

2

Detailed Specifications




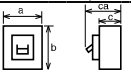
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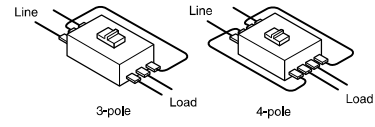
Molded Case Circuit Breakers

2 Detailed Specifications

NF-C (Economy class)

Frame (A)	30	50	60	63	100	125	
Model	NF30-CS		NF63-CV			NF125-CV	
Image							
Rated current In (A) Rated ambient temperature 40°C (45°C for marine use)	3 5 10 15 20 30	3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50	(60)	63	50 (60) 63 (75) 80 100	125	
Number of poles	2 3	2 3	2 3	2 3	2 3	2 3	
Rated insulation voltage Ui (V)	500	600	600	600	600	600	
Rated short-circuit breaking capacity (kA) IEC 60947-2 EN 60947-2 (Icu/Ics)	AC						
	690V	-	-	-	-	-	
	500V	-	2.5/2.5	2.5/2.5	2.5/2.5	7.5/4	7.5/4
	440V	-	2.5/2.5	2.5/2.5	2.5/2.5	10/5	10/5
	415V	1.5/1.5	2.5/2.5	2.5/2.5	2.5/2.5	10/5	10/5
	400V	1.5/1.5	5/5	5/5	5/5	10/5	10/5
	380V	1.5/1.5	5/5	5/5	5/5	10/5	10/5
	DC						
230V	2.5/2 (240V)	7.5/7.5	7.5/7.5	7.5/7.5	30/15	30/15	
200V	2.5/2 (240V)	7.5/7.5	7.5/7.5	7.5/7.5	30/15	30/15	
250V	-	2.5/2.5 (*7)	2.5/2.5 (*7)	2.5/2.5 (*7)	7.5/4 (*4)	7.5/4 (*4)	
Rated impulse withstand voltage Uimp (kV)	4	8	8	8	8	8	
Current (*1)	AC	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	
Suitability for isolation	-	Compatible	Compatible	Compatible	Compatible	Compatible	
Reverse connection	-	Possible	Possible	Possible	Possible	Possible	
Number of operating cycles	Without current	10,000	10,000	10,000	10,000	10,000	
	With current (440VAC)	6,000 (AC415V)	6,000	6,000	6,000	6,000	
Utilization category	A	A	A	A	A	A	
Pollution degree	2	3	3	3	3	3	
EMC environment condition (environment A or B)	N/A	N/A	N/A	N/A	N/A	N/A	
Overall dimensions (mm)							
	a	45 67.5	50 75	50 75	50 75	60 90	
	b	96	130	130	130	130	
	c	52	68	68	68	68	
ca	67	90	90	90	90		
Mass of front-face type (kg)	0.25 0.35	0.45 0.65	0.5 0.7	0.5 0.7	0.6 0.9	0.6 0.9	
Front connection (F)	Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	
	Solderless (BOX) terminal (SL)	-	-	-	-	-	
Rear connection (B)	92	●Round stud (assembled in)	●Round stud	●Round stud	●Round stud	●Bar stud	
	Plug-in (PM)	-	-	-	-	-	
Cassette-type accessories	Alarm switch (AL)	●(*5)	●(*6)	●(*6)	●(*6)	●(*6)	
	Auxiliary switch (AX)	●(*5)	●(*6)	●(*6)	●(*6)	●(*6)	
	Shunt trip (SHT)	-	●(*6)	●(*6)	●(*6)	●(*6)	
	Undervoltage trip (UVT)	-	●(*6)	●(*6)	●(*6)	●(*6)	
	With lead-wire terminal block (SLT)	114	●	●	●	●	
	Pre-alarm (PAL)	116	-	-	-	-	
External accessories	Enclosure						
	Dustproof (I)	130	●	●	●	●	
	Waterproof (W)	-	-	-	-	-	
	Electrical operation device (NFM)	133	-	-	-	-	
	Mechanical interlock (MI) (*10)	129	-	●	●	●	
	Panel mounting Breaker mounting	-	●	●	●	●	
	Handle lock device	127	●	●	●	●	
	HL	-	●	●	●	●	
	HL-S	-	●	●	●	●	
	External operating handle	117	●	●	●	●	
(F)	-	●	●	●	●		
(V)	-	●	●	●	●		
Terminal cover (TCL, TCS, TTC, BTC, PTC)	121	●	●	●	●		
Rear stud (B-ST)	94	●	●	●	●		
Plug-in (PM)	-	●	●	●	●		
IEC 35mm rail mounting adapters	137	●	●	●	●		
CE marking	TUV approval	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	
CCC recognition	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	
Marine use approval (NK, LR, ABS, GL)	☆ (NK, LR, ABS)	☆	☆	☆	☆	☆	
Automatic tripping device	Hydraulic magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	
Trip button	-(*2)	Equipped	Equipped	Equipped	Equipped	Equipped	
Page of Characteristics and dimensions	140		142		144		

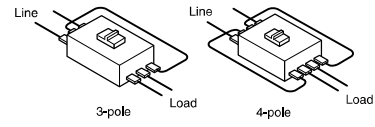
- Notes:
- *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
 - *2 It is attached with the alarm switch.
 - *3 In case of a current rating of 100A, it does not specify NK rating.
 - *4 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively.
 - *5 The standard lead drawing is performed laterally. Load drawing is also available.
 - *6 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
 - *7 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
 - *8 Place an order of other models in conjunction with the circuit breaker.
 - *9 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped).
 - *10 Not isolation compatible, excluding 400 to 800A frame.



NF-S (Standard class)

Frame (A)	30	32	50	60	63	
Model	NF32-SV			NF63-SV		
Image						
Rated current In (A)	3 4 (5) 6 10 15 16 20 25 (30)	32	3 4 (5) 6 10 (15) 16 20 25 (30) 32 40 50	(60)	63	
Rated ambient temperature 40°C (45°C for marine use)						
Number of poles	2 3	2 3	2 3 4	2 3 4	2 3 4	
Rated insulation voltage Ui (V)	600	600	600	600	600	
Rated impulse withstand voltage Uimp (kV)	690V	-	-	-	-	
	500V	2.5/2.5	2.5/2.5	7.5/7.5	7.5/7.5	
	440V	2.5/2.5	2.5/2.5	7.5/7.5	7.5/7.5	
	415V	2.5/2.5	2.5/2.5	7.5/7.5	7.5/7.5	
	400V	5/5	5/5	7.5/7.5	7.5/7.5	
	380V	5/5	5/5	7.5/7.5	7.5/7.5	
	230V	7.5/7.5	7.5/7.5	15/15	15/15	
	200V	7.5/7.5	7.5/7.5	15/15	15/15	
DC 250V	2.5/2.5 (*5)	2.5/2.5 (*5)	7.5/7.5 (*5)	7.5/7.5 (*5)	7.5/7.5 (*5)	
Rated impulse withstand voltage Uimp (kV)	8	8	8	8	8	
Current (*1)	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	AC/DC compatible	
Suitability for isolation	Compatible	Compatible	Compatible	Compatible	Compatible	
Reverse connection	Possible	Possible	Possible	Possible	Possible	
Number of operating cycles	Without current	10,000	10,000	10,000	15,000	
	With current (440VAC)	6,000	6,000	6,000	8,000	
Utilization category	A	A	A	A	A	
Pollution degree	3	3	3	3	3	
EMC environment condition (environment A or B)	N/A	N/A	N/A	N/A	N/A	
Overall dimensions (mm)		a: 50, b: 130, c: 68, ca: 90	a: 50, b: 130, c: 68, ca: 90	a: 50, b: 130, c: 68, ca: 90	a: 50, b: 130, c: 68, ca: 90	
	Mass of front-face type (kg)	0.45, 0.65	0.45, 0.65	0.5, 0.7, 0.9	0.55, 0.75, 1.0	
	Front connection (F)	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal
	Solderless (BOX) terminal (SL)	-	-	-	-	-
Installation and connections	Rear (B)	●Bar stud	●Round stud	●Round stud	●Round stud	
	Plug-in (PM)	●	●	●	●	
Cassette-type accessories	Alarm switch (AL)	●(*4)	●(*4)	●(*4)	●(*4)	
	Auxiliary switch (AX)	●(*4)	●(*4)	●(*4)	●(*4)	
	Shunt trip (SHT)	●(*4)	●(*4)	●(*4)	●(*4)	
	Undervoltage trip (UVT)	●(*4)	●(*4)	●(*4)	●(*4)	
	With lead-wire terminal block (SLT)	●	●	●	●	
Pre-alarm (PAL)	-	-	-	-		
External accessories	Enclosure	●	●	●	●	
	Dustproof (I)	-	-	-	-	
	Waterproof (W)	●	●	●	●	
	Electrical operation device (NFM)	-	-	-	-	
	Mechanical interlock (MI) (*7)	●	●	●	●	
	Panel mounting	●	●	●	●	
	Breaker mounting	●	●	●	●	
	Handle lock device	●	●	●	●	
	LC	●	●	●	●	
	HL	●	●	●	●	
HL-S	●	●	●	●		
External operating handle	●	●	●	●		
(F)	●	●	●	●		
(V)	●	●	●	●		
Terminal cover (TCL, TC-S, TTC, BTC, PTC)	●	●	●	●		
Rear stud (B-ST)	●	●	●	●		
Plug-in (PM)	●	●	●	●		
IEC 35mm rail mounting adapters	●	●	●	●		
CE marking	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	
CCC recognition	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	
Marine use approval (NK, LR, ABS, GL)	☆	☆	☆	☆	☆	
Automatic tripping device	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	
Trip button	Equipped	Equipped	Equipped	Equipped	Equipped	
Page of Characteristics and dimensions	142		142		142	

- Notes:
- *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
 - *2 In case of a current rating of 100A, it does not specify NK rating.
 - *3 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively. (In case of NF250-SV, three and four poles can be used for up to 500 and 600VDC)
 - *4 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
 - *5 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
 - *6 Place an order of other models in conjunction with the circuit breaker.
 - *7 Not isolation compatible. excluding 400 to 800A frame.



NF-S (Standard class)

100			125			125			125			160			225			250		
NF125-SV			NF125-SGV			NF125-SEV			NF160-SGV			NF250-SV								
(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100			125			16-20 20-25 25-32 32-40 35-50 45-63 56-80 70-100 90-125			16-32 32-63 63-125			125-160			(100) 125 150 160 175 200 225 (*2)			250		
2 3 4			2 3 4			2 3 4			3 4			2 3 4			2 3 4			2 3 4		
690			690			690			690			690			690			690		
8/8			8/8			8/8			8/8			8/8			8/8			8/8		
18/18			18/18			30/30			30/30			30/30			30/30			30/30		
25/25			25/25			36/36			36/36			36/36			36/36			36/36		
30/30			30/30			36/36			36/36			36/36			36/36			36/36		
30/30			30/30			36/36			36/36			36/36			36/36			36/36		
50/50			50/50			85/85			85/85			85/85			85/85			85/85		
50/50			50/50			85/85			85/85			85/85			85/85			85/85		
40/40 (*3)			40/40 (*3)			20/20 (300V) (*3)			-			20/20 (300V) (*3)			20/20 (300V) (*3)			20/20 (300V) (*3)		
8			8			8			8			8			8			8		
AC/DC compatible			AC/DC compatible			AC/DC compatible			AC			AC/DC compatible			AC/DC compatible (*1)			AC/DC compatible (*1)		
Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible		
Possible			Possible			Possible			Possible			Possible			Possible			Possible		
25,000			25,000			50,000			25,000			40,000			25,000			25,000		
10,000			10,000			30,000			10,000			15,000			10,000			10,000		
A			A			A			A			A			A			A		
3			3			3			3			3			3			3		
N/A			N/A			N/A			A			N/A			N/A			N/A		
60 90 120			60 90 120			105 140			105 140			105 140			105 140			105 140		
130			130			165			165			165			165			165		
68			68			68			68			68			68			68		
90			90			92			92			92			92			92		
0.7 1.0 1.3			0.7 1.0 1.3			1.4 1.6 2.0			1.7 2.2			1.4 1.6 2.0			1.4 1.6 2.0			1.4 1.6 2.0		
●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal		
●Bar stud			●Bar stud			●Bar stud			●Bar stud			●Bar stud			●Bar stud			●Bar stud		
●(*4)			●(*4)			●(*4)			●(*4)			●(*4)			●(*4)			●(*4)		
●(*4)			●(*4)			●(*4)			●(*4)			●(*4)			●(*4)			●(*4)		
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Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			TÜV approval			Self-declaration		
Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process		
☆			☆			☆ (LR, ABS, GL)			☆ (LR, ABS, GL)			☆ (LR, ABS, GL)			☆			☆		
Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Electronic (effective value detection)			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic		
Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped		
144			144			152			154			152			148			148		

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

2 Detailed Specifications

Molded Case Circuit Breakers

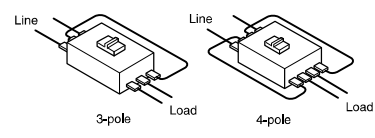
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1 Detailed Specifications









NF-S (Standard class)

Frame (A)		250			250			400			400			600			630			
Model		NF250-SGV			NF250-SEV			NF400-SW			NF400-SEW			NF630-SW						
Image																				
Rated current I _n (A) Rated ambient temperature 40°C (45°C for marine use)		125-160 140-200 175-250			80-160 125-250			250 300 350 400			Adjustable 200 225 250 300 350 400			500 600			630			
Number of poles		2 3 4			3 4			2 3 4			3 4			2 3 4			2 3 4			
Rated insulation voltage U _i (V)		690			690			690			690			690			690			
Rated short-circuit breaking capacity (kA) IEC 60947-2 EN 60947-2 (I _{cu} /I _{cs})	AC	690V	8/8			8/8			10/10			10/10			10/10			10/10		
		500V	30/30			30/30			30/30			30/30			30/30			30/30		
		440V	36/36			36/36			42/42			42/42			42/42			42/42		
		415V	36/36			36/36			45/45			50/50			50/50			50/50		
		400V	36/36			36/36			45/45			50/50			50/50			50/50		
		380V	36/36			36/36			50/50			50/50			50/50			50/50		
		230V	85/85			85/85			85/85			85/85			85/85			85/85		
200V	85/85			85/85			85/85			85/85			85/85			85/85				
DC	250V	20/20 (300V) (*2)			-			40/40 (*2)			-			40/40 (*2)			40/40 (*2)			
Rated impulse withstand voltage U _{imp} (kV)		8			8			8			8			8			8			
Current		AC/DC compatible			AC			AC/DC compatible			AC			AC/DC compatible			AC/DC compatible			
Suitability for isolation		Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			
Reverse connection		Possible			Possible			Possible			Possible			Possible			Possible			
Number of operating cycles	Without current	25,000			25,000			6,000			6,000			6,000			6,000			
	With current (440VAC)	10,000			10,000			1,000			1,000			1,000			1,000			
Utilization category		A			A			A			B			A			A			
Rated short time with stand current I _{sc} (kA) at 0.25s		-			-			-			5			-			-			
Pollution degree		3			3			3			3			3			3			
EMC environment condition (environment A or B)		N/A			A			N/A			A			N/A			N/A			
Overall dimensions (mm)	a	105 140			105 140			140 185			140 185			140 185			140 185			
	b	165			165			257			257			257			257			
	c	68			68			103			103			103			103			
	ca	92			92			155			155			155			155			
Mass of front-face type (kg)		1.4 1.6 2.0			1.7 2.2			4.6 5.2 6.8			6.0 7.6			5.4 6.2 8.0			5.4 6.2 8.0			
Installation and connections	Front connection (F)	Page			●Screw terminal ●Screw terminal			●Busbar terminal			●Busbar terminal			●Busbar terminal			●Busbar terminal			
	Solderless (BOX) terminal (SL)	92			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			
	Rear (B)	92			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			
Cassette-type accessories	Plug-in (PM)	92			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			●Bar stud ●Bar stud			
	Alarm switch (AL)	102			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			
	Auxiliary switch (AX)	102			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			
	Shunt trip (SHT)	102			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			
	Undervoltage trip (UVT)	102			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			●(*3) ●(*3)			
	With lead-wire terminal block (SLT)	114			● ●			● ●			● ●			● ●			● ●			
External accessories	Pre-alarm (PAL)	116			-			-			●(*5)			-			-			
	Enclosure	Closed (S)	130			●			-			-			-			-		
		Dustproof (D)	130			●			-			-			-			-		
		Waterproof (W)	130			●			-			-			-			-		
	Electrical operation devices (NFM)	Mechanical interlock (MI) (*7)	129			●			●(*6)			●(*6)			●(*6)			●(*6)		
		Panel mounting Breaker mounting	129			●			-			-			-			-		
	Handle lock device	LC	127			●			-			-			-			-		
		HL	127			●			-			-			-			-		
		HL-S	127			●			-			-			-			-		
	External operating handle	(F)	117			●			-			-			-			-		
(V)		117			●			-			-			-			-			
Terminal cover (TCL, TC-S, TTC, BTC, PTC)	121			●			●			●			●			●				
Rear stud (B-ST)	94			●			●			●			●			●				
Plug-in (PM)	94			●			●			●			●			●				
IEC 35mm rail mounting adapters	137			-			-			-			-			-				
CE marking		Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			
CCC recognition		Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			
Marine use approval (NK, LR, ABS, GL)		☆ (LR, ABS, GL) -			☆ (LR, ABS, GL) -			☆ -			☆ -			☆ -			☆ -			
Automatic tripping device		Thermal-magnetic			Electronic (effective value detection)			Thermal-magnetic			Electronic (effective value detection)			Thermal-magnetic			Thermal-magnetic			
Trip button		Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			
Page of Characteristics and dimensions		152			154			156			158			162			162			

- *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
- *2 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 400 and 500VDC, respectively.
- *3 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
- *4 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.
- *5 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped) AS for flush plate type, an outline differs from a standard.
- *6 Place an order of other models in conjunction with the circuit breaker.
- *7 Not isolation compatible, excluding 400 to 800A frame.



NF-S (Standard class)

630 NF630-SEW		800 NF800-SEW		800 NF800-SDW	1000 NF1000-SEW		1250 NF1250-SEW		1200 NF1200-SDW		1600 NF1600-SEW		1600 NF1600-SDW
													
Adjustable 300 350 400 500 600 630		Adjustable 400 450 500 600 700 800		(700) 800	Adjustable 500 600 700 800 900 1000		Adjustable 600 700 800 1000 1200 1250		1000 1250	Adjustable 800 1000 1200 1400 1500 1600		1600	
3 4		3 4		2	3 4		3 4		2	3 4		2	
690		690		690	690		690		690	690		690	
10/10		10/10		-	25/13		25/13		-	25/13		-	
30/30		30/30		-	65/33		65/33		-	65/33		-	
42/42		42/42		-	85/43		85/43		-	85/43		-	
50/50		50/50		-	85/43		85/43		-	85/43		-	
50/50		50/50		-	85/43		85/43		-	85/43		-	
50/50		50/50		-	85/43		85/43		-	85/43		-	
85/85		85/85		-	125/63		125/63		-	125/63		-	
85/85		85/85		-	125/63		125/63		-	125/63		-	
-		-		40/40	-		-		40/20	-		40/20	
8		8		8	8		8		8	8		8	
AC		AC		DC	AC		AC		DC	AC		DC	
Compatible Possible		Compatible Possible		Compatible Possible	Compatible Possible		Compatible Possible		Compatible Possible	Compatible Possible		Compatible Possible	
6,000		4,000		4,000	3,000		3,000		3,000	3,000		3,000	
1,000		500		500	500		500		500	500		500	
B		B		A	B		B		A	B		B	
7.6		9.6		-	20 at 0.1		20 at 0.1		-	20 at 0.1		-	
3		3		3	3		3		3	3		3	
A		A		N/A	A		A		N/A	A		A	
140		185		210	210 280		210 280		210	210 280		210	
257		275		275	406		406		406	406		406	
103		103		103	140		140		140	140		140	
155		155		155	190		190		190	190		190	
6.5		8.3		9.0	23.5 30.7		23.5 30.7		22.0	34.5 41.2		32.0	
●Busbar terminal		●Busbar terminal		●Busbar terminal	●Busbar terminal ●Busbar terminal		●Busbar terminal ●Busbar terminal		●Busbar terminal	●Busbar terminal ●Busbar terminal		●Busbar terminal	
- -		- -		-	- -		- -		-	- -		-	
●Bar stud ●Bar stud		●Bar stud ●Bar stud		●Bar stud	●Bar stud ●Bar stud		●Bar stud ●Bar stud		●Bar stud	●Bar stud ●Bar stud		●Bar stud	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● (*3) ●		● (*3) ●		●	● ●		● ●		●	● ●		●	
● (*3) ●		● (*3) ●		●	● ●		● ●		●	● ●		●	
● (*3) ●		● (*3) ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● (*5)		● (*5)		-	● (*5)		● (*5)		-	● (*5)		-	
- -		- -		-	- -		- -		-	- -		-	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● (*6) ●		● (*6) ●		● (*6)	● (*6)		● (*6)		● (*6)	● (*6)		● (*6)	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
● ●		● ●		●	● ●		● ●		●	● ●		●	
- -		- -		-	- -		- -		-	- -		-	
Self-declaration		Self-declaration		Self-declaration	Self-declaration		Self-declaration		Self-declaration	Self-declaration		Self-declaration	
Recognition in process		Recognition in process		Recognition in process	Recognition in process		Recognition in process		Recognition in process	Recognition in process		-	
☆ -		☆ -		-	☆ -		☆ -		-	☆ -		-	
Electronic (effective value detection) Equipped		Electronic (effective value detection) Equipped		Thermal-magnetic Equipped	Electronic (effective value detection) Equipped		Electronic (effective value detection) Equipped		Thermal-magnetic Equipped	Electronic (effective value detection) Equipped		magnetic Equipped	
164		166		168	172		172		174	176		178	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

2 Detailed Specifications

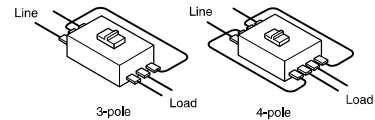
2 Detailed Specifications

Molded Case Circuit Breakers

NF-L / NF-H / NF-R (High-performance class)

Frame (A)	50	60	63	100	125	125	125	125			
Model	NF63-HV			NF125-HV		NF125-LGV	NF125-HGV	NF125-RGV			
Image											
Rated current In (A)	10 15 16 20 25	60	(63)	15 16 20 30 32 40	125	16-20 25-32 32-40 35-50	16-20 25-32 32-40 35-50	16-20 25-32 32-40 40-50			
Rated ambient temperature 40°C (45°C for marine use)	30 32 40 50			50 60 63 75 80 100		45-63 55-80 70-100 90-125	45-63 55-80 70-100 90-125	50-63 63-90 80-100 100-125			
Number of poles	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	2 3			
Rated insulation voltage Ui (V)	690			690		690		690			
Rated electric breaking capacities (kA) IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	2.5/2.5	2.5/2.5	2.5/2.5	10/8	10/8	8/8	10/8	-	
	500V	7.5/7.5	7.5/7.5	7.5/7.5	30/23	30/23	36/36	50/38	-	-	
	440V	10/8	10/8	10/8	50/38	50/38	50/50	65/65	125/125	-	
	415V	10/8	10/8	10/8	50/38	50/38	50/50	70/70	150/150	-	
	400V	10/8	10/8	10/8	50/38	50/38	50/50	75/75	150/150	-	
	380V	10/8	10/8	10/8	50/38	50/38	50/50	75/75	150/150	-	
	230V	25/19	25/19	25/19	100/75	100/75	90/90	100/100	150/150	-	
	200V	25/19	25/19	25/19	100/75	100/75	90/90	100/100	150/150	-	
DC	250V	7.5/7.5 (*5)	7.5/7.5 (*5)	7.5/7.5 (*5)	-	-	20/20 (300V) (*2)	40/40 (300V) (*2)	-	-	
Rated impulse withstand voltage Uimp (kV)	8			8		8		8	8	8	
Current	AC/DC compatible (*1)			AC/DC compatible (*1)		AC/DC compatible		AC/DC compatible	AC/DC compatible	AC/DC compatible	
Suitability for isolation	Compatible			Compatible		Compatible		Compatible	Compatible	Compatible	
Reverse connection	Possible			Possible		Possible		Possible	Possible	Possible	
Number of operating cycles	Without current	15,000			15,000		25,000		25,000	50,000	50,000
	With current (440VAC)	8,000			8,000		10,000		10,000	30,000	30,000
Utilization category	A			A		A		A	A	A	
Pollution degree	3			3		3		3	3	3	
EMC environment condition (environment A or B)	N/A			N/A		N/A		N/A	N/A	N/A	
Overall dimensions (mm)	a	50 75 100	50 75 100	50 75 100	90 120	90 120	105 140	105 140	105		
	b	130			130		165		165	165	
	c	68			68		68		68	68	
	ca	90			90		92		92	92	
	Mass of front-face type (kg)	0.5 0.7 0.9	0.55 0.75 1.0	0.55 0.75 1.0	0.8 1.0 1.3	0.8 1.0 1.3	1.4 1.6 2.0	1.4 1.6 2.0	1.5 1.8		
Front connection (F)	Page	●Screw terminal			●Screw terminal		●Screw terminal		●Screw terminal	●Screw terminal	
	Solderless (BOX) terminal (SL)	●			●		●		●	●	
Rear (B)	92	●Round stud			●Round stud		●Round stud		●Round stud	●Round stud	
Plug-in (PM)		●			●		●		●	●	
Cassette-type accessories	Alarm switch (AL)	●(*3)			●(*3)		●(*3)		●(*3)	●(*3)	
	Auxiliary switch (AX)	●(*3)			●(*3)		●(*3)		●(*3)	●(*3)	
	Shunt trip (SHT)	●(*3)			●(*3)		●(*3)		●(*3)	●(*3)	
	Undervoltage trip (UVT)	●(*3)			●(*3)		●(*3)		●(*3)	●(*3)	
	With lead-wire terminal block (SLT)	●			●		●		●	●	
	Pre-alarm (PAL)	-			-		-		-	-	
External accessories	Enclosure	Closed (S)	●			●		●		●	●
		Dustproof (I)	-			-		-		-	-
		Waterproof (W)	-			-		-		-	-
	Electrical operation device (NFM)	Mechanical interlock (M) (*4)	●			●		●		●	●
		Panel mounting Breaker mounting	-			-		-		-	-
	Handle lock device	LC	●			●		●		●	●
		HL	●			●		●		●	●
		HL-S	●			●		●		●	●
	External operating handle	(F)	●			●		●		●	●
		(V)	●			●		●		●	●
Terminal cover (TCL, TC-S, TTC, BTC, PTC)	121	●			●		●		●	●	
Rear stud (B-ST)	94	●			●		●		●	●	
Plug-in (PM)		●			●		●		●	●	
IEC 35mm rail mounting adapters	137	-			-		-		-	-	
CE marking	Self-declaration			Self-declaration		Self-declaration		Self-declaration	Self-declaration	Self-declaration	
CCC recognition	Recognition in process			Recognition in process		Recognition in process		Recognition in process	Recognition in process	Recognition in process	
Marine use approval (NK, LR, ABS, GL)	☆			☆		☆		☆ (LR, ABS, GL)	☆ (LR, ABS, GL)	☆ (LR, ABS, GL)	
Automatic tripping device	Thermal-magnetic			Thermal-magnetic		Thermal-magnetic		Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	
Trip button	Equipped			Equipped		Equipped		Equipped	Equipped	Equipped	
Page of Characteristics and dimensions	142			144		152		152	152		

- Notes:
- *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
 - *2 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. If wired as shown on the right, three and four poles can be used for up to 500 and 600VDC, respectively.
 - *3 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
 - *4 Not isolation compatible, excluding 400 to 800A frame.
 - *5 Use two poles for three- and four-pole products. In this case, do not use the neutral pole of the four-pole products. Not available for use with connection as shown on the right.



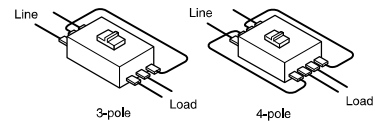
2 Detailed Specifications

Molded Case Circuit Breakers





NF-H / NF-R (High-performance class)

Frame (A)	250		400		630		800		
Model	NF250-HEV	NF400-HEW	NF400-REW	NF630-HEW	NF630-REW	NF800-HEW	NF800-REW		
Image									
Rated current In (A) Rated ambient temperature 40°C (45°C for marine use)	80-160 125-250	Adjustable 200 225 250 300 350 400	Adjustable 200 225 250 300 350 400	Adjustable 300 350 400 500 600 630	Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800	Adjustable 400 450 500 600 700 800		
Number of poles	3 4	3 4	3	3 4	3	3 4	3		
Rated insulation voltage Ui (V)	690	690	690	690	690	690	690		
Paper short-circuit breaking capacity (kA) IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	690V	10/8	35/18	—	35/18	—	15/15	—
		500V	50/38	50/50	70/35	50/50	70/35	50/50	70/35
		440V	65/65	65/65	125/63	65/65	125/63	65/65	125/63
		415V	70/70	70/70	125/63	70/70	125/63	70/70	125/63
		400V	75/75	70/70	125/63	70/70	125/63	70/70	125/63
		380V	75/75	70/70	125/63	70/70	125/63	70/70	125/63
		230V	100/100	100/100	150/75	100/100	150/75	100/100	150/75
		200V	100/100	100/100	150/75	100/100	150/75	100/100	150/75
DC 250V	—	—	—	—	—	—	—	—	
Rated impulse withstand voltage Uimp (kV) Current	8 AC	8 AC	8 AC	8 AC	8 AC	8 AC	8 AC	8 AC	
Suitability for isolation	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	
Reverse connection	Possible	Possible	Possible	Possible	Possible	Possible	Possible	Possible	
Number of operating cycles	Without current	25,000	6,000	6,000	6,000	6,000	4,000	4,000	
	With current (440VAC)	10,000	1,000	1,000	1,000	1,000	500	500	
Utilization category	A	B	B	B	B	B	B	B	
Rated short time with stand current Ics (kA) at 0.25s	—	5	5	7.6	7.6	9.6	9.6	9.6	
Pollution degree	3	3	3	3	3	3	3	3	
EMC environment condition (environment A or B)	A	A	A	A	A	A	A	A	
Overall dimensions (mm)	a	105 140	140 185	140	140 185	140 280	210 280	210	
	b	165	257	257	257	275	275	275	
	c	68	103	103	103	103	103	103	
	ca	92	155	155	155	155	155	155	
Mass of front-face type (kg)	1.7 2.2	6.0 7.6	6.0	6.5 8.3	6.0	10.9 14.2	10.9		
Installation and connections	Front connection (F)	Page	●Screw terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal ●Busbar terminal	●Busbar terminal ●Busbar terminal	●Busbar terminal	
	Solderless (BOX) terminal (SL)	92	●	—	—	—	—	—	
Cassette-type accessories	Rear (B)	●Bar stud ●Bar stud	●Bar stud	●Bar stud	●Bar stud ●Bar stud	●Bar stud ●Bar stud	●Bar stud ●Bar stud	●Bar stud	
	Plug-in (PM)	●	●	●	●	●	●	●	
	Alarm switch (AL)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	
	Auxiliary switch (AX)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	
	Shunt trip (SHT)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	●(*1)	
	Undervoltage trip (UVT)	●(*1)	●	●	●	●	●	●	
	With lead-wire terminal block (SLT)	●	●	●	●	●	●	●	
	Pre-alarm (PAL)	●	●(*2)	●(*2)	●(*2)	●(*2)	●(*2)	●(*2)	
External accessories	Enclosure	Closed (S)	—	—	—	—	—	—	
		Dustproof (I)	●	—	—	—	—	—	
		Waterproof (W)	●	—	—	—	—	—	
	Electrical operation device (NFM)	130	●	●(*3)	●(*3)	●(*3)	●(*3)	●(*3)	
		133	●	●(*3)	●(*3)	●(*3)	●(*3)	●(*3)	
	Mechanical interlock (MI) (*4)	Panel mounting	●	●	●	●	●	●	
		Breaker mounting	●	—	—	—	—	—	
	Handle lock device	LC	●	—	—	—	—	—	
		HL	●	●	●	●	●	●	
		HL-S	●	●	●	●	●	●	
External operating handle	(F)	●	●	●	●	●	●		
	(V)	●	●	●	●	●	●		
Terminal cover (TCL, TC-S, TTC, BTC, PTC)	121	●	●	●	●	●	●		
Rear stud (B-ST)	94	●	●	●	●	●	●		
Plug-in (PM)	●	●	●	●	●	●	●		
IEC 35mm rail mounting adapters	137	—	—	—	—	—	—		
CE marking	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration		
CCC recognition	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process		
Marine use approval (NK, LR, ABS, GL)	☆ (LR, ABS, GL)	—	☆	☆	☆	☆	☆		
Automatic tripping device	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)	Electronic (effective value detection)		
Trip button	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped		
Page of Characteristics and dimensions	154	158	158	164	164	166	166		

- Notes: *1 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
 *2 Solid state relay output is option. Please specify if other output is necessary. (Standard type is thus SLT equipped).
 *3 Place an order of other models in conjunction with the circuit breaker.
 *4 Not isolation compatible, excluding 400 to 800A frame.



NF-U (Ultra current-limiting class)



125 NF125-UV				250 NF250-UV				400 NF400-UEW				800 NF800-UEW							
																			
15 20 30 40 50 60 75 100 125				125 150 175 200 225 250				Adjustable 200 225 250 300 350 400				Adjustable 400 450 500 600 700 800							
2		3		2		3		4		3		4		3		4			
690				690				690				690							
10/10				15/15				-				35/35							
200/200				200/200				170/170				170/170							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
200/200				200/200				200/200				200/200							
-				-				-				-							
8				8				8				8							
AC				AC				AC				AC							
Compatible				Compatible				Compatible				Compatible							
Possible				Possible				Possible				Possible							
25,000				25,000				6,000				4,000							
10,000				10,000				1,000				500							
A				A				B				B							
-				-				5				9.6							
3				3				3				3							
N/A				N/A				A				A							
90		120		105		140		140		280		210		280					
191				240				297				322							
68				68				200				200							
90				92				252				252							
1.35		1.5		1.9		2.5		2.7		3.7		16.2		25.4		27.6		33.7	
●Screw terminal				●Screw terminal				●Busbar terminal				●Busbar terminal							
●Bar stud				●Bar stud				-				-							
●Bar stud				●Bar stud				●Bar stud				●Bar stud							
●				●				●				●							
● (*)				● (*)				● (*)				● (*)							
● (*)				● (*)				● (*)				● (*)							
● (*)				● (*)				● (*)				● (*)							
● (*)				● (*)				● (*)				● (*)							
●				●				●				●							
●				●				● (*)2				● (*)2							
-				-				-				-							
-				-				-				-							
●				●				● (*)3				● (*)3							
●				●				-				-							
●				●				-				-							
●				●				-				-							
●				●				-				-							
●				●				-				-							
●				●				-				-							
●				●				-				-							
-				-				-				-							
-				-				-				-							
●				●				-				-							
-				-				-				-							
Self-declaration				Self-declaration				Self-declaration				Self-declaration							
-				-				-				-							
☆				☆				☆				☆							
Thermal-magnetic				Thermal-magnetic				Electronic (effective value detection)				Electronic (effective value detection)							
Equipped				Equipped				Equipped				Equipped							
146				150				160				170							

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
 2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
 3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

2

1 Detailed Specifications






NV-C (Economy class) Harmonic Surge Ready

Frame (A)	50		60		63		100			125		
Model	NV63-CV										NV125-CV	
Image												
Rated current In (A) Rated ambient temperature 40°C	(5) (10) (15) (16) (20) (25)	(30) (32) (40) (50)	(60)		63		(60) 63 (75) 80 100			125		
Number of poles	2		3		2		3		3			
Phase line (*1)	1φ2W		3φ3W, 1φ3W, 1φ2W		1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W			
Rated operational voltage Ue (V) (*2) AC	100-240		100-440		100-240		100-440		100-440			
Time-delay type	High-speed type		High-speed type		High-speed type		High-speed type		High-speed type			
	Rated current sensitivity (mA)		30, 100/200/500 selectable		30, 100/200/500 selectable		30, 100/200/500 selectable		30, 100/200/500 selectable			
Time-delay type	Max. operating time (s)		at 1In at 5In		0.1 0.04		0.1 0.04		0.1 0.04			
	Rated current sensitivity (mA)		-		-		-		(100/200/500 selectable)			
Time-delay type	Max. operating time (s) (*3)		-		-		-		(0.45/1.0/2.0 selectable)			
	Internal non-operating (s) (or more)		-		-		-		(0.1/0.5/1.0)			
Earth leakage indication system		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		
Rated short-circuit breaking capacities (kA)	IEC 60947-2		440V		-		2.5/2.5		-		10/5	
	EN 60947-2		415V		-		2.5/2.5		-		10/5	
	(Icu/Ics)		400V		-		5/5		-		10/5	
			230V		7.5/7.5		7.5/7.5		7.5/7.5		30/15	
			200V		7.5/7.5		7.5/7.5		7.5/7.5		30/15	
			100V		7.5/7.5		7.5/7.5		7.5/7.5		30/15	
Rated impulse withstand voltage Uimp (kV)		6		6		6		6		6		
Current		AC		AC		AC		AC		AC		
Suitability for isolation		Compatible		Compatible		Compatible		Compatible		Compatible		
Reverse connection (below 230VAC)		Possible		Possible		Possible		Possible		Possible		
Number of operating cycles		10,000		10,000		10,000		10,000		10,000		
Without current		6,000		6,000		6,000		6,000		6,000		
With current		6,000		6,000		6,000		6,000		6,000		
Utilization category		A		A		A		A		A		
Pollution degree		2		2		2		2		2		
EMC environment condition (environment A or B)		A		A		A		A		A		
Overall dimensions (mm)	a		75		75		75		90		90	
	b		130		130		130		130		130	
	c		68		68		68		68		68	
	ca		90		90		90		90		90	
	Mass of front-face type (kg)		0.7		0.75		0.7		0.75		1.0	
Installation and connections	Front connection (F)		Page		●Screw terminal		●Screw terminal		●Screw terminal		●Screw terminal	
	Solderless (BOX) terminal (SL)		-		-		-		-		-	
	Rear (B)		92		●Round stud		●Round stud		●Round stud		●Bar stud	
	Plug-in (PM)		-		-		-		-		-	
Cassette-type accessories	Alarm switch (AL)		● (*4)		● (*4)		● (*4)		● (*4)		● (*4)	
	Auxiliary switch (AX)		● (*4)		● (*4)		● (*4)		● (*4)		● (*4)	
	Shunt trip (SHT)		● (*4)		● (*4)		● (*4)		● (*4)		● (*4)	
	Undervoltage trip (UVT)		● (*4)		● (*4)		● (*4)		● (*4)		● (*4)	
	Earth leakage alarm switch (EAL)		-		-		-		-		-	
	With lead-wire terminal block (SLT)		114		●		●		●		●	
Test button module (TBM)		115		● (*5)		● (*5)		● (*5)		● (*5)		
External accessories	Enclosure		Closed (S)		-		-		-		-	
			Dustproof (I)		-		-		-		-	
			Waterproof (W)		-		-		-		-	
	Electrical operation device (NFM)		133		-		-		●		●	
	Mechanical interlock (MI) (*7)		129		●		●		●		●	
	Panel mounting		-		●		●		●		●	
	Breaker mounting		-		●		●		●		●	
	Handle lock device		127		●		●		●		●	
	LC		-		●		●		●		●	
	HL		-		●		●		●		●	
	HL-S		-		●		●		●		●	
	External operating handle		117		●		●		●		●	
	(F)		-		●		●		●		●	
(V)		-		●		●		●		●		
Terminal cover (TCL, TC-S, TTC, BTC, PTC)		121		●		●		●		●		
Rear stud (B-ST)		94		-		-		-		-		
Plug-in (PM)		-		-		-		-		-		
IEC 35mm rail mounting adapters		137		●		●		●		●		
CE marking		Self-declaration		Self-declaration		Self-declaration		Self-declaration		Self-declaration		
CCC recognition		-		Recognition in process		-		Recognition in process		Recognition in process		
Marine use approval (NK, LR, ABS, GL)		-		-		-		-		-		
Automatic tripping device		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		
Trip button		Equipped		Equipped		Equipped		Equipped		Equipped		
Page of Characteristics and dimensions		180		180		180		180		182		

Notes: *1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
 *2 In case of time delay type, rated voltage is 200-440VAC.
 *3 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.
 *4 The cassette type design makes it easy for customer to install. Available for installation on side below 250A frame (excluding UVT).
 *5 Standard type is SLT equipped.

*6 Place an order of other models in conjunction with the circuit breaker.
 *7 Not isolation compatible, excluding 400 to 630A frame.
 *8 AC100V does not acquire the CCC certification.

NV-C (Economy class) Harmonic Surge Ready

225		250		400		600		630	
NV250-CV		NV250-CV		NV400-CW		NV600-CW		NV630-CW	
									
125 150 175 200 225		250		250 300 350 400		500 600		(630)	
3		3		3		3		3	
3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W	
100-440		100-440		100-440		200-440		200-440	
30,100/200/500 selectable		30,100/200/500 selectable		(30),100/200/500 selectable		-		-	
0.1		0.1		0.1		-		-	
0.04		0.04		0.04		-		-	
(100/200/500 selectable) (0.45/1.0/2.0 selectable) (0.1/0.5/1.0)		(100/200/500 selectable) (0.45/1.0/2.0 selectable) (0.1/0.5/1.0)		(100/200/500 selectable) (0.45/1.0/2.0 selectable) (0.1/0.5/1.0)		(100/200/500 selectable) (0.45/1.0/2.0 selectable) (0.1/0.5/1.0)		(100/200/500 selectable) (0.45/1.0/2.0 selectable) (0.1/0.5/1.0)	
Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)	
15/12		15/12		25/13		36/18		36/18	
25/19		25/19		36/18		36/18		36/18	
25/19		25/19		36/18		36/18		36/18	
36/27		36/27		50/25		50/25		50/25	
36/27		36/27		50/25		50/25		50/25	
36/27		36/27		50/25		-		-	
6		6		8		8		8	
AC		AC		AC		AC		AC	
Compatible		Compatible		Compatible		Compatible		Compatible	
Possible		Possible		Possible		Possible		Possible	
8,000		8,000		6,000		6,000		6,000	
4,000		4,000		1,000		1,000		1,000	
A		A		A		A		A	
2		2		3		3		3	
A		A		A		A		A	
105		105		140		140		140	
165		165		257		257		257	
68		68		103		103		103	
92		92		134		155		155	
1.7		1.7		6.1		6.9		6.9	
●Screw terminal		●Screw terminal		●Busbar terminal		●Busbar terminal		●Busbar terminal	
-		-		-		-		-	
●Bar stud		●Bar stud		●Bar stud		●Bar stud		●Bar stud	
-		-		-		-		-	
●(*4)		●(*4)		●(*4)		●(*4)		●(*4)	
●(*4)		●(*4)		●(*4)		●(*4)		●(*4)	
●(*4)		●(*4)		●(*4)		●(*4)		●(*4)	
●(*4)		●(*4)		●		●		●	
-		-		-		-		-	
●		●		●		●		●	
●(*5)		●(*5)		●(*5)		●(*5)		●(*5)	
-		-		-		-		-	
-		-		-		-		-	
-		-		-		-		-	
●		●		●(*6)		●(*6)		●(*6)	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
●		●		●		●		●	
-		-		-		-		-	
-		-		-		-		-	
TUV approval		TUV approval		Self-declaration		Self-declaration		Self-declaration	
Recognition in process		Recognition in process		Recognition in process		Recognition in process		Recognition in process	
-		-		-		-		-	
Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic	
Equipped		Equipped		Equipped		Equipped		Equipped	
184		184		188		192		192	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
 2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
 3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-240V	100/110/200/220/230/240V	85-264V
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	170-484V

NV-S (Standard class) Harmonic Surge Ready

Frame (A)	30	32	50	60	63	100	125	125	
Model	NV32-SV		NV63-SV			NV125-SV		NV125-SEV	
Image									
Rated current In (A) Rated ambient temperature 40°C	(5) 6 10 (15) 16 20 25 (30)	(32)	(5) (10) (15) 16 20 25 (30) 32 40 50	(60)	63	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 (*3)	125	63-125	
Number of poles	3	3	3	3	3	3 4	3 4	3 4	
Phase line (*1)	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W 3φ4W	3φ3W, 1φ3W, 1φ2W 3φ4W	3φ3W, 1φ2W 3φ4W	
Rated operational voltage Ue (V) (*2) AC	100-440		100-440			100-440 200-440		100-440	
High-speed type	Rated current sensitivity (mA)	30,100/200/500 selectable		30,100/200/500 selectable			30,100/200/500 selectable		
	Max. operating time (s)	at 1Δn 0.1 0.04		at 1Δn 0.1 0.04			at 1Δn 0.1 0.04		
Time-delay type	Rated current sensitivity (mA)	-		-			(100/200/500selectable)		
	Max. operating time (s) (*4)	-		-			(0.45/1.0/2.0selectable)		
Internal non-operating (s) (or more)	-		-			(0.1/0.5/1.0)		(0.1/0.5/1.0)	
Earth leakage indication system	Mechanical type (button)		Mechanical type (button)			Mechanical type (button)		Mechanical type (button)	
Rated short-circuit breaking capacities (kA)	AC	440V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	25/25	36/36
		415V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	30/30	36/36
		400V	5/5	5/5	7.5/7.5	7.5/7.5	7.5/7.5	30/30	36/36
		230V	10/10	10/10	15/15	15/15	15/15	50/50	85/85
		200V	10/10	10/10	15/15	15/15	15/15	50/50	85/85
		100V	10/10	10/10	15/15	15/15	15/15	50/50	85/85
Rated impulse withstand voltage Uimp (kV)	6		6			6		6	
Current	AC		AC			AC		AC	
Suitability for isolation	Compatible		Compatible			Compatible		Compatible	
Reverse connection (below 230VAC)	Possible		Possible			Possible		Possible	
Number of operating cycles	Without current	10,000	10,000	15,000	15,000	15,000	25,000	25,000	
	With current	6,000	6,000	8,000	8,000	8,000	10,000	10,000	
Utilization category	A		A			A		A	
Rated short time withstand current Icu (kA) at 0.25s	-		-			-		-	
Pollution degree	2		2			2		2	
EMC environment condition (environment A or B)	A		A			A		A	
Overall dimensions (mm)	a	75	75	75	75	75	90 120	90 120	
	b	130	130	130	130	130	130	165	
	c	68	68	68	68	68	68	68	
	ca	90	90	90	90	90	90	92	
	Mass of front-face type (kg)	0.75	0.75	0.75	0.8	0.8	1.1 1.4	1.1 1.4	1.9 2.5
Installation and connections	Front connection (F)	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	
	Solderless (BOX) terminal (SL)	-	-	-	-	-	-	-	
	Rear (B)	●Round stud	●Round stud	●Round stud	●Round stud	●Round stud	●Bar stud	●Bar stud	
	Plug-in (PM)	-	-	-	-	-	-	-	
Cassette-type accessories	Alarm switch (AL)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Auxiliary switch (AX)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Shunt trip (SHT)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Undervoltage trip (UVT)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Earth leakage alarm switch (EAL)	-	-	-	-	-	-	-	
	With lead-wire terminal block (SLT)	-	-	-	-	-	-	-	
	Test button module (TBM)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	
External accessories	Enclosure	Closed (S)	-	-	-	-	-	-	
		Dustproof (I)	-	-	-	-	-	-	
	Electrical operation device (NFM)	Mechanical interlock (MI) (*8)	●	●	●	●	●	●	
		Panel mounting Breaker mounting	●	●	●	●	●	●	
	Handle lock device	LC	●	●	●	●	●	●	
		HL	●	●	●	●	●	●	
		HL-S	●	●	●	●	●	●	
	External operating handle	(F)	●	●	●	●	●	●	
		(V)	●	●	●	●	●	●	
	Terminal cover (TC-L, TC-S, TTC, BTC, PTC)	121	●	●	●	●	●	●	
Rear stud (B-ST)	94	●	●	●	●	●	●		
Plug-in (PM)	-	-	-	-	-	-	-		
IEC 35mm rail mounting adapters	137	●	●	●	●	●	●		
CE marking	Self-declaration		Self-declaration			Self-declaration		Self-declaration	
CCC recognition	Recognition in process		Recognition in process			Recognition in process		Recognized	
Marine use approval (NK, LR, ABS, GL)	-		-			-		-	
Automatic tripping device	Thermal-magnetic		Thermal-magnetic			Thermal-magnetic		Electronic (effective value detection)	
Trip button	Equipped		Equipped			Equipped		Equipped	
Page of Characteristics and dimensions	180		180			182		186	

Notes: *1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
 *2 In case of time delay type, rated voltage is 200-440VAC.
 *3 In case of time delay type, rated current is produced with 20 amp. or more.
 *4 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.

*5 Cassette type accessories are field mountable type. It can respond to adhesion attachment of a breaker as standard below 250A frame. (excluding UVT).
 *6 Standard type is SLT equipped.
 *7 Place an order of other models in conjunction with the circuit breaker.
 *8 Not isolation compatible, excluding 400 to 800A frame.
 *9 AC100V does not acquire the CCC certification.

NV-S (Standard class) Harmonic Surge Ready

2

2 Detailed Specifications

225	250	250	400	400	600	630	630	800
NV250-SV		NV250-SEV	NV400-SW	NV400-SEW	NV630-SW		NV630-SEW	NV800-SEW
125 150 175 200 225	250	125-250	250 300 350 400	Adjustable 200 225 250 300 350 400	500 600	(630)	Adjustable 300 350 400 500 600 630	Adjustable 400 450 500 600 700 800
3	3	3	3	3 4	3	3	3 4	3
3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W 3φ4W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W 3φ4W	3φ3W, 1φ3W, 1φ2W
100-440	100-440	100-440	100-440	100-440	200-440	200-440	100-440	200-440
(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	(30),100/200/500 selectable	-	-	-	-
0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	-	-	-	-
(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	100/200/500selectable 0.45/1.0/2.0selectable 0.1/0.5/1.0	100/200/500selectable 0.45/1.0/2.0selectable 0.1/0.5/1.0	(100/200/500selectable) (0.45/1.0/2.0selectable) (0.1/0.5/1.0)	100/200/500selectable 0.45/1.0/2.0selectable 0.1/0.5/1.0
Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)
36/36	36/36	36/36	42/42	42/42	42/42	42/42	42/42	42/42
36/36	36/36	36/36	45/45	50/50	50/50	50/50	50/50	50/50
36/36	36/36	36/36	45/45	50/50	50/50	50/50	50/50	50/50
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85	85/85
6	6	6	8	8	8	8	8	8
AC	AC	AC	AC	AC	AC	AC	AC	AC
Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible	Compatible Possible
25,000 10,000	25,000 10,000	25,000 10,000	6,000 1,000	6,000 1,000	6,000 1,000	6,000 1,000	6,000 1,000	4,000 500
A	A	A	A	B	A	A	A	A
-	-	-	-	5	-	-	7.6	9.6
2	2	2	3	3	3	3	3	3
A	A	A	A	A	A	A	A	A
105	105	105	140	140 185	140	140	140 185	210
165	165	165	257	257	257	257	257	275
68	68	68	103	103	103	103	103	103
92	92	92	155	155	155	155	155	155
1.9	1.9	1.9	6.4	6.2 8.2	6.9	6.9	7.1 8.9	15.3
●Screw terminal	●Screw terminal	●	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal	●Busbar terminal
-	-	-	-	-	-	-	-	-
●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud
-	-	-	-	-	-	-	-	-
●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)
●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)
●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)
●(*5)	●(*5)	●(*5)	●	●	●	●	●	●
-	-	-	●	●	●	●	●	●
●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)
-	-	●	●	●	●	●	●	●
-	-	●	●	●	●	●	●	●
●	●	●	●(*7)	●(*7)	●(*7)	●(*7)	●(*7)	●(*7)
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●
-	-	-	-	-	-	-	●	-
-	-	-	-	-	-	-	-	-
TUV approval	TUV approval	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognition in process	Recognition in process	Recognized	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process
-	-	-	-	-	-	-	-	-
Thermal-magnetic Equipped	Thermal-magnetic Equipped	Electronic (effective value detection) Equipped	Thermal-magnetic Equipped	Electronic (effective value detection) Equipped	Thermal-magnetic Equipped	Thermal-magnetic Equipped	Electronic (effective value detection) Equipped	Electronic (effective value detection) Equipped
184	184	186	188	190	192	192	194	196

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
 2. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
 3. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

4.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	170-484V

NV-H / NV-R (High-performance class) Harmonic Surge Ready

Frame (A)	50	60	63	100	125	125	225	250	250	
Model	NV63-HV			NV125-HV		NV125-HEV	NV250-HV		NV250-HEV	
Image										
Rated current In (A) Rated ambient temperature 40°C	(15) 16 20 (30) 32 40 50	(60)	63	(15) 16 20 (30) 32 40 50 (60) 63 (75) 80 100 (*3)	125	63-125	125 150 175 200 225	250	125-250	
Number of poles	3	3	3	3 4	3 4	3 4	3	3	3	
Phase line (*1)	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ4W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ3W, 1φ2W	3φ3W, 1φ2W	
Rated operational voltage Ue (V) (*2) AC	100-440	100-440	100-440	100-440 200-440	100-440 200-440	100-440	100-440	100-440	100-440	
High-speed type	Rated current sensitivity (mA)	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	30,100/200/500 selectable	(30),100/200/500 selectable	
	Max. operating time (s)	at 1Δn 0.1 at 5Δn 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04	0.1 0.04
Time-delay type	Rated current sensitivity (mA)	-	-	-	(100/200/500selectable) (0.45/1.0/2.0selectable)	(100/200/500selectable) (0.45/1.0/2.0selectable)	(100/200/500selectable) (0.45/1.0/2.0selectable)	(100/200/500selectable) (0.45/1.0/2.0selectable)	(100/200/500selectable) (0.45/1.0/2.0selectable)	(100/200/500selectable) (0.45/1.0/2.0selectable)
	Max. operating time (s) (*4)	-	-	-	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)	(0.1/0.5/1.0)
Internal non-operating (s) (or more)	-	-	-	-	-	-	-	-	-	
Earth leakage indication system	Mechanical type (button)			Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	Mechanical type (button)	
Rated short-circuit breaking capacities (kA)	IEC 60947-2	440V 10/8	10/8	10/8	50/38	50/38	65/65	65/65	65/65	
	EN 60947-2	415V 10/8	10/8	10/8	50/38	50/38	70/70	70/70	70/70	
	(Icu/Ics)	400V 10/8	10/8	10/8	50/38	50/38	75/75	75/75	75/75	
		230V 25/19	25/19	25/19	100/75	100/75	100/100	100/100	100/100	
		200V 25/19	25/19	25/19	100/75	100/75	100/100	100/100	100/100	
		100V 25/19	25/19	25/19	100/75	100/75	100/100	100/100	100/100	
Rated impulse withstand voltage Uimp (kV)	6	6	6	6	6	6	6	6	6	
Current	AC	AC	AC	AC	AC	AC	AC	AC	AC	
Suitability for isolation	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible	
Reverse connection (below 230VAC)	-	-	-	-	-	-	-	-	-	
Number of operating cycles	Without current	15,000	15,000	15,000	25,000	25,000	25,000	25,000	25,000	
	With current	8,000	8,000	8,000	10,000	10,000	10,000	10,000	10,000	
Utilization category	A	A	A	A	A	A	A	A	A	
Rated short time withstand current Icu (kA) at 0.25s	-	-	-	-	-	-	-	-	-	
Pollution degree	2	2	2	2	2	2	2	2	2	
EMC environment condition (environment A or B)	A	A	A	A	A	A	A	A	A	
Overall dimensions (mm)	a	75	75	75	90 120	90 120	105 140	105	105	
	b	130	130	130	130	130	165	165	165	
	c	68	68	68	68	68	68	68	68	
	ca	90	90	90	90	90	92	92	92	
	Mass of front-face type (kg)	0.75	0.8	0.8	1.1 1.4	1.1 1.4	1.9 2.5	1.8	1.8	1.9
Installation and connections	Front connection (F)	Page	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	●Screw terminal	
	Solderless (BOX) terminal (SL)	92	-	-	-	-	-	-	-	
Rear (B)	●Round stud	●Round stud	●Round stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud	●Bar stud		
Plug-in (PM)	-	-	-	-	-	-	-	-		
Cassette-type accessories	Alarm switch (AL)	102	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Auxiliary switch (AX)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Shunt trip (SHT)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Undervoltage trip (UVT)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	●(*5)	
	Earth leakage alarm switch (EAL)	-	-	-	-	-	-	-	-	
	With lead-wire terminal block (SLT)	114	-	-	-	●	●	●	●	
Test button module (TBM)	115	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)	●(*6)		
External accessories	Enclosure	130	-	-	-	-	●	-	-	
	Dustproof (I)	-	-	-	-	-	-	-	-	
	Waterproof (W)	-	-	-	-	-	-	-	-	
	Electrical operation device (NFM)	133	-	-	-	●	●	●	●	
	Mechanical interlock (MI) (*7)	129	●	●	●	●	●	●	●	
	Panel mounting	-	-	-	-	-	-	-	-	
	Breaker mounting	-	-	-	-	-	-	-	-	
	Handle lock device	127	●	●	●	●	●	●	●	
	LC	●	●	●	●	●	●	●	●	
	HL	●	●	●	●	●	●	●	●	
HL-S	●	●	●	●	●	●	●	●		
External operating handle	117	●	●	●	●	●	●	●		
(F)	●	●	●	●	●	●	●	●		
(V)	●	●	●	●	●	●	●	●		
Terminal cover (TC-L, TC-S, TTC, BTC, PTC)	121	●	●	●	●	●	●	●		
Rear stud (B-ST)	94	●	●	●	●	●	●	●		
Plug-in (PM)	-	-	-	-	-	-	-	-		
IEC 35mm rail mounting adapters	137	●	●	●	-	-	-	-		
CE marking	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	
CCC recognition	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognition in process	Recognized	Recognition in process	Recognition in process	Recognized	
Marine use approval (NK, LR, ABS, GL)	-	-	-	-	-	-	-	-	-	
Automatic tripping device	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)	Thermal-magnetic	Thermal-magnetic	Electronic (effective value detection)	
Trip button	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	Equipped	
Page of Characteristics and dimensions	180			182		186	184		186	

Notes: *1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole. When wiring to single-phase 3-wire, connect the neutral line to the central pole.
 *2 In case of time delay type, rated voltage is 200-440VAC.
 *3 In case of time delay type, rated current is produced with 20 amp. or more.
 *4 When the operating time are 0.45, 1.0 and 2.0 seconds, the Earth Leakage circuit breaker operates between 0.15 and 0.45 seconds, between 0.6 and 1.0 seconds and between 1.2 and 2.0 seconds respectively.

*5 Cassette type accessories are field mountable type. It can respond to adhesion attachment of a breaker as standard. (excluding UVT).
 *6 Standard type is SLT equipped.
 *7 Not isolation compatible.
 *8 AC100V does not acquire the CCC certification.

NV-H / NV-R (High-performance class) Harmonic Surge Ready

400 NV400-HEW		400 NV400-REW		630 NV630-HEW		800 NV800-HEW	
Adjustable 200 225 250 300 350 400		Adjustable 200 225 250 300 350 400		Adjustable 300 350 400 500 600 630		Adjustable 400 450 500 600 700 800	
3		3		3		3	
3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W		3φ3W, 1φ3W, 1φ2W	
100-440		100-440		100-440		100-440	
(30), 100/200/500 selectable		(30), 100/200/500 selectable		-		-	
0.1		0.1		-		-	
0.04		0.04		-		-	
(100/200/500 selectable)		(100/200/500 selectable)		(100/200/500 selectable)		(100/200/500 selectable)	
(0.45/1.0/2.0)		(0.45/1.0/2.0)		(0.45/1.0/2.0)		(0.45/1.0/2.0 selectable)	
(0.1/0.5/1.0)		(0.1/0.5/1.0)		(0.1/0.5/1.0)		(0.1/0.5/1.0)	
Mechanical type (button)		Mechanical type (button)		Mechanical type (button)		Mechanical type (button)	
65/65		125/63		65/65		65/65	
70/70		125/63		70/70		70/70	
70/70		125/63		70/70		70/70	
100/100		150/75		100/100		100/100	
100/100		150/75		100/100		100/100	
100/100		150/75		100/100		100/100	
8		8		8		8	
AC		AC		AC		AC	
Compatible		Compatible		Compatible		Compatible	
-		-		-		-	
6,000		6,000		6,000		4,000	
1,000		1,000		1,000		500	
B		B		B		B	
5		5		7.6		9.6	
3		3		3		3	
A		A		A		A	
140		140		140		210	
257		257		257		275	
103		103		103		103	
155		155		155		155	
6.6		6.6		7.1		15.3	
●Busbar terminal		●Busbar terminal		●Busbar terminal		●Busbar terminal	
-		-		-		-	
●Bar stud		●Bar stud		●Bar stud		●Bar stud	
-		-		-		-	
●(*5)		●(*5)		●(*5)		●(*5)	
●(*5)		●(*5)		●(*5)		●(*5)	
●(*5)		●(*5)		●(*5)		●(*5)	
-		-		-		-	
-		-		-		-	
●(*6)		●(*6)		●(*6)		●(*6)	
-		-		-		-	
●		●		●		●	
●		●		●		●	
●(*7)		●(*7)		●(*7)		●(*7)	
●		●		●		●	
●		●		●		●	
●		●		●		●	
●		●		●		●	
●		●		●		●	
●		●		●		●	
-		-		-		-	
-		-		-		-	
Self-declaration		Self-declaration		Self-declaration		Self-declaration	
Recognition in process		Recognition in process		Recognition in process		Recognition in process	
-		-		-		-	
Electronic (effective value detection)		Electronic (effective value detection)		Electronic (effective value detection)		Electronic (effective value detection)	
Equipped		Equipped		Equipped		Equipped	
190		190		194		196	

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
 2. The setting is set to 500mA and delivered when not specifying the rated current sensitivity and the time of time-delay type of operation to 2.0 seconds.
 3. Specify "FP-LT" when using a flush plate product with a lead-wire terminal block.
 4. Specify "P-LT" when using a plug-in product with a lead-wire terminal block.
 5. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.

Rated operational voltage	Applicable circuit voltage	Available voltage range
100-440V	100/110/200/220/240/254/265/380/400/415/440V	85-484V
200-440V	200/220/240/254/265/380/400/415/440V	175-484V

NF-MB

Please specify MB

2 Detailed Specifications

Frame (A)		30			32			50			100			225								
Model		NF32-SV									NF63-CV			NF63-SV			NF125-SV			NF250-SV		
Rated current In (A)		200/220V 400/440V			200/220V 400/440V			200/220V 400/440V			200/220V 400/440V			200/220V 400/440V			200/220V 400/440V					
Rated motor capacity (kW)		kW			kW			kW			kW			kW			kW					
Rated ambient temperature 40°C (45°C for marine use)		A			A			A			A			A			A					
Number of poles		3			3			3			3			3			3					
Rated insulation voltage Ui (V)		500			500			500			500			500			500					
Rated short-circuit breaking capacity (kA)	IEC 60947-2	440V			2.5/2.5			2.5/2.5			2.5/2.5			7.5/7.5			25/25			36/36		
	EN 60947-2 (Icu/Ics)	415V			2.5/2.5			2.5/2.5			2.5/2.5			7.5/7.5			30/30			36/36		
		400V			5/5			5/5			5/5			7.5/7.5			30/30			36/36		
		380V			5/5			5/5			5/5			7.5/7.5			30/30			36/36		
		230V			7.5/7.5			7.5/7.5			7.5/7.5			15/15			50/50			85/85		
Rated impulse withstand voltage Uimp (kV)		8			8			8			8			8			8					
Suitability for isolation		Compatible			Compatible			Compatible			Compatible			Compatible			Compatible					
Reverse connection		Possible			Possible			Possible			Possible			Possible			Possible					
Number of operating cycles	Without current	10,000			10,000			10,000			15,000			25,000			25,000					
	With current (440VAC)	6,000			6,000			6,000			8,000			10,000			10,000					
Utilization category		A			A			A			A			A			A					
Pollution degree		3			3			3			3			3			3					
EMC environment condition (environment A or B)		N/A			N/A			N/A			N/A			N/A			N/A					
Overall dimensions (mm)	a	75			75			75			75			90			105					
	b	130			130			130			130			130			165					
	c	68			68			68			68			68			68					
	ca	90			90			90			90			90			92					
	Mass of front-face type (kg)	0.65			0.65			0.65			0.7			1.0			1.6					
Installation and accessories	Front connection (F)	●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal			●Screw terminal					
	Solderless (BOX) terminal (SL)	-			-			-			-			-			-					
	Rear (B)	●Round stud			●Round stud			●Round stud			●Round stud			●Bar stud			●Bar stud					
	Plug-in (PM)	●			●			●			●			●			●					
	Alarm switch (AL)	●(*1)			●(*1)			●(*1)			●(*1)			●(*1)			●(*1)					
	Auxiliary switch (AX)	●(*1)			●(*1)			●(*1)			●(*1)			●(*1)			●(*1)					
	Shunt trip (SHT)	●(*1)			●(*1)			●(*1)			●(*1)			●(*1)			●(*1)					
	Undervoltage trip (UVT)	●(*1)			●(*1)			●(*1)			●(*1)			●(*1)			●(*1)					
	With lead-wire terminal block (SLT)	●			●			●			●			●			●					
	Enclosure	Closed (S)	●			●			●			●			●			●				
	Dustproof (I)	●			●			●			●			●			●					
	Waterproof (W)	●			●			●			●			●			●					
Electrical operation device (NFM)		-			-			-			-			●(*3)			●(*3)					
Mechanical interlock (M) (*2)	Panel mounting	●			●			●			●			●			●					
	Breaker mounting	●			●			●			●			●			●					
Handle lock device	LC	●			●			●			●			●			●					
	HL	●			●			●			●			●			●					
	HL-S	●			●			●			●			●			●					
External operating handle	(F)	●			●			●			●			●			●					
	(V)	●			●			●			●			●			●					
Terminal cover (TC-L, TC-S, TTC, BTC, PTC)		●			●			●			●			●			●					
Rear stud (B-ST)		●			●			●			●			●			●					
Plug-in (PM)		●			●			●			●			●			●					
IEC 35mm rail mounting adapters		●			●			●			●			-			-					
CE marking		Self-declaration			Self-declaration			Self-declaration			Self-declaration			Self-declaration			TUV approval					
CCC recognition		Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process					
Marine use approval (NK, LR, ABS, GL)		☆			☆			☆			☆			☆			☆					
Automatic tripping device		Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic					
Trip button		Equipped			Equipped			Equipped			Equipped			Equipped			Equipped					
Page of Characteristics and dimensions		142			142			142			144			148								

Notes: *1 The cassette type design makes it easy for customer to install. Available for installation on side (excluding UVT).
 *2 Not isolation compatible.
 *3 Place an order of other models in conjunction with the circuit breaker.

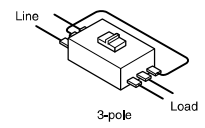
Remarks: 1. The motor circuit breakers do not have an applicable rated motor capacity. Select a motor circuit breaker based on the total load current of the motor.
 2. Products with rating parenthesized are produced when an order is placed.
 3. Specify "P-LT" when using a plug-in product with a lead wire terminal block.
 4. The circuit breaker has the rated short circuit breaking capacity specified in the shaded cells.
 5. Please refer to "Table 4-17", of Page 73 for details.

UL 489 Listed Molded Case Circuit Breakers

Frame (A)		50		100		125			
Model		NF50-SVFU		NF100-CVFU		NF125-SVU			
Image									
Rated current In (A) (*4) Rated ambient temperature 40°C (IEC 30°C)		(3) 5 10 15 20 30	40 50	60 (70) 75 (80) (90)	100	15 20 30 40 50 60 (70) 75 (80) (90) 100	125	15 20 30 40 50 60 (70) 75 (80) (90) 100	125
Number of poles		2 3		2 3		2 3		2 3	
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	AC (V)	240	240	480	480	600Y/347	600Y/347	
			DC (V)	-	-	-	-	-	
		600Y/347V	-	-	-	-	18	18	
			480V	-	-	30	30	50	50
			480Y/277V	-	-	-	-	-	-
	240V	14	14	50	50	100	100		
		120V	-	-	-	-	-	-	
	DC	60V	-	-	-	-	-	-	
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	Rated insulation voltage Ui (V)	440	600	690	690	690	690
			690V	-	-	8/4	8/4	10/5	10/5
500V			-	7.5/4	18/9	18/9	25/13	25/13	
440V			7.5/4	10/5	30/15	30/15	50/25	50/25	
415V			10/5	10/5	30/15	30/15	50/25	50/25	
400V		10/5	10/5	30/15	30/15	50/25	50/25		
380V		10/5	10/5	30/15	30/15	50/25	50/25		
230V		15/8	15/8	50/25	50/25	100/50	100/50		
DC		250V	-	-	-	-	-	-	
		60V	-	-	-	-	-	-	
Rated impulse withstand voltage Uimp (kV) Current (*1)		6 AC		8 AC		8 AC		8 AC	
Suitability for isolation		Compatible		Compatible		Compatible		Compatible	
Reverse connection		-		Possible		Possible		Possible	
Utilization category		A		A		A		A	
Pollution degree		3		3		3		3	
EMC environment condition (environment A or B)		N/A		N/A		N/A		N/A	
Overall dimensions (mm)		a	36 54	50 75	90	90	90	90	
		b	120	150	160	160	160	160	
		c	68	68	68	68	68	68	
		ca	90	90	90	90	90	90	
Mass of front-face type (kg)		0.3 0.45	0.55 0.8	1.0 1.1	1.0 1.1	1.1	1.1		
Installation and accessories (*2)	Front (F)	Screw terminal (AMP-N)	Page	●	●	●	●	●	
		Solderless terminal (SL)	92	-	●	●	●	●	
		Bar (BAR)	-	● (*5)	●	●	●	●	
		Power supply solderless load bar (SL, BAR)	-	● (*5, 6)	● (*6)	● (*6)	● (*6)	● (*6)	
		Alarm switch (AL)	102	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	
	Auxiliary switch (AX)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)		
	Shunt trip (SHT)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)		
	Undervoltage trip (UVT)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)	● (*7)		
	With lead-wire terminal block (SLT)	114	●	●	●	●	●		
	Mechanical interlock (MI)	129	-	-	-	-	-		
External accessories (*2)	Handle lock device	(HL)	127	●	●	●	●		
		(HL-S)	●	●	●	●			
	External operating handle	(F)	117	●	●	●	●		
		(V)	●	●	●	●			
	Terminal cover	Large terminal cover (TC-L)	121	●	●	●	●		
Small terminal cover (TC-S)	122	- (*3)	- (*3)	- (*3)	- (*3)	- (*3)			
IEC 35mm rail mounting adapters	137	Standard accessory	Standard accessory	-	-	-			
CE marking		TUV approval		TUV approval		TUV approval		TUV approval	
CCC recognition		Recognition in process		Recognition in process		Recognition in process		Recognition in process	
Automatic tripping device		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic		Thermal-magnetic	
Trip button		Equipped		Equipped		Equipped		Equipped	
Page of Characteristics and dimensions		198		200		202		202	

Notes: *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
 *2 These accessories differ from the general and CE/CCC products in specifications. Please consult us for details.
 *3 The standard structure conforms to IP20 (finger protection).
 *4 The rated ambient temperature for NF50-SVFU, NF100-CVFU, NF125-SVU and NF125-HVU is specified at 40°C also by IEC.
 *5 The circuit breakers with busbar terminals have insulation barriers.
 *6 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a busbar terminal is not provided on the load side.
 *7 These cassette type circuit breakers can be installed by the customer. They can be installed with their side faces in close contact (except NF50-SVFU and UVT).

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.
 2. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
 3. The 3-pole circuit breakers can be used on single-phase circuits.



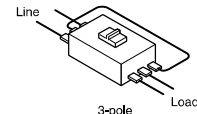
US UL Standard 489
 UL File No.E167691 Body
 UL File No.E108284 Accessories

Canada CSA Standard
 C22.2 No.5

UL 489 Listed Molded Case Circuit Breakers								
Frame (A)		225		250				
Model		NF225-CWU		NF250-SVU		NF250-HVU		
Image								
Rated current In (A) (*5) Rated ambient temperature 40°C (IEC 30°C)		125 150 175 200 225		125 150 175 200 225	250	125 150 175 200 225 250		
Number of poles		3		3	3	3		
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	AC	Rated voltage AC (V)	240	480	480	600Y/347	
			DC (V)	-	-	-	-	
		DC	600Y/347V	-	-	-	-	-
			480V	-	35	35	18	18
			480Y/277V	-	-	-	50	50
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	240V	35	65	65	100	100
			120V	-	-	-	-	-
			60V	-	-	-	-	-
			Rated insulation voltage Ui (V)	600	690	690	690	690
			690V	-	8/4	8/4	10/5	10/5
DC	AC	500V	10/5	25/13	25/13	36/18	36/18	
		440V	15/8	36/18	36/18	50/25	50/25	
		415V	18/9	36/18	36/18	50/25	50/25	
		400V	18/9	36/18	36/18	50/25	50/25	
		380V	18/9	36/18	36/18	50/25	50/25	
		230V	35/18	65/33	65/33	100/50	100/50	
		250V (*3)	10/5	-	-	-	-	
60V	-	-	-	-	-			
Rated impulse withstand voltage Uimp (kV)		6		8	8	8		
Current (*1)		AC/DC compatible		AC	AC	AC		
Suitability for isolation		Compatible		Compatible	Compatible	Compatible		
Reverse connection		Possible		Possible	Possible	Possible		
Utilization category		A		A	A	A		
Pollution degree		3		3	3	3		
EMC environment condition (environment A or B)		N/A		N/A	N/A	N/A		
Overall dimensions (mm)			a	105	105	105	105	
			b	165	185	185	185	
			c	68	68	68	68	
			ca	92	92	92	92	
	Mass of front-face type (kg)		1.5		1.6	1.6	1.6	
Installation and connections	Front (F)	Screw terminal (AMP-N)	Page	●	●	●	●	
		Solderless terminal (SL)	92	-	●	●	●	
		Bar (BAR)	92	●	●	●	●	
		Power supply solderless load bar (SU/BAH)	-	●(*8)	●(*8)	●(*8)	●(*8)	
Cassette-type accessories (*2)	Alarm switch (AL)	102	●	●(*7)	●(*7)	●(*7)		
	Auxiliary switch (AX)	102	●	●(*7)	●(*7)	●(*7)		
	Shunt trip (SHT)	102	●	●(*7)	●(*7)	●(*7)		
	Undervoltage trip (UVT)	102	●	●(*7)	●(*7)	●(*7)		
	With lead-wire terminal block (SLT)	114	●	●	●	●		
External accessories (*2)	Mechanical interlock (MI)	129	●(*6)	-	-	-		
	Handle lock device (HL)	(HL)	127	●	●	●	●	
		(HL-S)	127	●	●	●	●	
	External operating handle (F)	(F)	117	●	●	●	●	
		(V)	117	●	●	●	●	
	Terminal cover	Large terminal cover (TC-L)	121	●	●	●	●	
Small terminal cover (TC-S)		122	-(*4)	-(*4)	-(*4)	-(*4)		
IEC 35mm rail mounting adapters	137	-	-	-	-			
CE marking		TUV approval		TUV approval	TUV approval	TUV approval		
CCC recognition		Recognition in process		Recognition in process	Recognition in process	Recognition in process		
Automatic tripping device		Thermal-magnetic		Thermal-magnetic	Thermal-magnetic	Thermal-magnetic		
Trip button		Equipped		Equipped	Equipped	Equipped		
Page of Characteristics and dimensions		204		206	206	206		

- Notes:
- *1 The trip action characteristics differ between AC and DC for products that are compatible with both AC and DC.
 - *2 These accessories differ from the general products in specifications. Please consult us for details.
 - *3 When using a 3-pole circuit breaker, use two poles. When wired as shown right, NF225-CWU can be used at up to 400 V DC.
 - *4 Since NF225-CWU comes with a protective cover, it has an IP20 (finger protection) structure as standard. Other models have IP20 (finger protection) structures as standard.
 - *5 The rated ambient temperature for NF250-SVU and NF250-HVU is specified at 40°C also by IEC.
 - *6 Not isolation compatible.
 - *7 These cassette type circuit breakers can be installed by the customer. They can be installed with their side faces in close contact (except UVT).
 - *8 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a busbar terminal is not provided on the load side.

- Remarks:
1. Products with rated current parenthesized are produced when an order is placed.
 2. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
 3. The 3-pole circuit breakers can be used on single-phase circuits.



US UL Standard 489
 UL File No.E167691 Body
 UL File No.E108284 Accessories

Canada CSA Standard
 C22.2 No.5

UL 489 Listed Molded Case Circuit Breakers

Frame (A)		400		630				
Model		NF400-SWU	NF400-HWU	NF630-SWU	NF630-HWU			
Image								
Rated current In (A) Rated ambient temperature 40°C		250 300 350 400	250 300 350 400	500 600 630	500 600 630			
Number of poles		3	3	3	3			
Rated short-circuit breaking capacities (kA)	UL 489 CSA C22.2 No.5-02	Rated voltage	600Y/347	600Y/347	600Y/347	600Y/347		
		AC	AC (V)	—	—	—	—	
			DC (V)	—	—	—	—	
			600Y/347V	20	25	20	25	
			480V	35	65	35	65	
	IEC 60947-2 EN 60947-2 (Icu/Ics)	AC	480Y/277V	—	—	—	—	
			240V	65	100	85	100	
			120V	—	—	—	—	
			DC 60V	—	—	—	—	
		Rated insulation voltage Ui (V)	690	690	690	690		
Rated impulse withstand voltage Uimp (kV)	Current	AC	8	8	8	8		
		AC	Compatible	Compatible	Compatible	Compatible		
	Suitability for isolation	Possible	Possible	Possible	Possible			
	Reverse connection	—	—	—	—			
	Utilization category	A	A	A	A			
	Pollution degree	3	3	3	3			
	EMC environment condition (environment A or B)	N/A	N/A	N/A	N/A			
	Overall dimensions (mm)		a	140	140	210	210	
b			257	257	275	275		
c			103	103	103	103		
ca			155	155	155	155		
Installation and accessories	Cassette-type accessories	Mass of front-face type (kg)	5.7	5.7	9.6	9.6		
		Front (F)	Screw terminal (AMP-N)	Page	—	—	—	—
			Solderless terminal (SL)	92	●(*5)	●(*5)	●(*5)	●(*5)
			Bar (BAR)	—	●(*5)	●(*5)	—	
			Power supply solderless load bar (SLBAR)	—	●(*5)	—	—	
	Alarm switch (AL)	102	●(*3)	●(*3)	●(*3)	●(*3)		
	Auxiliary switch (AX)	—	●(*3)	●(*3)	●(*3)	●(*3)		
	Shunt trip (SHT)	—	●(*3)	●(*3)	●(*3)	●(*3)		
	Undervoltage trip (UVT)	—	●	●	●	●		
	With lead-wire terminal block (SLT)	114	●	●	●	●		
External accessories	Mechanical interlock (MI)	129	●(*1)(*2)	●(*1)(*2)	●(*1)(*2)	●(*1)(*2)		
	Handle lock device	(HL)	127	●(*6)	●(*6)	●(*6)	●(*6)	
		(HL-S)	—	—	—	—	—	
	External operating handle	(F)	117	●	●	●	●	
		(V)	—	●	●	●	●	
	Terminal Large terminal cover (TC-L)	121	—	—	—	—		
Terminal Small terminal cover (TC-S)	122	—	—	—	—			
IEC 35mm rail mounting adapters	137	—	—	—	—			
CE marking	TÜV approval	TÜV approval	TÜV approval	TÜV approval				
CCC recognition	Recognition in process	Recognition in process	Recognition in process	Recognition in process				
Automatic tripping device	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic				
Trip button	Equipped	Equipped	Equipped	Equipped				
Page of Characteristics and dimensions	208	208	210	210				

- Notes:
- *1 Not isolation compatible.
 - *2 Not acquire the TÜV certification.
 - *3 Cassette type accessories are field mountable type. It can respond to adhesion attachment of a breaker as standard below 250A frame. (excluding UVT.)
 - *4 The values in parentheses apply to the circuit breakers with solderless terminals.
 - *5 The circuit breakers with busbar terminals have insulation barriers.
 - *6 Please consult us. (Models which are not UL or TÜV certified but can be locked in the ON and OFF positions are available.)
 - *7 Not available for 630A.

- Remarks:
1. The circuit breaker has the rated short-circuit breaking capacity specified in the shaded cells.
 2. The 3-pole circuit breakers can be used on single-phase circuits.

US UL Standard 489
UL File No.E167691 Body
UL File No.E108284 Accessories

Canada CSA Standard
C22.2 No.5

UL 489 Listed Earth Leakage Circuit Breakers (Harmonic Surge Ready)

4 Detailed Specifications

Frame (A)		50			100			125			250																										
Model		NV50-SVFU			NV100-CVFU			NV125-SVU			NV125-HVU			NV250-SVU			NV250-HVU																				
Image																																					
Rated current I _n (A) Rated ambient temperature 40°C		(5) (10) 15 20 30 40 50			60 (70) 75 (80) (90) 100			15 20 30 (40) 50 60 75 100			125			15 20 30 (40) 50 60 75 100			125			125 150 175 200 225			250			125 150 175 200 225			250								
Number of poles		2			3			3			3			3			3			3			3			3			3			3					
Phase line (*1)		1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W			3φ3W, 1φ2W					
Rated operational voltage AC V		UL 489 IEC 60947-2 EN 60947-2			120-240			120-240			120-480			120-480			120-480			120-480			120-480			120-480			120-480			120-480					
Rated current sensitivity ΔI _n mA		30 50			30 50 100			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable			30, 50, 100/200/500 selectable								
Pickup current, UL 1053		75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}			75% of I _{Δn}					
Max. operating time (s) at 5I _{Δn} (*4)		0.04			0.04			0.04			0.04			0.04			0.04			0.04			0.04			0.04			0.04			0.04					
Earth leakage indication system		Display window			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)			Mechanical type (button)					
Rated short-circuit breaking capacities (kA)		UL 489 CSA C22.2 No.5-02			AC			480V			-			-			-			-			-			-			-			-					
								240V			14			14			14			14			14			14			14			14					
								120V			14			14			14			14			14			14			14			14					
								440V			-			7.5/4			10/5			30/15			30/15			50/25			50/25			36/18			36/18		
								400V			-			10/5			10/5			30/15			30/15			50/25			50/25			36/18			36/18		
								230V			15/8			15/8			15/8			50/25			50/25			100/50			100/50			65/33			65/33		
								100V			15/8			15/8			15/8			50/25			50/25			100/50			100/50			65/33			65/33		
Rated impulse withstand voltage U _{imp} (kV)		4			6			6			6			6			6			6			6			6			6			6					
Suitability for isolation		Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible			Compatible					
Reverse connection (below 240VAC)		-			Possible			Possible			Possible			Possible			Possible			Possible			Possible			Possible			Possible			Possible					
Utilization category		A			A			A			A			A			A			A			A			A			A			A					
Pollution degree		2			2			2			2			2			2			2			2			2			2			2					
EMC environment condition (environment A or B)		A			A			A			A			A			A			A			A			A			A			A					
Overall dimensions (mm)					a			36			54			75			90			90			90			90			105			105			105		
					b			120			150			160			160			160			160			160			185			185			185		
					c			68			68			68			68			68			68			68			68			68			68		
					ca			90			90			90			90			90			90			92			92			92			92		
Mass of front-face type (kg)		0.4			0.5			0.9			1.2			1.2			1.2			1.2			1.2			1.8			1.8			1.8			1.8		
Installation and connections		Screw terminal (ANP-N)			Page			●			●			●			●			●			●			●			●			●					
		Solderless terminal (SL)			92			●			●			●			●			●			●			●			●			●			●		
		Bar (BAR)			●(*5)			●(*5, *6)			●(*6)			●(*6)			●(*6)			●(*6)			●(*6)			●(*6)			●(*6)			●(*6)					
		Power supply solderless load bar (SLBAR)			-			-			-			-			-			-			-			-			-			-			-		
Cassette-type accessories (*2)		Alarm switch (AL)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)		
		Auxiliary switch (AX)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)		
		Shunt trip (SHT)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)		
		Undervoltage trip (UVT)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)			●(*8)		
		With lead-wire terminal block (SLT)			114			-			-			-			-			-			-			-			-			-			-		
		Test button module (TBM)			115			●(*9)			-			-			-			-			-			-			-			-			-		
External accessories (*2)		Mechanical interlock (MI)			129			-			-			-			-			-			-			-			-			-			-		
		Handle lock device (HL)			127			●			●			●			●			●			●			●			●			●			●		
		External operating handle (F)			117			●			●			●			●			●			●			●			●			●			●		
		Terminal Large terminal cover (TC-L)			121			●			●			●			●			●			●			●			●			●			●		
		Terminal Small terminal cover (TC-S)			122			●(*3)			-			-			-			-			-			-			-			-			-		
		IEC 35mm rail mounting adapters			137			Standard accessory			Standard accessory			-			-			-			-			-			-			-			-		
CE marking		TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval			TUV approval					
CCC recognition		Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process			Recognition in process					
Automatic tripping device		Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic			Thermal-magnetic					
Trip button		Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped			Equipped					
Page of Characteristics and dimensions		198			200			202			202			202			206			206			206			206			206			206					

- Notes: *1 If using a 3-pole earth leakage circuit breaker as a 1-pole 2-phase device, connect the left and right poles and not the central pole.
 *2 These are different from general models in specifications. Consult us for the details.
 *3 The standard structure conforms to IP20 (finger protection).
 *4 The maximum operating time is 0.1 according to UL 1053.
 *5 The circuit breakers with busbar terminals have insulation barriers.
 *6 Circuit breakers for power supply solderless load screw terminal (SL/AMP-N) are available. In this case, a bar terminal is not provided on the load side.
 *7 Circuit breakers for 100 V AC do not have obtained CCC certificate.
 *8 These cassette type accessories can be installed by the customer. They can be installed with their side faces in close contact with circuit breakers (except NV50-SVFU and UVT).
 *9 Standard type is SLT equipped.

Remarks: 1. Products with rated current parenthesized are produced when an order is placed.

Rated operational voltage	Applicable circuit voltage	Available voltage range
120-240V (UL)	120/240V	66-264V
120-240-480V (UL)	120/240/480V	66-528V
240V (UL)	240V	132-264V
100-230V (IEC)	100/110/200/220/230V	85-253V
100-240V (IEC)	100/110/200/220/230/240V	85-264V
100-230-400-440V (IEC)	100/110/200/220/230/240/254/265/380/400/415/440V	85-484V
230-400-440V (IEC)	230/240/254/265/380/400/415/440V	195-484V

US UL Standard 489
 UL File No.E167691 Body
 UL File No.E108284 Accessories

Canada CSA Standard
 C22.2 No.144
 C22.2 No.5

MDU Breakers																				
Frame (A)		250				400				630				800						
Model		NF250-SEV with MDU NF250-HEV with MDU				NF400-SEP with MDU NF400-HEP with MDU				NF630-SEP with MDU NF630-HEP with MDU				NF800-SEP with MDU NF800-HEP with MDU						
Image																				
Rated current In (A) Rated ambient temperature 40°C		Adjustable 125-250A (12.5A Step)				Adjustable 200 225 250 300 350 400				Adjustable 300 350 400 500 600 630				Adjustable 400 450 500 500 600 700 800						
Number of poles		3		4		3		4		3		4		3		4				
Phase line		3φ3W, 1φ2W		3φ4W		3φ3W, 1φ2W		3φ4W		3φ3W, 1φ2W		3φ4W		3φ3W, 1φ2W		3φ4W				
Rated insulation voltage Ui (V)		690				690				690				690						
Rated short-circuit breaking capacities (kA)	IEC 60947-2 (Icu/Ics)	AC	690V		8/8		10/8		10/10		10/10		10/10		15/15		10/10		15/15	
			500V		18/18		30/23		30/30		50/50		30/30		50/50		30/30		50/50	
			440V		36/36		50/50		42/42		65/65		42/42		65/65		42/42		65/65	
			415V		36/36		70/70		45/45		70/70		45/45		70/70		45/45		70/70	
			400V		36/36		75/75		45/45		70/70		45/45		70/70		45/45		70/70	
			380V		36/36		75/75		45/45		70/70		45/45		70/70		45/45		70/70	
			230V		85/85		100/100		85/85		100/100		85/85		100/100		85/85		100/100	
			200V		85/85		100/100		85/85		100/100		85/85		100/100		85/85		100/100	
			100V		-		-		-		-		-		-		-		-	
Rated impulse withstand voltage Uimp (kV)		8				8				8				8						
Current		AC				AC				AC				AC						
Suitability for isolation		Compatible				Compatible				Compatible				Compatible						
Reverse connection (below 240VAC)		-				-				-				-						
Number of operating cycles		Without current		25,000		6,000		1,000		6,000		1,000		4,000		500				
Utilization category		A		B		A		B		A		B		A		B				
Pollution degree		3		3		3		3		3		3		3		3				
EMC environment condition (environment A or B)		A				A				A				A						
Overall dimensions (mm)			a	105	140	105	140	140	185	140	185	210	280	210	280	210	280	210	280	
	b	165				257				275				275						
	c	68				103				103				103						
	ca	92				155				155				155						
Mass of front-face type (Breaker mounting) (kg)		1.8	2.3	1.8	2.3	6.2	8	6.2	8	10.7	13.8	10.7	13.8	11.1	14.4	11.1	14.4			
MDU installation		Breaker mounting, Panel mounting (*1)				Breaker mounting, Panel mounting (*2)														
Installation conditions	Front	(F)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Rear (*3)	(B)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
Cassette-type accessories	Plug-in	(PM)	92	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Alarm switch	(AL)	102	●(*4)	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)		
	Auxiliary switch	(AX)	102	●(*4)	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)		
	Shunt trip	(SHT)	102	●(*4)	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)		
	Undervoltage trip	(UVT)	102	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	MDU transform AL, AX, AL + AX	(MG)	102	●(*4)	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)	●	●	●(*4)		
	With lead-wire terminal block	(SLT)	114	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Alarm contact output (*5)	(PAL)	116	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Pre-alarm output (*5)	(PAL)	116	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Trip-indicator	(TI)	116	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
External accessories (*2)	Electrical operation device (*6) (NFM)	133	Available only for the MDU panel mounting type				Available only for the MDU panel mounting type. Disavailable alarm contact output.													
	Mechanical interlock (MI) (*7)	129	●(*9)	-	●(*9)	-	●	●	●	●	●	●	●	●	●	●	●	●		
	Handle lock device	127	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	External operating handle	117	Available only for the MDU panel mounting type				Available only for the MDU panel mounting type													
	Terminal cover	121	●(*8)	●	●(*8)	●	●	●	●(*8)	●	●	●(*8)	●	●	●(*8)	●	●	●(*8)		
	Rear stud (B-ST)	94	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	Automatic tripping device	Electronic (effective value detection)				Electronic (effective value detection)				Electronic (effective value detection)				Electronic (effective value detection)						
	MDU measurement specifications	See. 36																		
Trip button	Equipped				Equipped				Equipped				Equipped							
Page of Characteristics and dimensions	212				214				216				216							

- Notes: *1 In the case of panel mounting, the panel holder plate, the screws and the MDU connection cable (2m) are packed as standard. The MDU connection cable of 0.5m, 3m, 5m and 10m can be specified when ordering. And dimension of the front panel drilling of the breaker is different between breaker mounting and panel mounting.
- *2 In the case of panel mounting, the panel holder plate, the nuts and the MDU connection cable (2m) are packed as standard. The MDU connection cable of 0.5m, 3m, 5m and 10m can be specified when ordering.
- *3 For 250AF breakers, the studs are packed as standard. For 400/630/800AF breakers, please specify the installation angle of the studs because it is installed to the breaker before shipping.
- *4 It can be installed to the breaker by each customer.
- *5 In the case of the breaker with alarm contact output, the module (terminal) is attached to the right side of the breaker and the control power (AC/DC 100-240V 50-60Hz 5VA) is needed. The Output function for alarm output of PAL can set "Self-holding" or "Auto-reset". Default setup is "Auto-reset".
- *6 For 250AF of electrical operation device, AL is used for the trip indication as standard. The breaker with alarm output contact is not available.
- *7 Not isolation compatible.
- *8 In the case of breaker mounting, the terminal cover is special type for MDU breaker.
- *9 Available only for the MDU panel mounting type.

Measuring Display Unit Breakers (Circuit Breakers with Measuring Display Unit)

● Three major features of Measuring Display Unit Breakers

1. Saving of space and labor for installation
2. Improved and diversified functions
3. Provision of total cost advantages

Measuring Display Unit Breakers with built-in VT and CT and Measuring Display Unit realize measurement, display and transmission of electric circuit information in small space with less installation and wiring work and provide total cost advantages.

The Measuring Display Unit Breakers full of functions in small bodies are suitable for monitoring and protection of electric circuits and maintenance of equipment. A wide variety of models applicable to various networks supports the customers' energy saving activities through detailed energy control as energy saving supporting devices.

● Simply realizing measurement and monitoring of electric circuits for supporting various types of energy saving control

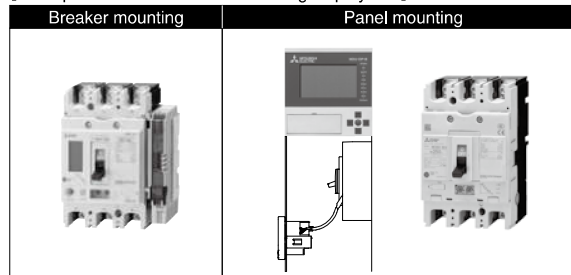
The circuit breakers measure and display the load current, line voltage, electric power, electric energy, harmonic current, leak current and power factor to realize detailed energy control. They support customers' energy saving control.

WS-V Series Measuring Display Unit Breakers

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

- The measuring display unit can be installed on the body or panel.

[Examples of installation of measuring display unit]



Note: The size of holes in the face board of the circuit breaker body varies depending on whether the measuring display unit is installed on the body or the panel.

◆ Model list

Model type	Type name
CC-Link communication	MDU-DP-C
Electric energy pulse output	MDU-DP-P
No transmission	MDU-DP-N

◆ Measuring Display Unit cable list

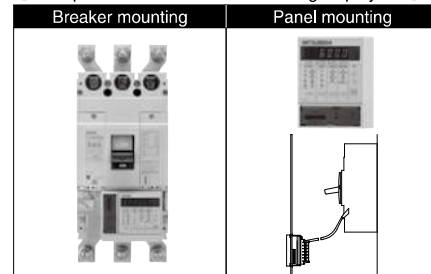
Type name	Cable length
MDU-DP-CB-2M	2m
MDU-DP-CB-3M	3m
MDU-DP-CB-5M	5m
MDU-DP-CB-10M	10m

W & WS Series Measuring Display Unit Breakers

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

- The measuring display unit can be installed on the body or panel.

[Examples of installation of measuring display unit]



◆ Model list

Model type	Type name	Remarks
CC-Link communication	MDU-AC ○○○	<ul style="list-style-type: none"> • The model names do not include ○○○.
Electric energy pulse output	MDU-AP ○○○	<ul style="list-style-type: none"> • When installing the Measuring Display Unit on the body, specify the A frame type in ○○○.
No transmission	MDU-AN ○○○	<ul style="list-style-type: none"> • For example, when the circuit breaker NF400-SEP with MDU and the Measuring Display Unit with CC-Link communication are combined, the model name is MDU-AC400. If 630A frame or 800A frame is used, specify 630 or 800 in ○○○. • When installing the Measuring Display Unit on the panel, specify the cable length (0.5 m, 2 m, 3 m, 5 m or 10 m) in ○○○. • For example, when the Measuring Display Unit with CC-Link communication is installed on the panel with a 3-m cable, the model name is MDU-AC-PANEL 3M.

● Specifications for Measuring Display Unit (1)

The measurement and display items vary depending on the model or frame A.
(For the measurement accuracy, please refer to page 39.)

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

Table 2-1

Measurement and memory items (accuracy) (*1) (*2)		Model	Display	Storage (*3)	With CC-Link communication	Remarks
Load current (±1.0%)	Present value	Each phase	●	—	●	
		General (average value) (*5)	●	—	●	
	Present value of demand (*4)	Each phase	●	—	●	
		Phase with max. value	●	—	●	
	Max. demand value among all phases		●	●	●	
	Time of occurrence of max. demand value among all phases		●	●	●	
Line voltage (±1.0%)	Present value	Between each lines	●	—	●	
		General (average value) (*5)	●	—	●	
	Max. value among all lines		●	●	●	
	Time of occurrence of max. value among all lines		●	●	●	
Harmonic current (±2.5%)	Present value	Fundamental wave of each phase	●	—	●	
		Each order of each phase	●	—	●	
	General of each phase (*6)		●	—	●	
	Max. value of fundamental wave among all phases		●	●	●	
	Time of occurrence of max. value of fundamental wave among all phases		●	●	—	
	Max. value in each order of each phase		●	●	●	
	Time of occurrence of max. value in each order of each phase		●	●	●	
	Demand value (*4)	General of each phase (*6)	●	—	●	
		General max. value among all phases	●	●	●	
	Time of occurrence of general max. value among all phases		●	●	●	
General distortion factor of each phase		●	—	—		
Content in each order of each phase		●	—	—		
Electric power (±1.5%)	Present value		●	—	●	
	Demand value (*4)	Present value	●	—	●	
		Max. value	●	●	●	
Time of occurrence of max. value		●	●	●		
Reactive power (±2.5%)	Present value		●	—	●	
	Demand value (*4)	Present value	●	—	●	
		Max. value	●	●	●	
Time of occurrence of max. value		●	●	●		
Electric energy (±2.0%) (*7)	Integrated value		●	—	●	Value accumulated from previous reset to present
	Amount for last 1 hour		●	—	●	
	Max. value of amount for 1 hour		●	●	●	
	Time of occurrence of max. value of amount for 1 hour		●	●	●	
Reactive energy (±3.0%) (*7)	Integrated value		●	—	●	Value accumulated from previous reset to present
	Amount for last 1 hour		●	—	●	
	Max. value of amount for 1 hour		●	●	●	
	Time of occurrence of max. value of amount for 1 hour		●	●	●	
Cause of fault (*8)	Fault current (accuracy: ±15%)		●	●	●	Information on fault after previous reset or last fault, and cause of fault (continuously monitored)
	Cause of fault		●	●	●	
Power factor (±5.0%)	Present value		●	—	●	
	Max. value		●	●	●	
	Time of occurrence of max. value		●	—	—	
Frequency (±2.5%)	Present value		●	—	●	
Alarm of circuit breaker (*9)	PAL, OVER, IDM_AL, ILA_AL, IUB_AL, Neutral line open phase alarm		●	—	●	The PAL functions are enabled when the MDU breaker with PAL module (option) is used. The neutral line open phase alarm is given only on the display.
	Tripping state of circuit breaker (AL)		—	—	—	On installation of alarm switch for transmission with Measuring Display Unit (option)
	ON/OFF state of circuit breaker (AX)		—	—	—	On installation of auxiliary switch for transmission with Measuring Display Unit (option)
State of circuit breaker	Number of times of tripping of circuit breaker		—	—	—	On installation of alarm switch for transmission with Measuring Display Unit (option)
	Number of times of opening and closing of circuit breaker		—	—	—	On installation of auxiliary switch for transmission with Measuring Display Unit (option)
	Time setting		●	●	●	Initial setting and resetting after power failure are necessary (no power failure compensation)
Default settings	Demand time limit setting (*4)		●	●	●	By default, the demand time limit is 2 min. It can be set in the range from 0 to 15 min in 1-min steps.
	IDM_AL (current demand alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 50 to 100% (1% step) Demand time limit: 1 to 10 min (1-min step), 15, 20, 25 and 30 min
	ILA_AL (current open phase alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 10%, fixed (no setting) Operating time: 30 sec (no setting)
	IUB_AL (unbalanced current alarm)		●	●	●	By default, the function is off. The parameters can be set in the following ranges. Function: ON/OFF Pickup current: 30%, fixed (no setting) Operating time: 30 sec (no setting)
	Neutral line open phase alarm		●	●	●	30 When the single-phase 3-wire type is set, the function is turned on. Rated operating overvoltage: 135 V AC (no setting) Operating time: 1 sec (no setting)
	Phase switching setting		●	●	●	Default: No phase switching
	Alarm retention (self-retention or automatic reset) setting		●	●	●	Default: Automatic reset
	Phase and wire type		●	●	●	Default: 3-phase 3-wire
	Electric energy arbitrary setting		●	●	●	
	Reactive energy arbitrary setting		●	●	●	
Display direction		●	●	●	Default: Vertical One of vertical, horizontal 1 and horizontal 2 can be selected.	

Notes: *1 The term "each phase" used for load current and harmonic current refers to phase 1, 2, 3 or N. However, the phase N is provided only on 4-pole circuit breakers.
The term "between each phase" used for line voltage refers to between phases 1 and 2, 2 and 3, 3 and 1, 1 and N, 2 and N or 3 and N. However, voltage between phases 1 and N, 2 and N and 3 and N is applicable only on 4-pole circuit breakers.
These circuit breakers measure the values every 0.25 sec. Therefore, even when a low order circuit breaker operates, operating current may not be measured.
*2 Each maximum value is the largest value among values obtained from the start of operation (after the previous reset) to the present.
*3 The integrated value of electric energy and the integrated value of reactive energy are stored upon occurrence of power failure and every 30 minutes, the fault current and the cause are stored upon occurrence of fault, the set values are stored when they are set, and other values are stored every 30 minutes in the nonvolatile EPROM.
*4 The demand time limit cannot be set individually. It is common to the items.
*5 The average values of load current and line voltage are calculated as shown below when the phase and wire type is specified.

Phase and wire type	Average present value of current	Average present value of voltage
Single-phase 2-wire	Average present value of current = phase 3 current	Average present value of voltage = voltage between phases 2 and 3
Single-phase 3-wire	Average present value of current = (phase 1 current + phase 3 current)/2	Average present value of voltage = (voltage between phases 1 and 2 + voltage between phases 2 and 3)/2
3-phase 3-wire	Average present value of current = (phase 1 current + phase 2 current + phase 3 current)/3	Average present value of voltage = (voltage between phases 1 and 2 + voltage between phases 2 and 3 + voltage between phases 3 and 1 phases)/3

*6 Sum of values of harmonic components in third to 19th orders except fundamental wave component
*7 The reverse power is not measured.
*8 If the upper limit of the fault current measurement range (rated current 125 to 250 A (adjustable): 4000 A, rated current 50, 60, 75, 100, 125 A (fixed): 2000 A) is exceeded when overload or short circuit fault occurs, the cause of the fault may not be displayed, and the fault current may not be measured. For fault current, display of cause of fault and measurement of fault current are enabled when the AL for transmission with the Measuring Display Unit (option) is installed.
*9 When the alarm retention mode has been set to Automatic reset, the alarm display on the Measuring Display Unit will be reset automatically. When the alarm retention mode is Self-retention, the alarm display will be self-retained. In the self-retention mode, the display can be reset through the alarm reset operation (collective reset). OVER will be automatically reset regardless of the mode setting.

● Specifications for Measuring Display Unit (1)

The measurement and display items vary depending on the model or frame A.
(For the measurement accuracy, please refer to page 40.)

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

Table 2-2

Measurement and memory items (accuracy) (*3)	Model	MDU Display	Storage (*1)	Electric energy with pulse output Pulse output (*1)	With CC-Link communication	Remarks
Load current (±2.5%) Present value of each phase Demand value of each phase Average present value (*11) Max. demand value (general value) (*4) Time of occurrence of max. value (year, month, day, hour, minute)	●	●	—	—	●	Time limit: 0 to 15 min, changeable (Same as the present value when 0 min is specified) } Max. demand value after previous reset
	●	—	—	—	●	
	●	—	—	—	●	
	●	●	—	—	●	
	—	●	—	—	●	
Line voltage (±2.5%) Present value between each phases Average present value (*11) Max. value (general value) (*4) Time of occurrence of max. value (year, month, day, hour, minute)	●	—	—	—	●	} Max. value after previous reset (not demand value)
	●	—	—	—	●	
	●	●	—	—	●	
	—	●	—	—	●	
Harmonic current (±2.5%) Current value in 3rd, 5th, 7th ... 19th orders of each phase Max. value in 3rd, 5th, 7th ... 19th orders (general value) (*4) Time of occurrence of max. value (year, month, day, hour, minute)	●	—	—	—	●	} Max. value after previous reset (not demand value)
	●	●	—	—	●	
	●	—	—	—	●	
	—	●	—	—	●	
Electric power (±2.5%) Current value (also reverse power is measured) Demand value (also reverse power is measured) Max. demand value Time of occurrence of max. value (year, month, day, hour, minute)	●	—	—	—	●	Time limit: 0 to 15 min, changeable (Same as the present value when 0 min is specified) } Max. demand value after previous reset
	●	—	—	—	●	
	●	●	—	—	●	
	—	●	—	—	●	
Electric energy (±2.5%) Electric energy (integrated value) (*5) Electric energy per time (*5) Max. value of electric energy per time (*5) Time of occurrence of max. value (year, month, day, hour, minute)	●	●	—	—	●	Value accumulated from previous reset to present Amount for 1 hour from hour to hour on built-in clock } Max. demand value after previous reset
	●	—	—	—	●	
	●	●	—	—	●	
	—	●	—	—	●	
Cause of fault Fault current (accuracy: ±15%) (*11)	●	●	—	—	●	Information on fault after previous reset or last fault, and cause of fault (continuously monitored)
	●	●	—	—	●	
Power factor (±5%) Present value	●	—	—	—	●	
Alarm of circuit breaker PAL, OVER (*6) (*11)	● LED on	—	—	—	●	
State of circuit breaker Tripping state of circuit breaker (AL) ON/OFF state of circuit breaker (AX)	—	—	—	—	●	When alarm switch for transmission with Measuring Display Unit (option) is installed When auxiliary switch for transmission with Measuring Display Unit (option) is installed
	—	—	—	—	●	
Default settings	Time setting	—	—	—	●	Initial setting and resetting after power failure are necessary (no power failure compensation).
	Demand time limit setting (*7)	●	●	—	●	Default: 2 min Setting in 1-min steps in range from 0 to 15 min
	PAL pickup current setting * Setting on circuit breaker body The Measuring Display Unit does not have the setting function.	●	●	—	●	Default: 100% Setting in 5% steps in range from 70 to 100% Default setting on breaker body is 70% unless otherwise specified.
	Pulse unit setting	●	●	—	—	Default: 1 kWh/pulse Setting to 1 kWh, 10 kWh, 100 kWh, 1000 kWh or 10000 kWh
	Phase switching setting	●	●	—	●	Default: No phase switching
	Alarm retention (self-retention or automatic reset) setting	●	●	—	●	Default: Automatic reset

Notes: *1 The electric energy (integrated value) is stored upon occurrence of power failure and every 2 hours, the fault current and the cause are stored upon occurrence of fault, the demand time limit, EPAL sensitivity current, PAL pickup current, pulse unit, alarm retention and phase switching settings are stored when they are set, and other values are stored every 2 hours in the nonvolatile E²PROM.
Each maximum value is the largest value among values obtained from the start of operation (after the previous reset) to the present.
*2 Every time the electric energy is integrated in the pulse unit (the unit can be set to 1 kWh, 10 kWh, 100 kWh, 1000 kWh or 10000 kWh), a pulse is output. Counting can be performed with a PLC.
*3 The term "each phase" used for load current and harmonic current refers to phase 1, 2, 3 or N. However, the phase N is provided only on 4-pole circuit breakers.
The term "between each phase" used for line voltage refers to between phases 1 and 2, 2 and 3, 3 and 1, 1 and N, 2 and N or 3 and N. However, voltage between phases 1 and N, 2 and N and 3 and N is applicable only on 4-pole circuit breakers.
The electric energy data is 6-digit data of up to 999999 kWh. The voltage and harmonic current are 3-digit data, and others are 4-digit.
These circuit breakers measure the values every 0.25 sec. Therefore, even when a low order circuit breaker operates, operating current may not be measured.
*4 Each general value indicates the value only of the phase with the maximum value.
*5 The electric energy is not measured in the case of reverse power flow.
*6 When the alarm retention mode has been set to Automatic reset, the PAL alarm LED display on the Measuring Display Unit front panel will be reset automatically. When the alarm retention mode is Self-retention, the alarm display will be self-retained. In the self-retention mode, the display can be reset through alarm reset operation (collective reset). OVER will be automatically reset regardless of the mode setting.
*7 The demand time limit cannot be set individually. It is common to the items.
*8 Sum of values of harmonic components in third to 19th orders except fundamental wave component.
*9 The average present value of load current is the average value of current among phases 1, 2 and 3 (the current of the phase N is not included even in the case of a 4-pole circuit breaker). When the circuit breaker is used on a single-phase 3-wire circuit, the calculated value is displayed. However, ignore it. The average present value of line voltage is the average value of voltages between phases 1 and 2, 2 and 3 and 3 and 1 (the voltages between phases 1 and N, 2 and N and 3 and N are not included in the case of a 4-pole circuit breaker).
*10 Setting at the pre-alarm current I_p (which can be set in the range from 70 to 100% of the rated current I_n in 5% steps) on the circuit breaker body. The Measuring Display Unit does not have the setting function.
*11 The operating time of PAL is shown below.

PAL	Same as pre-alarm operating time T _p on circuit breaker body
-----	---

● Specifications for Measuring Display Unit (2)

Applicable models
NF250-SEV with MDU, NF250-HEV with MDU

Table 2-3

Item	Specification
Data updating cycle	250 ms (harmonic current: 2 s)
Tolerances	Current and voltage: ±1.0% (to rating input)
	Electric power: ±1.5% (to rating input)
	Reactive power: ±2.5% (to rating input)
	Harmonic current: ±2.5% (to rating input)
	Power factor: ±5%
Demand time limit setting range	Frequency: ±2.5%
	Electric energy: ±2.0% (voltage 100 V to 440 V, range from 5 to 100% of current rating, power factor 1)
	Reactive energy: ±3.0% (voltage 100 V to 440 V, range from 10 to 100% of current rating, power factor 0)
Rated input	Fault current: ±15% (*1)
	0 to 15 min (1-min steps)
	Voltage circuit (1φ2W, 3φ3W)
	Voltage circuit (1φ3W)
	Voltage circuit (3φ4W)
Power failure compensation	440 V (only 4-pole breakers applicable to 3φ4W)
	Load current/harmonic current: 250 A
	Frequency
Clock accuracy	50 Hz/60 Hz (automatic discrimination of frequency)
	(1) Wh (integrated value)
	(2) Max. value
	(3) Setting data
External dimensions (unit: mm)	Stored in EEPROM (nonvolatile memory)
	* Wh and varh are stored upon occurrence of power failure and every 30 min.
Control power supply	Max. value is stored every 30 min. Setting data are stored when they are set.
	Clock
Other functions	No power failure compensation
	Approx. 1 min/month
External dimensions (unit: mm)	See Characteristics and Dimensions.
Control power supply	Compatible with 100 to 240 V AC/DC, 50/60 Hz (allowable voltage range: 85% to 110%), 12 VA (*2)
Other functions	Function for switching phases to be measured to 1-3 and 3-1
	PAL alarm, self-retention/automatic reset setting function (*3)
	Function for counting number of times of opening and closing of circuit breaker body (*4)

Notes: *1 The measurement of fault current of load is enabled when the AL switch for transmission with Measuring Display Unit (option) is installed in the Measuring Display Unit Breaker body.
 *2 When the MDU unit control power is turned on, a rush current transitionally flows (maximum rush current: 2A, energizing time: 1ms (240V AC))
 *3 The PAL functions are enabled when the MDU breaker with PAL module (option) is used.
 *4 The function is enabled when the AX switch for transmission with Measuring Display Unit (option) is installed in the Measuring Display Unit Breaker body.

● Network Specifications for Measuring Display Unit

[Electric energy pulse output]

Table 2-4

Item	Specification
Output elements	Solid state relay (SSR), no voltage a contact (Ca and Cb terminals: no polarity)
Contact capacity	Compatible with 24V DC and 100 to 200 V AC, 20 mA
Output pulse unit	1, 10, 100, 1000 and 10000 kWh/pulse (settable)
Output pulse width	0.35 to 0.45 s
Max. wiring length	100m

[CC-Link communication]

Table 2-5

Item	Specification																	
Communication speed	10M/5M/2.5M/625k/156kbps																	
Communication method	Broadcast polling method																	
Synchronization method	Frame synchronization method																	
Encoding method	NRZI																	
Transmission format	Conforming to HDLC																	
Number of occupied stations	Remote device occupying 1 station																	
Number of connected units	Meet the following conditions.																	
	When a system consists only of Measuring Display Units, up to 42 units can be connected.																	
	Condition 1 for number of connected units $\lfloor (1 \times a) + (2 \times b) + (3 \times c) + (4 \times d) \rfloor \leq 64$ a: Number of units occupying 1 station b: Number of units occupying 2 stations c: Number of units occupying 3 stations d: Number of units occupying 4 stations																	
	Condition 2 for number of connected units $\lfloor (16 \times A) + (54 \times B) + (88 \times C) \rfloor \leq 2304$ A: Number of units at 1 remote I/O station ≤ 64 B: Number of units at remote device station ≤ 42 C: Number of units at local station ≤ 26																	
Station number	Setting in range from 1 to 64 (Set the station number without fail.)																	
CC-Link version	CC-Link Ver.1.10																	
Max. total extension cable length and cable length between stations																		
	Cables applicable to CC-Link Ver. 1.10 (with use of 110-ohm terminal resistance)																	
	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>Communication speed</td> <td>156kbps</td> <td>625kbps</td> <td>2.5Mbps</td> <td>5Mbps</td> <td>10Mbps</td> </tr> <tr> <td>Cable length between stations</td> <td colspan="5">0.2 m or more</td> </tr> <tr> <td>Max. total extension cable length</td> <td>1200m</td> <td>900m</td> <td>400m</td> <td>160m</td> <td>100m</td> </tr> </table>	Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps	Cable length between stations	0.2 m or more					Max. total extension cable length	1200m	900m	400m	160m
Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps													
Cable length between stations	0.2 m or more																	
Max. total extension cable length	1200m	900m	400m	160m	100m													
Connecting cable	Cables applicable to CC-Link Ver. 1.10 (shielded 3-core twisted pair cables) * Cables applicable to Ver. 1.10 supplied by different manufacturers can be used simultaneously.																	

Note: For more information, visit the website of CC-Link Partner Association (HYPERLINK "<http://www.cc-link.org/>").

● Specifications for Measuring Display Unit (2)

Applicable models
NF400-SEP with MDU, NF400-HEP with MDU, NF630-SEP with MDU, NF630-HEP with MDU, NF800-SEP with MDU, NF800-HEP with MDU

Table 2-6

Item	Specification	
Data updating cycle	250 ms (harmonic current: 2 s)	
Tolerances	Current, voltage and Electric power: ±2.5% (to rating input) Power factor: ±5% Electric energy: ±2.5% (voltage 100 V to 440 V, range from 5 to 100% of current rating, power factor 1) Fault current: ±15%	
Demand time limit setting range	0 to 15 min (1-min steps)	
Rated input	Voltage circuit (1φ2W, 3φ3W)	
	Voltage circuit (1φ3W)	440 V (only 4-pole breakers applicable to 3φ4W)
	Voltage circuit (3φ4W)	
	Current circuit	Load current/harmonic current: 100 A/225 A/400 A/600 A/800 A (Automatic discrimination. Determined based on A frame of circuit breaker. 100 A when rated current of 225 A frame is 100 A or less) Leakage current: 500 mA
	Frequency	50 Hz/60 Hz (automatic discrimination of frequency)
Power failure compensation	(1) Wh (integrated value)	Stored in EEPROM (nonvolatile memory)
	(2) Max. value	* Wh is stored upon occurrence of power failure and every 2 hours
	(3) Setting data	The max. value is stored every 2 hours. The setting data is stored when it is set.
Clock	No power failure compensation	
Clock accuracy	Approx. 1 min/month	
External dimensions (unit: mm)	W×D×H: 90×75×30	
Control power supply	Compatible with 100 to 240 V AC/DC, 50/60 Hz (allowable voltage range: 85% to 110%), 12 VA (*1)	
Other functions	Function for switching phases to be measured to 1-3 and 3-1 ECA/PAL alarm, self-retention/automatic reset setting function	

Note: *1 When the MDU unit control power is turned on, a rush current transitionally flows (maximum rush current: 2A, energizing time: 1ms (240V AC))

● Network Specifications for Measuring Display Unit

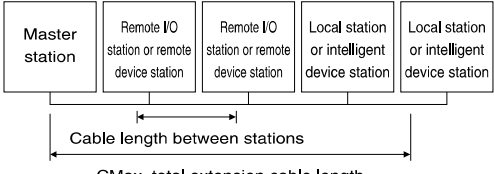
[Electric energy pulse output]

[CC-Link communication]

Table 2-7

Item	Specification
Output elements	Solid state relay (SSR), no voltage a contact (Ca and Cb terminals: no polarity)
Contact capacity	Compatible with 24V DC and 100 to 200 V AC, 20 mA
Output pulse unit	1, 10, 100, 1000 and 10000 kWh/pulse (settable)
Output pulse width	0.35 to 0.45 s
Max. wiring length	100m

Table 2-8

Item	Specification																		
Communication speed	10M/5M/2.5M/625k/156kbps																		
Communication method	Broadcast polling method																		
Synchronization method	Frame synchronization method																		
Encoding method	NRZI																		
Transmission format	Conforming to HDLC																		
Number of occupied stations	Remote device occupying 1 station																		
Number of connected units	Meet the following conditions. When a system consists only of Measuring Display Units, up to 42 units can be connected. Condition 1 for number of connected units $(1 \times a) + (2 \times b) + (3 \times c) + (4 \times d) \leq 64$ a: Number of units occupying 1 station b: Number of units occupying 2 stations c: Number of units occupying 3 stations d: Number of units occupying 4 stations Condition 2 for number of connected units $(16 \times A) + (54 \times B) + (88 \times C) \leq 2304$ A: Number of units at 1 remote I/O station ≤ 64 B: Number of units at remote device station ≤ 42 C: Number of units at local station ≤ 26																		
Station number	Setting in range from 1 to 64 (Set the station number without fail.)																		
CC-Link version	CC-Link Ver. 1.10																		
Max. total extension cable length and cable length between stations	 <p>Cables applicable to CC-Link Ver. 1.10 (with use of 110-ohm terminal resistance)</p> <table border="1"> <thead> <tr> <th>Communication speed</th> <th>156kbps</th> <th>625kbps</th> <th>2.5Mbps</th> <th>5Mbps</th> <th>10Mbps</th> </tr> </thead> <tbody> <tr> <td>Cable length between stations</td> <td colspan="5">0.2 m or more</td> </tr> <tr> <td>Max. total extension cable length</td> <td>1200m</td> <td>900m</td> <td>400m</td> <td>160m</td> <td>100m</td> </tr> </tbody> </table> <p>When the Measuring Display Unit is installed on the panel, the terminal block on the panel mounting plate and the terminal block on the Measuring Display Unit are connected with a CC-Link cable having a one-way length of 15 cm and an entire length of 30 cm. When connecting the unit in consideration of the following three points. (1) The one-way length of the CC-Link cable, 15 cm, is included in the distance between stations. (2) The entire length of the CC-Link cable, 30 cm, is included in the maximum transmission distance (total extension distance).</p>	Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps	Cable length between stations	0.2 m or more					Max. total extension cable length	1200m	900m	400m	160m	100m
Communication speed	156kbps	625kbps	2.5Mbps	5Mbps	10Mbps														
Cable length between stations	0.2 m or more																		
Max. total extension cable length	1200m	900m	400m	160m	100m														
Connecting cable	Cables applicable to CC-Link Ver. 1.10 (shielded 3-core twisted pair cables) * Cables applicable to Ver. 1.10 supplied by different manufacturers can be used simultaneously.																		

Note: For more information, visit the website of CC-Link Partner Association (HYPERLINK "<http://www.cc-link.org/>").

● Cautions when Using Measuring Display Unit Breakers (common instructions)

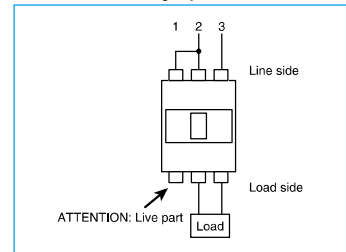
Measuring accuracy

- (1) The accuracy of measurement of current or voltage is indicated as the percentage of error to the rated current or voltage for measurement by the Measuring Display Unit.
The measurement rated current is the maximum rated current of each ampere frame. For W & WS Series Measuring Display Unit Breakers, the accuracy is the max. rated current $\times \pm 2.5\%$. For WS-V Series Measuring Display Unit Breakers, the accuracy is the max. rated current $\times \pm 1\%$.
(For example, when the rated current of NF630-SEP with Measuring Display Unit is 350 A, the measurement rated current is 630 A, and the current accuracy is $630 \text{ A} \times \pm 2.5\% = \pm 15 \text{ A}$.)
* The measurement rated voltage is 440 V. (Common to all A frames)
When the current is less than 1.0% of the measurement rated current in the case of WS-V Series Measuring Display Unit Breakers or less than 2.0% of the measurement rated current in the case of W & WS Series Measuring Display Unit Breakers or when the voltage is less than 5.0% of the measurement rated voltage in the case of WS-V Series Measuring Display Unit Breakers or less than 2.0% of the measurement rated current in the case of W & WS Series Measuring Display Unit Breakers, the current or voltage is cut off, and zero is displayed.
- (2) When the current is cut off, the current is displayed as 0 A. However, if the current is 0.4% or more of the measurement rated current, the electric energy is measured.
- (3) The accuracy of power factor is the percentage to electrical angle of 90°. A power factor of 50% or less is displayed as a reference value.
- (4) The accuracy of electric energy is $\pm 2.0\%$ of the true value in the case of WS-V Series Measuring Display Unit Breakers and $\pm 2.5\%$ of the true value in the case of W & WS Series Measuring Display Unit Breakers in the range of measurement rated voltage (100 V to 440 V) \times current (measurement rated current of 5 to 100%).

How to use Measuring Display Unit Breaker on single-phase 2-wire circuitry

- (1) Connect the breaker as shown in the right figure.
The phase 1 on the load side is charged. Insulate it.
As measurement data, use the current of the phases 2 and 3 and the voltage between the phases 2 and 3.
Although the current of the phase 1 and the voltage between the phases 1 and 2 and the phases 3 and 1 are measured, ignore the measurements. The Measuring Display Unit is designed for 3-phase 3-wire and single-phase and 3-wire circuits.
On W & WS Series Measuring Display Unit Breakers, the average values of load current and line voltage are calculated from the values of the phases 1, 2 and 3 (between the phases). Ignore these measurement values.
Also when the breaker is used on a single-phase 3-wire circuit, ignore these values.
When using any WS-V Series Measuring Display Unit Breaker, set the phase and wire type.

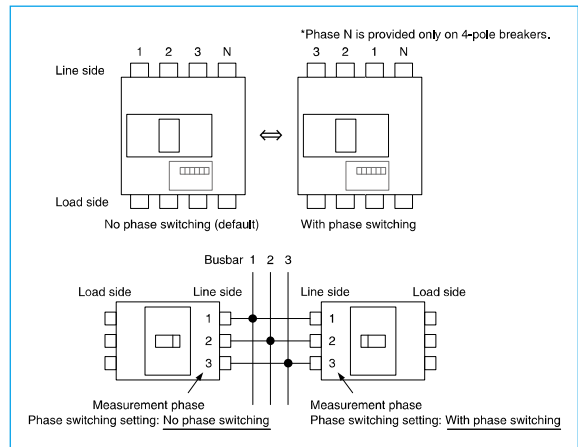
Connection on single-phase 2-wire circuit



Phase sequence of Measuring Display Unit Breaker

The phase sequence of Measuring Display Unit Breaker can be set by using the phase switching function as shown below.
When the breaker is installed vertically with the power supply side upward (see the right figure), the phase sequence is set as stated below.
No phase switching: 1, 2, 3 and N from the left (default)
With phase switching: 3, 2, 1, and N from the left
Set the phase sequence in accordance with the installation and wiring methods.

- Notes (1) The phase N is provided only on 4-pole circuit breakers.
(2) Note that the position of the phase N is unchanged regardless of the phase switching setting.



Reverse connection of Measuring Display Unit Breaker

The Measuring Display Unit Breakers cannot be connected with the power supply and load sides set reversely.

Installation of Measuring Display Unit Breaker in close contact

The Measuring Display Unit Breakers must not be installed in close contact.

- (1) In the case of 400, 630 or 800A frame, install the breaker body securing a wiring space of 30 mm or more on the right side of the breaker to connect the connecting cables and fitting the connecting cable connectors.
- (2) In the case of WS-V Series Measuring display Unit Breaker, install the breaker body securing a wiring space of 40 mm or more on the right side of the breaker to connect the connecting cables.

● Cautions when using Measuring Display Unit Breaker (For Measuring Display Unit)

Transmission method

- (1) One of No transmission, With pulse output and With CC-Link communication should be specified.
- (2) W & WS Series Measuring Display Unit Breaker with CC-Link communication cannot be manufactured for installing the Measuring Display Unit on the breaker body.
- (3) When With transmission is selected, data which can be transmitted depends on the function of the Measuring Display Unit Breaker body. The transmission options cannot be installed or changed later. Specify the options when issuing the initial order.
- (4) For the maximum number of connected units and transmission distance for each transmission type, see the following tables.
 - <WS-V Measuring Display Unit Breakers>
Tables 2-4 and 2-5
 - <W & WS Measuring Display Unit Breakers>
Tables 2-7 and 2-8

2

5 Detailed Specifications

Installation of Measuring Display Unit

- (1) When the installation of Measuring Display Unit on panel has been specified, the breaker will come with the panel mounting parts, mounting screws and 2-m connecting cable (standard).
(The 0.5-, 3-, 5- or 10-m connecting cable can be specified.)
- (2) If the installation position of the Measuring Display Unit is changed from the panel to the body or vice versa, the Measuring Display Unit and the breaker body must be returned to the manufacturer for modification.

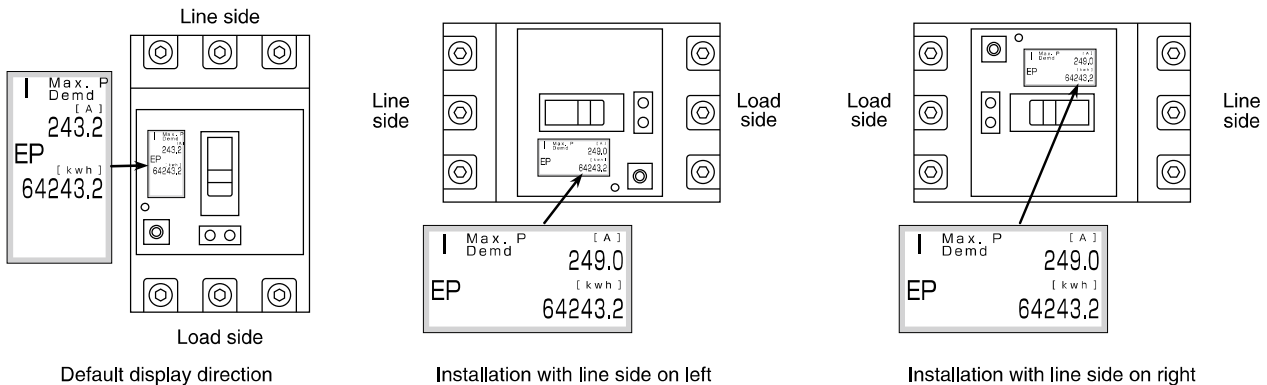
Measuring Display Unit Breaker with CC-Link communication (W & WS Series Measuring Display Unit Breakers)

- (1) If you intend to use the circuit breaker with its pane out on the face board, specify the installation on panel.

● Change of display direction for breaker mounting

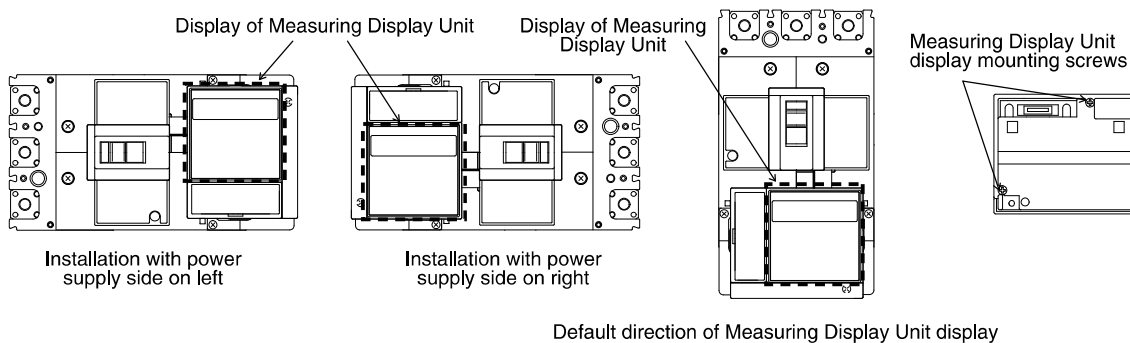
<WS-V Series Measuring Display Unit Breaker>

- (1) When installing the Measuring Display Unit on the breaker body installed in the horizontal direction, the direction of the display can be changed according to the installation direction.
- (2) The display direction is set on the display unit.









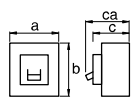


<W & WS Series Measuring Display Unit Breaker>

- (1) When installing the Measuring Display Unit on the breaker body installed in the horizontal direction, the direction of the display of Measuring Display Unit can be changed for ease in reading according to the installation direction.
- (2) Remove the screws on the rear panel of the Measuring Display Unit, and change the direction according to the installation direction.




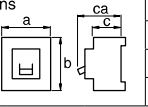


MEMO


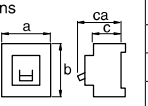
Lined area for writing the memo content.

Model		BH			BH-P			
Frame (A)		70	100	100	70	100	100	
Image								
Number of poles		1	2	3	1	2	3	
Rated current (A) at ambient temperature 40°C		70	70, 100	70, 100	70	70, 100	70, 100	
Rated voltage (V)		AC	230/400			230/400		
		DC	125			125		
Rated short circuit capacity (kA)	IEC 60898-1	AC230/400V	3	-	-	3	-	
		AC400V	-	3	-	-	3	
	-	DC125V	1			1		
Instantaneous tripping		Type C (5 In <, ≤10 In)						
Dimensions (mm)		a	25	50	75	25	50	75
		b	95			74		
		c	57.5			60.5		
		ca	77.5			79		
Mass (kg)		0.16	0.32	0.48	0.13	0.26	0.38	
Connection (*1)		Clamp terminal			Plug-in (line) Clamp (load)			
								
Automatic tripping device		Thermal, magnetic						
Optional accessories	Terminal cover	●			-			
	Mounting plate	●			-			
	Terminal base	-			●			
	Lock cover	●			●			
Approved by		-	LR, GL, NK	-	-	LR, BV, AB, GL, NK	-	

Notes: *1 If required solderless terminal can be supplied.
(BH : Line and Load side, BH-P : Load side only)


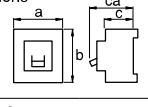
Model		BH-D6					BH-D10				BH-DN			
Image														
Number of poles [P]		1	2	3	4(3+N) ^{*1}	2(1+N) ^{*1}	1	2	3	4(3+N) ^{*1}	2(1+N) ^{*1}			
Instantaneous tripping		Type B, C, D ^{*2}					Type B, C, D ^{*2}				Type C ^{*2}			
Rated insulation voltage U_i [V]		440					440				230			
Rated current I_n [A] at ambient temperature 30°C		0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63					0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63		6, 10, 16, 20	
Rated short-circuit capacity [kA] (I _{cn})	IEC 60898-1 AC	230V	6	-			6	10	-			4.5		
		230/400V	6	-			-	10	-			-		
		400V	-	6			-	-	10			-		
Number of operating cycles	Without current		8,000					10,000				20,000		
	With current		8,000					10,000				20,000		
Dimensions [mm]		a	18	36	54	72	36	18	36	54	72	18		
		b	87					87				88		
		c	44					44				44		
		ca	70					70				70		
		Type of overcurrent release	Thermal-magnetic					Thermal-magnetic				Thermal-magnetic		
Mounting		IEC35mm rail					IEC35mm rail				IEC35mm rail			
Applicable wire size		1 to 25mm ²					1 to 25mm ²				1 to 10mm ²			
Weight [kg]		0.15	0.3	0.45	0.55	0.25	0.15	0.3	0.45	0.55	0.12			
Mass optional accessories	Alarm switch (AL)		●					●				-		
	Auxiliary switch (AX)		●					●				-		
	Shunt trip (SHT)		●					●				-		
Terminal connection		Solderless					Solderless				Solderless			
Based on standard		IEC 60898-1					IEC 60898-1				IEC 60898-1			
CE marking		EN 60898-1 : Self-declaration					EN 60898-1 : Self-declaration				EN 60898-1 : Self-declaration			
CCC		GB 10963.1					GB 10963.1				GB 10963.1			

Notes: *1 N pole is a switched neutral pole (without overcurrent release device).
*2 Type B (3 In <, ≤ 5 In), Type C (5 In <, ≤ 10 In), Type D (10 In <, ≤ 20 In)

Model		BH-D10 (For DC)	
Image			
Number of poles [P]		1	2
Instantaneous tripping		Type B, C ^{*3}	
Rated insulation voltage U_i [V]		250	
Rated current I_n [A] at ambient temperature 30°C		0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit capacity [kA] (I _{cn})	IEC 60898-2 DC	125V	10
		250V	-
Number of operating cycles	Without current		8,000
	With current		4,000
Dimensions [mm]		a	18
		b	87
		c	44
		ca	70
		Type of overcurrent release	Thermal-magnetic
Mounting		IEC35mm rail	
Applicable wire size		1 to 25mm ²	
Weight [kg]		0.15	0.3
Mass optional accessories	Alarm switch (AL)		●
	Auxiliary switch (AX)		●
	Shunt trip (SHT)		●
Terminal connection		Solderless	
Based on standard		IEC 60898-2	
CE marking		EN 60898-2 : Self-declaration	
CCC		GB 10963.2	

Notes: *3 Type B: (5 In <, ≤ 7 In), Type C: (7 In <, ≤ 15 In)


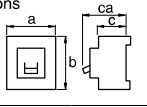



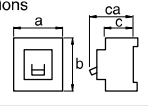
Model		RCCB	
		BV-D	
Image			
Number of poles [P]		$2(1+N)^{*1}$	$4(3+N)^{*1*3}$
Rated current [A] at ambient temperature 30°C		25, 40, 63	
Rated voltage [VAC]		230	230/400
Rated current sensitivity $I_{\Delta n}$ [mA]		30, 300	
Max. operating time at $5I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Rated conditional short-circuit current [kA]		6	
Dimensions [mm] 		a	36
		b	85
		c	44
		ca	70
Mass [kg]		0.2	0.35
Rated making and breaking capacity I_m [A]		500(In 25,40A), 630(In63A)	
Rated conditional short-circuit current I_{nc} [kA]		6	
Rated residual making and breaking capacity $I_{\Delta m}$ [A]		500(In 25,40A), 630(In63A)	
Rated conditional residual short-circuit current $I_{\Delta c}$ [kA]		6	
Number of operating cycles	Without current	8,000	
	With current	8,000	
Type of overcurrent release		-	
Mounting		IEC35mm rail	
Applicable wire size		1 to 25mm ²	
Weight [kg]		0.2	0.35
Terminal connection		Solderless	
Based on standard		IEC 61008-2-2	
CE marking		EN 61008-2-2 : Self-declaration	
CCC		GB 16916.22	

Notes: *1 N pole is a switched neutral pole (without overcurrent release device).

*2 Type C: (5 In <, ≦ 10 In)

*3 For use to three phase 4-wire type. When using, it be sure to connect the neutral wire to the neutral phase. Not available for use to three phase 3-wire type.

Model		RCBO	
		BV-DN	
Image			
Number of poles [P]		$2(1+N)^{*1}$	
Rated current [A] at ambient temperature 30°C		6, 10, 16, 20, 25, 32, 40	
Rated voltage [VAC]		230	
Rated current sensitivity $I_{\Delta n}$ [mA]		30, 100, 300	
Max. operating time at $5I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Breaking capacity [kA] sym. (IEC 61009)		4.5	
Tripping characteristics		Type C ²	
Dimensions [mm] 		a	36
		b	88
		c	44
		ca	70
Mass [kg]		0.19	
Automatic tripping device		Thermal, magnetic	
Number of operating cycles	Without current	20,000	
	With current	20,000 (In 6,10,16,20A) 15,000 (In 25A) 10,000 (In 32,40A)	
Type of overcurrent release		Thermal-magnetic	
Mounting		IEC35mm rail	
Applicable wire size		1 to 16mm ²	
Weight [kg]		0.19	
Terminal connection		Solderless	
Based on standard		IEC 61009-2-2	
CE marking		EN 61009-2-2 : Self-declaration	
CCC		GB 16917.22	

Model		Isolating switch			
		KB-D			
Image					
Number of poles [P]		1	2	3	4(3+N)
Utilization category		AC22A class			
Rated current [A] at ambient temperature 30°C		32, 63, 80			
Rated voltage [VAC]		230	400		
Short time withstand current [A]		$20 \times I_n, 1s$			
Short-circuit making capacity [A]		$20 \times I_n$			
Dimensions [mm] 		a	18	36	54
		b	87		
		c	44		
		ca	70		
Mass [kg]		0.09	0.18	0.27	0.36
Number of operating cycles	Without current	20,000			
	With current	3,000			
Mounting		IEC35mm rail			
Applicable wire size		1 to 25mm ²			
Weight [kg]		0.1	0.2	0.3	0.4
Terminal connection		Solderless			
Based on standard		IEC 60947-3			
CE marking		EN 60947-3 : Self-declaration			
CCC		GB 14048.3			

Accessories for Miniature Circuit Breakers

■ Functions of Accessories

Internal accessory	Function
AL Alarm switch	Electrically indicates the trip status of the circuit breaker.
AX Auxiliary switch	Electrically indicates the On/Off status of the circuit breaker.
SHT Shunt trip	Electrically trips the circuit breaker from a remote location. Permissible working voltages are 70 to 110% of the AC rated voltage or 70 to 125% of the DC rated voltage.

■ Equipping of Accessories

Accessory \ Model	BH-D6	BH-D10	BH, BH-P, BH-DN, BV-DN, KB-D, BV-D
AL	○	○	-
AX	○	○	
SHT	○	○	

○: Accessory equipped
-: Accessory not equipped

■ Specifications

Type		AL	AX	AL+AX	AX+AX
		AL-05DLS	AX-05DLS	ALAX-05DLS	AX2-05DLS
Contact	Configuration	1C	1C	2C	2C
	Contact capacity	400VAC, 2A	230VAC, 5A	120VDC, 0,4A	48VDC, 1,5A
Function	Line	-	-	AX	AX
	Load	AL	AX	AL	AX
Connection		Clamp terminal			
Compliance standard		IEC 60947-5-1			

Type	SHT	
	SHTA400-05DLS	SHTD048-05DLS
Cut-off switch	Equipped	
Voltage	110-400VAC	24-48VDC
Input power requirement	110VAC 60VA 230VAC 250VA 400VAC 750VA	24VDC 75VA 48VDC 300VA
Operating time [ms]	<20	
Connection	Solderless terminal	
Compliance standard	IEC 60947-2	

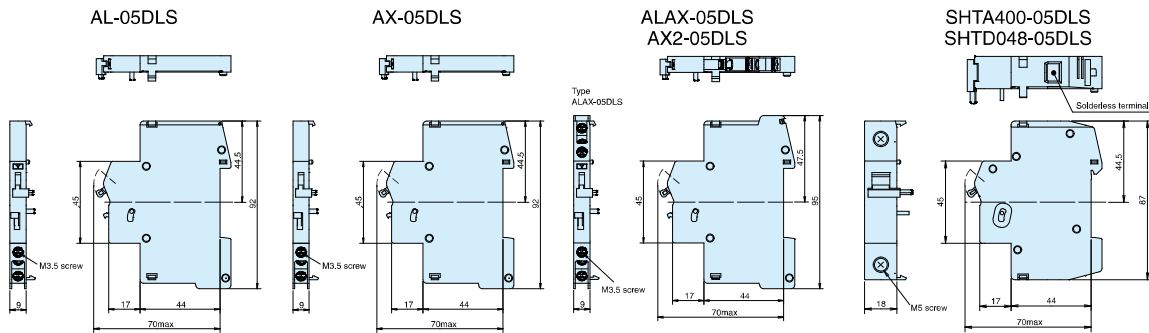
* Secure a sufficient input power supply so that the voltage will not drop below the permissible lower working voltage (70% of the lowest rated voltage).
* The operating time denotes the time from when the rated voltage is applied to SHT until the time the main contact of the breaker starts to open.

Combinations of Accessories

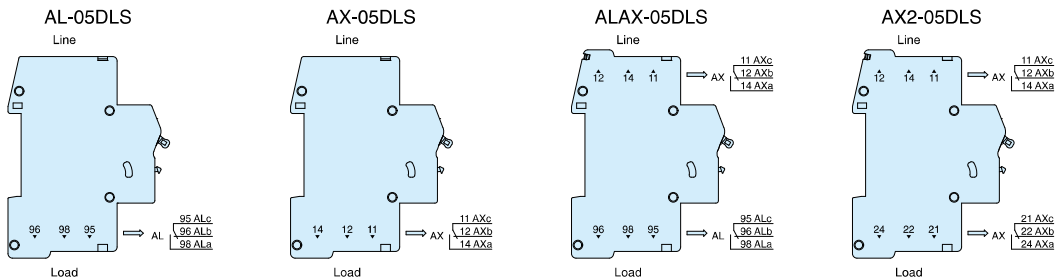
Accessory connection combinations	AL	
	AX	
	2AX	
	ALAX	
	SHT	
	AX+SHT	
	AL+SHT	
	2AX+SHT	
	ALAX+SHT	



Outline Drawing

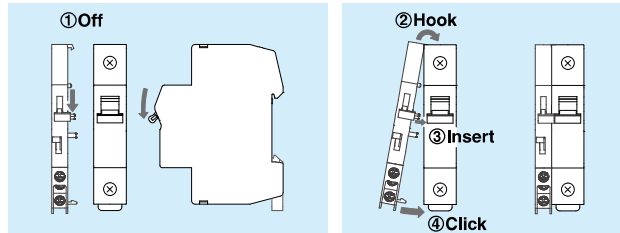


Connection of Line and Load Side

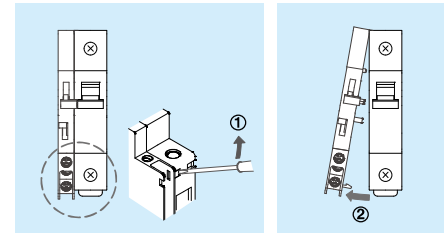


Installation of Accessories (AX, AL, SHT)



(1) Installation



(2) Removal



2 Detailed Specifications 7 Circuit Protectors

Frame (A)		30						
Model		CP30-BA			CP-S			
Image								
Number of poles		1	2	3	1	2	3	
Rated insulation voltage Ui (V)		250			250			
Rated impulse withstand voltage Uimp (kV)		2.5			2.5			
Rated current (A)		0.1 0.25 0.3 0.5 1 2 3 5 7 10 15 20 30			0.05 0.1 0.25 0.3 0.5 0.75 1 2 2.5 3 5 7 7.5 10 15 20 25 30			
Rated short-circuit capacity (kA)	UL 1077 CSA C22.2 No.235 (*11)	Rated voltage (V)	AC (V)	250		250		
			DC (V)	65	125	–	65	–
		AC		2.5kA at 250V		1.5kA at 250V		–
		DC		2.5kA at 65V	2.5kA at 125V	–	1kA at 65V	–
	IEC 60934 EN 60934 (Icn)	Rated insulation voltage Ui (V)	250		250			
		AC		250		1.5kA at 230V 2.5kA at 120V		
		DC		2.5kA at 60V	2.5kA at 120V	–	1kA at 120V (1kA at 60V) (*7)	1kA at 60V
	EN 60947-2 IEC 60947-2 (Icu/Ics)	Rated insulation voltage Ui (V)	250		–			
		AC		2.5/2.5kA at 230V		–		
		DC		2.5/2.5kA at 60V	2.5/2.5kA at 120V	–	–	
AC-DC common use		●			– (*8)			
Reverse connection		●			–			
Rated short time current (for switch only type)		–			AC250V 50/60Hz 1500A 0.02s AC125V 50/60Hz 2500A 0.02s DC65V 1000A 0.02s DC125V 1000A 0.02s			
Rated ambient temperature (°C)		40 (T40)			25 (T25)			
Operating characteristics		Instantaneous type (I); Medium type (M), (MD); Slow type (S), (SD); Fast type (F) (*2)			Instantaneous type (I); Medium type (M), (MD); Slow type (S), (SD); Fast type (F) (FD)			
Mode of tripping		Instantaneous type (I): magnetic only [MO] Medium type (M), (MD) Slow type (S), (SD) : hydraulic-magnetic [HM] Fast type (F)			Instantaneous type (I): magnetic only [MO] Medium type (M), (MD) Slow type (S), (SD) : hydraulic-magnetic [HM] Fast type (F), (FD)			
Method of operation		S-type (IEC 60934)						
Trip-free behaviour		Trip-free (IEC 60934)						
Mass (kg)		0.08	0.16	0.23	0.06	0.12	0.18	
Accessories	Retractable small terminal cover (TC-S)		● Standard IP20 (front, terminal covers closed) [Certified of TUV]			–		
	Inertial delay (ID)		● (Medium, Slow type: AC only)			● (Medium, Slow, Fast type: AC only)		
	Alarm switch (AL)		● (1c)			● (1c) (*7)		
	Auxiliary switch (AX)		● (1c)			● (1c)		
	Shunt trip (SHT)		● (for relay type) (*3)			● (for parallel and relay type: AC only)		
	Large terminal cover (TC-L)		● (*6)			–		
	Flushpanel mounting brackets (FP)		●			–		
	Back facing wiring terminal (BT)		● (*4), (*6)			–		
	Lock cover (LC)		–			● –		
Accessory terminal cover (TC)		● (*6)			–			
Connection	Main body		20A or less : Screw terminal M4 30A : Screw terminal M5			Male tub terminal 6.3mm (#250) [Screw terminal M4 (series type only)]		
	Alarm switch / Auxiliary switch		Screw terminal M3.5			Male tub terminal 2.8mm (#110)		
Main body mounting method		Srface, IEC rail mounting Flush panel mounting (option)			Panel mounting			
International standard		UL(cURus), CCC (*5)			UL(UR) (*9), (*10)			
CE Marking		EN 60934 : TUV approval EN 60947-2 : Self-declaration (*5)			EN 60934 : TUV approval (*10)			

- Notes: *1 The 3-pole products are for AC use only.
*2 Contact us for operating characteristics other than those mentioned above.
*3 In poles equipped with a shunt tripping mechanism, the overcurrent tripping element is not operative (switched shunt tripping).
*4 For back-face wiring terminals, specify if it will be used with 30A, or 20A or less.
*5 UL(cURus), CCC, and CE Marking are displayed on standard products.
*6 It is recognition of UL(cURus), CCC, and TUV.
*7 In case of DC use, only DC65V is available.
*8 Specify if for DC use when ordering.
*9 Specify when ordering. (In case of CP-S UL, type name is CP-SU.)
*10 Connection is male tub terminal only.
*11 CP30-BA only.

- Remarks: 1. Products for non-standard conditions are special order. (Low temperature, 1st and 2nd-degree moisture fungal treatment, corrosion-resistant)
2. Although a buzzing sound may occur when an instantaneous type becomes 80% or more of the rated current for AC use, performance is not effected. Please take this point into consideration when selecting units for use in quiet environments.
3. Please use in environments free of high temperatures, humidity, dust, corrosive gas, vibration, and impact.
Also, do not use it in a circuit with inrush current or harmonics. Problems may result.

Internal circuits and examples of application

Internal circuit	Available model	Operating characteristics							shunt trip
		Instantaneous type		High speed type		Medium speed type		Low speed type	
		I	F	FD	M	MD	S	SD	
Serial type 	CP30-BA	●	●	-	●	●	●	●	-
	CP-S	●	●	●	●	●	●	●	-
Serial type with auxiliary switch 	CP30-BA	●	●	-	●	●	●	●	-
	CP-S	●	●	●	●	●	●	●	-
Serial type with alarm switch 	CP30-BA	●	●	-	●	●	●	●	-
	CP-S	●	●	●	●	●	●	●	-
Relay type shunt trip (with SHT) 	CP30-BA	-	-	-	-	-	-	-	●
	CP-S	-	-	-	-	-	-	-	●
Parallel type shunt trip (with SHT) 	CP-S	-	-	-	-	-	-	-	●
	CP-S	-	-	-	-	-	-	-	●
Relay type current trip 	CP-S	●	●	●	●	●	●	●	-
	CP-S	●	●	●	●	●	●	●	-
Parallel type current trip 	CP-S	●	●	●	●	●	●	●	-
	CP-S	●	●	●	●	●	●	●	-
Switch type 	CP-S	-	-	-	-	-	-	-	-
	CP-S	-	-	-	-	-	-	-	-

Internal accessories

Auxiliary switch (AX)

Operates in conjunction with the main circuit operating mechanism to electrically retrieve the ON/OFF status of protector.

Alarm switch (AL)

Operates in conjunction with the main circuit operating mechanism to electrically retrieve the tripping status of protector.

- Remarks (1) When the handle of CP30-BA is constrained in the ON status, it does not issue the alarm signal even if it is tripped.
 (2) The alarm switch will be reset when the body is reset or turned on.

Shunt trip (SHT)

A parallel relay type protector, which can break the circuit instantaneously when receiving an external signal

Inertial delay device

The inertial delay device is designed to avoid unnecessary operation caused by inrush current of transformer or lamp load. The device can withstand unrepeatd one pulse of crest value 20 times higher than the rated current (pulse time = 8 ms). It can be added to circuits having high, medium and low speed operating characteristics. (It cannot be added to instantaneous or DC types.)

● Ratings of alarm switches (AL) and auxiliary switches (AX)

(1) For CP30-BA

Classification	For general load	AC			DC			
		Voltage (V)	Current (A)		Voltage (V)	Current (A)		
			Resistive load	Inductive load		Resistive load	Inductive load	
Ratings of items other than those shaded in Table 1	Max.	(250)	(1)	(0.5)	50	1	0.5	
	Min.	125	3	1	30	2	1	
	For minute load	Max.	0.1A/15VAC		0.1A/15VDC			
	Min.	125	0.5	-	30	0.5	-	
Ratings of items shaded in Table 1	For general load	Max.	(250)	(1)	(0.5)	(50)	(1)	(0.5)
	Min.	125	3	(1)	30	(2), 0.5	(1)	
	For minute load	Max.	0.1A/15VAC		0.1A/15VDC			
	Min.	125	(0.5), 0.1	-	30	(0.5), 0.1	-	

Remarks: 1. The switches having the ratings in parentheses are manufactured at the customer's request. (Specify the voltage). Such switches do not conform to UL (cURus), CCC or CE Marking requirements.

(2) For CP-S

Voltage (V)	AC		Voltage (V)	DC	
	Resistive load	Inductive load		Resistive load	Inductive load
250	3	2	250	0.2	0.2
125	5	3	125	0.4	0.4
-	-	-	30	4	3
-	-	-	14	5	4

Remarks: 1. When using these switches to a circuit with a minute load (125 V AC, 0.1 A or 30 V DC, 0.1 A or less), designate the application as minute load.

● Ratings of shunt trip (SHT) coils

(1) For CP30-BA

Ratings	
Rated operating voltage (V)	Time rating
100-200	Compatible with 100 to 200 V AC and 100 V DC
24-48	Compatible with 24 to 48 V DC
24-48, 100	10 sec or less

Coil resistance, resistance and impedance (at25°C)		
Voltage (V)	Impedance for AC (Ω)	DC resistance for DC (Ω)
24-48	-	160
100-200	2400	2100

Remarks: 1. The allowable range is 70 to 110% of the rated voltage for AC and 75 to 120% of the rated voltage for DC.
 2. The time rating is 10 seconds or less. Configure the circuit on which voltage will not be applied for more than 10 seconds.

(2) For CP-S

Ratings	
Rated operating voltage (V)	Time rating
100	Compatible with 100 to 120 V AC (50/60Hz)
200	Compatible with 200 to 240 V AC (50/60Hz)
24, 48, 100	DC24, DC48, DC100
24, 48, 100	10 sec or less

Coil resistance, resistance and impedance (at25°C)		
Voltage (V)	Impedance for AC (Ω)	DC resistance for DC (Ω)
24	-	110
48	-	110
100	1100	400
200	1100	-

Remarks: 1. The allowable range is 70 to 110% of the rated voltage for AC and 75 to 120% of the rated voltage for DC.
 2. The time rating is 10 seconds or less. Configure the circuit on which voltage will not be applied for more than 10 seconds.

● Operation of auxiliary switch and alarm switch


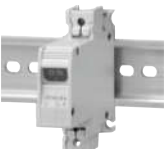


Protector status		Switch status	
		CP30-BA, CP-S	
AX	Off or trip 		AXa (open) / ALa (closed)
AL	Off or ON 		AXb (open) / ALb (closed)
AX	ON 		AXc / ALc
AL	Trip 		AXa (closed) / ALa (open)
			AXb (closed) / ALb (open)
			AXc / ALc

Table 1 List of numbers of internal accessories which can be fitted

Type name	AX			AX More than one			AL			AL+AX			SHT			AL+SHT or AX+SHT			AL+AX+SHT	
	1P	2P	3P	1P	2P	3P	1P	2P	3P	1P	2P	3P	1P	2P	3P	1P	2P	3P	3P	
CP30-BA	○	○	○	-	○	○	○	○	●	●	●	-	○	○	○	○	○	○	○	○
CP-S	○	○	○	-	○	○	○	○	○	○	○	-	○	○	○	○	○	○	○	○

Remark: 1. All accessories should be fitted on the internal accessory terminal block.

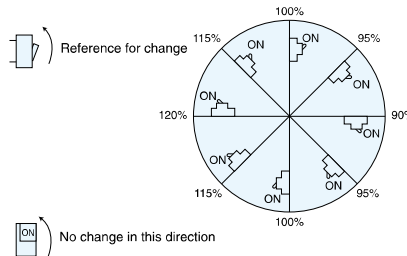
Installation and connection

Installation method	With screws	On IEC rails	With embedded fittings	On panel
Appearance			 Circuit protectors with AL, AX and/or SHT cannot be installed by this method.	
CP30-BA	●	●	●	-
CP-S	-	-	-	●

Installation posture

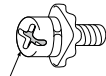


The operating characteristics of electromagnetic (instantaneous) type circuit protectors are not affected by the installation posture. However, when installing a fluid electromagnetic (high, medium or low speed) type circuit protector, pay attention to the installation angle because the operating current value is changed under the influence of the gravity applied to the iron core in the oil dash pot.

Generally, it is recommended to use the circuit protectors in the vertical direction.





Electric wires which can be connected and applicable screw terminals

CP30-BA

Classification	Shape of terminal	Electric wire size used (mm ²)	Applicable screw terminals	Tightening torque (N • m)
Body	Threaded terminal (standard specification) 	20 A or less M4	R1.25-4 R1.25-5	M4 1-1.4
		30A M5	R2-4 R2-5	
	Cross recessed or slotted 		2.63-6.64	R5.5-4 R5.5-5
		6.64-10.52	*8-5NS (made by JST)	
Alarm and auxiliary switch terminals	Wire retaining screw (square washer) 	0.25-1.65	R1.25-3.5	0.7-0.9
		1.04-2.63	R2-3.5	

*Use the screw terminal 8-5NS made by JST.

Low Voltage Air Circuit Breakers (AE-SW Series)											
Frame (A)	630	1000	1250	1600	2000	2000	2500	3200	4000		
Model	AE630-SW	AE1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA		
Image								● See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.			
Rated current (CT rating) In (A)	630 (*1)	1000	1250	1600	2000	2000 (*1)	2500	3200	4000		
Rated current setting Ir (A) (adjustable) (Rated ambient temperature 40°C) (For marine use 45°C)	315-346.5-378-409.5-441-472.5-504-535.5-567-598.5-630 (*1)	500-550-600-650-700-750-800-850-900-950-1000	625-687.5-750-812.5-875-937.5-1000-1062.5-1125-1187.5-1250	800-880-960-1040-1120-1200-1280-1360-1440-1520-1600	1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000	1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000 (*1)	1250-1375-1500-1625-1750-1875-2000-2125-2250-2375-2500	1600-1760-1920-2080-2240-2400-2560-2720-2880-3040-3200	2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000		
Number of poles	3, 4 (*2)										
Rated insulation voltage V	1000										
Current carrying capacity of neutral pole A	630	1000	1250	1600	2000	2000	2500	3200	4000		
Rated breaking capacity (kA symmetrical RMS)	IEC 60947-2, EN 60947-2	AC690V	65			75			85		
	B5	AC600V	65			75			85		
	JIS C 8201-2-1 Ann.1 Ann.2	AC240-500V	65			75			85		
	NK, LR, GL, BV, ABS, DNV, CCS	AC240-500V	65			75			85		
Ics = % Icu	100%										
Rated short-time withstand current (kA symmetrical RMS)	1 second	65			75			85			
Suitability for isolation	Compatible										
Reverse connection	Possible										
Number of operating cycles	Without current With current (600 V AC)	25000			1500			20000			1000
Utilization category	B										
Pollution degree	3										
EMC environment condition (environment A or B)	A										
Outline dimension (mm)	Fixed type	3-pole product 4-pole product				410x340x290 410x425x290		410x475x290 410x605x290			
	Drawout type	3-pole product 4-pole product				430x300x368 430x385x368		430x435x368 430x565x368		430x439x368 430x569x368	
Weight (kg) (Without Accessory)	Fixed type	3-pole product	41	42	47	60	61	63	81		
	4-pole product	50	51	52	57	72	73	75	99		
	Drawout type	3-pole product	63	64	65	70	92	93	108		
	4-pole product	77	78	79	84	113	114	116	136		
	Cradle only	3-pole product	26	31	35	35	43	36	49		
	4-pole product	30	35	43	44	61					
CE Marking	Self-declaration										
CCC recognition (☆ Certified)	☆										
Marine approval	☆ Certified (NK, LR, GL, BV, ABS, DNV, CCS)										
Automatic tripping device	Electronic (effective value detection)										

- When the MCR is provided, the breaking capacity may be changed. See the catalog of Low Voltage Air Circuit Breakers, Y-0622.
- See the catalog of Low-voltage Air Circuit Breakers, Y-0622, for the details of the accessories.
- Notes: *1 AE630-SW and AE2000-SW having low rating types are available. See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.
- *2 The 4-pole products do not have obtained the marine approval.
- *3 4 (HN) means the neutral poles current capacity is 50% of the rated current, for 4poles.
- 4 (FN) means the neutral poles current capacity is 100% of the rated current, for 4poles.
- *4 () shows the value for 4P FN type.
- *5 Marine approval value is 138kA.

Features










- **Higher reliability by High operating durability (Mechanical)**
- **Increase of rated short-time withstand current**
Combination of the Electronic trip relay (ETR) with MCR (*1) enables increase of the choice coordination range.
- **Applicability to increase and decrease of load and improvement of protection coordination**
The electronic tripping system enables detailed setting of tripping characteristics. The system uses RMS detection resistant to distorted waves.
- **More improved Electronic trip relay (ETR) and transmission functions**
To flexibly meet various requirements, functions suitable for purposes can be selected effectively. In addition, improved measuring functions are provided, so that the circuit breakers are applicable to CC-Link, PROFIBUS-DP and MODBUS transmission and helpful in establishing various electrical circuit measurement monitoring systems and energy-saving systems in combination with measuring display unit breakers.

Notes: *1 MCR is an abbreviation for marking current release. It has INST characteristic only when the circuit breaker in the OFF state turns ON (closes). The circuit breaker will lose the INST characteristic after closing, and it will have LTD and STD characteristics.

Various connections

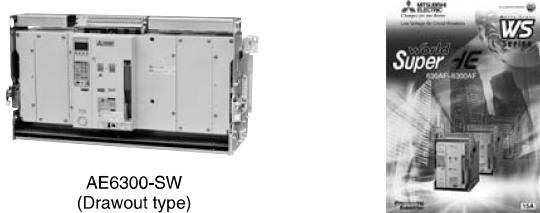
Various connections for panel structures are available. (See the following figure.)

Connections

Connections Model	Horizontal (standard)	Vertical (*1) (VT)	Front (FT)	Vertical terminal adapter (VTA)	Front terminal adapter (FTA)
Fixed type (FIX)	 (Standard)	 FIX-VT	-	 (FIX-VTA)	 (FIX-FTA)
Drawout type (DR)	 (Standard)	 (DR-VT)	 (DR-FT)	 (DR-VTA)	 (DR-FTA)

Notes: *1 For AE2000-SWA, AE4000-SWA, AE1000-SW, AE5000-SW and AE6300-SW models, vertical terminal only is available.

Low Voltage Air Circuit Breakers (AE-SW Series)

Frame (A)	4000	5000	6300	
Model	AE4000-SW	AE5000-SW	AE6300-SW	
Image (Reference)	 <p>AE6300-SW (Drawout type)</p> <p>● See the catalog of Low Voltage Air Circuit Breakers, Y-0622, for the details.</p>			
Rated current (CT rating) In (A)	4000	5000	6300	
Rated current setting Ir (A) (adjustable) (Rated ambient temperature 40°C) (For marine use 45°C)	2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000	2500-2750-3000-3250-3500-3750-4000-4250-4500-4750-5000	3150-3465-3780-4095-4410-4725-5040-5355-5670-5985-6300	
Number of poles	3, 4 (HN, FN) (*3)			
Rated insulation voltage V	1000			
Current carrying capacity of neutral pole A	2000 (4000) (*4)	2500 (5000) (*4)	3150 (6300) (*4)	
Rated breaking capacity (symmetrical RMS)	IEC 60947-2, EN 60947-2	85		
	BS	85		
	JIS C 8201-2-1 Ann.1 Ann.2	130 (*5)		
	NK, LR, GL, BV, ABS	100%		
Rated short-time withstand current (kA symmetrical RMS) 1 second	100			
Suitability for isolation	Compatible			
Reverse connection	Possible			
Number of operating cycles	Without current	10000 (3P) / 5000 (4P)		
	With current (690V AC)	1000		
Utilization category	B			
Pollution degree	3			
EMC environment condition (environment A or B)	A			
Outline dimension (mm) Height (H) x width (W) x depth (D)	Fixed type	3-pole product 414×873×290		
	Drawout type	3-pole product 414×1003×290		
	3-pole product	480×875×368		
	4-pole product	480×1005×368		
Weight (kg) (without Accessory)	Fixed type	3-pole product	160	160
	4-pole product		180	180
	Drawout type	3-pole product	233	240
	4-pole product		256	263
	Cradle only	3-pole product	118	125
	4-pole product		133	140
CE Marking	Self-declaration			
CCC recognition (☆ Certified)	☆			
Marine approval	☆Certified (NK, LR, GL, BV, ABS)			
Automatic tripping device	Electronic (effective value detection)			

2 Detailed Specifications

Electronic trip relay (ETR) Type code

Main setting module

WS1, WB1, WM1, WF1	AE630-1600-SW, AE2000-3200-SW, AE4000-SW
WS2, WB2, WM2, WF2	AE2000-SWA, AE4000-SWA, AE5000-SW
WS3, WB3, WM3, WF3	AE6300-SW

WS : General use
WM : Generator protection use
WB : INST/MCR only
WF : Protective coordination use

Optional setting module

G1: Ground fault protection
N5: Neutral pole 50% protection
E1: Earth leakage protection
AP: 2nd Additional Pre-alarm
NA: Without optional setting

ETR Auxiliary Equipment

Temperature alarm(TAL)
 MCR switch(MCR-SW)

Power supply

P1: AC-DC100-240V
P2: DC24-60V
P3: AC100-240V / DC100-125V with output contact
P4: DC24-60V with output contact
P5: DC100-240V with output contact (SSR)

Additional function

Extension module(EX1)

Network

Display(DP1)
 Display onto panel board(DP2)
 VT unit(VT)

BIF-CC
 BIF-PR
 BIF-MD

Wire system (when EX1 is specified)

EX1

- 3φ3W
- 3φ4W
- Normal connection
- Reverse connection

Normal connection: Upper terminal is connected to power supply.
Reverse connection: Lower terminal is connected to power supply.

For the details of the characteristics, alarm contact output and expanded functions of the ETR, see the catalog of Low Voltage Air Circuit Breakers, Y-0622.

*The display is optional.



Earth Leakage Relays

2

9 Detailed Specifications

Model		Interchangeable leakage relays (*1)													
		Electrical self-hold type				Mechanical self-hold type									
		NV-ZBA		NV-ZSA		NV-ZHA		NV-ZLA							
Model name of ZCT combined (*5)	Hole diameter mm	ZT15B		ZT30B		ZT40B		ZT60B		ZT80B		ZT100B			
	15	ZT15B		ZT30B		ZT40B		ZT60B		ZT80B		ZT100B			
	30	ZT30B		ZT40B		ZT60B		ZT80B		ZT100B					
	40	ZT40B		ZT60B		ZT80B		ZT100B							
	60	ZT60B		ZT80B		ZT100B									
	80	ZT80B		ZT100B											
Image															
Phase line type		3φ4W, 3φ3W, 1φ3W, 1φ2W													
Control voltage AC V		JIS		120 • 240 selectable		120 • 240 selectable 240 • 415 selectable		-		-					
		UL/JIS (*2) UL/CE (*3)		-		-		120 • 240 selectable 240 • 440 selectable		120 • 240 selectable 240 • 440 selectable 480					
JIS	High speed type	Rated sensitivity current mA		100 • 200 • 500 selectable		100 • 200 • 500 selectable		-		-					
		Max. operating time (s)		0.1		0.1		-		-					
	Delay type	Rated sensitivity current mA		100 • 200 • 500 selectable		100 • 200 • 500 selectable (200 • 500 • 1000 selectable)		-		-					
		Operating time (s) (*4)		0.3 • 0.8 • 1.6 selectable		0.3 • 0.8 • 1.6 selectable		-		-					
Inertial non-operating time (s) or longer than (s)		0.1 • 0.5 • 1.1		0.1 • 0.5 • 1.1		-		-							
UL/JIS	High speed type	Rated sensitivity current mA		-		-		30 50		30 50					
		Max. operating time (s)		-		-		0.1		0.1					
	Delay type	Rated sensitivity current mA		-		-		100 • 200 • 500 selectable		100 • 200 • 500 selectable					
		Max. operating time (s) (*4)		-		-		0.1 • 0.45 • 1.0 selectable		0.1 • 0.45 • 1.0 selectable					
UL/CE	High speed type	Rated sensitivity current mA		-		-		30 • 50 • 100 selectable		30 • 50 • 100 selectable					
		Max. operating time (s) at 5IΔn		-		-		0.04		0.04					
	Delay type	Rated sensitivity current mA		-		-		100 • 300 • 500 selectable 300 • 500 • 1000 selectable		100 • 300 • 500 selectable 300 • 500 • 1000 selectable					
		Max. operating time (s) at 2IΔn (*4)		-		-		0.45 • 1.0 selectable		0.45 • 1.0 selectable					
Earth leakage indication		Electric type (LED)		Mechanical type (button)		Electric type (LED)		Mechanical type (button)							
Resetting method		Push button or control power switch off		Push button (combined with earth leakage indicator)		Push button or control power switch off		Push button (combined with earth leakage indicator)							
Built-in contact	Configuration		1c		1a1c		1a1c		1a1c						
	Continuous current capacity A		5		5		5		5						
	Contact capacity A			cosφ=1		cosφ=0.4 L/R=0.007		cosφ=1		cosφ=0.4 L/R=0.007		cosφ=1		cosφ=0.4 L/R=0.007	
		120VAC		5		2		5		2		5		3	
		240VAC		5		2		3		2		5		2	
		24VDC		5		2		2		1		5		1	
30VDC				4		3				30VDC		3			
100VDC				0.4		0.4				Use auxiliary relay for AC415V contact.					
200VDC				0.2		0.2									
Connection		Front		●Clamp terminal		●Clamp terminal		●Clamp terminal		●Clamp terminal		●Clamp terminal			
		Rear		-		●Clamp terminal		●Clamp terminal		●Clamp terminal		●Clamp terminal			
Standard attachment (Front connection)		Mounting screw													
Mass kg		Relay		0.3		0.4		0.4		0.4					
External accessories	Terminal cover		● (TC-ZBA)		● (TC-ZSA)		● (TC-ZSA) (*6)		● (TC-ZSA) (*6)						
	Mounting hook for IEC 35mm rail (DIN rail) Fixture		● (DIN-ZBA)		-		-		-						
Max. consumption VA		3													
Conforming standard	US UL standard (UR certified)		-		-		UL1053 Recognized component (File No.E196562)		UL1053 Recognized component (File No.E196562)						
	Canada CSA standard		-		-		LR103083(Certified No.)		LR103083(Certified No.)						
	European CE marking		-		-		Declaration for conformity IEC 60947-2 AnnexB EN 60947-2 AnnexB		Declaration for conformity IEC 60947-2 AnnexB EN 60947-2 AnnexB						

Notes: *1 Interchangeable leakage relays can be easily combined with other relays and our ZCT. However, products with 30mA sensitivity (excluding NV-ZHA/ZLA) can only be used in combination with ZT15B, ZT30B and ZT40B.
 *2 Indicates the UL-standard control voltage. UL, CSA and JIS standards are indicated together. For JIS voltage indications, 100-200V changeover is 120-240V changeover, 200-415V changeover is 240-440V changeover, and 460V and 480V are described together. When ordering, specify "UL/JIS".
 *3 Indicates the UL-standard control voltage. UL, CSA and CE standards are indicated together. For CE voltage indications, 120-230V changeover is 120-240V changeover, 230-440V changeover is 240-440V selectable, which are described together. When ordering, specify "UL/CE".
 *4 When operating times are 0.3 and 0.45sec, 0.8 and 1.0sec and 1.6sec, the relay operates between 0.15 and 0.45sec, 0.6 and 1.0sec and 1.2 and 2.0sec, respectively.
 *5 Can be combined with an interchangeable ZCT equipped with a primary conductor. Refer to the next page for details.
 *6 Not UL-certified.

Remarks: 1. Relays with rates shown in parentheses are special-order.
 2. The relay complies with CE marking conformity declaration only when used with CE marking type MCCB with a voltage tripping device to interrupt current during ground fault.
 3. NV-ZBA/ZSA

Control voltage	Available voltage range	Example of applicable circuit voltage
120V	80-126V	100 • 110V • 120V
240V	160-252V	200 • 220 • 240V
415V	320-484V	400 • 415 • 440V

Control voltage	Available voltage range	Example of applicable circuit voltage
120V	80-132V	100 • 110 • 120V
240V	160-264V	200 • 220 • 230 • 240V
440V	304-484V	380 • 400 • 415 • 440V
480V	368-528V	460 • 480V

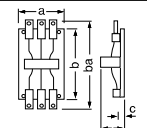
Interchangeable ZCT

Type	ZT15B	ZT30B	ZT40B	ZT60B	ZT80B	ZT100B
Aperture diameter (mm)	15	30	40	60	80	100
Mass (kg)	0.2	0.4	0.6	2.0	2.6	3.3
Rated short time current	50 (peak value)					
Dimensions (mm)	a	48	68	85	140	185
	b	52	52	52	90	90
	c	70	90	100	150	169
	d	25	50	50	100	100
	e	40	40	40	70	70

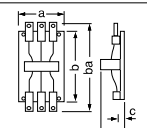
ZCT aperture diameter and wire size

	ZCT aperture diameter (mm)	15	30	40	60	80	100
		Max. 600V rated wire size in mm ² (current in amperes)					
1φ2w	Polyvinyl-chloride insulated wire	14 (88)	60 (217)	150 (395)	325 (650)	600 (992)	800 (1185)
	Cross-linked polyethylene insulated cable	2 (33)	38 (190)	60 (260)	250 (655)	400 (870)	600 (1140)
1φ3w 3φ3w	Polyvinyl-chloride insulated wire	8 (61)	38 (162)	100 (298)	250 (556)	500 (842)	725 (1095)
	Cross-linked polyethylene insulated cable	2 (33)	22 (135)	60 (260)	200 (560)	325 (760)	600 (1140)
3φ4w	Polyvinyl-chloride insulated wire	8 (61)	38 (162)	100 (298)	150 (395)	325 (650)	600 (992)
	Cross-linked polyethylene insulated cable	—	14 (105)	38 (190)	100 (365)	250 (655)	400 (870)

Interchangeable ZCTs with primary conductors

Type	ZTA600A	ZTA1200A	ZTA2000A	
Number of poles	3			
Rated voltage (VAC)	600			
Rated short time current (kA)	100 (peak value)			
	a	227	227	360
	b	256	298	250
	ba	366	444	594
	c	42	78	79
	ca	125	176	214

ELRs with a ZCT with primary conductors

Frame (A)	600	1200	2000	3200	
Type	ZBA	Interchangeable ELR and interchangeable ZCTs with primary conductors		NV-ZBA3200	
	ZSA			NV-ZSA3200	
	ZHA			NV-ZHA3200	
	ZLA			NV-ZLA3200	
Number of poles	3				
Rated voltage (VAC)	600				
Rated short time current (kA)	100 (peak value)				
	a	227	227	360	490
	b	256	298	250	320
	ba	366	444	594	868
	c	42	78	79	111
	ca	125	176	214	290
Mass (kg)	6.5	11	27	54	

Specification of ELRs	High-speed type	Control voltage (VAC)	Rated current sensitivity (mA)	Max. operating time (s)	Inertial non-operating time (s)
		ZBA	120 • 240 (*1)	100 • 200 • 500 (*1)	0.1
ZSA	120 • 240 (*1) 240 • 415 (*1)	100 • 200 • 500 (*1)			
Time-delay type (High-speed • Time-delay type)	ZBA	120 • 240 (*1)	100 • 200 • 500 (*1)	0.3 • 0.8 • 1.6 (*1)	0.1 • 0.5 • 1.1
	ZSA	120 • 240 (*1) 240 • 415 (*1)	100 • 200 • 500 (*1) (200 • 500 • 1000 (*1))	0.3 • 0.8 • 1.6 (*1)	0.1 • 0.5 • 1.1
	ZHA	120 • 240 (*1) 240 • 440 (*1)	100 • 200 • 500 (*1)	0.1 • 0.45 • 1.0 (*1)	— • 0.1 • 0.5
	ZLA	120 • 240 (*1) 240 • 440 (*1) 480	100 • 200 • 500 (*1) 100 • 300 • 500 (*1) 300 • 500 • 1000 (*1)	0.1 • 0.45 • 1.0 (*1) 0.45 • 1.0 (*1) (at 2Δn)	— • 0.1 • 0.5 0.1 • 0.5 (at 2Δn)

Note: *1 Selectable.

MEMO

2

9 Detailed Specifications