

FUJIED & C TIMES

New Products

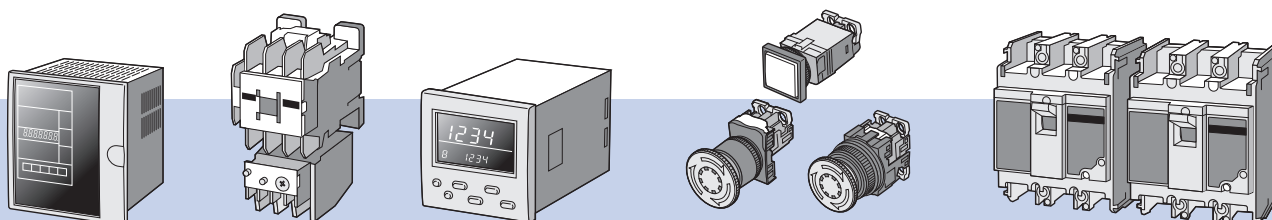
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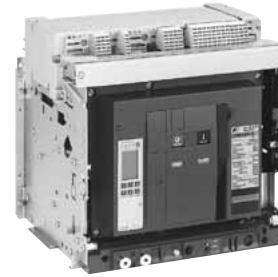
Low Voltage Air Circuit Breakers (ACB) DW Series

Full-featured & compact ACB.

Ideal for protecting and measuring the power receiving and distribution circuit.

■ Features

- 2 sizes and 11 types from 800 AF to 6300 AF of frames are covered.
- High breaking-capacity (DW08-DW40: 440 V/65 kA: H1 type, 440 V/100 kA: H2 type; DW40b-DW63: 440 V/100 kA: H1 type, 440 V/150 kA: H2 type).
Ideal for factory and equipment of large estimated short-circuit capacity.
- Compliant with international standards.
 - IEC60947-2
 - NEMA AB1
- Abundant main circuit terminal connection systems are available.
- Intelligent control unit
 - Large repertoire is provided from basic type only with over current protection function to enhanced type with measurement and programmable function.
 - The combination with various measuring functions, such as an ammeter, watt-hour meter, harmonic meter as well as with long time delay, short time delay, instantaneous delay,

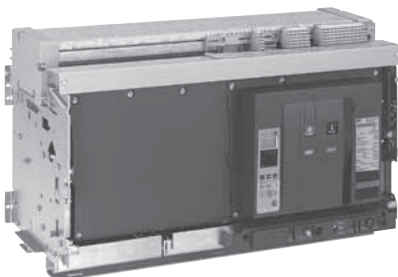


DW Series

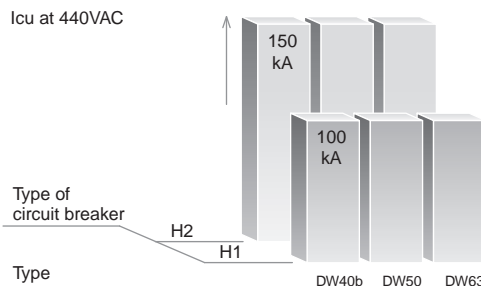
- ground fault, and electric leakage is possible.
- The parameter measurement & operation, data storage, log event recording, alarm output, and communication are possible.
- The navigation button and LCD display are provided for easy operation.



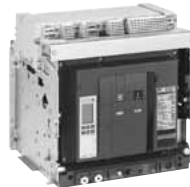
DW series 800 to 4000A



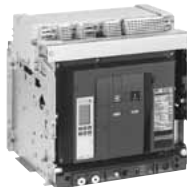
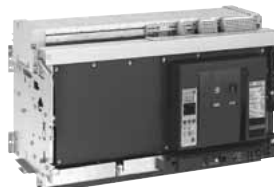
DW series 4000 to 6300A



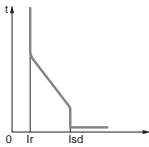
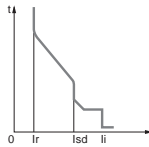
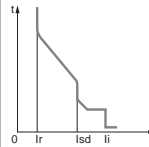
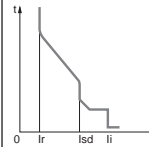















Specifications

Type				DW08		DW10		DW12		
Appearance										
Number of poles				3, 4						
Rated insulation Voltage U_i (V)				1000						
Impulse withstand voltage U_{imp} (kV)				12						
Rated operational voltage U_e (VAC 50/60Hz)				690						
Suitability for isolation		IEC60947-2, JISC8201-2-1		○						
Pollution degree		IEC60664-1, JISC60664-1		4						
Type of circuit breaker				H1	H2	H1	H2	H1	H2	
Rated current(A) I_n at 40°C	Vertical rear connection	IEC60947-2, JISC8201-2-1 Ann1		800		1000		1250		
		JISC8201-2-1 Ann2		800		1000		1250		
	Horizontal rear connection	IEC60947-2, JISC8201-2-1 Ann1		800		1000		1250		
		JISC8201-2-1 Ann2		800		1000		1250		
Front connection				800		1000		1250		
Sensor rating (A)				400, 630, 800		400, 630, 800, 1000		630, 800, 1000, 1250		
IEC60947-2 JISC8201-2-1 Ann1, Ann2		Ultimate breaking capacity I_{cu}	220/415VAC	65	100	65	100	65	100	
			Rated service breaking capacity I_{cs} (kA rms) $I_{cu} = I_{cs}$	440VAC	65	100	65	100	65	100
				690VAC	65	85	65	85	65	85
		Rated making capacity I_{cm} (kA peak)	220/415VAC	143	220	143	220	143	220	
			440VAC	143	220	143	220	143	220	
			690VAC	143	187	143	187	143	187	
NEMA AB1	Breaking capacity (kA)	240/480VAC	65	100	65	100	65	100		
		600VAC	65	85	65	85	65	85		
Utilisation category				B						
Rated short-time withstand current I_{cw} (kA rms)			1s	65	85	65	85	65	85	
			3s	36	50	36	50	36	50	
Break time (ms) between tripping order and arc extinction				25						
Closing time (ms)				<70						
Service life (C/O Cycles x1000)	Mechanical	With maintenance		25						
		Without maintenance		12.5						
	Electrical	Without maintenance	460VAC In	10						
			690VAC In	10						
		Motor power (AC3, IEC60947-4-1)		690VAC	6					
		Connection	Drawout		Front Connection	○				
Rear Connection	○									
Fixed			Front Connection	○						
			Rear Connection	○						
Control units				2.0, 5.0, 2.0A, 5.0A, 6.0A, 7.0A, 2.0E, 5.0E, 6.0E, 5.0P, 6.0P, 7.0P, 5.0H, 6.0H, 7.0H						
Dimensions (mm) H x W x D	Drawout, Rear Connection		3P	439 × 441 × 395						
			4P	439 × 556 × 395						
	Fixed, Rear Connection		3P	352 × 422 × 297						
			4P	352 × 537 × 297						
Mass (kg)	Drawout		3P/4P	90/120						
			Fixed	3P/4P	60/80					

Specifications

Type				DW16		DW20		DW25		DW32		DW40		DW40b		DW50		DW63		
Appearance																				
Number of poles				3, 4										3, 4						
Rated insulation Voltage U_i (V)				1000										1000						
Impulse withstand voltage U_{imp} (kV)				12										12						
Rated operational voltage U_e (VAC 50/60Hz)				690										690						
Suitability for isolation		IEC60947-2, JISC8201-2-1		○										○						
Pollution degree		IEC60664-1, JISC60664-1		4										4						
Type of circuit breaker				H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1	H2	
Rated current(A) I_n at 40°C	Vertical rear connection	IEC60947-2, JISC8201-2-1 Ann1		1600		2000		2500		3200		4000		4000		5000		6300		
		JISC8201-2-1 Ann2		1600		2000		2500		3150		3500		4000		5000		5750		
	Horizontal rear connection Front connection	IEC60947-2, JISC8201-2-1 Ann1		1600		2000		2500		3200		4000		4000		5000		—		
		JISC8201-2-1 Ann2		1600		1950	2000	2250		2700		3400		4000		4800		—		
Sensor rating (A)				800, 1000, 1250, 1600		1000, 1250, 1600, 2000		1250, 1600, 2000, 2500		1600, 2000, 2500, 3200		2000, 2500, 3200, 4000		2000, 2500, 3200, 4000		2500, 3200, 4000, 5000		3200, 4000, 5000, 6300		
IEC60947-2 JISC8201-2-1 Ann1, Ann2	Ultimate breaking capacity I_{cu}	220/415VAC	65	100	65	100	65	100	65	100	65	100	65	100	100	150	100	150	100	150
		440VAC	65	100	65	100	65	100	65	100	65	100	65	100	100	150	100	150	100	150
	Rated service breaking capacity I_{cs} (kA rms) $I_{cu} = I_{cs}$	690VAC	65	85	65	85	65	85	65	85	65	85	65	85	100	100	100	100	100	100
		220/415VAC	143	220	143	220	143	220	143	220	143	220	143	220	220	330	220	330	220	330
	Rated making capacity I_{cm} (kA peak)	440VAC	143	220	143	220	143	220	143	220	143	220	143	220	220	330	220	330	220	330
		690VAC	143	187	143	187	143	187	143	187	143	187	143	187	220	220	220	220	220	220
NEMA AB1	Breaking capacity (kA)	240/480VAC	65	100	65	100	65	100	65	100	65	100	65	100	100	150	100	150	100	150
		600VAC	65	85	65	85	65	85	65	85	65	85	65	85	100	100	100	100	100	100
Utilisation category				B										B						
Rated short-time withstand current I_{cw} (kA rms)		1s	65	85	65	85	65	85	65	85	65	85	65	85	100					
		3s	36	50	36	75	65	75	65	75	65	75	65	75	100					
Break time (ms) between tripping order and arc extinction				25										25						
Closing time (ms)				<70										<80						
Service life (C/O Cycles x1000)	Mechanical	With maintenance		25		20		20		10										
		Without maintenance		12.5		10		10		5										
	Electrical	Without maintenance	460VAC I_n	10		8		5		1.5										
			690VAC I_n	10		6		2.5		1.5										
			Motor power (AC3, IEC60947-4-1)	690VAC	6		6		—		—									
Connection		Drawout	Front Connection	○								—		—						
			Rear Connection	○								○		○						
		Fixed	Front Connection	○								—		—						
			Rear Connection	○								○		○						
Control units				2.0, 5.0, 2.0A, 5.0A, 6.0A, 7.0A, 2.0E, 5.0E, 6.0E, 5.0P, 6.0P, 7.0P, 5.0H, 6.0H, 7.0H																
Dimensions (mm) H x W x D	Drawout, Rear Connection	3P	439 x 441 x 395										479 x 786 x 395							
		4P	439 x 556 x 395										479 x 1016 x 395							
	Fixed, Rear Connection	3P	352 x 422 x 297										352 x 767 x 297							
		4P	352 x 537 x 297										352 x 997 x 297							
Mass (kg)	Drawout	3P/4P	90/120										225/300							
	Fixed	3P/4P	60/80										120/160							

Intelligent control unit

Name		Unit 2: for basic protection	Unit 5: for selective protection	Unit 6: for selective + ground fault protection	Unit 7: for selective + earth leakage protection
Current protection					
Protection		Long time + instantaneous	Long time + short time + instantaneous	Long time + short time + instantaneous + ground fault	Long time + short time + instantaneous + earth leakage
Protection only		2.0 	5.0 	—	—
Measurement and programmable protection	A: with ammeter • Phase current (I1, I2, I3), neutral current (IN), ground-fault current (earth-fault), earth-leakage current (earth leakage), and maximum earth-leakage current • Failure cause indicator • Preset constant (A) and time period (s) indicator	2.0A 	5.0A 	6.0A 	7.0A 
	E: A + energy meter • In addition to measurement of type A, measurement of voltage, power factor, electric power, and electric energy (watt-hour) • Calculation of demand current • "Quick view" function automatically indicating most effective value (default or optional)	2.0E 	5.0E 	6.0E 	—
	P: E + programmable protection • Voltage, current, electric power, electric energy (watt-hour), frequency, peak voltage, peak current, and minimum and maximum peak current • IDMTL long time protection, minimum & maximum voltage and frequency, unbalanced voltage & current, phase sequence, and reverse power • Disconnection and reconnection of load because of power or current • Measurement of breaking current, failure cause indicator, maintenance information, event history, timestamp, etc.	—	5.0P 	6.0P 	7.0P 
	H: P + harmonic meter • Power quality: up to 31th harmonic fundamental waves, distortion factor • Waveform recording because of failure, alarm, or necessity • Advanced alarm program: Setup and operation	—	5.0H 	6.0H 	7.0H 

Molded Case Circuit Breakers BX Series

Full-featured & compact MCCB.

Ideal for protecting and measuring the power receiving and distribution circuit.

■ Features

- 3 sizes and 9 frames of MCCB can cover currents rated from 100 A to 1600 A.
- Compliant with international standards.
IEC60947-2, EN60947-2, JISC8201-2-1, NEMA AB1
- Improved breaking performance because Ics (rated service short-circuit breaking capacity) is the same as Icu (rated ultimate short-circuit breaking capacity).
- Control unit & display unit
- Abundant lineups are provided from basic type only with over current protection function to enhanced type with power quality control.
- The combination with various measuring functions, such as an ammeter, watt-hour meter, harmonic meter as well as with long time delay, short time delay, and instantaneous delay is possible.
- The parameter measurement & operation, data storage, log event recording, alarm output, and communication functions are possible.



BX Series

- Internal accessories of various rating are prepared.
(auxiliary/alarm switch, voltage/under voltage trip, etc.)
- The compact external operating handle and electric control device are also prepared. Possible to change the setting of control unit while attaching a handle.

■ Ordering information

BX 250 RA E - 3P 250 □ H W K FA □ MA
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬

①	Code Basic type	
	BX	BX Series MCCB
②	Code Frame size	
	100	100AF
	160	160AF
	250	250AF
	400	400AF
	630	630AF
	800	800AF
	1000	1000AF
	1250	1250AF
	1600	1600AF
③	Code Breaking capacity range	
	RA	415VAC/ Icu 50kA type
	HA	415VAC/ Icu 70kA type
④	Code Usage	
	E	Electronic
	G	Thermal-magnetic

⑤	Code Pole	
	3P	3P
	4P	4P
⑥	Code Rated current	
	016	16A
	025	25A
	032	32A
	040	40A
	050	50A
	063	63A
	080	80A
	100	100A
	125	125A
	160	160A
	200	200A
	250	250A
	400	400A
	630	630A
	800	800A
	10X	1000A
	12X	1250A
	16X	1600A

⑦	Code Trip unit	
	Blank	Thermal-magnetic
	A	Electronic type 2
	B	Electronic, type 5
	C	Electronic, type 2A
	D	Electronic, type 5A
	E	Electronic, type 6A
	F	Electronic, type 7A
	G	Electronic, type 2E
	H	Electronic, type 5E
	I	Electronic, type 6E
	J	Electronic, type 5P
	K	Electronic, type 6P
	L	Electronic, type 7P
⑧	Code Connection/Style of front connection	
	Blank	Fixed
	H	Fixed(with terminal extensions)
	G	Fixed(with 70mm pitch spreaders - 400/630AF)
	P	Plug-in(only 100-630AF)
	X	Rear connection

⑨	Code Auxiliary switch	
	W	1pcs.
	V	2pcs.
⑩	Code Alarm switch	
	K	Alarm switch 1pcs.
	J	Fault-trip indicator 1pcs.
	8	SDx module 1pcs.



⑪	Code Shunt trip device		Code Under voltage release
	BX100-630	BX800-1600	BX100-630 BX800-1600
	F2	24VAC	-
	F3	48VAC	-
	F5	125VDC	-
	FA	110-130VAC	100-130VAC/DC
	FB	-	277VAC
	FC	-	12VDC
	FK	220-240VAC	200-250VAC/DC
	FP	380-415VAC(50Hz)/ 440-480VAC(60Hz)	380-415VAC(50Hz)/ 440-480VAC(60Hz)
	FQ	525VAC(50Hz)/ 600VAC(60Hz)	-
	FR	24VDC	24-30VDC/24VAC
	FS	48VDC	48-60VDC/48VAC

⑫	Code Communication accessory	
	A	BSCM+0.35m NSX cord
	B	BSCM+1.3m NSX cord
	C	BSCM+3m NSX cord


⑬	Code Motor mechanism	
	MR	24-30VDC
	MS	48-60VDC
	M4	110-130VDC
	MA	110-130VAC
	MK	220-240VAC
	MP	380-415VAC(50Hz)/440-480VAC(60Hz)
	M3	48-60VAC

Specifications

• 100 to 630AF

Frame size				100AF	160AF	250AF	400AF	630AF				
Type				BX100	BX160	BX250	BX400	BX630				
Appearance												
Number of poles				3, 4	3, 4	3, 4	3, 4	3, 4				
Electric characteristics as per IEC 60947-2, EN60947-2, JISC8201-2-1(Ann1, Ann2)												
Rated current (A)		In 40°C	Thermal-magnetic	16, 25, 32, 40, 50, 63, 80, 100	125, 160	200, 250		—	—			
			Electronic	40, 100	160	100, 160, 250	250	400	630			
Rated insulation Voltage (V)		Ui		800	800	800		800	800			
Impulse withstand voltage (kV)		Uimp		8	8	8		8	8			
Rated operational voltage (VAC)		Ue	AC 50/60 Hz	690	690	690		690	690			
Breaking capacity range				H	H	R	H	R	H	R	H	
Ultimate breaking capacity (kArms)		Icu	AC 50/60 Hz	220/240 V	100	100	90	100	85	100	85	100
				380/415 V	70	70	50	70	50	70	50	70
				440 V	65	65	50	65	42	65	42	65
				500 V	50	50	36	50	30	50	30	50
				525 V	35	35	35	35	22	35	22	35
				660/690 V	10	10	10	10	10	20	10	20
Rated service breaking capacity (kArms)		Ics	AC 50/60 Hz	220/240 V	100	100	90	100	85	100	85	100
				380/415 V	70	70	50	70	50	70	50	70
				440 V	65	65	50	65	42	65	42	65
				500 V	50	50	36	50	30	50	30	50
				525 V	35	35	35	35	11	11	11	11
				660/690 V	10	10	10	10	10	10	10	10
Suitability for isolation				○	○	○		○	○			
Utilisation category				A	A	A		A	A			
Pollution degree (IEC60664-1, JISC60664-1)				3	3	3		3	3			
Durability (C-O cycles x1000)		Mechanical		50	40	20		15	15			
		Electrical	440 V	In/2	50	20	20	12	8			
				In	30	10	10	6	4			
			690 V	In/2	20	15	10	6	6			
				In	10	7.5	5	3	2			
Electrical characteristics as per NEMA AB-1												
Breaking capacity (kArms)		AC 50/60 Hz	240 V	100	100	90	100	85	100	85	100	
			480 V	65	65	50	65	42	65	42	65	
			600 V	35	35	20	35	20	35	20	35	
Protection and measurements												
Overload /short-circuit protection	Thermal magnetic			○	○	—	○	—	—			
	Electronic with neutral protection (Off-0.5-1-OSN)			○	○	○		○	○			
	with ground-fault protection			○	○	○		○	○			
	with zone selective interlocking (ZSI)			○	○	○		○	○			
Control units				2, 5A, 6A, 5E, 6E								
Display/I, U, f, P, E, THD measurements/interrupted-current measurement				○								
Option	Power Meter display on door			○								
	Operating assistance			○								
	Counters			○								
	Histories and alarm			○								
	Metering Com			○								
	Device status/control Com			○								
Installation/connection												
Dimensions and mass	Dimensions (mm) W x H x D		Fixed, front connection	3P	105 × 161 × 126			140 × 255 × 168				
				4P	140 × 161 × 126			185 × 255 × 168				
	Mass (kg)		Fixed, front connection	3P	2.1	2.2	2.4	6.1	6.2			
			4P	2.4	2.6	2.8	7.9	8.2				
Connections	Connection terminal	Pitch	With/without spreaders	— /35mm	— /35mm	— /35mm	52.5/45mm 70/45mm		52.5/45mm 70/45mm			

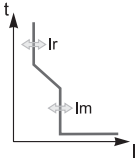

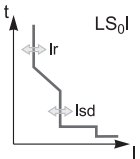
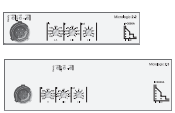
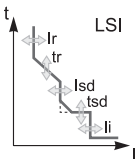
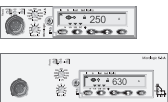
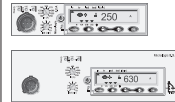
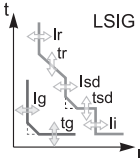
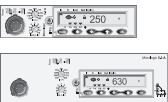
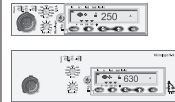
• 800 to 1600AF

Frame size				800AF		1000AF		1250AF		1600AF					
Type				BX800		BX1000		BX1250		BX1600					
Appearance															
Number of poles				3, 4		3, 4		3, 4		3, 4					
control				Manual		<input type="radio"/>		<input type="radio"/>		<input type="radio"/>					
				Electric		<input type="radio"/>		<input type="radio"/>		<input type="radio"/>					
Electric characteristics as per IEC 60947-2, EN60947-2, JISC8201-2-1(Ann1, Ann2)															
Rated current (A)		In 40°C	Thermal-magnetic		—		—		—		—				
			Electronic		800		1000		1250		1600				
Rated insulation Voltage (V)		Ui			750		750		750		750				
Impulse withstand voltage (kV)		Uimp			8		8		8		8				
Rated operational voltage (VAC)		Ue	AC 50/60 Hz		690		690		690		690				
Breaking capacity range				R		H		R		H		R			
Manual *1	Ultimate breaking capacity (kArms)	Icu	AC 50/60 Hz	220/240 V	85	85	85	85	85	85	85	85			
				380/415 V	50	70	50	70	50	70	50	70			
				440 V	50	65	50	65	50	65	50	65			
				500/525 V	40	50	40	50	40	50	40	50			
				660/690 V	30	42	30	42	30	42	30	42			
	Service breaking capacity (kArms)	Ics	AC 50/60 Hz	220/240 V	50	52	50	52	50	52	37	37			
				380/415 V	50	52	50	52	50	52	37	37			
				440 V	50	48	50	48	50	48	37	32			
				500/525 V	40	37	40	37	40	37	30	25			
				660/690 V	30	31	30	31	30	31	22	21			
	Electric *2	Ultimate breaking capacity (kArms)	Icu	AC 50/60 Hz	220/240 V	50	70	50	70	50	70	50	70		
					380/415 V	50	70	50	70	50	70	50	70		
					440 V	50	65	50	65	50	65	50	65		
					500/525 V	40	50	40	50	40	50	40	50		
660/690 V					30	42	30	42	30	42	30	42			
Service breaking capacity (kArms)		Ics	AC 50/60 Hz	220/240 V	37	35	37	35	37	35	37	35			
				380/415 V	37	35	37	35	37	35	37	35			
				440 V	37	32	37	32	37	32	37	32			
				500/525 V	30	25	30	25	30	25	30	25			
				660/690 V	22	21	22	21	22	21	22	21			
				Short-time withstand current (kA rms) Icw 1s				19.2							
				Integrated instantaneous protection kA peak ±10%				40							
				Suitability for isolation				<input type="radio"/>							
				Utilisation category				B							
Pollution degree				3											
Durability (C-O cycles x1000)	Mechanical			10		10		10		10					
	Electrical	440 V	In/2	6		6		5		5					
			In	5		5		4		2					
	690 V	In/2	4		4		3		2						
		In	2		2		2		1						
	Electrical characteristics as per NEMA AB-1														
breaking capacity (kArms)		240 V	50	65	50	65	50	65	50	65					
		480 V	35	50	35	50	35	50	35	50					
		600 V	25	50	25	50	25	50	25	50					
Protection and measurements															
Control units			2, 5, 2A, 5A, 6A, 7A, 2E, 5E, 6E, 5P, 6P, 7P												
Connection															
Connection	Fixed/Front connection devices			<input type="radio"/>											
	Spredders for Fixed/Front connection			<input type="radio"/>											
	Rear Connection			<input type="radio"/>											
Dimensions and mass															
Dimensions		3P	210 × 327 × 205												
W × H × D (mm)		4P	280 × 327 × 205												
Mass (kg)	3P		14												
	4P		18												

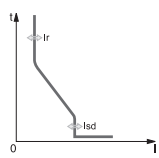



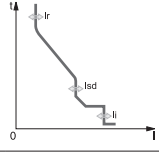




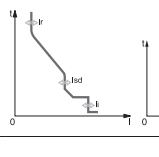



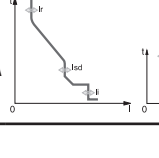


Note: *1 Manual operation *2 Electrical operation (Motor mechanism)

Control unit

• BX100/160/250/400/630

Type of protection		Without measurement		Measurements			
				A: ammeter		E: A+energy	
		Code	Appearance	Code	Appearance	Code	Appearance
Type TM-D Long time + Instantaneous (Thermal-magnetic)		Blank		—	—	—	—
Type 2 Long time + Instantaneous (Electronic trip units)		2 A		—	—	—	—
Type 5 Long time + Short time + Instantaneous (Electronic trip units)		—	—	5A D		5E H	
Type 6 Long time + Short time + Instantaneous + Ground fault (Electronic trip units)		—	—	6A E		6E I	

• BX800/1000/1250/1600

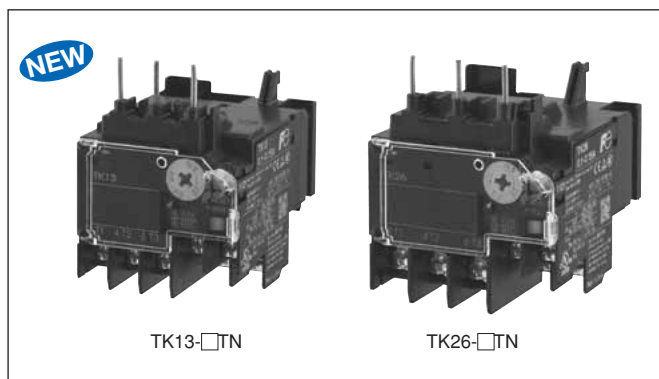
Type of protection		Without measurement		Measurements				Measurements and programmable	
				A: Ammeter		E: A + Energy		P: E + Programmable protection	
		Code	Appearance	Code	Appearance	Code	Appearance	Code	Appearance
Type 2 Long time + Instantaneous (Electronic trip units)		2 A		2A C		2E G		—	—
Type 5 Long time + Short time + Instantaneous (Electronic trip units)		5 B		5A D		5E H		5P J	
Type 6 Long time + Short time + Instantaneous + Ground fault (Electronic trip units)		—	—	6A E		6E I		6P K	
Type 7 Long time + Short time + Instantaneous + Earth leakage up to 3200A (Electronic trip units)		—	—	7A F		—	—	7P L	

Thermal overload relays TK13, TK26

Full model change for low-rating Thermal Overload Relays (0.1 to 26 A)

■ Features

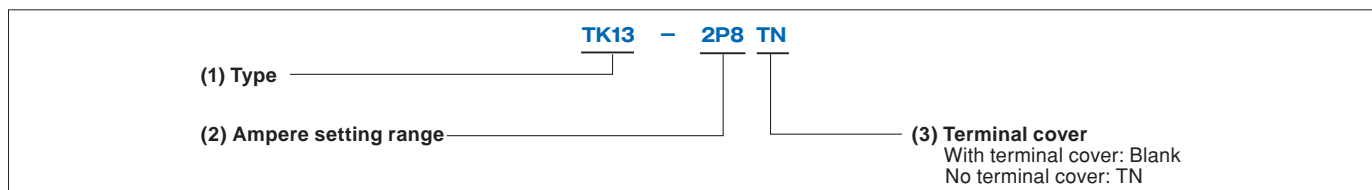
- Phase-loss protection on standard models.
- Terminal arrangement changed to greatly improve ease of wiring.
- Standard-feature dial cover that opens and closes to prevent unintentional operation.
- Conforming to, or certified major certifications such as IEC, UL, and CCC.
- All materials used are compliant to RoHS Directive and the main components are easy to recycle.



TK13-□TN

TK26-□TN

■ Type number nomenclature



■ Specifications

Type		Ampere setting range				Contactors to be combined		
No terminal cover	With terminal cover	(Specification codes for ampere setting range are given in brackets [].)						
TK13-□TN	TK13-□	0.1-0.15	[P10]	0.95-1.45	[P95]	7-10.5	[007]	SC-03
		0.13-0.2	[P13]	1.4-2.1	[1P4]	9-13	[009]	SC-0
		0.18-0.27	[P18]	1.7-2.6	[1P7]			SC-05
		0.24-0.36	[P24]	2.2-3.4	[2P2]			
		0.34-0.52	[P34]	2.8-4.2	[2P8]			
		0.48-0.72	[P48]	4-6	[004]			
		0.64-0.96	[P64]	5-7.5	[005]			
		0.8-1.2	[P80]	6-9	[006]			
TK26-□TN	TK26-□	0.1-0.15	[P10]	0.95-1.45	[P95]	7-10.5	[007]	SC-4-0
		0.13-0.2	[P13]	1.4-2.1	[1P4]	9-13	[009]	SC-4-1
		0.18-0.27	[P18]	1.7-2.6	[1P7]	12-18	[012]	SC-5-1
		0.24-0.36	[P24]	2.2-3.4	[2P2]	16-22	[016]	
		0.34-0.52	[P34]	2.8-4.2	[2P8]			
		0.48-0.72	[P48]	4-6	[004]			
		0.64-0.96	[P64]	5-7.5	[005]			
		0.8-1.2	[P80]	6-9	[006]			

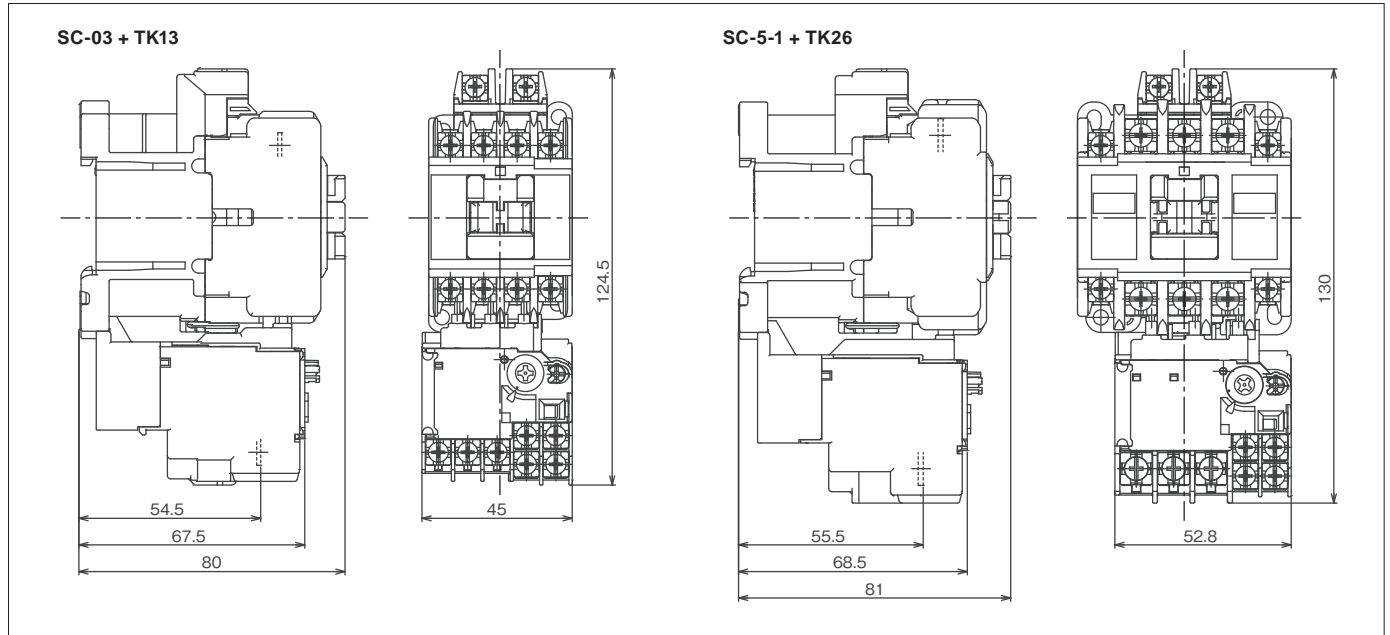
Note 1. Replace □ in the type number with the specification code for the ampere setting range.

■ International standards

Models	Conforming standards			Certified standards			EC Directives	Certification organization
	IEC	EN	JIS	UL	CSA	GB	CE	TÜV
	International	Europe	Japan	USA	Canada	China	Europe	Germany
TK13 TK26	○	○	○	○	○	○	○	○

Note ○ : Compliance with standard models.

■ Dimensions, mm (Typical examples in combination with magnetic contactors)



■ Comparison with previous products

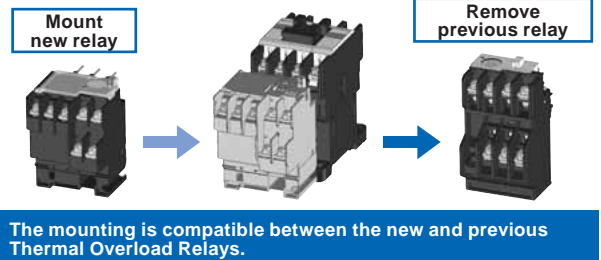
Changes

- (1) The shape has been changed so that the dial cover is built in.
- (2) The dimensions have changed to reduce the volume by 14% over the previous product.
- (3) Terminal locations were changed to make wiring easier. (Locations of main terminals and auxiliary terminals were changed.)
- (4) Phase-loss protection was added to all relays.

Previous product	New product
TR-0N/3, TK-0N Outline dimensions 44×45.5×77mm (W×H×D)	TK13-□TN Outline dimensions 45×48.5×61mm (W×H×D)
TR-5-1N/3, TK-5-1N Outline dimensions 53×47.5×77mm (W×H×D)	TK26-□TN Outline dimensions 52.8×48.5×61mm (W×H×D)

Thermal Overload Relay replacement

You can change the Thermal Overload Relays and still use your current magnetic contactors.



■ New and previous magnetic contactor combinations for the new Thermal Overload Relays

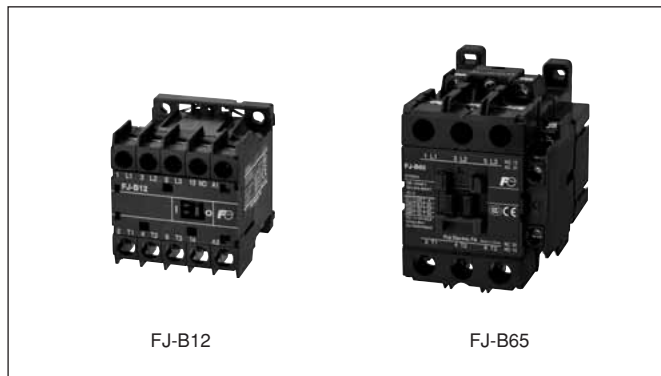
	Previous	New	Remarks
1. Purchasing magnetic contactor and Thermal Overload Relay separately and combining them as a magnetic motor starter	Magnetic Contactor SC-03 SC-0 SC-05 SC-4-0 SC-4-1 SC-5-1		There are no changes to the product. Use the previous type number to order.
	Thermal overload relay TR-0N/3 TK-0N TR-5-1N/3 TK-5-1N	TK13-□TN TK26-□TN	The Thermal Overload Relay can be changed to the new model. Use the new type number to order.

Contactors and Thermal Overload Relays FJ Series

The FJ Series is compact, safety, environmental friendly and the world's smallest magnetic contactors.

■ Features

- The smallest one in the basic type series (6A, 9A, 12A rated products)
- 6A, 9A and 12A rated products are small sized AC contactors of AC and DC coil products with the same outline dimensions.
- DC coil products are low-power-consumption products that can be driven directly by PLC. (FJ-B06/G to B12/G type DC24V coil)
- Energy-saving type with an energy efficiency level of 2. (6A, 9A, 12A, 40A to 95A rated products)



■ Types and ratings

- Standard-type (non-reversing)

Frame	Max. motor capacity (kW) AC-3, IEC60947-4-1			Operational current (A)			Operational current (A) AC-1	Conventional free air thermal current (A)	Auxiliary contact arrangement	Type	
	200/240V	380/440V	600/690V	200/240V	380/440V	600/690V				AC operated	DC operated
06	1.5	2.2	2.7	6	6	3	20	20	1NO or 1NC	FJ-B06	FJ-B06/G
09	2.2	4	4	9	9	5	20	20	1NO or 1NC	FJ-B09	FJ-B09/G
12	3	5.5	5.5	12	12	6	20	20	1NO or 1NC	FJ-B12	FJ-B12/G
18	4	7.5	7.5	18	18	7	25	25	1NO or 1NC	FJ-B18	FJ-B18/G
25	5.5	11	7.5	25	25	9	32	32	1NO or 1NC	FJ-B25	FJ-B25/G
32	7.5	15	7.5	32	32	10	40	40	1NO or 1NC	FJ-B32	FJ-B32/G
40	11	18.5	11	40	40	15	50	50	1NO1NC	FJ-B40	—
50	15	22	15	50	50	19	60	60	1NO1NC	FJ-B50	—
65	18.5	30	22	65	65	26	65	65	1NO1NC	FJ-B65	—
80	22	40	30	80	80	38	100	100	1NO1NC	FJ-B80	—
95	25	45	37	95	95	44	105	105	1NO1NC	FJ-B95	—

(Note 1) The rated values meet the standards IEC60947-4-1 and GB14048.4.

- Reversing-type

Frame	Max. motor capacity (kW) AC-3, IEC60947-4-1			Operational current (A)			Operational current (A) AC-1	Conventional free air thermal current (A)	Auxiliary contact arrangement *1	Type	
	200/240V	380/440V	600/690V	200/240V	380/440V	600/690V				AC operated	DC operated
06	1.5	2.2	2.7	6	6	3	20	20	1NC×2 or 1NO×2 *2	FJ-B06RM	FJ-B06RM/G
09	2.2	4	4	9	9	5	20	20		FJ-B09RM	FJ-B09RM/G
12	3	5.5	5.5	12	12	6	20	20		FJ-B12RM	FJ-B12RM/G
18	4	7.5	7.5	18	18	7	25	25		FJ-B18RM	FJ-B18RM/G
25	5.5	11	7.5	25	25	9	32	32		FJ-B25RM	FJ-B25RM/G
32	7.5	15	7.5	32	32	10	40	40		FJ-B32RM	FJ-B32RM/G

(Note 1) The rated values meet the standards IEC60947-4-1 and GB14048.4.

*1 In the auxiliary contact arrangement, "1NC" indicates the number of contacts of 1 AC contactor, while "×2" means the total values of 2 contactors. Please make orders according to the codes of the auxiliary contacts of each piece of equipment.

*2 Auxiliary contact 1NO×2 is available on request. However, these contactors are not electrically interlocked. Be sure to arrange electrical interlock circuit externally to avoid short-circuit accidents.

List of Products, Model Information

List of Products

Type			Frame Size										
			06	09	12	18	25	32	40	50	65	80	95
Standard type contactors	AC Operated	FJ-B□	○	○	○	○	○	○	○	○	○	○	○
	DC Operated	FJ-B□/G	○	○	○	○	○	○	—	—	—	—	—
Reversing contactors	AC Operated	FJ-B□RM	○	○	○	○	○	○	—	—	—	—	—
	DC Operated	FJ-B□RM/G	○	○	○	○	○	○	—	—	—	—	—

Type number nomenclature

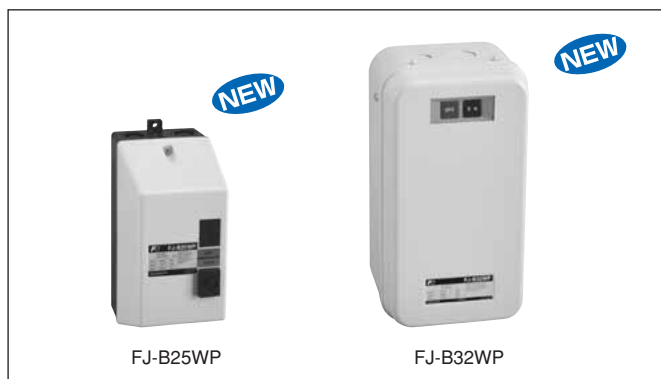
		(1) FJ-B	(2) 12	(3) RM	(4) /G	(5) S	(6) E	(7) 01			
(1) Basic type	Code									(7) Contact arrangement	Code
AC Contactor	FJ-B										
(2) Frame Size	Code										
6A	06										
9A	09										
12A	12										
18A	18										
25A	25										
32A	32										
40A	40										
50A	50										
65A	65										
80A	80										
95A	95										
(3) Non-reversing or reversing	Code										
Non-reversing	Blank										
Reversing	RM										
(4) Operating method	Code										
AC operated	Blank										
DC operated	/G										
										(6) Rated voltage of AC coil	Code
										(6) Rated voltage of DC coil	Code
										(5) Built-in coil surge	Code
										None	Blank
										Built-in (06, 09, 12 only)	S

Magnetic starter FJ Series Starters with on-off pushbuttons

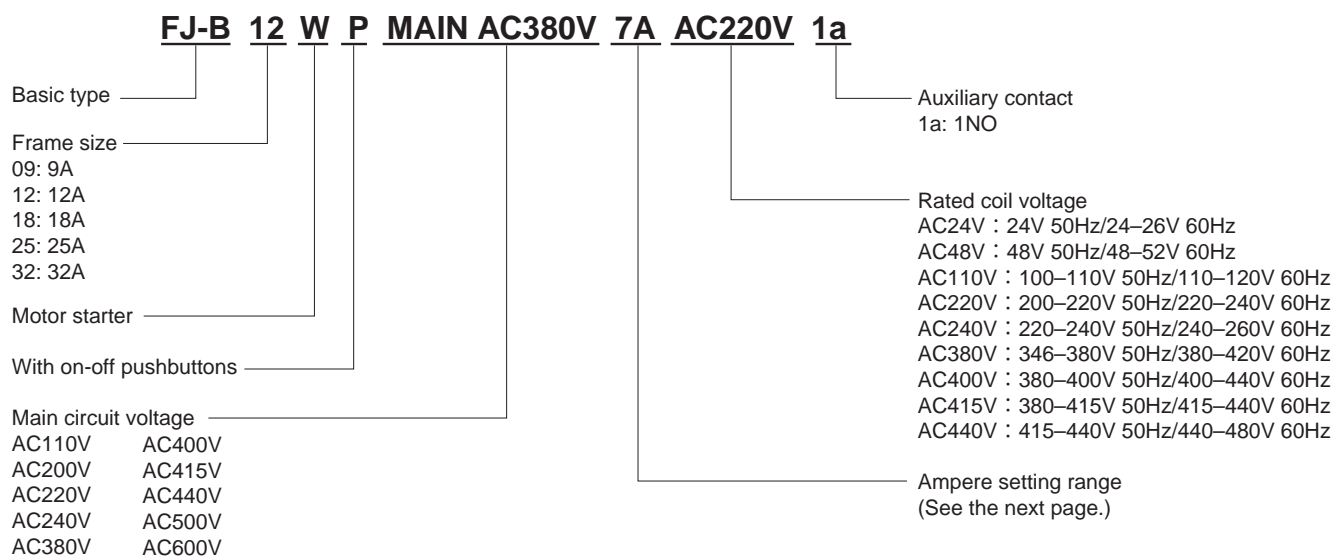
Models of “starters with pushbuttons convenient for motor ON/OFF” have been changed.

■ Features

- Compact and simple operation – Provided with ON-OFF pushbuttons, hence best suited for direct-on-line starting.
- Superior motor protection – Built-in highly reliable thermal overload relay is designed to give motor complete protection against overcurrent.



■ Type number nomenclature



■ Types and ratings

Max. motor capacity (kW)				Rated operational current (A)				Auxiliary contact	Enclosure material	Type	Combined thermal overload relay
Single-phase	3-phase			Single-phase	3-phase						
110V	200V 240V	380V 440V	600V 690V	110V	200V 240V	380V 440V	600V 690V				
0.4	2.2	4	4	9	9	9	5	1NO	Plastic	FJ-B09WP	TK12B
0.5	3	5.5	5.5	12	12	12	6	1NO	Plastic	FJ-B12WP	TK12B
0.6	4	7.5	7.5	18	18	18	7	1NO	Plastic	FJ-B18WP	TK18B
0.8	5.5	11	7.5	22	25	25	9	1NO	Plastic	FJ-B25WP	TK32B
1.2	7.5	15	7.5	32	32	32	10	1NO	Steel	FJ-B32WP	TK32B

Note: Auxiliary contact and surge suppressor are optional accessories. (Please refer to the next paragraphs.)

Ampere setting range

Setting range code	Ampere setting range				
	FJ-B09WP	FJ-B12WP	FJ-B18WP	FJ-B25WP	FJ-B32WP
0.1A	0.1-0.15	0.1-0.15	0.1-0.15	0.1-0.15	0.1-0.15
0.13A	0.13-0.2	0.13-0.2	0.13-0.2	0.13-0.2	0.13-0.2
0.18A	0.18-0.27	0.18-0.27	0.18-0.27	0.18-0.27	0.18-0.27
0.24A	0.24-0.36	0.24-0.36	0.24-0.36	0.24-0.36	0.24-0.36
0.34A	0.34-0.52	0.34-0.52	0.34-0.52	0.34-0.52	0.34-0.52
0.48A	0.48-0.72	0.48-0.72	0.48-0.72	0.48-0.72	0.48-0.72
0.64A	0.64-0.96	0.64-0.96	0.64-0.96	0.64-0.96	0.64-0.96
0.8A	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2	0.8-1.2
0.95A	0.95-1.45	0.95-1.45	0.95-1.45	0.95-1.45	0.95-1.45
1.1A	1.1-1.65	1.1-1.65	1.1-1.65	1.1-1.65	1.1-1.65
1.4A	1.4-2.1	1.4-2.1	1.4-2.1	1.4-2.1	1.4-2.1
1.7A	1.7-2.6	1.7-2.6	1.7-2.6	1.7-2.6	1.7-2.6
2.2A	2.2-3.4	2.2-3.4	2.2-3.4	2.2-3.4	2.2-3.4
2.8A	2.8-4.2	2.8-4.2	2.8-4.2	2.8-4.2	2.8-4.2
4A	4-6	4-6	4-6	4-6	4-6
5A	5-7.5	5-7.5	5-7.5	5-7.5	5-7.5
6A	6-9	6-9	6-9	6-9	6-9
7A		7-10.5	7-10.5	7-10.5	7-10.5
9A		9-13	9-13	9-13	9-13
12A				12-18	12-18
13A			13-18		
16A				16-22	16-22
20A				20-26	20-26
26A					26-32

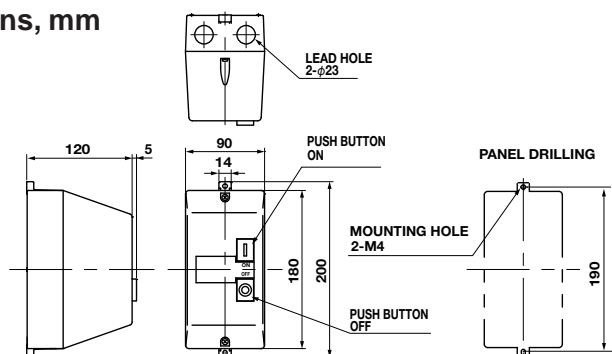
Optional unit

Optional unit	Description	Type	Used with
Auxiliary contact block	Front mounting (Bifurcated) 1NO+1NC	SZ1FA11	FJ-B09WP FJ-B12WP
	Front mounting (Single button) 1NO+1NC	SZ1FA11H	
	Side mounting (Bifurcated) 1NO+1NC	SZ-AS1 ^{*1}	FJ-B18WP FJ-B25WP FJ-B32WP
	Side mounting (Single button) 1NO+1NC	SZ-AS1H ^{*1}	
Coil surge suppression unit	Varistor 24 to 48V AC/DC 48 to 125V AC/DC 100 to 240V AC/DC	SZ1KZ1 SZ1KZ2 SZ1KZ3	FJ-B09WP FJ-B12WP
	Varistor 24 to 48V AC/DC 100 to 240V AC/DC 380 to 440V AC	SZ-Z1 SZ-Z2 SZ-Z3	FJ-B18WP FJ-B25WP FJ-B32WP
	CR (Capacitor-resistor) 24 to 48V AC/DC 100 to 240V AC/DC	SZ-Z4 SZ-Z5	

Note: ^{*1} In case of FJ-B18WP and B25WP, 1 optional unit can be installed, on the left side of the internal magnetic contactor.
In case of FJ-B32WP, maximal 2 optional units can be installed, one on each side of the internal magnetic contactor (left-side and right-side).

Dimensions, mm

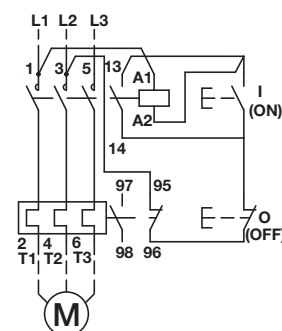
FJ-B09WP
FJ-B12WP
FJ-B18WP
FJ-B25WP



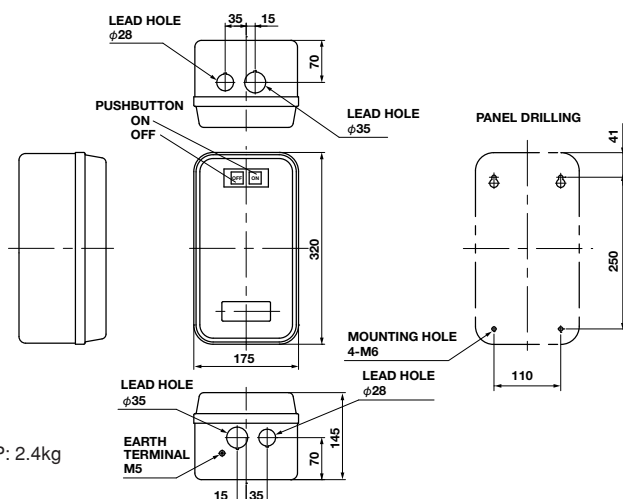
Mass
FJ-B09WP: 0.70kg
FJ-B12WP: 0.70kg
FJ-B18WP: 0.79kg
FJ-B25WP: 0.82kg

Wiring diagrams

FJ-B09WP
FJ-B12WP
FJ-B18WP
FJ-B25WP

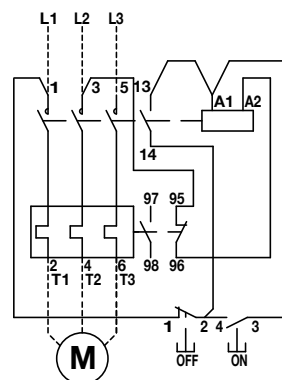


FJ-B32WP



Mass
FJ-B32WP: 2.4kg

FJ-B32WP



Mini contactor SK Series

Products with four-pole main contact, with printed circuit board installed

Supports wide range of applications by enhancing products used with mini contactor.

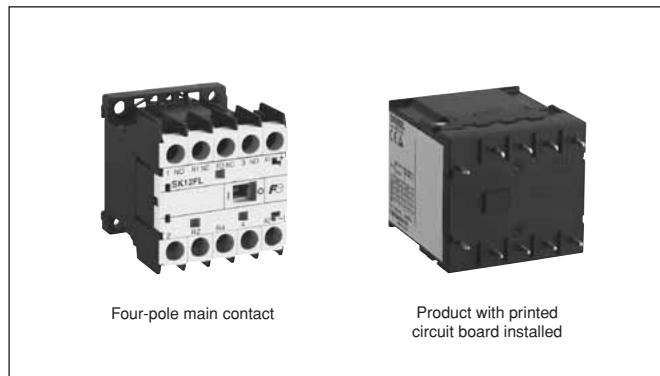
■ Features

Four-pole main contact product

- Optimum to be used when four lines of main circuits are necessary.
- Products with contact arrangement of 4A and 2A2B are available.

Product with printed circuit board installed

- A magnetic contactor with terminals to mount on printed circuit board.



■ Types and ratings

Four-pole main contact product

Main contact A (NO)								Main contact B (NC)			Conventional free air thermal current [A] (Rated thermal current)	Main contact Contact arrangement	Type
Rated capacity [kW]			Rated operational current [A]					Rated operational current [A]					
Three-phase squirrel-cage induction motor (AC-3)			Three-phase squirrel-cage induction motor (AC-3)			Resistive load (AC-1)		Resistive load (AC-1)					
200-240V	380-440V	500-550V	200-240V	380-440V	500-550V	200-240V	380-440V	200-240V	380-440V	500-550V			
2.2	5.5	5.5	12	12	9	20	20	—	—	—	20	4A (4NO)	SK12EL-□
								10	10	5		2A2B (2NO2NC)	SK12FL-□

Note 1: Combine two poles of the auxiliary contact block if necessary since an auxiliary contact is not provided with this product.

This product cannot be combined with a four-pole product of an auxiliary contact block.

Note 2: Applicable panel inside temperature is 55°C or less.

Note 3: Coil voltage indication code is indicated in the "□" part of the product code column.

Product with printed circuit board installed

Rated capacity [kW]		Rated operational current [A]		Resistive load (AC-1)	Rated thermal current [A]	Auxiliary contact arrangement [Product code]	Type
Three-phase squirrel-cage induction motor (AC-3)		Three-phase squirrel-cage induction motor (AC-3)					
200-240V	380-440V	200-240V	380-440V	200-240V			
1.5	3.7	9	9	9		1a (1NO) [10]	SK092L-□10
						1b (1NC) [01]	SK092L-□01

Note 1: Applicable panel inside temperature is 55°C or less.

Note 2: Coil voltage indication code is indicated in the "□" part of the product code column.

● Coil voltage indication code

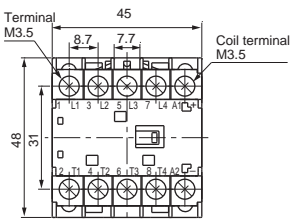
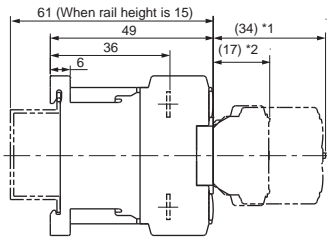
Coil voltage	Code	Coil specification
DC12V	B	
DC24V	E	

Note 1: Permissible voltage fluctuation range is 85 to 110% of the rated value.

Note 2: Be aware of the polarity of the control coil terminal.

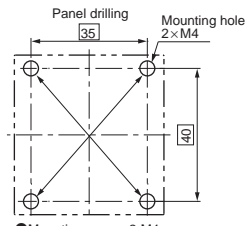
■ Dimensions, mm

SK12EL type
SK12FL type

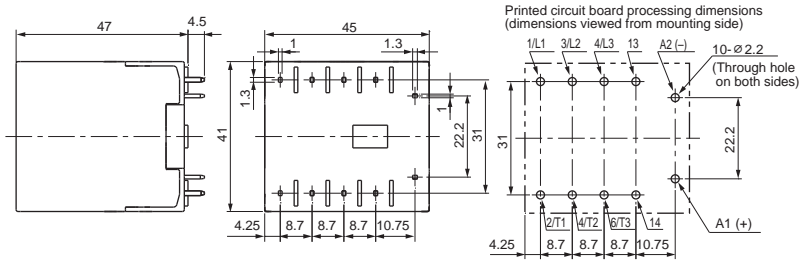


Type (Contact arrangement)	Contact arrangement diagram
SK12EL (4A)	
SK12FL (2A2B)	

*1 When auxiliary contact block (SZ1KA□) (front mounting, 2-pole) is attached (4-pole product cannot be attached)
*2 When auxiliary contact block (SZ1FA□) (front mounting) is attached



SK092L type



Auxiliary contact	Contact arrangement diagram
1a (1NO)	
1b (1NC)	

Industrial Relays SKH4AB, SKH4GB

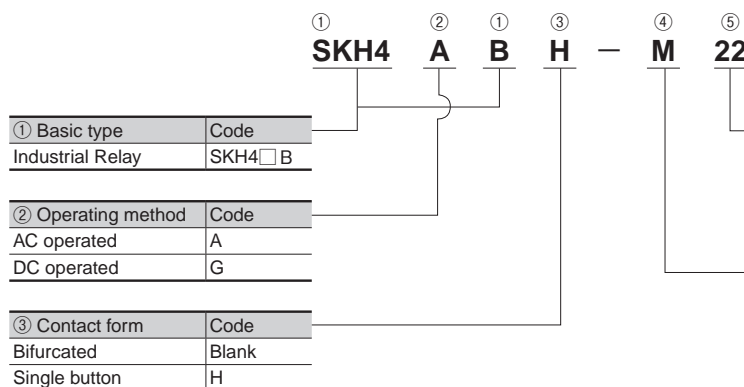
“Compact Industrial Relays of which outer shapes of coil products for AC and coil products for DC are the same”

■ Features

- Standard products conform to and are certified by major standards of the world (IEC, GB)
- Operating coil products for DC and AC are available in the same outer shape
- Compact size of 45 × 48 × 49 mm (Width × Height × Depth)
- Improved the contact reliability using bifurcated contact and it supports low-level circuit of 5V DC 3mA
- High capacity contact specifications (single contact) are also available in the product line-up



■ Type number nomenclature



⑤ Contact arrangement	Code
4NO	40
3NO1NC	31
2NO2NC	22

④ Coil voltage (AC)	Code
24V AC 50Hz / 24-26V AC 60Hz	E
48V AC 50Hz / 48-52V AC 60Hz	F
100V AC 50Hz / 100-110V AC 60Hz	1
100-110V AC 50Hz / 110-120V AC 60Hz	H
110-120V AC 50Hz / 120-130V AC 60Hz	K
200V AC 50Hz / 200-220V AC 60Hz	2
200-220V AC 50Hz / 220-240V AC 60Hz	M
220-240V AC 50Hz / 240-260V AC 60Hz	P
346-380V AC 50Hz / 380-420V AC 60Hz	S
380-400V AC 50Hz / 400-440V AC 60Hz	4
415-440V AC 50Hz / 440-480V AC 60Hz	T
480-500V AC 50Hz / 500-550V AC 60Hz	5

④ Coil voltage (DC)	Code
24V DC	E
48V DC	F
110V DC	H
220V DC	M

■ Types

Operating method	Contact	Coil voltage		Contact arrangement	Type
AC operated [A]	Bifurcated [Blank]	24V AC 50Hz / 24-26V AC 60Hz	[E]	4NO [40]	SKH4AB- □ 40
		48V AC 50Hz / 48-52V AC 60Hz	[F]	3NO1NC [31]	SKH4AB- □ 31
		100V AC 50Hz / 100-110V AC 60Hz	[1]	2NO2NC [22]	SKH4AB- □ 22
	Single button [H]	100-110V AC 50Hz / 110-120V AC 60Hz	[H]	4NO [40]	SKH4ABH- □ 40
		110-120V AC 50Hz / 120-130V AC 60Hz	[K]	3NO1NC [31]	SKH4ABH- □ 31
				2NO2NC [22]	SKH4ABH- □ 22
DC operated [G]	Bifurcated [Blank]	24V DC	[E]	4NO [40]	SKH4GB- □ 40
		48V DC	[F]	3NO1NC [31]	SKH4GB- □ 31
		110V DC	[H]	2NO2NC [22]	SKH4GB- □ 22
	Single button [H]	220V DC	[M]	4NO [40]	SKH4GBH- □ 40
				3NO1NC [31]	SKH4GBH- □ 31
				2NO2NC [22]	SKH4GBH- □ 22

Note: The figure inside the square brackets "[]" indicates the code.

■ Ratings (IEC60947-5-1, GB14048.5)

● Bifurcated contact

Type	Conventional free air thermal current (I _{th})[A] (Rated thermal current)	Making and breaking current [A]	Rated operational current [A]						Minimum voltage and current
			AC rated operational voltage [V]	AC-15 (Ind. load)	AC-12 (Res. load)	DC rated operational voltage [V]	DC-13 (Ind. load)	DC-12 (Res. load)	
SKH4AB SKH4GB	10	30	100 to 120	3	6	24	2	3	5V DC, 3mA
		30	200 to 240	3	6	48	1	2	
		10	380 to 440	1	6	110	0.3	1.5	
		5	500 to 600	0.5	3	220	0.2	0.5	

Note: The failure rate in normal atmosphere where no dust or corrosive gas exists is at the 10^{-7} level.
Rating of additional auxiliary contact block is the same as the above table.

● Single-button contact

Type	Conventional free air thermal current (I _{th})[A] (Rated thermal current)	Making and breaking current [A]	Rated operational current [A]						Minimum voltage and current
			AC rated operational voltage [V]	AC-15 (Ind. load)	AC-12 (Res. load)	DC rated operational voltage [V]	DC-13 (Ind. load)	DC-12 (Res. load)	
SKH4ABH SKH4GBH	10	60	100 to 120	6	10	24	4	8	24V DC, 10mA
		60	200 to 240	6	10	48	1	3.5	
		60	380 to 440	6	10	110	0.5	2.5	
		30	500 to 600	3	5	220	0.25	0.8	

Note: The failure rate in normal atmosphere where no dust or corrosive gas exists is at the 10^{-7} level.
Rating of additional auxiliary contact block is the same as the above table.

■ Performance data

Operating cycles per hour	Durability						
	Electrical						Mechanical
	AC			DC			
	Voltage [V]	Ind. AC-15	Res. AC-12	Voltage [V]	Ind. DC-13	Res. DC-12	
1,800	230/400	300,000	150,000	24/200	100,000	300,000	5 million

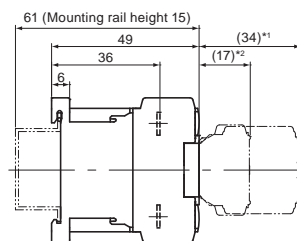
■ Optional units

Description			Type	Used with
Auxiliary contact block (Front mounting)	Bifurcated	1NO+1NC	SZ1FA11	SKH4□B, SKH4□BH
	Single button	1NO+1NC	SZ1FA11H	
	Bifurcated	2NO	SZ1KA20	
		1NO+1NC	SZ1KA11	
		2NC	SZ1KA02	
	Single button	2NO	SZ1KA20H	
		1NO+1NC	SZ1KA11H	
		2NC	SZ1KA02H	
Coil surge suppression unit	Varistor	24-48VAC	SZ1KZ1	SKH4AB, SKH4ABH * ¹
		48-125VAC	SZ1KZ2	
		100-250VAC	SZ1KZ3	

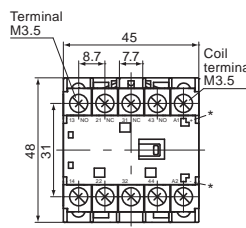
*¹ A varistor is installed in the main unit of DC operated types SKH4GB and SKH4GBH.

■ Dimensions, mm

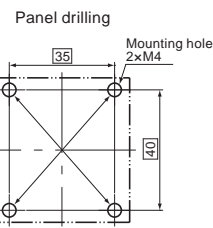
SKH4AB
SKH4GB



[NOTE]
*¹: When auxiliary contact block SZ1KA□ type is attached
*²: When auxiliary contact block SZ1FA□ type is attached



* For DC operated type



• Mounting screw: 2-M4
Mount using two mounting holes on the diagonal line.

Weight: 0.14 kg (SKH4AB type, SKH4ABH type)
0.17 kg (SKH4GB type, SKH4GBH type)

■ Wiring diagrams

Auxiliary contact	Contact arrangement
4NO	
3NO1NC	
2NO2NC	

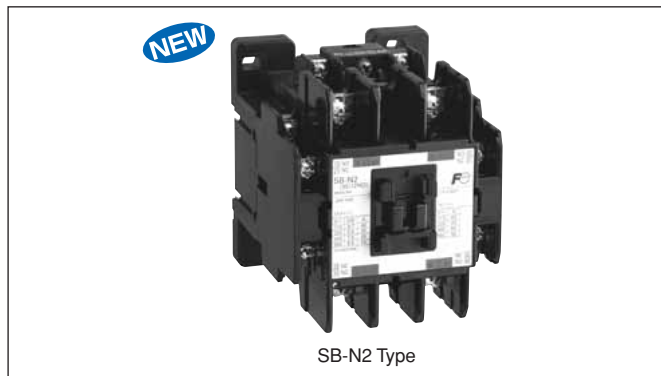
* For DC operated type

DC Magnetic Contactor SB Series SB-N2 Type

DC Magnetic Contactor Model Change Max applicable voltage increased to 660 VDC. Application scope widened for DC low voltage circuits.

■ Features

- Applicable up to resistive load 660 VDC, 40 A
- An auxiliary contact with a mirror contact function is adopted, which is applicable to circuits where safety categories 3 or 4 are required.
- Shares options available in the SC series.
- RoHS support is standard. Flame-proofing material with enhanced tracking performance is adopted as standard.



■ Ordering information

Type	SB-N2	2NO+1NC	AC200V	4NO+4NC	Auxiliary contact arrangement
Main contact arrangement					Coil voltage code
					* Designation unnecessary for 2NO+2NC

■ Types

Model	Type	Main contact arrangement	Auxiliary contact arrangement		Product code
			Standard	Designation	
Standard type	SB-N2 *2	2NO	2NO+2NC [22] *1	4NO+4NC [44] *1	SB35CAA- □ ■ ■
		2NO+1NC			SB35CBA- □ ■ ■
	SB-N2B *2	2NC		—	SB35CCA- □ 22
		1NO+2NC			SB35CDA- □ 22
With SUPER-MAGNET (AC/DC)	SB-N2/SE *2	2NO	4NO+4NC [44] *1	4NO+4NC [44] *1	SB35CAS- □ ■ ■
		2NO+1NC			SB35CBS- □ ■ ■
	SB-N2B/SE *2	2NC		—	SB35CCS- □ 22
		1NO+2NC			SB35CDS- □ 22

Note: For the product code field, fill the coil voltage designation code in the □ field and the auxiliary contact designation code in the ■ field.

*1: The data in the brackets represents an auxiliary contact designation code. For 4NO+4NC, the contactor will be combined with two auxiliary contact blocks (side mounting) SZ-AS1.

■ Operating coil voltages

• AC-operated models

Type	Coil voltage code	Designation code	Coil voltage/frequency AC	Coil voltage color indication
SB-N2 SB-N2B	24 VAC	E	24V, 50 Hz / 24-26V, 60 Hz	White
	48 VAC	F	48V, 50 Hz / 48-52V, 60 Hz	White
	100 VAC	1	100V, 50 Hz / 100-110V, 60 Hz	Green
	110 VAC	H	100-110 V, 50 Hz / 110-120 V, 60 Hz	White
	120 VAC	K	110-120V, 50 Hz / 120-130V, 60 Hz	White
	200 VAC	2	200V, 50 Hz / 200-220V, 60 Hz	Yellow
	220 VAC	M	200-220V, 50 Hz / 220-240V, 60 Hz	White
	240 VAC	P	220-240V, 50 Hz / 240-260V, 60 Hz	White
	380 VAC	S	346-380V, 50 Hz / 380-420V, 60 Hz	White
	400 VAC	4	380-400V, 50 Hz / 400-440V, 60 Hz	Lilac
	440 VAC	T	415-440V, 50 Hz / 440-480V, 60 Hz	White
	500 VAC	5	480-500V, 50 Hz / 500-550V, 60 Hz	White

• SUPER MAGNET (AC/DC)

Type	Coil voltage code	Designation code	Coil voltage/frequency		Coil voltage color indication
			AC	DC	
SB-N2/SE SB-N2B/SE	24 V	E	24-25 V, 50/60 Hz	24 V	White
	48 V	F	48-50 V, 50/60 Hz	48 V	White
	100 V	1	100-127 V, 50/60 Hz	100-120 V	Green
	200 V	2	200-250 V, 50/60 Hz	200-240 V	Yellow
				*2	

Note: The coil voltage is common for AC and DC.

*1: 100 to 110 V for single-phase full-wave DC.

*2: 200 to 220 V for single-phase full-wave DC.

Note 1: The coil voltage code indicates a voltage specified so as to simplify the designation of the control coil voltage at the time of order.

For orders with a coil voltage code, a magnetic contactor with a coil having a voltage range corresponding to the coil voltage code will be delivered. At this time, the contactor will display a coil voltage and frequency listed in the table above, instead of the coil voltage code.

Main contact ratings

• Main contacts 2NO, 2NO+1NC:

Main contact NO ratings (two serial contacts)

Type	Max. motor capacity (kW)				Rated operational current (A)										Conventional free air thermal current (rated thermal current) (A)
	Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)				Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)				Class DC1(JEM1038) (Resistive, L/R ≤ 1ms.)						
	110 V	220 V	440 V	550 V	110 V	220 V	440 V	550 V	110 V	220 V	440 V	550 V	660 V		
SB-N2 SB-N2/SE	3.7	5.5	7.5	5.5	40	35	20	15	60	60	60	50	40	60	

Notes: Conforming to class DC2 and DC4, JEM 1038

DC2: For shunt-wound motors: Starting, switching off during running. The starting current is less than 2.5 times the rated current.

DC4: For series-wound motors: Starting, switching off during running. The starting current is less than 2.5 times the rated current.

Main contact NC ratings (single contact)

Type	Dynamic brake ^{†1}			Conventional free air thermal current (rated thermal current) (A)
	Making current (A)	Time rating (sec)	Operating cycles per hour	
SB-N2 SB-N2/SE	60	3	600	50

^{†1}: The electrical switching durability test consists of 250,000 times or more under a double closed circuit and no-voltage open contact conditions

• Main contacts 2NC, 1NO+2NC:

Main contact NC ratings (two serial contacts)

Type	Max. motor capacity (kW)			Rated operational current (A)								Conventional free air thermal current (rated thermal current) (A)
	Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)			Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)			Class DC1(JEM1038) (Resistive, L/R ≤ 1ms.)					
	110 V	220 V	440 V	110 V	220 V	440 V	110 V	220 V	440 V	550 V	660 V	
SB-N2B SB-N2B/SE	2.2	3.7	—	30	20	—	30	25	10	5	—	50

Main contact NO ratings (single contact)

Type	Max. motor capacity (kW)			Rated operational current (A)			Conventional free air thermal current (rated thermal current) (A)
	Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)			Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)			
	110 V	220 V	440 V	110 V	220 V	440 V	
SB-N2B SB-N2B/SE	1.5	2.2	—	20	15	—	60

Auxiliary contact ratings

Conventional free air thermal current (rated thermal current) (A)	Making and breaking current at AC (A)	Rated operational current (A)						Minimum voltage and current ^{*)}
		AC			DC			
		Voltage (V)	AC-15 (Ind. load)	AC-12 (Res. load)	Voltage (V)	DC-13 ^{*)3} (Ind. load)	DC-12 (Res. load)	
10	60	100 to 120	6	10	24	3	5	5 VDC, 3 mA
	30	200 to 240	3	8	48	1.5	3	
	15	380 to 440	1.5	5	110	0.55	2.5	
	12	500 to 600	1.2	5	220	0.27	1	

^{†1}: The failure rate is level 10⁻⁷ in a usual atmosphere without dust and corrosive gas.

^{†2}: The rating of the auxiliary contact block is the same as in the table above.

^{†3}: Time constant L/R = 70 ms.

Performances

Type	Main contact	Rated operational voltage (V)	Rated operational current (A)	Operating cycles per hour	Durability	
					Mechanical	Electrical Class DC2, 4(JEM1038) (DC motor, L/R ≤ 15ms.)
SB-N2 SB-N2/SE	Contact NO (two serial contacts)	220	35	1200	2.5 million	500,000
SB-N2B SB-N2B/SE	Contact NC (two serial contacts)	110	30	1200	2.5 million	250,000
	Contact NO (single contact)	110	20	1200	2.5 million	250,000
		220	15			

Coil Characteristics

• AC-operated models (SB-N2, N2B)

Power consumption						Watt loss	
Inrush			Sealed				
200 V, 50 Hz	220 V, 60 Hz		200 V, 50 Hz	220 V, 60 Hz		200 V, 50 Hz	220 V, 60 Hz
120 VA	135 VA		12.7 VA	12.4 VA		3.6 W	3.8 W

Note 1: Coil rating: 200 V, 50 Hz / 220-220 V, 60 Hz

Note 2: Variation range of operating voltage: 85 to 110% of rated voltage



• SUPER MAGNET (SB-N2/SE, N2B/SE)

Power consumption						Watt loss		
Inrush			Sealed					
200 V, 50 Hz	220 V, 60 Hz	200 VDC	200 V, 50 Hz	220 V, 60 Hz	200 VDC	200 V, 50 Hz	220 V, 60 Hz	200 VDC
105 VA	130 VA	125 W	3.5 VA	4.2 VA	2.4 W	2.8 W	3.2 W	2.4 W

Note 1: Coil rating: 200-250 V, 50 Hz / 60 Hz, 200-240 VDC

Note 2: Variation range of operating voltage: 80 to 110% of rated voltage

Standard compliance

Type	Compliant standards		Certified standards	
	JEM	IEC	UL	CSA
	Japan	International	USA	Canada
	JEM			
SB-N2, SB-N2/SE	○	○	○ ^{*1}	○ ^{*1}
SB-N2B, SB-N2B/SE	○	○	—	—

Note: Applicable ○: Standard product is compliant and certified

*1: Under application

Options

Option	Type	Combination of options			
		Main contact arrangement			
		2NO	2NO+1NC	2NC	1NO+2NC
Auxiliary contact block (side mounting)	SZ-AS1	○	—	—	—
Coil driving unit (relay type) for IC output ^{*1}	SZ-CD3	○	—	○	—
Coil driving unit (SSR type) for IC output ^{*1}	SZ-CD4	○	—	○	—
Coil-surge suppression unit ^{*1}	SZ-Z31 to Z35	○	—	○	—
Live-section cover ^{*1}	SZ-N1J	○	—	○	—
Terminal cover	SZ-T24	○	—	○	—

*1: Unable to combine with the mechanical latch model and SB-N2/VS Type.

*2: ○: combination OK, —: combination disabled

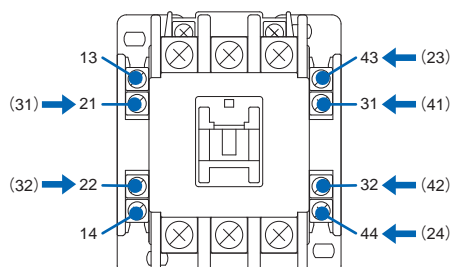
Comparison between new and old types

Model	Old type			New type		Compatible mounting method
	Type	Main contact arrangement		Type	Main contact arrangement	
Standard type	SB-2N	2NO	→	SB-N2	2NO	Yes
	SB-2NB	2NO+1NC	→		2NO+1NC	Yes
		2NO	→	SB-N2B	2NC	Yes
		1NO+2NC	→		1NO+2NC	Yes
With super magnet	SB-2N/SE	2NO	→	SB-N2/SE	2NO	Yes
	SB-2NB/SE	2NO+1NC	→		2NO+1NC	Yes
		2NC	→	SB-N2B/SE	2NC	Yes
		1NO+2NC	→		1NO+2NC	Yes

Changing the auxiliary contact terminal number

Ensure that the terminal numbers for auxiliary contact differ from that for conventional contacts.

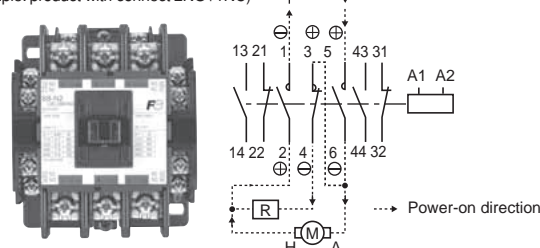
The number in the parentheses indicates a terminal number of old type SB-2N.



Note: Caution on use

- The main contact terminals have positive and negative polarities. Connect cables correctly in terms of their polarities. (Refer to the example on the right.)
- It is ideal to mount the contactor on a vertical plane. However, if mounting the contactor on a sloping surface, ensure that the slope is within ± 30 degree longitudinally and vertically.
- When mounting the contactor, ensure that an arc space of more than the value shown in the outline drawing is provided in front of the arc-extinguishing chamber. (This is unnecessary if the contactor is not used for shutting off currents.)

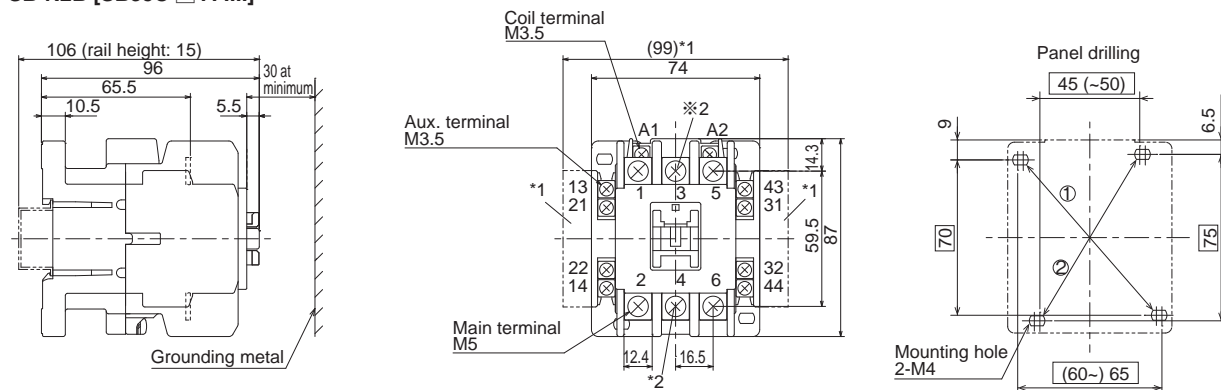
(example: product with connect 2NO+1NC)



Note: • R: resistance for dynamic brake
• For products with main contact 2NO, contact 1NC No. 3, 4 are omitted.

■ Dimensions, mm

SB-N2 [SB35C □ A-....]
SB-N2B [SB35C □ A-....]

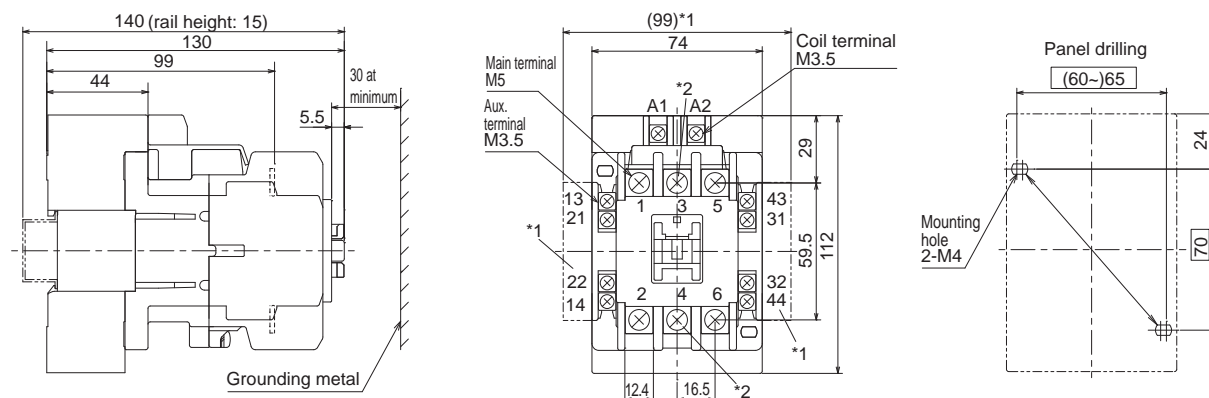


*1: In cases where auxiliary contact block (side mounting) is installed (SB-N2B and N2B/SE are not allowed)
*2: There are no terminals 3/4 in the case of main contact 2NO or 2NC.

Mass: 0.59 kg

SB-N2/SE [SB35C □ S-....]
SB-N2B/SE [SB35C □ S-....]

Caution
Use two diagonal holes for installation of the contactor.
(i) (60 to) 65 x 70: compatible with SB-2N, 2NB
(ii) 45 (to 50) x 75: IEC mounting hole

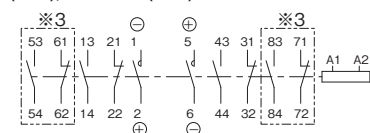


*1: In cases where auxiliary contact block (side mounting) is installed (SB-N2B and N2B/SE are not allowed)
*2: There are no terminals 3/4 in the case of main contact 2NO or 2NC.

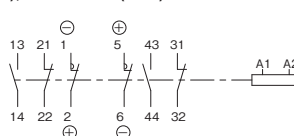
Mass: 0.87 kg

Contact arrangement

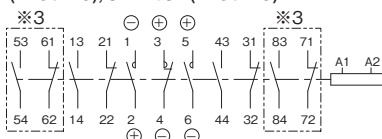
SB-N2 (2NO), SB-N2/SE (2NO)



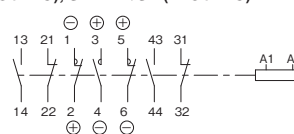
SB-N2B (2NC), SB-N2B/SE (2NC)



SB-N2 (2NO+1NC), SB-N2/SE (2NO+1NC)



SB-N2B (1NO+2NC), SB-N2B/SE (1NO+2NC)




Note 1: *3: In the case of auxiliary contact 4NO+4NC
Note 2: Combination with auxiliary contact block (front mounting) is not allowed.

Time Delay Relays Super Timers ST7P-C Series

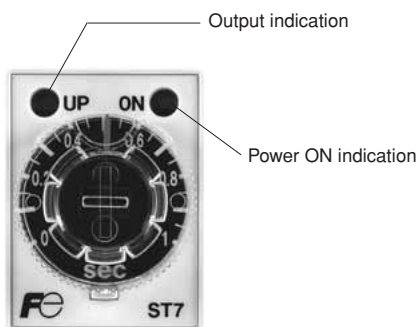
The ST7P-C series are compact and highly accurate Super Timers. The ST7P-C are on-delay operation types.

■ Features

- These Super Timers are highly accurate. Their repeat accuracy is less than $\pm 1\%$ at maximum setting time.
- Timing range
ST7P-C is the single timing range types; 0.06 sec. to 12 hours.
- Time setting dial is user friendly.
Easy to check the status of the timer by the LED indicators.
- The ST7P-C has been approved by the UL,  and CCC.



ST7P-2C, -4C



■ Specifications


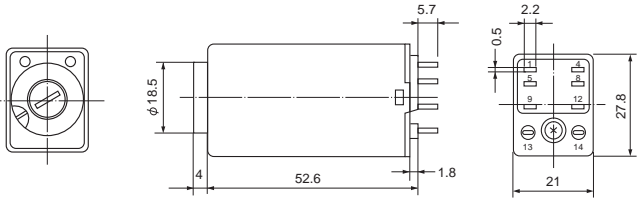

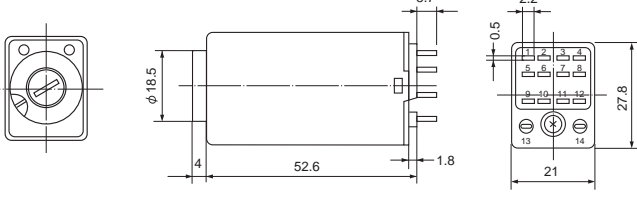
Type	Ordering code	Contact	Operation	Input voltage	Code	Time range	Code	Socket
ST7P-2C	MS7P2C-■□	Timed: 2PDT	On-delay	24V AC 50/60Hz	[AE]	0.05-0.5s	[P5]	Screw
				110V AC 50/60Hz	[AH]	0.1-1s	[1S]	
				220V AC 50/60Hz	[AM]	0.5-3s	[3S]	
				240V AC 50/60Hz	[AP]	0.5-5s	[5S]	
				12V DC	[DB]	1-10s	[1T]	
				24V DC	[DE]	3-30s	[3T]	
				48V DC	[DF]	5-60s	[6T]	
				110V DC	[DH]	0.5-3min	[3M]	
ST7P-4C	MS7P4C-■□	Timed: 4PDT				1-10min	[1N]	
						3-30min	[3N]	
						5-60min	[6N]	
						0.2-2h	[2H]	
						0.5-6h	[6H]	
						1-12h	[1J]	

Note: Enter the input voltage code in the ■ mark and timing range code in the □ mark.

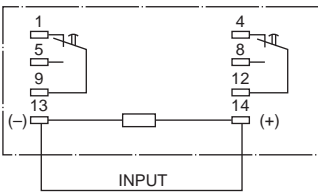
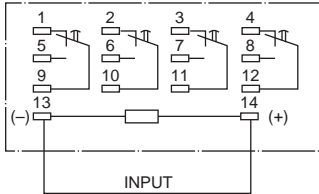
Technical data

Repeat accuracy	±1% at max. setting time		
Reset time	0.1s or less		
Max. operating cycle	1800 cycles/h		
Operating temperature range	-10°C to 50°C		
Mechanical durability	50 million operations		
Electrical durability		ST7P-2C	ST7P-4C
	Resistive load (AC-12)	200,000 Operations	120,000 Operations
	Inductive load (AC-15)	320,000 Operations	260,000 Operations
	Resistive load (DC-12)	500,000 Operations	260,000 Operations
	Inductive load (DC-13)	150,000 Operations	50,000 Operations
Operating voltage range	0.85 to 1.1 times input voltage		
Contact ratings		ST7P-2C	ST7P-4C
	Resistive load (AC-12)	240V 5A	240V 3A
	Inductive load (AC-15)	220V 1A	220V 0.3A
	Resistive load (DC-12)	110V 0.5A	110V 0.5A
	Inductive load (DC-13)	110V 0.2A	110V 0.2A
Power consumption	1.9VA or less (AC), 1.2W or less (DC)		
Dielectric strength	2000V AC rms. 1min. between current carrying part and non current carrying part		
	1500V AC rms. 1min. between output contacts and control circuit		
	1000V AC rms. 1min. between open contacts		
Insulation resistance	100M at 500V DC meger		
Vibration	Durability: 10 to 55Hz, 0.5mm double amplitude		
Shock	Durability: 5 x 9.8 m/s ²		

Dimensions, mm

Type	Appearance, mass	Dimensions, mm
ST7P-2C	 <p>Approx. 45g</p>	
ST7P-4C	 <p>Approx. 45g</p>	

Wiring diagrams

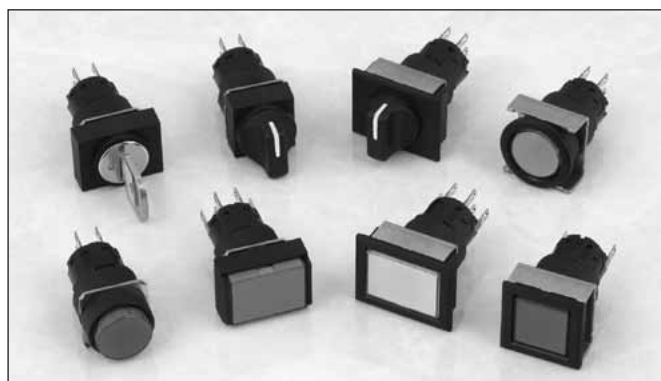
ST7P-2C	ST7P-4C
	

Command Switches Integrated contact structure AR15C • DR15C, AF15C • DF15C AR16C • DR16C, AF16C • DF16C

An integrated structure with built-in contacts that can reduce control panel depth.

Features

- An integrated operator component and contact mechanism that reduces control panels' depth. A unified depth of 28.4mm for the Standard type and 35.9mm for the Thin type.
- Thin type and Standard types available for your control panel design. Select an optimum one to match your control panel design.
- A wide variety of sockets help to reduce wiring.
- Incorporating a gold-flashed SPDT or 2PDT contact mechanism with a snap-action structure that makes and breaks 1mA at 5V.
- A key selector switch with a pin tumbler key and reversible-type mechanism provides improved key insertion and removal (extraction) performance.
- Complies with RoHS (EU Directive 2002/95/EC).



- The standard models are approved by UL/CSA, CCC and TÜV (EN standard).
- Bearing CE markings.

Contact ratings

UL/CSA

- AC (COS ϕ = 0.35)

Contact rating code	120V		240V	
	Making current	Breaking current	Making current	Breaking current
D300	3.6A	0.6A	1.8A	0.3A

- TÜV (EN60947-5-1), CCC (GB14048-5), JIS C 8201-5-1

Type of switches	Conventional free air thermal current Ith	Rated operational current Ie			
		Rated operational voltage Ue	AC		DC
			AC-13 (Inductive load)	AC-12 (Resistive load)	DC-13 (Inductive load)
Illuminated pushbutton switch	5A	24V	—	—	0.7A ^{*)}
Pushbutton switch		120V	1A	1.5A	—
Selector switch		125V	—	—	0.15A ^{*)}
		240V	0.7A	1A	—

Note: *) T_{0.95}=21ms

Specifications (indoor use)

Item		Illuminated pushbutton switch, pushbutton switch	Selector switch	Pilot lights
Rated insulation voltage		250V AC/DC		
Durability	Mechanical	Momentary action: 1 million operations Alternate action: 250,000 operations	Maintained: 250,000 operations Spring/manual return: 250,000 operations Spring return: 250,000 operations	—
	Electrical	100,000 operations (at 220V AC 0.7A)	—	—
Operating frequency		1200 operations/hour (On-load factor: 40%)		
Withstand voltage	Between live section and grounding	2000V AC, 1 minute		
	Between opposite polarity live sections	2000V AC, 1 minute		
Insulation resistance		100M Ω or more (500V DC megger)		
Rated impulse withstand voltage		Uimp 2.5kV		
Conditional short-circuit current		1000A		
Short-circuit protective device		gG 2A (IEC60269 Fuse)		
Pollution degree		3		
Vibration		Resonance: frequency 10 to 55Hz, double amplitude 1.0mm Constant: frequency 16.7Hz, double amplitude 3mm		
Shock		Malfunction durability: 100m/s ² , Mechanical durability: 500m/s ²		
Operational ambient temperature		-10 to +55°C (no icing or no condensation)		
Storage temperature		-40 to +70°C		
Relative humidity (inside control panel)		45 to 85%RH (-5 to +40°C) (no icing or no condensation)		
Degree of protection of operating (displaying) section		AR15C • DR15C, AF15C • DF15C : IP40 (IEC60529) AR16C • DR16C, AF16C • DF16C : IP65 (IEC60529)		
Degree of protection of terminal section		IP2X (Fast-connection socket: AR6S690, Connector socket: AR6S691-C or Terminal cover: AR2Y261, At the connection)		

■ Specifications (Socket)

Item	Fast-connection socket	Connector socket	Socket for PC board
Rated insulation voltage Ui	250V AC/DC		60V AC/DC
Conventional free air thermal current Ith	3A	5A	3A
Rated impulse withstand voltage Uimp	2.5kV		0.5kV
Withstand voltage (Between live section and grounding)	2000V AC, 1minute		1000V AC, 1minute
Insulation resistance	100MΩ or more (500V DC megger)		
Operational ambient temperature	-10 to +55°C (no icing or no condensation)		
Storage temperature	-40 to +70°C		
Relative humidity	45 to 85%RH (-5 to +40°C) (no icing or no condensation)		
Pollution degree	3		

■ Contact reliability

FUJI has confirmed that the product can be used in 1mA circuit conditions at 5V AC or DC. The operable range, however, may vary depending on the operational ambient conditions and type of load.

■ Lamp ratings and current consumption

- Illuminated pushbutton switch, Pilot lights

Applied method	Lamp operational voltage	High-brightness LED lamp		
		Type	Lamp rated voltage	Current consumption
without transformer	12V DC	DR6L695C-B□	12V DC	Green, Red, Amber, Blue: 9 to 10.5mA DC
	24V DC	DR6L695C-E□	24V DC	White: 4.5 to 5.5mA DC

Note: A box □ indicates the luminous color. For details, see the "Combination of Illuminated pushbutton / pilot light color and LED lamp luminous color".

■ Combination of Illuminated pushbutton / pilot light color and LED lamp luminous color

Illuminated pushbutton / pilot light color (lens color)		Luminous color of high-brightness LED lamp	
Type		Type	
Green	G	Green	DR6L695C-■ G
Red	R	Red	DR6L695C-■ R
White	W	White	DR6L695C-■ P
Yellow	Y	White	DR6L695C-■ P
Orange	A	Amber	DR6L695C-■ A
Blue	S	Blue	DR6L695C-■ S

Note: *1 A box ■ indicates the lamp operational voltage. For details, see the "Lamp ratings and current consumption".

■ LED durability

Type of lamp	Durability(reference)	Judgment criterion
LED lamp	Approx. 30000h	When the brightness is less than 50% of initial value.

Note: The durability of LED lamp is a mean value in all colors.

■ Standard approved

UL508	cUL File No.E44592
CSA C22.2 No.14	
TÜV: EN60947-5-1	Pushbutton, Illuminated pushbutton: R50116757 Selector: R50116759 Pilot lights: R50116762
CCC: GB14048.5	Switches (except pilot lights): 2013010305590653 Pilot lights: 2013010305590652

■ Standard models approved by international standards

The standard models of AR15C•DR15C, AF15C•DF15C series and AR16C•DR16C, AF16C•DF16C series of the ø16 Command Switches meet UL / CSA requirements, China Compulsory Certification (CCC) standards, and TÜV EN standards, thus ensuring easier direct or indirect export to North America and European countries with no safety standard concerns.

Cam-type control selector switches AK7 Series

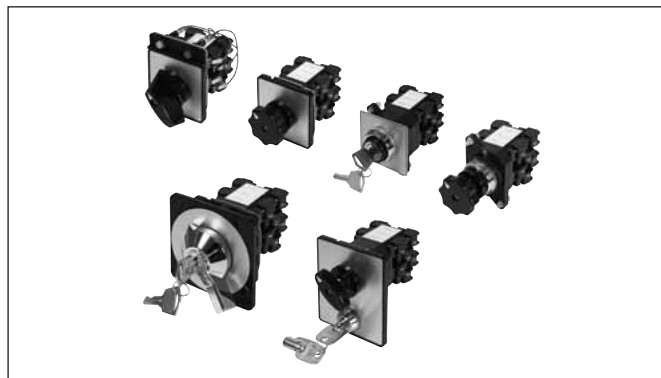
Switch for general operation that can be used in various combinations

■ Features

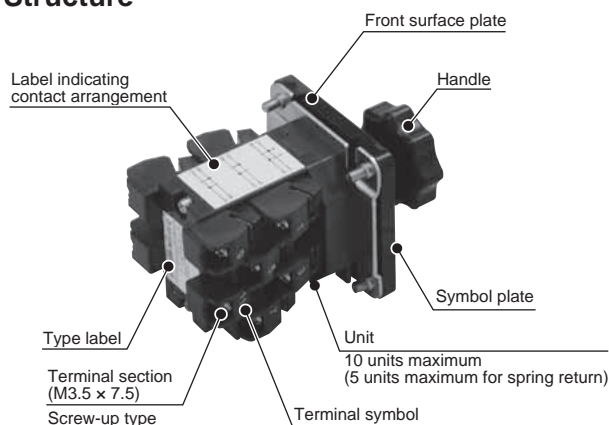
- A screw-up type of product that has no risk of screw detachment is used for wiring terminals, and the round crimp terminal shortens the wiring installation work.
- A terminal cover is unnecessary since the terminal has a finger-protection structure.
- A bifurcated contact that is adequate for a low-voltage and small current control circuit is available.
- The contact arrangement is indicated on the main unit so that it is easy to identify the contact details.
- Polyamide resin that has excellent oil resistance and fire-resistant properties is adopted.

■ Specifications (for indoor use)

Item		Specifications
Rated insulation voltage U_i		AC/DC 600V
Durability	Mechanical	AK7E, X, L: 5 million times AK7F: 1 million times AK7K, S, J: 250,000 times
	Electrical	250,000 times (AC-15 220V 7.5A) 100,000 times (DC-13 110V 1.3A)
Operating cycles per hour		600 times/h (activity ratio 40%)
Dielectric strength		2500 V AC 1 min.
Insulation resistance		1000 MΩ or more (with 500 V megger)
Rated impulse withstand voltage U_{imp}		6kV
Conditional short-circuit current		1000A
Short-circuit protective device		20A
Pollution degree		3
Vibration resistance		Frequency 16.7 Hz, double amplitude 3 mm, three-axes directions 1 hour each
Shock resistance		Durability 500m/s ² Malfunction 100m/s ²
Rated frequency		50/60Hz
Operational ambient temperature		-20 to +60°C No freezing or dew condensation shall be observed
Storage temperature		-40 to +70°C No freezing or dew condensation shall be observed
Relative humidity (within the panel)		45 to 85%RH No freezing or dew condensation shall be observed
Degree of protection of operating section		AK7E, X, L, K, S: IP40 AK7F, J: IP65
Terminal screw		M3.5×7.5
Maximum connection wire		Maximum 2 mm ² × 2 wires



■ Structure



■ Rating




• Standard contact

Rated insulation voltage [V]	Rated thermal current [A]	Rated operational voltage [V]	Rated operational current [A]			
			DC		AC	
			Inductive load	Resistance load	Inductive load	Resistance load
600	10	24	10	10	5	10
		110	7.5	10	1.3	3
		220	7.5	7.5	0.45	0.8
		440	2.5	2.5	0.2	0.4
		550	1.5	2	0.15	0.3

• Bifurcated contact

Rated insulation voltage [V]	Rated thermal current [A]	Rated operational voltage [V]	Rated operational current [A]
600	2	AC24	0.5
		AC50	0.25
		DC12	0.5
		DC24	0.25

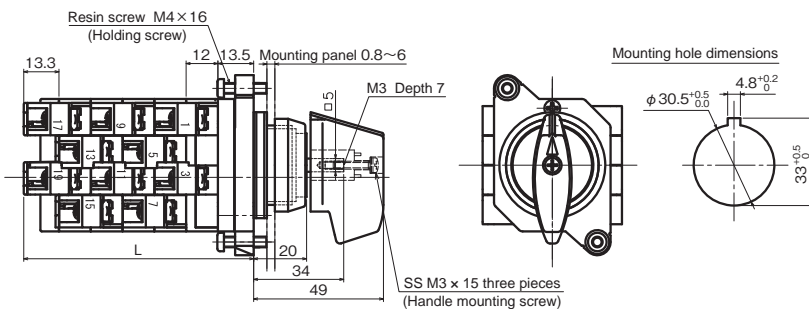
Types

Appearance	Basic type	Mounting	Number of element steps
 AK7F1	AK7F1-M	30 φ Ring nut mounting	1
	• Maintained type		2
	• With small handle		3
			4
	AK7F1-A		5
	• Spring return type		6
	• With small handle		7
	• Note 1		8
			9
			10
 AK7X1	AK7X1-M	Flange mounting Flush mounting No front surface plate	1
	• Maintained type		2
	• With small handle		3
			4
	AK7X1-A		5
	• Spring return type		6
	• With small handle		7
	• Note 1		8
			9
			10
 AK7E1	AK7E1-M	Flange mounting Flush mounting With front surface plate	1
	• Maintained type		2
	• With small handle		3
			4
	AK7E1-A		5
	• Spring return type		6
	• With small handle		7
	• Note 1		8
			9
			10

(Note) Only standard products are described. * Number of simultaneous contacts is 5 or less (up to 5 elements)

Dimensions, mm

AK7F1 (handle operation type)



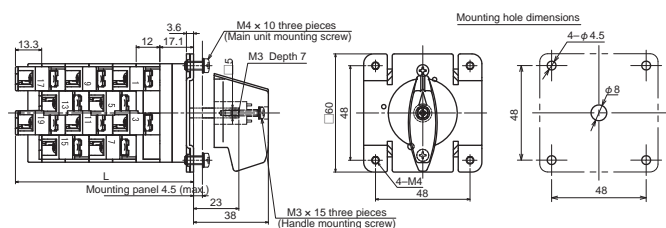
(Note) There is no need to make a hole with a width of 4.8 mm when there is no key washer or when a symbol plate is not used.

L dimension table

Number of elements	1	2	3	4	5
L dimension (mm)	38.8	50.8	62.8	74.8	86.8
Number of elements	6	7	8	9	10
L dimension (mm)	98.8	110.8	122.8	134.8	146.8

The dimension will be 17.5 mm longer than the dimensions described above for specifications that add a pulling operation.

AK7X1 (flush mounting with no front surface plate)

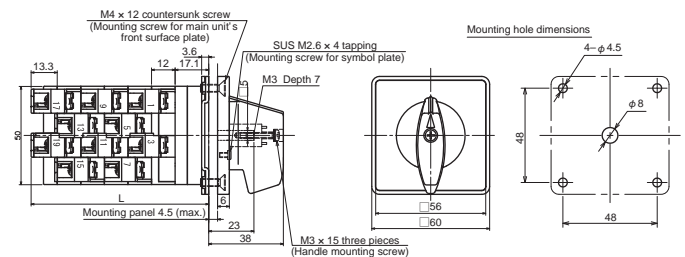


L dimension table

Number of elements	1	2	3	4	5	6	7	8	9	10
L dimension (mm)	42.4	54.4	66.4	78.4	90.4	102.4	114.4	126.4	138.4	150.4

The dimension will be 17.5 mm longer than the dimensions described above for specifications that add a pulling operation.

AK7E1 (with flush mounting front surface plate)



L dimension table

Number of elements	1	2	3	4	5	6	7	8	9	10
L dimension (mm)	42.4	54.4	66.4	78.4	90.4	102.4	114.4	126.4	138.4	150.4

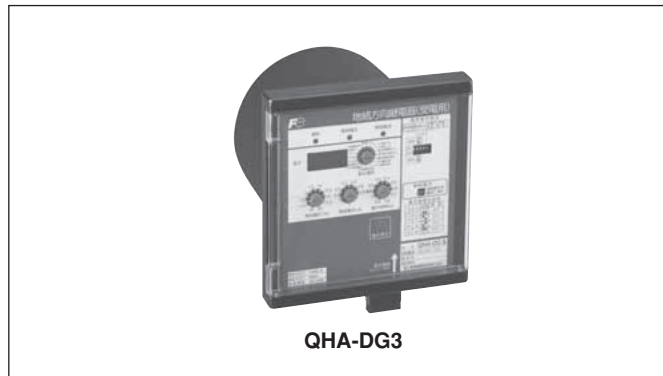
The dimension will be 17.5 mm longer than the dimensions described above for specifications that add a pulling operation.

High-Voltage Power Receiving and Distribution Protective Relay QHA Series

Full model change for static protective relay! Digital system makes it possible to set detailed operation.

■ Features

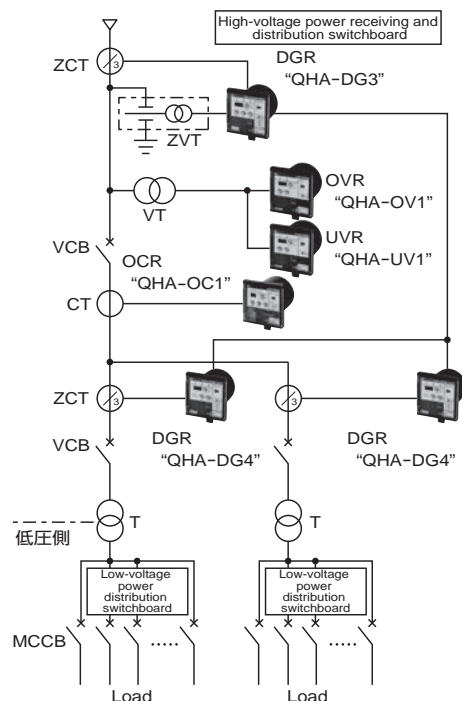
- Stable protective characteristics achieved through use of digital calculation type
- High reliability achieved through constant monitoring of internal circuit and automatic inspection of output circuit
- Possible to check the operation condition through values such as setting value, operating value, input current value and error code shown on the LED indicator of the front face panel
- Easy setting
- Possible to open and close from either right or left by switching the open/close type cover
- Mounting compatibility with "QH" series



■ Types

Use	Name	Symbol	Product specifications	Type
For high-voltage power receiving and distribution equipment	Overcurrent relay	OCR	Shunt trip	QHA-OC1
			Current trip	QHA-OC2
	Overvoltage relay	OVR	Shunt trip	QHA-OV1
	Undervoltage relay	UVR	Shunt trip	QHA-UV1
	Directional ground-fault relay (for power receiving)	DGR	Shunt trip	QHA-DG3
			Current trip	QHA-DG5
			Current trip	QHA-DG6
	Directional ground-fault relay (for branch)	OCGR	Shunt trip	QHA-GR3
			Current trip	QHA-GR5
	Ground-fault relay		Current trip	QHA-GR5

■ Example of solid-wire wiring diagram of high-voltage power receiving equipment



Overcurrent relays

■ Features

- Stable protective characteristics achieved through use of digital calculation type
- High reliability achieved through constant monitoring of internal circuit and automatic inspection of output circuit
- Possible to check the operation condition through values such as setting value, operating value, input current value and error code shown on the LED indicator of the front face panel
- Easy setting
 - Easy setting by dip switch
 - Easy setting by knob rotation operation
- Possible to open and close from either right or left by switching the open/close type cover
- Can be attached to the conventional product "QH" product category
- Protective coordination is simplified by four time-limit characteristics
- Three steps of instantaneous trip characteristics → Simple to coordinate with upper and lower protective devices



QHA-OC1

Overvoltage relays, Undervoltage relays

■ Features

- Stable protective characteristics achieved through use of digital calculation type
- High reliability achieved through constant monitoring of internal circuit and automatic inspection of output circuit
- Possible to check the operation condition through values such as setting value, operating value, input current value and error code shown on the LED indicator of the front face panel
- Easy setting
 - Easy setting by dip switch
 - Easy setting by knob rotation operation
- Possible to open and close from either right or left by switching the open/close type cover
- Can be attached to the conventional product "QH" Series



QHA-OV1

Directional ground-fault relays

■ Features

- Stable protective characteristics achieved through use of digital calculation type
- High reliability achieved through constant monitoring of internal circuit and automatic inspection of output circuit
- Possible to check the operation condition through values such as setting value, operating value, input current value and error code shown on the LED indicator of the front face panel
- Easy setting
 - Easy setting by dip switch
 - Easy setting by knob rotation operation
- Possible to open and close from either right or left by switching the open/close type cover
- Can be attached to the conventional product "QH" Series



QHA-DG3

Ground-fault relays

■ Features

- Stable protective characteristics by static type circuit
- Easy setting
 - Easy setting by dip switch
 - Easy setting by knob rotation operation
- Possible to open and close from either right or left by switching the open/close type cover
- Can be attached to the conventional product "QH" Series



QHA-GR3

Analog unit for transducer F-MPC WS3 Series

Possible to monitor energy by inputting an analog signal from devices such as a pressure gauge, flowmeter, thermometer and hygrometer.

■ Features

- Analog input and communication output conversion unit for Power Monitoring System F-MPC.
- DC4 to 20 mA, 1 to 5 V DC, 0 to 10 V DC, etc. for analog input. F-MPC-Net, Modbus for communication output
- Supports two circuits of analog input. However, the two circuits must have the same signal specifications.
- All types of products conform to RoHS Directive.



■ Type number nomenclature

WS3MF-□□Y□Y□Y1

Input signal

23	DC0 ~ 50mV	42	DC±5V
33	DC0 ~ 60mV	24	DC±10V
11	DC0 ~ 100mV	27	DC0 ~ 1mA
12	DC0 ~ 1V	54	DC0 ~ 5mA
13	DC0 ~ 5V	55	DC0 ~ 10mA
14	DC0 ~ 10V	56	DC0 ~ 16mA
15	DC1 ~ 5V	16	DC4 ~ 20mA
50	DC±50mV	57	DC±1mA
51	DC±60mV	58	DC±5mA
52	DC±100mV	59	DC±10mA
53	DC±1V		

External power supply

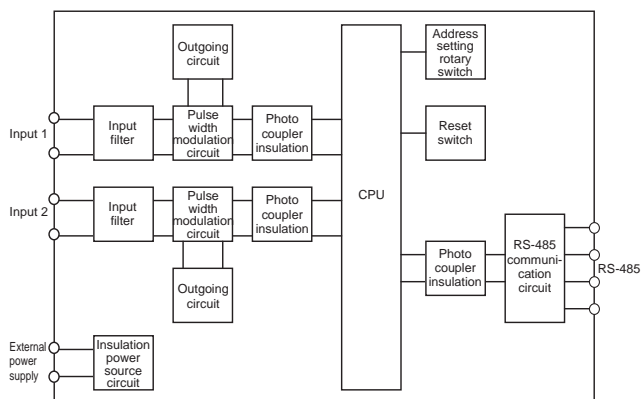
0	AC · DC80 ~ 264V
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Output signal

F	F-MPC-Net Communication output (RS-485)
M	Modbus Communication output (RS-485)

(Note) The socket (WS212) is a standard accessory.

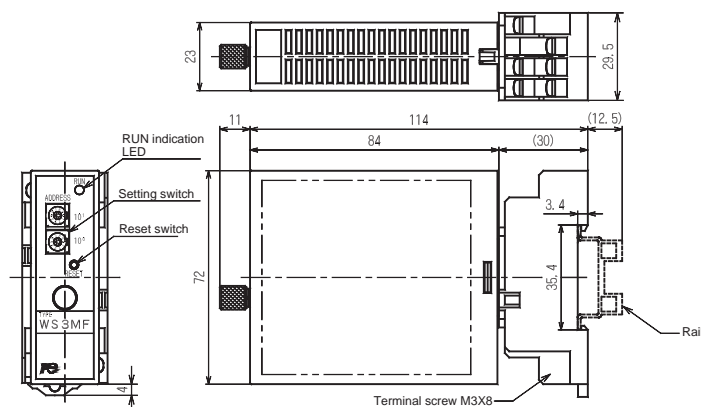
■ Block chart



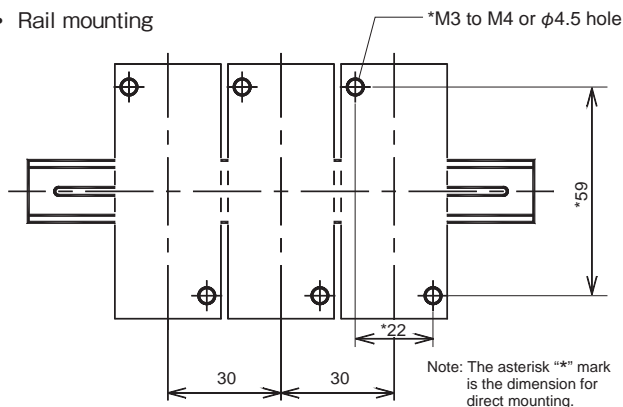
■ Specifications

Type	WS3MF	
Insulation type	Photo coupler type	
Standard accuracy	±0.2%	
Temperature characteristics	0.2% (% of span)	
Input circuit	Number of circuits	Two circuits
	Input signal	Refer to the code described on the left
	Input resistance	Voltage input: Approx. 1 MΩ Current input: Approx. 100Ω
External power supply	Range of power source and consumption VA	AC80 to 264V (AC110V: 3.5VA, AC220V: 5.0VA) DC80 to 264V (DC110V/220V: 3.0W)
	Inrush current (time constant)	Rated voltage 110 V AC 1.7 A or less (approx. 1.0 ms) 220 V AC 3.3 A or less (approx. 1.0 ms) 110 V DC 1.2 A or less (approx. 1.0 ms) 220 V DC 2.4 A or less (approx. 1.0 ms)
Communication output	Standard	EIA RS-485
	Transmission method	Half-duplex two-line type
	Synchronization system	Start-stop synchronization type
	Protocol	F-MPC-Net or Modbus
	Transmission speed	19200bps
	Transmission code	NRZ
	Start bit	1 bit
	Data length	F-MPC-Net: 7 bits, Modbus: 8 bits
	Parity	Odd number
	BCC (CRC)	F-MPC-Net : Even number horizontal parity Modbus :CRC-16
	Stop bit	1 bit
	Address	1 to 99 (changeable by switch setting)
	Transmission characters	ASCII code
	Transmission distance	1,000 m (total length)
	Number of connection units	Maximum 64 units/system (including other devices)
	Terminating resistor (100Ω) is connected to the transmission line by a short circuit of the DXB terminal and Ter. Terminal.	
Insulation resistance	50 MΩ or more (500 V DC)	
Dielectric strength	2000 V AC 1 min.	
Input, output, power source, to ground		
Between inputs		
Range of service temperature and humidity	-10 to +55°C, 90%RH or less (no dew condensation shall be observed)	
Storage temperature	-20 to +70°C	
Mass	Approx. 180 g (supplied with socket WS212 type)	

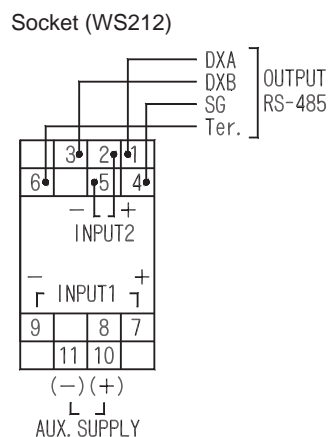
■ Dimensions, mm



• Rail mounting



■ Wiring diagram



■ Other specifications

• Electric strength and mechanical stress

Item	Specifications
Overload capacity	Current input circuit: 10 times the rated current for 5 sec., 1.2 times continuously Voltage input circuit: 2 times the rated current for 10 sec., 1.2 times continuously External power supply circuit: 1.5 times 220 V AC for 10 sec., 264 V AC continuously
Noise immunity	Damping oscillation wave 1 to 1.5 MHz Peak voltage 2 kV Square wave Square wave noise of 100 ns × 1 μs 1 kV Radio wave noise 10 V/m Static electricity Air discharge ±8 kV Contact discharge ±4 kV
Vibration	10 to 55 Hz: One-way amplitude 0.15 mm
Shock	In each of the X, Y and Z direction Three times each with shock of 294 m/s ²

• Other functions

Item	Specifications
Indication: RUN	When power source is applied, the LED (green) turns on during normal operation. When a communication abnormality, etc. is generated, the LED starts blinking according to the condition.
Address	Address is 01 to 99 (changeable by rotary code switch setting) The setting at factory shipping is 00 (communication function lock).

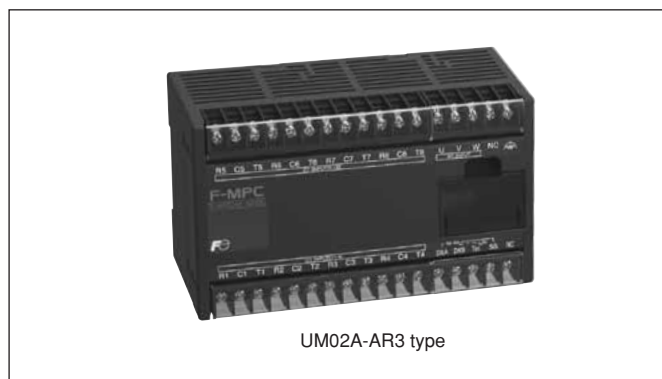
Power monitoring unit F-MPC Series

Multi-circuit power monitoring unit F-MPC04P

**The multi-circuit power monitoring unit F-MPC04P is renewed!
Realized significant downsizing while maintaining same
amount of applied circuits.**

■ Features

- Monitoring unit
- Product to be attached on the panel for multi-circuit of F-MPC product category power monitoring unit
- Digital multifunction multi-meter integrated with measuring functions necessary for electric energy monitoring on one unit.
- Possible to perform measurement of several circuits in one unit.
Possible to measure up to 12 feeders, 8 feeders and 4 feeders with single-phase two-wire type, three-phase three-wire type and three-phase four-wire type respectively.
*Distribution system that is connected to one common bus line is the scope of measurement.
- RS-485 communication is equipped as standard.
- Measurement of active electric energy of inverse load flow is added to measurement items of current product.
- Size and weight is reduced: -40% in external shape and -40% in mass (compared to current product) while keeping the same amount of applied circuits.
- Power consumption is reduced 50% as well (Compared to current product)
- Indicator (separately sold)
- Possible to display measurement data on the panel using a separately sold indicator.
- Visibility is improved by increasing the size of letters and numbers. (Compared to current product)
- Expression methods such as measurement display items are improved by increasing the number of LEDs. (Compared to current product)
- Operability is improved by adopting selection SW type for each function (Measurement: Meter, Phase: Phase and Function: Func.). (Compared to current product)



UM02A-AR3 type

■ Specifications

● General specifications

Item	Specifications
Rating	Voltage 100 to 240 V AC (permissible operational voltage range: 85 to 264 V AC) AR2: Between P1 - N terminals, AR3: Between U - V terminals, AR4: Between P1 - P2 terminals
	Frequency 50/60 Hz (permissible range: 47.5 to 63 Hz)
	Current (CT primary/secondary) AC5A/7.34mA, AC50A/73.4mA, AC100A/33.3mA, AC200A/66.7mA, AC400A/133.3mA, AC800A/133.3mA
Power source	Load VA 7VA
	Inrush current 30A, 3ms (240V) 15A, 3ms (100V)
Insulation resistance	Between collective electric circuits - Ground (Housing, DIN rail) 10 MΩ or more Between collective I/O circuits - Ground 10 MΩ or more Collective electric circuits - Collective I/O circuits 5 MΩ or more
Vibration resistance performance	10 to 58 Hz: One-way amplitude 0.075 mm, 58 to 150 Hz: Constant acceleration 10 m/s ² 8 min. × 10 cycles in each direction of X, Y and Z (in a condition with slip prevention fitting attached)
Shock resistance	Semisinusoidal wave 294m/s ² , 11ms, Three times in each direction of X, Y and Z (in a condition with slip prevention fitting attached)
Dielectric strength	Between collective terminals - Ground (Housing, DIN rail) 2,000 V AC One min. Collective electric circuits - Collective I/O circuits 2,000 V AC One min.
Noise resistance judgment criterion B	Square wave 1 ns × 1 μs Noise of square wave of 1.5 kV Applied for 10 min. consecutively Radiation electromagnetic field 20 V/m (i) Static electricity Gap discharge: 8 kV, contact discharge (housing): 4 kV Burst Control power: 2kV, CT input (clamp): 2 kV, I/O (clamp): 1 kV
Overload capacity	Current circuit 1.1 times of full scale (1.25 times of rated current) Two hours
	Voltage circuit 1.1 times of full scale Two hours
Operating ambient temperature	-10 to 55°C
Storage temperature	-20 to 70°C
Relative humidity	20 to 90%RH (no dew condensation shall be observed)
Atmosphere	No corrosive gas or excessive dust shall be observed
Permissible instantaneous power failure time	20ms (communication and measurement are interrupted)
Mass	[Measurement unit] Approx. 300 g (excluding CT) [indicator] Approx. 70 g (excluding connection cable)

(i) The operation of power monitoring unit may temporarily stop under strong radio wave environment.

■ Product and type

Product name	Type	On sale
Multi-circuit power monitoring unit (three-phase three-line 8 circuits)	UM02A-AR3	Jan. 2014
Multi-circuit power monitoring unit (single-phase two-line 12 circuits)	UM02A-AR2	Coming soon
Multi-circuit power monitoring unit (three-phase four-line 4 circuits)	UM02A-AR4	Coming soon
Indication and addressing unit	UM02AX-S	Jan. 2014
Screw attachment fitting (set of 10 pieces)	BZ0SET	
Split type CT Primary rated current 5A	CC2D81-0057	Now on sale
(Manufactured by Fuji Electric Technica) 50A	CC2D81-0506	
100A	CC2D71-1004	
200A	CC2D65-2008	
400A	CC2D54-4009	
800A	CC2D52-8009	

■ Specifications (continued)

● Measurement specifications

Item	Scope of guaranteed effective accuracy	Indication and addressing unit	Accuracy (i)
Current (ii) (Measure N phase current as well for AR4)	0.4 to 125% of CT rating * However, 50 A CT: 0.4 to 100% 100 A CT: 0.4 to 120% Active electric energy is described in the accuracy column	Four digits	±1.5% FS However, ±2.5%FS for S phase current of AR3 and N phase current of AR4
Active power (iii) (Negative value for inverse load flow)		Four digits	±1.5% FS
Reactive power (iii) (Reactive power measurement method)		Five digits	Equivalent to JIS regular grade ±2.0% by power factor 1.0 and 5 to 120% of CT rating current ±2.5% by power factor 0.5 and 10 to 120% of CT rating current
Active electric energy (iii) Forward active electric energy Active electric energy of inverse load flow		Four digits	±1.5% FS
Maximum value of active power (iii) (Forward active electric energy only)	Same as above (possible to set demand time of 0, 1, 5, 10 and 30 min.)	Four digits	±1.5% FS
Power factor (reactive power measurement method)	0 to ±1.000	Four digits	±5% (Conversion by 90° phase angle)
Voltage (ii)	For AR2 (single-phase two-line) and AR3 (three-phase three-line) Voltage 85 to 264V (conversion by direct and VT secondary voltage)	Four digits	±1.5% FS However, the voltage between W - U of AR3 and between P1 - P2 of AR2 is ±2.5% FS
Minimum value of each phase-to-phase voltage (iv)	For AR4 (three-phase four-line), phase-to-phase voltage 50 to 279 V (Conversion by direct and VT secondary voltage) Line voltage 87 to 484 V	None	
Maximum value of the maximum phase-to-phase voltage (iv)			

(i) Accuracy performance excludes externally attached CT and VT.

(ii) AR3 calculates by automatically judging three-phase three-line type, single-phase three-line type and single-phase two-line type. For single-phase two-line, Vvw, Vwu, Is and It become zero.

(iii) Active power, reactive power and active electric energy are measured in the range of voltage: 85 to 264 V and current: 0.4 to 125%.

(iv) The minimum value and maximum value of voltage are only for the communication data and cannot be displayed on the indicator and addressing unit.

(v) F-MPC-Net: four digits and MODBUS: nine digits are sent as communication data. However, only active electric energy data of F-MPC-Net supports sending data of nine digits.

● Communication specification

RS-485 communication is used by selecting F-MPC-Net communication or MODBUS/RTU communication protocols.

Item	Specifications
	F-MPC-Net MODBUS/RTU
Standard	EIA-485
Transmission method	Half duplex two-line type
Data exchange method	1: N (Power monitoring unit) Polling/selecting
Synchronization method	Start-stop synchronization method
Transmission distance	1,000 m (total length)
Number of connection units	Maximum 64 units (i) One system (however, the master device is included in the 64 units)
Transmission speed	4,800/9,600/19,200/38,400bps (Select)
Station address setting	1 to 99 (ii) (MODBUS/RTU communication are also 1 to 99)
Connection method	Terminal block
RS-485 terminal name	DXA, DXB Connect by replacing DXA to D1 (+) and DXB to D0 (-).
Transmission character	ASCII code Binary
Data type	Start bit 1 bit (fixed) 1 bit (fixed)
	Data length 7 bits / 8 bits (select) 8 bits (fixed)
	Parity bit None / Even number / Odd number (select) None / Even number / Odd number (select)
	Stop bit 1 bit (fixed) No parity: 2 bits (fixed), Others: 1 bit (fixed)
	BCC Even number horizontal parity CRC-16

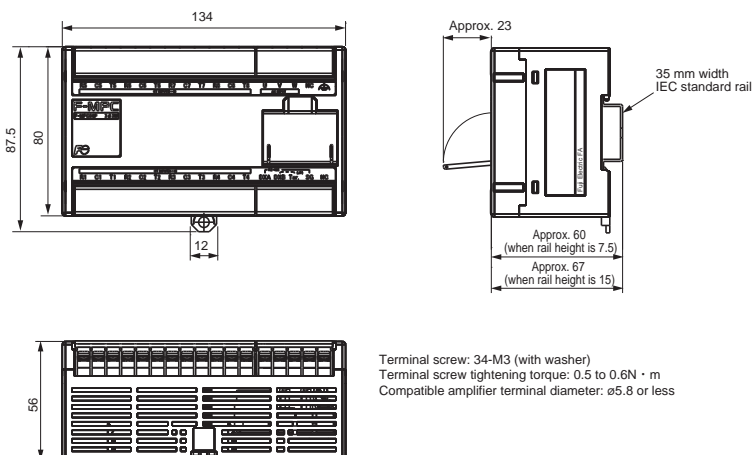
Note 1: Setting of factory shipment is F-MPC-Net protocol; Communication speed: 19,200 bps; Data length: 7 bits; Parity: Odd number. (A special indicator [Type: UM02AX-S] is necessary to change the communication setting of factory shipment.)

(i) When 32 units are connected, two units are recognized as one unit and the maximum number of connection will be lower.

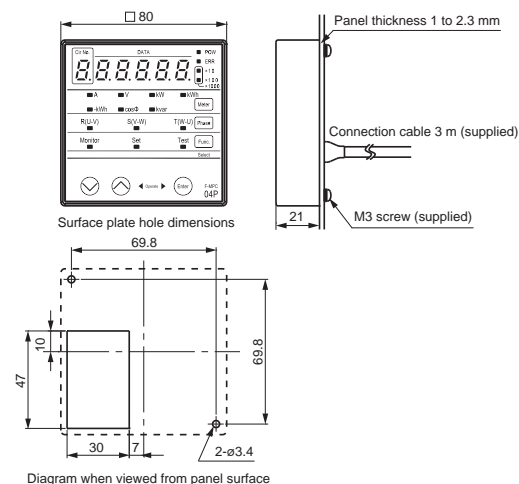
(ii) Communication code is set using the rotary switch. In addition, use an address in the range of 1 to 99 for the power monitoring unit with MODBUS/RTU as well. The communication will be invalid when the communication code is set at "00."

■ Dimension, mm

UM02A-AR3



UM02AX-S



AC power regulator [APR] APR-D Series (three-phase)

Three-phase APR-D Series is the successor of APR-L. Space-saving, wire-saving and low-cost type of APR with a significant improvement in function and performance achieved by installing a CPU.

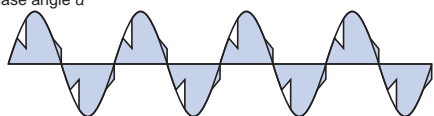
■ Features

- Thyristor pure inverse-parallel type (six arms).
- The output range is 0–100% of the main circuit power source voltage.
However, the amount of voltage decrease due to thyristor specific resistance is excluded
- Possible to switch between the waveform control types (phase control, cycle control or phase angle proportion control).

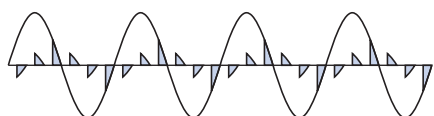
Phase control type (0–100%)

Output voltage
Ignition phase angle α

93%V
 $\alpha=30^\circ$



21%V
 $\alpha=120^\circ$



Cycle control type (continuous type)

Output voltage

71%V
(1/2)



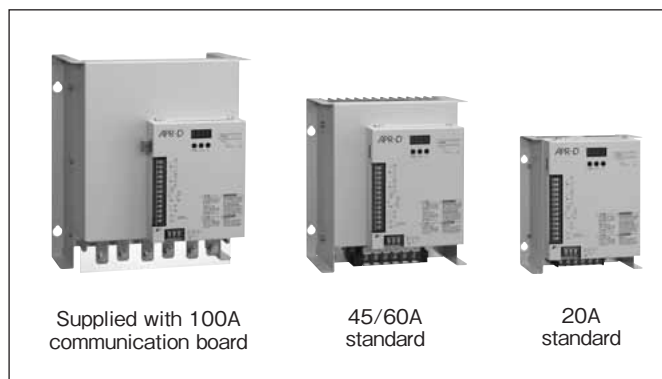
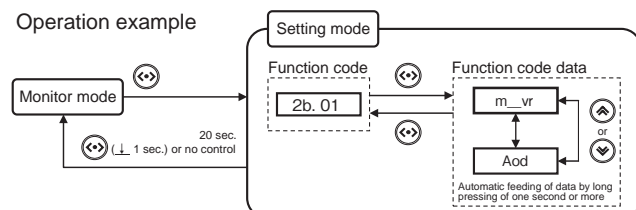
45%V
(1/5)



0.5–2 sec.
(Changeable by inverter time)

- With main circuit terminal block cover.
- Mounting pitch is the same as APR-L.
However, 400 V system 45/60 A product is excluded
- Output is RMS value linear characteristic for various settings.
- Digital settings such as base load setting and gradient setting as well as a monitor function is provided as standard.

Operation example



- Soft start, soft up and soft down time can be set individually from 0 to 100.0 sec.
- Soft start functions securely upon inrush of main circuit power source.
- The range of power source voltage is 200–240 V AC and 380–480 V AC.
(Note) Operating transformer is supplied to 380–440 V AC product.
Operating transformer of 380–480 V AC product is sold separately.
- Communication control is possible as an option.
Main unit option type:
ZAP: Possible to perform parallel operation with a maximum of 50 units.
Flicker prevention function is available during cycle control.
ZAM: Various settings and types of monitoring by RS485 (Modbus RTU) are available.
- All products conform to CE marking

■ Rating, type and product code

Number of phases	Input voltage	Output current [A]	Type
Three-phase	200–240V	20	RPDW2020-T
		45	RPDW2045-T
		60	RPDW2060-T
		100	RPDW2100-T
	380–440V	20	RPDW4020-T
		45	RPDW4045-T
		60	RPDW4060-T
		100	RPDW4100-T

Specifications

Type (product code)			RPDW□020-T	RPDW□045-T	RPDW□060-T	RPDW□100-T
Input	Number of phases		Three-phase			
	Main circuit	Rated voltage	200–240 V AC $\pm 10\%$ (performance guarantee), $\pm 15\%$ (operation guarantee) (Note 1) 380–480 V AC $\pm 10\%$ (performance guarantee), $\pm 15\%$ (operation guarantee) (Note 1)			
		Frequency	50 Hz/60 Hz ± 2.5 Hz (however, shall be the same as the control circuit)			
	Control circuit	Rated voltage	200–240 V AC $\pm 10\%$ (performance guarantee), $\pm 15\%$ (operation guarantee) (Note 1)			
		Frequency	50Hz/60Hz ± 2.5 Hz (Automatic judgment)			
	Power supply capacity		15 VA or less			
Output	Rated current (ambient temperature 40°C)		20A	45A	60A	100A
	Cooling type		Natural cooling			
	Application load		Resistance load			
	Minimum load current		0.5 A (however, when 100% output with rated input voltage)			
	Generated watt loss		75W	155W	196W	317W
Control function	Waveform control type		Phase control, cycle control (continuous), phase angle proportion control			
	Output voltage adjustment range		0–100% of the main circuit power source voltage (RMS value) (however, excluding the voltage decrease amount of thyristor)			
	Input and output characteristic		RMS value linear characteristic Linearity $\pm 3\%$ FS or less (phase control) Linearity $\pm 5\%$ FS or less (cycle control) (however, when 10–90% of resistance load and setting signal)			
	Setting signal	Manual setting	Digital setting: Setting by front face key External variable resistor: 1 k Ω (B characteristic 1/2 W or more) HIGE - LOW (two-position control) contact signal: Digital setting by external wiring or front face key			
		Automatic setting	Current signal: DC4–20 mA ($Z_{in} = 100\Omega$) Voltage signal: 0–5 V DC (SSC signal: 0/12 V DC), 1–5 V DC ($Z_{in} = 11\text{ k}\Omega$) (setting switch by front face key)			
	Gradient setting	Setting range	0–100% of output voltage			
		Setting device	Digital setting: Setting by front face key External variable resistor: 1 k Ω (B characteristic 1/2 W or more) Control input terminal “5 V - M0” voltage signal: 1–5 V DC			
	Base load setting	Setting range	0–100% of output voltage			
		Setting device	Digital setting: Setting by front face key			
	Soft start, up/down time	Setting range	0–100 sec.			
		Setting device	Digital setting: Setting by front face key			
	Scanning interval setting	Setting range	0.5–2.0 sec.			
		Setting device	Digital setting: Setting by front face key			
Alarm function	CPU memory abnormality		Detects memory abnormality of CPU at startup			
	Power source frequency abnormality		Detects control power source frequency of devices other than 45–65 Hz ones			
	Automatic setting input unconnected (Note 2)		Detects when current signal or voltage signal is unconnected (when the setting signal is set automatically)			
	Manual setting input unconnected		Detects the unconnected condition of the manual setting device (when the manual setting is at external variable resistor)			
	Gradient setting input unconnected		Detects the unconnected condition of the gradient setting device (when the gradient setting is at external variable resistor or 1–5 V DC)			
	Open phase, phase sequence abnormality		Detect the open phase or phase sequence abnormality of the main circuit power source and control power source			
	Data writing/reading failure		Detects read/write check error of EEPROM			
	Communication abnormality (Note 3)		Detects data transmission abnormality at parallel operation or network communication			
Service environment	Alarm output		Open collector 24 V DC /0.1 A One circuit			
	Ambient temperature		-10 to +55°C (the load current value is decreased when +40°C or more)			
	Storage temperature		-20°C to +60°C			
	Ambient humidity		+5 to 95%RH (no dew condensation shall be observed)			
Insulation	Others		No corrosive gas (sulfidizing gas, ammonia gas, etc.), dust, items or actions that promote deterioration of insulation, or vibration shall be observed. Indoor, altitude 1,000 m or less			
	Dielectric strength (between the main circuit and ground)		AC2kV One min. (200–240 V), AC2.5kV One min. (380–480V)			
	Insulation resistance (between ground)		10 M Ω or more with 500 V DC megger			

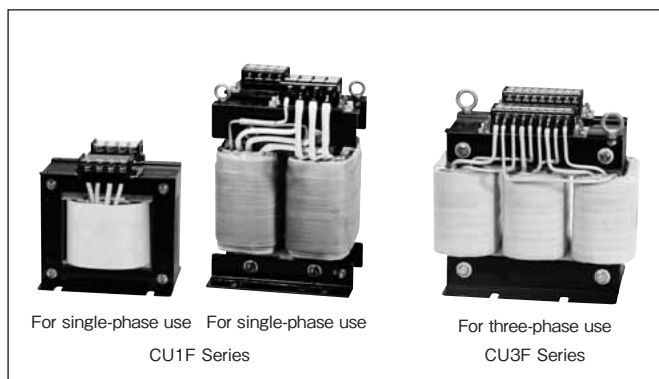
(Note 1) Performance guarantee signifies that the specifications are satisfied and the device is operable. Operation guarantee signifies that there is no damage to parts and the device is operable.
 (Note 2) It does not operate when it is at voltage signal 0–5 V DC (0/12 V) setting.
 (Note 3) Option type “ZAP” or “ZAM” only.

Low-voltage control power transformers CU1F Series (for single-phase use) CU3F Series (for three-phase use)

Compact and economical type of power source transformer optimum for controlling operation.

■ Features

- Wide variety of types including ones for single-phase and for three-phase use are available so that it is easier to select a product.
- The standard is for single-phase use with a static electricity shield.
- Safe design conforming to JEM1333 (transformer for operation) and JEC2200 (transformer).
- The terminal block comes with a clear cover as standard



For single-phase use CU1F Series

■ Types and ratings

Transformation ratio Primary voltage / Secondary voltage Frequency	Rated capacity [VA]	Insulation classification	Mass [kg]	Type
AC200V, 220V AC100V, 110V 50/60Hz	50	A	1.5	CU1F-050-A2010
	100	A	2.1	CU1F-100-A2010
	150	A	2.7	CU1F-150-A2010
	200	A	3.2	CU1F-200-A2010
	300	A	4.3	CU1F-300-A2010
	500	B	5.5	CU1F-500-B2010
	750	B	8.1	CU1F-750-B2010
	1k	B	10.3	CU1F-1K-B2010
	1.5k	B	14.4	CU1F-1.5K-B2010
	2k	B	18.5	CU1F-2K-B2010
	3k	B	27.7	CU1F-3K-B2010
	4k	H	30.5	CU1F-4K-H2010
	5k	H	38.3	CU1F-5K-H2010
	6k	H	45.7	CU1F-6K-H2010
AC180V, 200V, 220V AC100V, 110V	7.5k	H	49.6	CU1F-7.5K-H2010
	10k	H	63.7	CU1F-10K-H2010

■ Types and ratings

Transformation ratio Primary voltage / Secondary voltage Frequency	Rated capacity [VA]	Insulation classification	Mass [kg]	Type
AC380V, 400V, 440V AC100V, 110V 50/60Hz	50	A	1.5	CU1F-050-A4010
	100	A	2.1	CU1F-100-A4010
	150	A	2.8	CU1F-150-A4010
	200	A	3.5	CU1F-200-A4010
	300	A	4.3	CU1F-300-A4010
	500	B	5.5	CU1F-500-B4010
	750	B	8.1	CU1F-750-B4010
	1k	B	10.5	CU1F-1K-B4010
	1.5k	B	14.8	CU1F-1.5K-B4010
	2k	B	19.0	CU1F-2K-B4010
	3k	B	28.0	CU1F-3K-B4010
	4k	H	30.5	CU1F-4K-H4010
	5k	H	36.8	CU1F-5K-H4010
	6k	H	44.1	CU1F-6K-H4010
	7.5k	H	49.4	CU1F-7.5K-H4010
	10k	H	63.8	CU1F-10K-H4010
AC380V, 400V, 440V AC200V, 220V 50/60Hz	50	A	1.5	CU1F-050-A4020
	100	A	2.1	CU1F-100-A4020
	150	A	2.8	CU1F-150-A4020
	200	A	3.5	CU1F-200-A4020
	300	A	4.3	CU1F-300-A4020
	500	B	5.5	CU1F-500-B4020
	750	B	8.1	CU1F-750-B4020
	1k	B	10.7	CU1F-1K-B4020
	1.5k	B	14.6	CU1F-1.5K-B4020
	2k	B	18.8	CU1F-2K-B4020
	3k	B	27.9	CU1F-3K-B4020
	4k	H	30.5	CU1F-4K-H4020
	5k	H	37.3	CU1F-5K-H4020
	6k	H	44.0	CU1F-6K-H4020
	7.5k	H	49.4	CU1F-7.5K-H4020
	10k	H	63.8	CU1F-10K-H4020

For three-phase use CU3F Series

■ Types and ratings

Transformation ratio Primary voltage / Secondary voltage Frequency	Rated capacity [VA]	Insulation classification	Mass [kg]	Type
AC380V, 400V, 440V AC200V, 220V 50/60Hz	500	A	8.0	CU3F-500-A4020
	750	A	10.0	CU3F-750-A4020
	1k	B	11.6	CU3F-1K-B4020
	1.5k	B	16.0	CU3F-1.5K-B4020
	2k	B	20.1	CU3F-2K-B4020
	3k	B	29.0	CU3F-3K-B4020
	4k	B	36.6	CU3F-4K-B4020
	5k	B	42.7	CU3F-5K-B4020
	6k	B	49.9	CU3F-6K-B4020
	7.5k	F	59.0	CU3F-7.5K-F4020
	10k	F	71.0	CU3F-10K-F4020

High-Voltage Alternating Current Load-Break Switch LBS Series

Full model change for the striker tripping type of high-voltage alternating current load-break switch (LBS) with current limiting fuse!

■ Features

Compact and simple

- Decreased the volume ratio by 10% (compared to our company's product: Without optional parts)
- Adopted main contactor and arc contactor integrated type
- Fuse part non-movable

Improvement in operation

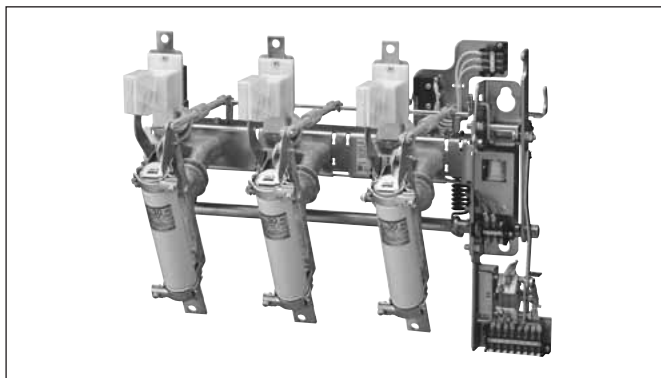
- Continuous output of blowout indication contact (Current product: Instantaneous)

Composition of self-holding circuit is unnecessary in the panel

- One-touch attachment of barrier
- Improvement in wiring property by using auxiliary switch with terminal block

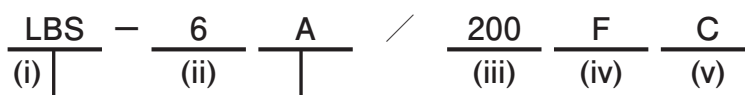
Environmental consideration

- Conformity to RoHS
- Consideration to disposal of recycled product [Indication of used material on main resin parts]



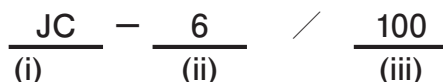
■ Type number nomenclature

1. LBS main unit



(i) Basic type	LBS□A	: Striker tripping type of high-voltage alternating current load-break switch with current limiting fuse		
(ii) Rated voltage	6	: 7.2/3.6kV		
(iii) Rated current	200	: 200A (Mountable fuse JC-6/5 to 75)		
	210	: 200A (Mountable fuse JC-6/100)		
(iv) Shunt trip device	Blank	: Without shunt trip devices		
	F	: With shunt trip devices		
(v) Fuse holder	Blank	: Screw fastening structure using fuse clamp (Standard)		
	C	: Non-screw structure using spring pressure (Manufacturing of LBS-6A/210□type is not possible)		

2. Fuse link



(i) Basic type	JC	JC: JC type fuse link			
(ii) Rated voltage	6	: 7.2/3.6kV			
(iii) Rated current	5	: G5A	30	: G30A	60 : G60A
	10	: G10A	40	: G40A	75 : G75A
	20	: G20A	50	: G50A	100 : G100A

Ratings and specifications

Type		LBS-6A/200	LBS-6A/200F	LBS-6A/200C	LBS-6A/200FC	LBS-6A/210	LBS-6A/210F
Rated voltage (kV)		7.2/3.6					
Dielectric withstand voltage	Commercial frequency (kV)	22 (between ground or phase), 35 (between poles of the same phase) [1 min.]					
	BIL (kV)	60 (between ground or phase), 70 (between poles of the same phase) [1.2 × 50 μs]					
Rated frequency (Hz)		50/60					
Rated current	Switch (A)	200					
	Fuse (A)	Maximum: G75				G100	
Rated cable charging breaking current (kA)		A12.5 (A: Once)					
Rated control voltage (V)		—	AC100/110 DC100/110 (3A short time 5 sec.)	—	AC100/110 DC100/110 (3A short time 5 sec.)	—	AC100/110 DC100/110 (3A short time 5 sec.)
Rated switching capacity	Load current (A)	200 (200 times)					
	Exciting current (A)	10 (10 times)					
	Charging current (A)	10 (10 times)					
	Capacitor current (A)	50 (200 times, with 6% reactor)					
Rated overload breaking current (A)		—	A1100 (A: Once)	—	A1100 (A: Once)	—	A1100 (A: Once)
Rated ground fault breaking current (A)		—	30	—	30	—	30
Opening time	Striker tripping (sec)	0.13 or less					
	Voltage tripping (sec)	—	0.1 or less	—	0.1 or less	—	0.1 or less
Additional function achieved by striker tripping device	All-range shutdown	Can shutdown all fault currents from 40kA or less of the fuse rated breaking current to fuse minimum breaking current through combination with a fuse					
	Open phase prevention	Switch opens even when one phase of the fuse breaks and disconnects between the power source and load					
Mechanical make/break durability (times)		1000					
Structure	Operation type	Hook operation					
	Striker tripping device	Available					
	Voltage tripping device	None	Available	None	Available	None	Available
	Contact arrangement	Integrated electrification contact and arc contact type					
	Arc extinction type	Narrow slit and gas cooling arc extinction type					
	Fuse fixing method	Screw fastening structure using fuse clamp			Non-screw structure using spring pressure		Screw fastening structure using fuse clamp
Separately sold accessory type	Fuse link	JC-6/5, 10, 20, 30, 40, 50, 60, 75				JC-6/100	
	Auxiliary switch	AUX-7, AUX-8					
	Blown-fuse indicator contact	AL-3C					
	Insulation barrier	SP-4D					

Types and mass

Product name	Type	Mass (kg)
Main unit	LBS-6A/200	8.5
	LBS-6A/200F	9
	LBS-6A/200C	8.5
	LBS-6A/200FC	9
	LBS-6A/210	8.5
	LBS-6A/210F	9
Accessory	Blown-fuse indicator contact	AL-3C 0.3
	Auxiliary switch	AUX-7 0.5
	With auxiliary contact terminal block	AUX-8 0.7
	Insulation barrier (four pieces)	SP-4D 1.3
	Fuse link	JC-6/5 0.6
		JC-6/10
		JC-6/20
		JC-6/30
		JC-6/40
		JC-6/50
		JC-6/60
		JC-6/75
	JC-6/100	1.1

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 Thermal Overload Relays Industrial Relays	TR-□□, TK-□□, SW-□□	New SC, NEO SC series Thermal overload relay auxiliary terminal	Changed appearance	July 2012
	SZ1APK02		Changed shape of adapter plate for SK series magnetic starter	November 2012
	SC-N□A, SW-N□A, SZ-GM/N□□, SC-N□/SE, SW-N□/SE	NEO SC series Some products of magnetic contactor and starter	Changed coil discrimination display	November 2012
	SK06□, SK09□, SK12□, SK06□W, SK09□W, SK12□W, SKH4□	SK series Contactors, starters, industrial relays	Changed shape of rail mounting wire spring	December 2012
	TR-0N□/3, TR-0N□/3A	New SC series thermal overload relays, Some Types of starters	Changed nameplate	February 2013
	TK-0N□, TK-0N□/A			
	TR-5-1N□/3, TR-5-1N□/3A			
	TK-5-1N□, TK-5-1N□/A			
	SC-N2S/G, N3/G, SW-N2S/G, N3/G, SC-E3/G, E4/G	NEO SC series, SC-E series Coil terminal for some products of magnetic contactor and starter	Changed appearance	February 2013
	SZ-DE□□□, SZ-N1/GDE, SZ-N2S/GDE, SZ-N5/DE, N6/DE, N8/DE, N11/DE, N14/DE	New SC, NEO SC series Off-delay release units	Changed insulation tape	March 2013
	SC-N14, SW-N14, SC-N16, SB-10N, 10NB, 10N/VS, SB-11N, 11NB, 11N/VS	NEO SC series, SB series Electronic unit case for some products of magnetic contactor and starter option parts	Changed appearance	April 2013
	SZ-N8T (for power supply side/loading side of SC-N8, N10, for power supply side of SW-N8, N10), SZ-N8RT1 (for power supply side/loading side of SC-N8RM, N10RM), SZ-N8RT2 (for power supply side/loading side of SC-N8RM, N10RM), SZ-N11T (for power supply side/loading side of SC-N11, N12, for loading side of SW-N11, N12), SZ-N11RT1 (for power supply side/loading side of SC-N11RM, N12RM), SZ-N11RT2 (for power supply side/loading side of SC-N11RM, N12RM)	NEO SC series Some products of option part terminal cover for magnetic contactor and starter	Changed shape	May 2013
	SC-N8~N16		Changed partial display contents due to change of production base for NEO SC series magnetic contactor, thermal relay and magnetic starter	July 2013
	TR-N2/3~TR-N14/3			October 2013
	SW-N8~N14			April 2014
Manual Motor Starters	BM3VSB-□, BM3VHB-□, BM3VHBK-□		Changed partial description contents of nameplate and operation manual for Manual Motor Starters (MMS)	November 2012
	BZ0BP22A		Changed length of screws supplied with the same packing of some accessories for Manual Motor Starters (MMS)	November 2012
	BZ0W□□, BZ0□KU□, BZ0□□□	Manual Motor Starters (MMS) Some accessories	Added UL mark printing item	January 2013

Product	Series and Type	Changed part	Specific change	Change date
Molded Case Circuit Breakers Earth Leakage Circuit Breakers	BW32□□□, BW50□□□, BW63□□□, BW100□□□, EW32□□□, EW50□□□, EW63□□□, EW100□□□	G-TWIN series Cases of auto breaker and earth leakage circuit breaker (back surface)	Changed shape	February 2013
	BW9UVHA-3, BW9UVJA-3		Changed dust-proof type iron box for MCCB and ELCB G-TWIN series 400AF to 800AF	April 2013
	BW400EAG-2P, BW400SAG-2P, BW400RAG-2P, BW400HAG-2P, BW400EAA-2P, BW400SAA-2P, BW400RAA-2P, BW400HAA-2P, BW400RAQ-2P, BW400HAQ-2P, BW400EAT-2P, BW400RAT-2P, BW400RAB-2P, BW400HAB-2P, BW400EAS-2P, BW400RAS-2P, BW400EAGU-2P, BW400SAGU-2P, BW400RAGU-2P, BW400HAGU-2P BW250EAG-2P, BW250EAG-3P		Changed insulation board on loading side of MCCB G-TWIN series 400AF	June 2013
			Changed appearance of MCCB G-TWIN series 250AF economical type	October 2013
Molded Case Circuit Breakers Solid-state trip type	BZ6N101C, BZ6H103C	MCCB Solid-state trip type N-type external operating handle/auxiliary handle	Changed nameplate	November 2012
Circuit Protectors	CP31F, CP32F	Individual packing box and shipping box for circuit protector CP-F type	Changed dimensions	January 2013
Low Voltage Fuses	BLA003~030, FCF2-1~30	Current-limiting fuses (Some types)	Changed packing box size	January 2013
Command Switches	DM22□□□		Changed shape of packing for full voltage pilot light of $\phi 22$ command switch (AM22, DM22 series)	January 2013
	AR16, DR16, AF16, DF16		Changed display contents of packing for $\phi 16$ integrated command switch (minico)	January 2013
	AR22, DR22, AR30, DR30, AM22, DM22, AG28, DG28		Changed nameplate for command switch transformer of AR/DR, AM/ DM and AG/DG series	May 2013
	AM22		Changed packing box of AM22 series $\phi 22$ command switch	June 2013
Miniature Control Relays	HH52, HH53, HH54		Changed place/country of origin due to addition of production bases for miniature control relay HH52, HH53, HH54 and miniature power relay HH62	August 2013
Miniature Power Relays	HH62			
Power Monitoring Equipment	UM43□, UM42□, UM4B□, UM45T-H5R, UM50□, UM45□, UM5ACG-H5R		Changed F-MPC60B, F-MPC50/30 series multifunction digital relay for high voltage receiving and distribution	February 2013

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
QH series Protective Relays	QH-DG3	QHA-DG3, QHA-DG5	June 2013	
	QH-DG4	QHA-DG4, QHA-DG6	June 2013	
	QH-GR3A	QHA-GR3, QHA-GR5	June 2013	
	QH-OC1, QH-OC2	QHA-OC1, QHA-OC2	June 2013	
	QH-OV1	QHA-OV1	June 2013	
	QH-UV1	QHA-UV1	June 2013	
2-pole DC Magnetic Contactors (Some Types)	SB-2N	SB-N2	March 2014	
	SB-2N/SE	SB-N2/SE	March 2014	
	SB-2NB	SB-N2B	March 2014	
	SB-2NB/SE	SB-N2B/SE	March 2014	
Applied products for Magnetic Contactors and Starters SJ series	SJ-0TG, SJ-0AG			
AS-Interface (All types)	AS-Interface			

Safety Considerations

- 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 the Fuji sales division.
- 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.

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