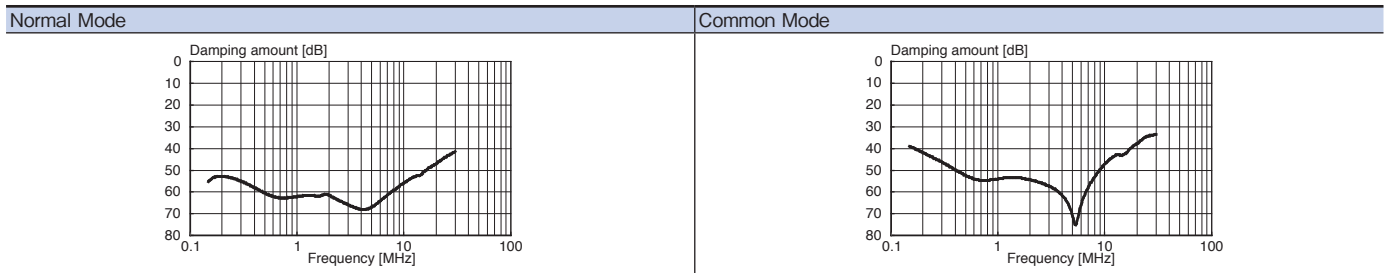


■ Noise Damping Performance Examples

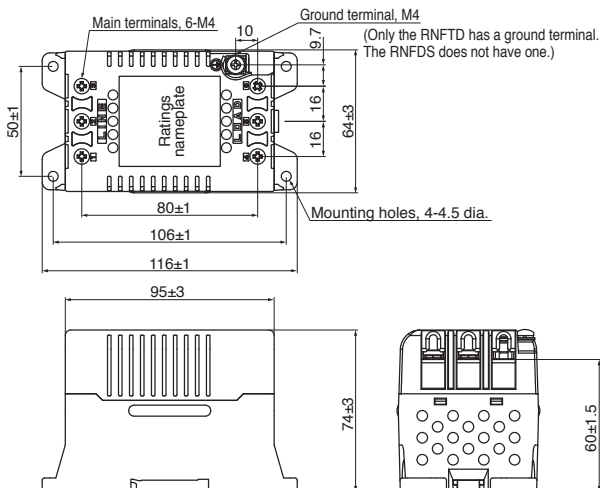
● Dynamic Characteristics (Representative Type: RNFTD06-20)



● Static Characteristics (Representative Type: RNFTD06-20)



■ Dimensions, mm



Type	Weight
RNFTD06-20	500g max.
RNFTD10-20	
RNFTD20-20	
RNFTD30-20	
RNFTD06-40	
RNFTD10-40	600g max.
RNFTD20-40	
RNFTD30-40	
RNFDS05-20	
RNFDS10-20	
RNFDS20-20	500g max.
RNFDS30-20	
RNFDS05-40	
RNFDS10-40	
RNFDS20-40	
RNFDS25-40	
RNFDS30-40	

Thermostat-type Temperature Switches PQ Series

Ideal for Temperature Control in Distribution Boards and Control Cabinets.

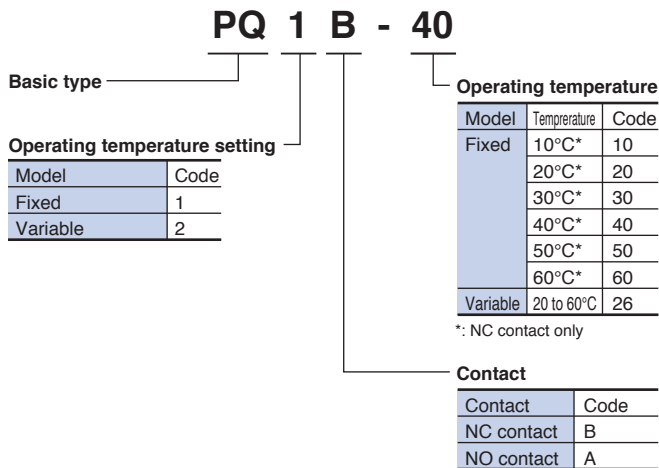
- Turn space heaters ON and OFF to control in-panel temperatures. (NC contacts)
- Turn ventilation fans ON and OFF to control in-panel temperatures. (NO contacts)

■ Features

- Types available with either fixed temperatures or variable temperatures.
- Easy mounting to DIN rails.
- Save energy and reduce CO₂ emissions by controlling temperatures.
- A thermostat is used, so no power supply is required.
- All Types are RoHS compliant (lead-free).



■ Type number nomenclature



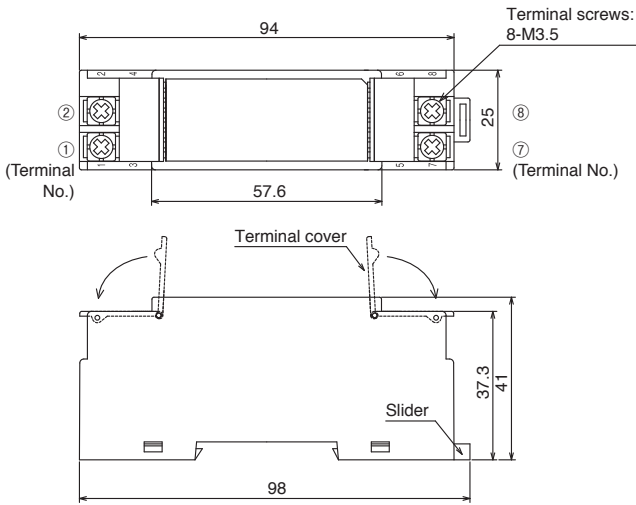
■ Specifications

Type	PQ1	PQ2
Maximum ratings	100 to 240V AC 3A (resistive load) 5 to 24V DC 1A (resistive load)	
Temperature error	Operating temperature: ±4K *4 Reset temperature: ±4K	
Differential *1	7k *2	4 to 7K *3
ON resistance	1Ω max. (initial value)	
Durability	100,000 operations	
Ambient operating temperature	-5 to 70°C	
Ambient operating humidity	90% RH max.(with no condensation)	
Mass	50g	70g

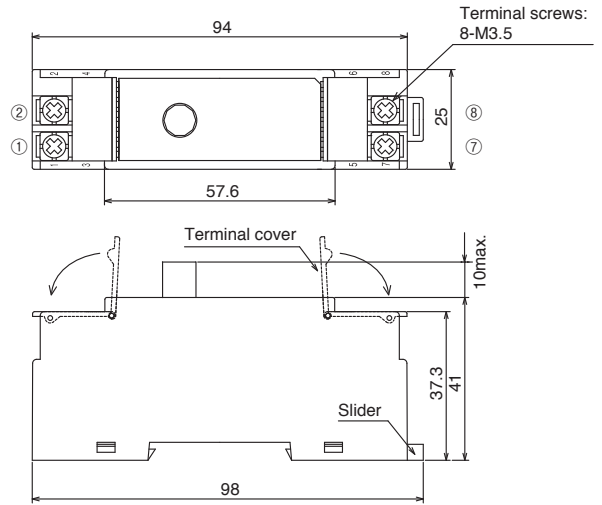
Notes: *1) The difference between ON and OFF.
 *2) For an operating temperature of 40°C, the operating temperature is 40°C±4K and the reset temperature is 33°C±4K (3K min.)
 *3) For an operating temperature of 60°C (it is a rough standard for other temperatures).
 *4) For the PQ2, this is the accuracy at 60°C (it is a rough standard for other temperatures).

■ Dimensions, mm

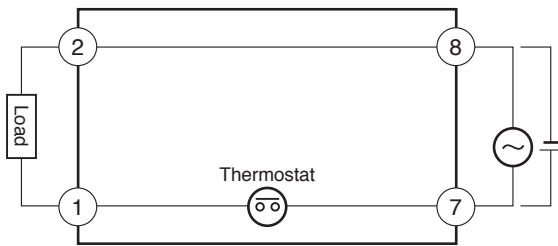
● PQ1



● PQ2



■ Connection Diagram (Terminals 1, 2, 7, and 8)



Note) The locations of the load and power supply are examples. (They could be reversed.)

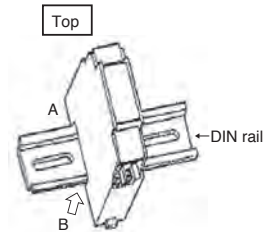
■ Precautions

- Use the unit at an installation temperature of between -5 and 70°C and at a humidity of 90% max.
- Store the unit at a storage temperature of between -10 and 70°C and at a humidity of 60% max.
- Use the unit in a location that is not subject to dust, dirt, chemicals that adversely affect electric components, or harmful gases.
- Do not subject the unit to vibration or shock.

■ Mounting and Removing

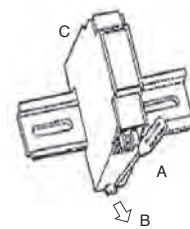
Mounting the Unit

- Hook the top of the unit onto the rail.
- Press in on the bottom of the unit.



Removing the Unit

- Pull down on the slider with a flat-blade screwdriver.
- Pull out on the unit to free the bottom.
- Remove the top of the unit from the rail.



Note) If the unit may move on the rail after it is mounted, we recommend that you use end clamps.

High-voltage Distribution Overcurrent Relays QHA-OC1 and QHA-OC2

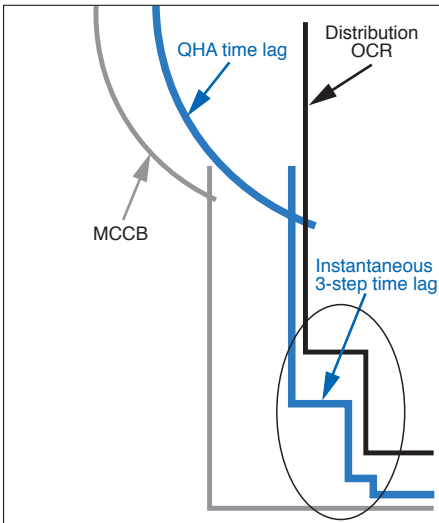
A New OCR with Enhanced Functionality.

■ Features

- Stable protection with digital operation.
- Easier coordinated protection with four time-lag characteristics.
- Three-step instantaneous characteristic for easier coordinated operation with upstream and downstream protective devices.
- Constant monitoring of internal circuits and automatic inspection of output circuits.
- Numeric confirmation of operating status.
- Mounting is compatible with previous QH Series.



Four Time-lag and Three Instantaneous Characteristics



Digital Overcurrent Relay QHA-OC1

■ LED Display

Operating status display (Selected with knob.)

- Instantaneous current
- Time-lag current
- Time-lag time

■ Set value display (when switching)

■ Error code display



Instantaneous characteristics

- Setting can be changed from 2 steps to 3 steps.

Four time-lag characteristics

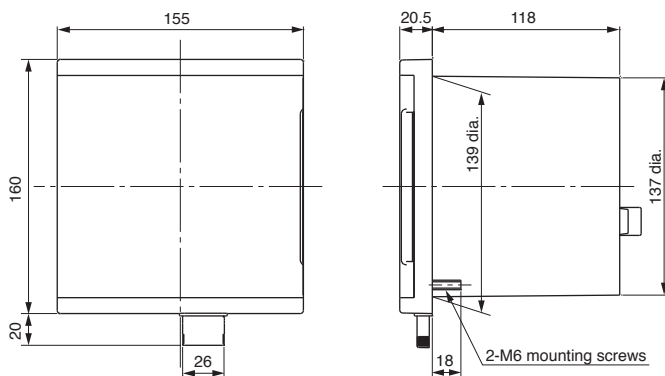
- Extremely inverse time lag (EI)
- Very inverse time lag (VI)
- Inverse time lag (NI)
- Definite time lag (DT)

Types and Ratings

Type	QHA-OC1	QHA-OC2	
Tripping method	Shunt trip	CT secondary current shunt	
Rated current	5A		
Rated frequency	50-60Hz		
Time-lag element	Operation setting	3A, 3.5A, 4A, 4.5A, 5A, 6A, or lock	
	Time-lag setting	0.25, 0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 10, 15, 20, or 30 (16 settings)	
	Operating characteristics	Extremely inverse time lag (EI) Very inverse time lag (VI) Inverse time lag (NI) Definite time lag (DT) } Switchable	
	Operation setting	10A, 15A, 20A, 25A, 30A, 50A, 60A, 80A, or lock	
Instantaneous element	Operation setting		
	Operating characteristics	2-step or 3-step (switchable)	
Display	Operation display	LED display (Lights green.)	
	Operating indicators	R phase, T phase, and instantaneous (orange)	
	Character display (red LEDs)	Start display ①	00
		Elapsed time ①	10, 20, 30, 40, 50, 60, 70, 80, or 90 (%)
		Current ②	CT secondary current for R or T phase: 2.0 to 50 [A]
Set values ③		Time-lag operation current, instantaneous time set value, and instantaneous operation current	
Self monitoring	Error code display		
Resetting method	Output contacts	Automatically reset when current drops.	
	Operating indicator	Manually reset.	
Output contacts	Trip contacts: 1NO, Alarm contacts: 1NO		
Contact capacity	Tripping contacts	Making: 100V AC 10A (L/R = 7ms) 220V DC 10A (L/R = 7ms)	Trip contacts: 2NC, Alarm contacts: 1NO Making: 110V AC 60A (Depends on CT's load VA.)
	Shunt trip (T ₁ , T ₂)		
	Current trip (T _{1R} , C _{2T2R}) (T _{1T} , C _{2T2T})	Breaking: 110V DC 1A (L/R = 7ms) 220V AC 3.5A (cosφ = 0.4)	
Alarm contacts (a1, a2)	24V DC 2A (125V DC 30W max.) (L/R = 7ms) AC100V 2A (250V AC 220VA) (cosφ=0.4)		
Consumed VA	5VA (at 5A)		
Standards	JIS C 4602: Overcurrent Relays for 6.6kV Receiving		
Mass	1kg		

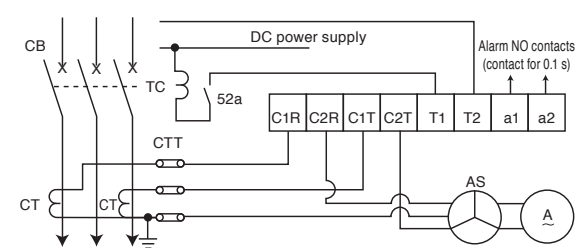
Notes ① Displayed when the display knob is set to the elapsed time, R-phase elapsed time, or T-phase elapsed time.
 ② Displayed when the display knob is set to the current, R-phase current, or T-phase current.
 ③ Displayed when the display knob is set to the instantaneous current, time-lag current, or instantaneous time. Also displayed for approx. 2 seconds for each setting.

Dimensions, mm

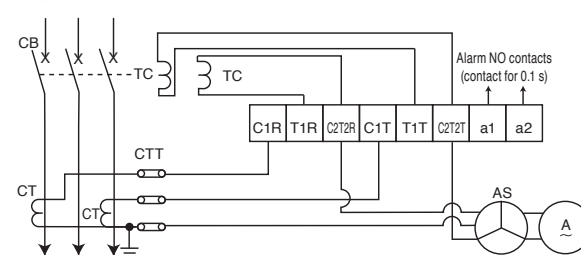


External Wiring Diagram

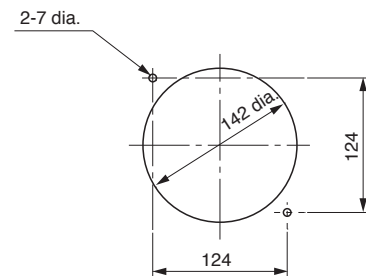
• QHA-OC1



• QHA-OC2



Panel Drilling Dimensions

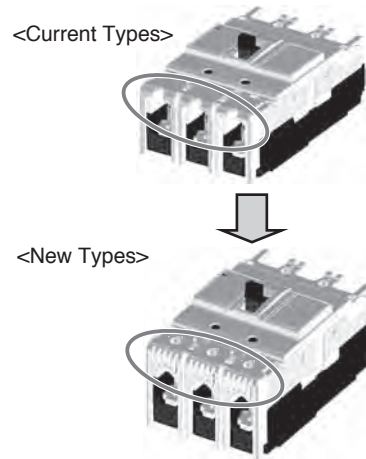


View from Front of Panel

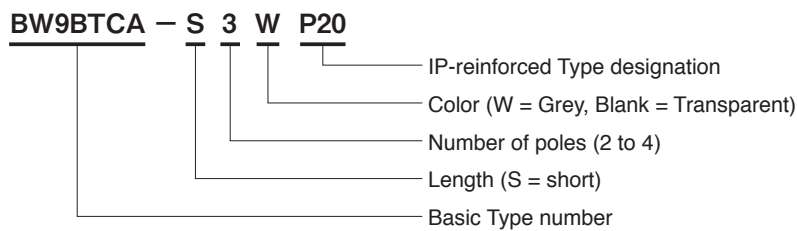
Moded Cased Circuit Breakers and Earth Leakage Circuit Breakers Marketing of G-TWIN-series IP-reinforced Terminal Covers

Features

- G-TWIN-series 125–250AF Short Terminal Covers
- Mount the covers to increase the range of insulation protection on the front.
- * The protection ranges for the wire insertion section and from the back are the same as before.



Types



Types

Frame	NO. of poles	Terminal cover Type	
		Transparent	Grey
125AF	2	BW9BTCA-S2P20	BW9BTCA-S2WP20
	3	BW9BTCA-S3P20	BW9BTCA-S3WP20
	4	BW9BTCA-S4P20	BW9BTCA-S4WP20
250AF	3	BW9BTGA-S3P20	BW9BTGA-S3WP20
	4	BW9BTGA-S4P20	BW9BTGA-S4WP20

Date of Market Release

October 2011

Changed Types

■ Applicable Types and Specific Changes

Ask your Fuji Electric sales representative for more detailed information.

Product	Series and Type	Changed part	Specific change	Change date
Magnetic Contactors or Magnetic Motor Starters	SC-03 to SC-N14, FC Series	Label	Changed CCC energy-saving label.	August 2011
	SC, SW-03 to SW-5-1	Main terminals	Raised main terminal base level.	February 2012
	SC and SW-N4 to SW-N7	Fixed contact block	Added notch to fixed contact block.	February 2012
	SC-N16	Some of the configuration parts	Shapes	November 2011
	NEO SC Series	Terminal cover screws	Color	July 2011
	New SC-series Mechanical-latching Types	Operating indicator	Color	July 2011
	New SC-series General-purpose Special Types	Nameplate	Changed nameplate.	July 2011
	Some NEO SC-series and SB-series Types	Fixed contact block	Changed to non-plated contact block.	September 2011
	Some Types of New SC-series Thermal Overload Relays	Nameplate	Changed nameplate.	April 2012
	FC-0S	Reset releases	Added mounting bracket (accompanying SK marketing).	February 2012
	FC and SJ Series	Contact support	Changed color.	February 2012
	SJ-0G and SJ-06G (including SW)	CCC Mark	Changed to printing the CCC Mark.	September 2011
	Manual Motor Starters	Some Types of Surge Absorber Units	Main contacts	Changed shape.
BM3 Series		Indications	Added manufacturing location.	January 2012
BM3 Series		Power supply input terminal block	Power supply input terminals	January 2012
Optional Products for BM3 Series		Packaging labels and nameplates	Contents	June 2011
BM3R and BM3V		Nameplate	Contents	October 2011
Automatic Breakers and Earth Leakage Circuit Breakers	BM3 Series	UL nameplate	Contents	February 2012
	G-TWIN 400AF	Auxiliary nameplate	Changed dimensions.	April 2011
	Power Controller for G-TWIN 400-800AF	Wiring outlet	Wiring outlet position	September 2011
	G-TWIN-series and L-series Rain-proof Steel Boxes for 100AF and Smaller Types	Packaging	Packaging specifications	September 2011
	G-TWIN Economic Types of 100AF or Smaller	Studs for rear mounting (X Types) and flush-mounting (E Types) Types	Stud shape	February 2011
	G-TWIN 630AF and 800AF	Terminal cover	Shape	May 2011
	G-TWIN Global Types, 50AF and 100AF	Precautions nameplate	Contents	February 2012
	Q2 Handle Key Lock Device, Plate Type for G-TWIN 400AF to 800AF	Set screws	Shape	December 2011
	Solid-state Circuit Breakers	Accessory lead wire	Color	July 2011
	50AF and 100AF Earth Leakage Automatic Breaker	Earth Leakage indications	Changed parts.	April 2012
	V-Type External Operation Handle Extension Shaft	Set screws	Set screw length	April 2011
	N- and V-Type External Control Handle	Structure	Changed structure.	June 2011
	G-TWIN Global Types	Nameplate and operating instructions	Nameplate printing method and operating instruction languages	December 2011
	Build-in Earth Leakage Circuit Breakers	Nameplate	Changed nameplate (changed PSE mark).	March 2011
	Electric Work Automatic Breaker	Nameplate	Changed nameplate (changed PSE mark).	March 2011
	G-TWIN 100AF and Smaller Types for Transformer Primary	Nameplate	Contents	July 2011
	Earth Leakage Protective Relays	EL Types	Main unit case	Changed material of main unit case.
Circuit Protectors	CP-E Types	Ratings nameplate	Changed design.	May 2012
	CP-F, CP-E, CP-V, CP-P, and CP-B Types		Contents	June 2011

Modified Products

Product	Series and Type	Changed part	Specific change	Change date
Low-voltage Fuses	Fuse Holders for Indicator Fuses	Printing of lot number	Ink color	January 2012
	Plug Fuses	Protective cover for charging section	Height and logo mark	May 2011
	CR Fuses	Indications	Rated current and lot indication method	August 2011
Command Switches	AH08-125 Series	LED lamp	Shape and color	September 2011
	AR22, DR22, AR30, DR30, AM22, DM22, AG28, and DG28 Series	Transformer Unit	Company logo and part shape	March 2012
	AH25 series	LED globe (green)	Appearance	June 2011
	AG22, AG23, AG225, AH164, AH165, AH165-2, AH16P, AH16P-2, AH22P, and AH225 Series	Contact Unit	Changed.	April 2012
	Selector Switches (Some Types)	Stopper	Changed color.	February 2012
	Command Switches and Square Indicators	LED lamp	Changed Y color specification.	April 2011
Multi Display Lights	AP30F and AP40F	LED (pure white)	Brightness and color	April 2012
	AP30F and AF41F	Special Unit	Deleted flicker and Constant-voltage Unit specifications.	July 2011
Control Relays	Types with 24V DC Rating	Coil	Changed color of coil insulation tape.	February 2011
	HH2□ Types (Some Types)	Surge-absorbing diode	Changed mounting structure.	April 2012
	HH64-series Power Relays	Stamp	Added contents to ratings stamp.	November 2011
Timers	MS4S (Some Types)	Output contacts	Changed electrical durability.	January 2012
	Sockets for MS4S	Terminal section	Appearance	May 2012
	ST7P Series	Socket packaging box	Changed displayed contents (removed UL contents).	April 2012
Terminal Blocks	AU-TW39	Main unit	Changed color of acceptance stamp.	November 2011
	LT5	Cap	Changed text printing method.	March 2012
FA Sensors	PE-U Flat Inductive Proximity Switches	Case	Displayed contents	February 2012
	Some Types of K244-series Limit Switches	Case	Changed internal shape of case.	February 2012
Cam Switches	AK22	Main unit	Changed logo mark.	June 2011
	AK22-J	Key	Deleted logo mark from special key.	June 2011
	AK22	Symbol plate	Eliminated symbol plate standard accessory.	July 2011
	AK22	Packaging specifications	Deleted "No NP" from the packaging box accompanying elimination of signal plate standard accessory.	October 2011
	RC310-1,2	Packaging specifications	Deleted masking table (with small 10-position handle and microswitch)	November 2011
Energy Monitoring Equipment	F-MPC60B and F-MPC50 Series	Indicator LEDs	Changed parts.	March 2012
	F-MPC Web Units	Software and appearance	Version upgrade and RoHS compatibility	May 2011
High-voltage Equipment	Some Types of High-voltage Current-limiting Fuses	Packaging	Changed packaging method.	April 2012
	Some Types of High-voltage Current-limiting Fuses	Main nameplate	Changed lot and acceptance stamp indication.	May 2012
	Remote Power Controllers for High-voltage Disconnecting Switches	Electric motor	Exterior color	December 2011
	HS Types	Parts in main circuit connector	Changed surface treatment.	April 2011
Square Current Transformers with Through Hole	CC3M□	Coating, nameplate, etc.	Eliminated red coating and changed nameplate specifications and installation instructions.	January 2012

Discontinued Products

Discontinued Products

Ask your Fuji Electric sales representative for more detailed information.

Product name and series	Discontinued product	Replacement Types	Date of discontinuation	Remarks
Magnetic Contactors or Magnetic Motor Starters	SJ-series Magnetic Contactors and Switches	SK Series	September 2012	
	SC-M-series Magnetic Contactors and Optional Products	SK Series	September 2012	
	SZ-J□ Operation Counters	–	July 2012	
	Some Types of SRC-series Magnetic Contactors and Switches	SK Series	September 2012	
Auxiliary Relays	SRC(WRC)50-2F/X Contactor-type Auxiliary Relays	SRC(WRC) 50-2U/X	March 2012	
Solid-state Contactors	Reversible Unit-type SSCs	None	September 2011	
	SY-P-A1 Power Units for SSCs	None	September 2011	
Molded Cased Circuit Breakers and Earth Leakage Circuit Breakers	1200AF-Type BU Breakers with UL and CSA Standard Certification	–	April 2011	
	BU Breakers	–	March 2012	
	DG33N-2E	Equivalent product from another company	March 2012	
Command Switches	Command Switch DR30B0 30-dia. Electromagnetic Buzzers	DR30B5 and DR30B6 Types (electronic sound)	December 2012	
	AG22- and AG23-series Square Command Switch Barriers (White)	Black and gray Types in the same series	April 2012	
	Constant-voltage Units	None	August 2012	
Control Relays	H35-7.5 Steel Socket Mounting Rails	TH35-7.5AL (Aluminum Rail)	July 2012	
Timers	MS4SM-DB, MS4SA-DB, MS4SR-CE, and MS4SR-CEN	–	November 2011	
Terminal Blocks	AYBN and AYBS TÜV Types		November 2011	
Proximity Switches	PE2-CTS Spatter-resistant Types	–	May 2012	
Limit Switches	AI Series (Metal Types)	–	March 2011	
AS-i	AS-i (Slave) AS-i Safety Accessory Gateway	–	September 2012	
Transducers	Some L, C, S, WH1, WH7, and WH9-series Types		January 2012	
Energy Monitoring Equipment	Some F-MPC60B-series Types (UM40*)		March 2011	
AC Power Regulators	RPBE and RPCE		March 2012	
Control Power Transformers	Some CU4 Types		December 2011	
	CU5		December 2011	

Safety Considerations

- Operate (keep) in the environment specified in the operating instructions and manual. High temperature, high humidity, condensation, dust, corrosive gases, oil, organic solvents, excessive vibration or shock might cause electric shock, fire, erratic operation or failure.
- For safe operation, before using the product read the instruction manual or user manual that comes with the product carefully or consult the Fuji sales representative from which you purchased the product.
- Products introduced in this catalog have not been designed or manufactured for such applications in a system or equipment that will affect human bodies or lives.
- Customers, who want to use the products introduced in this catalog for special systems or devices such as for atomic-energy control, aerospace use, medical use, passenger vehicle, and traffic control, are requested to consult with Fuji Electric FA.
- Customers are requested to prepare safety measures when they apply the products introduced in this catalog to such systems or facilities that will affect human lives or cause severe damage to property if the products become faulty.
- For safe operation, wiring should be conducted only by qualified engineers who have sufficient technical knowledge about electrical work or wiring.
- Follow the regulations of industrial wastes when the product is to be discarded.
- For further questions, please contact your Fuji sales representative or Fuji Electric FA.

 **Fuji Electric FA Components & Systems Co., Ltd.**

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URL <http://www.fujielectric.co.jp/fcs/eng>