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ACB / MCCB / MCB / MC&TOR / Mini-MS / MMS / EMPR

LS IS

Air circuit breakers

Page 4

Susol series

- 85, 100 and 130kA short circuit current with instantaneous at 508V
- High functional digital trip relays
- UL approved

Molded Case Circuit Breakers

Page 12

Susol series

- 2, 3 pole series up to 1200AF
- UL approved

Miniature circuit breakers

Page 15

- UL 489 R-Series
- UL 1077 R-Series

Contactors & Overload Relays Page 20

Metasol series

- 3 and 4 pole series up to 2100AF Mini-contactors available
- AC/DC common use coil from 150AF to 800AF
- Thermal (Bimetallic) and electronic type overload relays are available
- UL approved

Mini contactors Page 30

Manual motor starters Page 32

Electronic motor protection relays (Electronic type overload relays) Page 37

- Various connection & mount
- Reliability by real-time data processing and high precision.
- Wide current setting range & Various protection functions
- Inverse or definite time mode
- Display the causes of the fault by LED
- Ampere meter, Load rate Display type
- Standard, Ground fault and short circuit protection type
- Unit or Extension in one body by cable option
- CE marked and UL approved type

Vacuum Circuit Breakers Page 43

Susol series

Air circuit breakers

Ratings for UL Listed/ANSI Certified Susol UA Circuit Breakers

TYPE					Susol UAS- □□D	
AF					08	16
Rated current (In max)	(A)			at 40°C	800	1600
Rated current	(A)			at 40°C		800
					400	1000
					600	1200
					630	1250
					800	1600
Rated Maximum Voltage	(V)				254V / 508V / 635V	
Frequency	(Hz)				50/60	
Number of poles	(P)				3P / 4P	
Type of Trip relay (Electronic trip device)					N, A, P, S (4 type)	
Rated short circuit current (Sym.) UL 1066 ANSI C37.13	(kA)	With instantaneous	AC	635V	65	
				508V	85	
				254V	85	
		Without instantaneous	AC	635V	65	
				508V	65	
				254V	65	
Rated short Time current	(kA)				65	
Operating time (t)	(ms)	Maximum total breaking time			50ms	
		Maximum closing time			80ms	
Life cycle ACB	(time)	Mechanical	Without maintenance		12,500	
			With maintenance			
		Electrical	Without maintenance		2,800	
			With maintenance			
Weight	lb (kg)	Drawout type	Main Body with Cradle	3P	154 (70)	
				4P	187 (85)	
			Only Cradle	3P	71 (32)	
				4P	84 (38)	
		Fixed type	Motor charging type	3P	77 (35)	
				4P	99 (45)	
External dimension	Draw-out type	Inch (mm)	H×W×D	3P	16.93×13.15×16.02 (430×334×407)	
				4P	16.93×16.5×16.02 (430×419×407)	
	Fixed type	Inch (mm)	H×W×D	3P	11.81×11.81×11.61 (300×300×295)	
				4P	11.81×15.16×11.61 (300×385×295)	
Enclosure dimension		Inch (mm)	H×W×D	3P	19.69×15.75×13.39 (500×400×340)	
				4P	19.69×19.69×13.39 (500×500×340)	

Susol				
UAH- □□E				
08	16	20	25	32
800	1600	2000	2500	3200
400	800	1000	1200	1600
600	1000	1200	1250	2000
630	1200	1250	1600	2500
800	1250	1600	2000	3000
	1600	2000	2500	3200
254V / 508V / 635V				
50/60				
3P / 4P				
N, A, P, S (4 type)				
85				
100				
100				
85				
85				
85				
85				
50ms				
80ms				
12,500				5,000
2,800				1,000
214 (97)			245 (111)	326 (148)
269 (122)			309 (140)	414 (188)
99 (45)			123 (56)	205 (93)
121 (55)			152 (69)	256 (116)
101 (46)			110 (50)	196 (89)
126 (57)			137 (62)	249 (113)
16.93×16.22×16.02 (430×412×407)				
16.93×20.75×16.02 (430×527×407)				
11.81×14.88×11.61 (300×378×295)				
11.81×19.41×11.61 (300×493×295)				
19.69×19.69×13.39 (500×500×340)				
19.69×24.21×13.39 (500×615×340)				

Susol		
UAH- □□G		
32	40	50
3200	4000	5000
1600	2000	2500
2000	2500	3000
2500	3000	3200
3000	3200	3600
3200	3600	4000
	4000	5000
254V / 508V / 635V		
50/60		
3P / 4P		
N, A, P, S (4 type)		
100		
130		
130		
100		
100		
100		
100		
50ms		
90ms		
5,000		
1,000		
489 (222)		
626 (284)		
276 (125)		
355 (161)		
227 (103)		
287 (130)		
18.11×30.91×16.02 (460×785×407)		
18.11×39.96×16.02 (460×1015×407)		
11.81×29.57×11.61 (300×751×295)		
11.81×38.62×11.61 (300×981×295)		
31.5×32.48×13.39 (800×825×340)		
31.5×41.54×13.39 (800×1055×340)		

Trip relay(OCR)

The trip relay of Susol ACB provides the additional protection functions for voltage, frequency, unbalance, and others in addition to main protection functions for over current, short-circuit, ground fault. It supports the advanced measurement functions for voltage, current, power, electric energy, harmonics, communication function, and others.

Analog trip function interlocked with mechanism enhanced a durability of devices as well as the breaking capacity of ACB.

Zone selective interlocking function makes the protective coordination more simple and thermal memory can be applied to various loads.

Air circuit breakers

Trip relay types

Classification	N type	A type	P type	S type
Externals				
Current protection	• L / S / I / G	• L / S / I / G / Thermal • ZSI(Protective coordination)	• L / S / I / G / Thermal(Continuous) • ZSI(Protective coordination)	• P type
Other protection	-	• Earth leakage (Option)	• Earth leakage(Option) • Over/Under current • Over/Under frequency • Unbalance(Voltage/Current) • Reverse power	• P type
Measurement function	-	• Current (R / S / T / N)	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand • Voltage/Current harmonics (1st~63th) • 3 Phase Waveforms • THD, TDD, K-Factor
Fine adjustment	-	-	• Fine adjustment for long/short time delay/instantaneous/ ground	• P type
Pre Trip Alarm	-	-	• Overload protection relays : DO (Alarm) (Ground fault is not available when using Pre trip alarm)	• P type
Digital Output	-	• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• P type
IDMTL setting	-	-	• Compliance with IEC60255-3 SIT, VIT, EIT, DT	• P type
Communication	-	• Modbus/RS−485 • Profibus−DP	• Modbus / RS-485 • Profibus-DP	• Modbus / RS-485 • Profibus-DP
Power supply	• Self Power - Power source works over 20% of load current.	• Self Power - Power source works over 20% of load current. - External power source are required for comm. • AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V Basic protection function(L / S / I / G) is still under normal operation without control power.	• AC/DC 100~250V • DC 24~60V
RTC timer	• Available	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• N type	• N type	• N type
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records • Last fault wave recording (3 Phase)
Event recording	-	-	• 256 records(Content, Status, Date)	• P type
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• A type	• A type

Air circuit breakers

Numbering system

Breaker and Accessories

UAS — 10 D 3 — 10 A

Frame Type
UAS

Frame Size	
08	800AF
16	1600AF

Phasing	
D	3/4P Standard RST(N)
W	4P Reversed NRST

Poles	
3	3P
4	4P

Sensor Rating	
04~08	400A~800A
08~16	800A~1600A

Mounting and Terminal	
Mounting	
A	Drawout
Fixed	
H	Horizontal terminals
V	Vertical terminals
M	Horizontal for line
	Vertical for load
N	Vertical for line
	Horizontal for load
P	Front terminal
G	Horizontal-con type
W	Vertical-con type

* Terminals for P type must be ordered separately
* G and W types can be applicable to UAS-08D, UAS-16D only
* Front terminal is only available for 800~2000A

UAH — 32 E 3 — 32

Frame Type
UAH

Frame Size	
08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF
32	3200AF
40	4000AF
50	5000AF

Phasing	
E	3/4P Standard RST(N)
X	4P Reversed NRST
G	3/4P Standard RST(N)
Z	4P Reversed NRST

Poles	
3	3P
4	4P
3	3P
4	4P

Sensor Rating	
04~08	400A~800A
08~16	800A~1600A
10~20	1000A~2000A
12~25	1200A~2500A
16~32	1600A~3200A
16~32	1600A~3200A
20~40	2000A~4000A
25~50	2500A~5000A

UAA — 16 D 3 — 00

Frame Type
UAA

Frame Size	
08	800AF
16	1600AF
20	2000AF
25	2500AF
32	3200AF
40	4000AF
50	5000AF

Phasing	
D	3/4P Standard RST(N)
W	4P Reversed NRST
E	3/4P Standard RST(N)
X	4P Reversed NRST
G	3/4P Standard RST(N)
Z	4P Reversed NRST

Poles	
3	3P
4	4P

Sensor Rating
Not applied

Motor Operator	
MA	None (Manual operated)
M1	AC/DC 100V~125V
M2	AC/DC 200V~250V
M3	DC 125V
M4	DC 24V~30V
M5	DC 48V~60V
M8	AC 48V

Shunt Trip	
D0	None
D1	AC/DC 100V~125V
D2	AC/DC 200V~250V
D3	DC 125V
D4	DC 24V~30V
D5	DC 48V~60V
D7	AC 48V

Trip relay
Refer to 21page

Option

Closing Coil	
D0	None
D1	AC/DC 100V~125V
D2	AC/DC 200V~250V
D3	DC 125V
D4	DC 24V~30V
D5	DC 48V~60V
D7	AC 48V

Charging/Auxiliary Switch	
HX	High capacity OFF charge/5a5b
HC	High capacity ON charge/5a5b

UVT	
U0	None
U1	AC/DC 100V~125V
U2	AC/DC 200V~250V
U3	DC 125V
U4	DC 24V~30V
U5	DC 48V~60V
U6	AC 380V~480V
U7	AC 48V

Code	Description		Code		Description
AL	AL1+MRB		M	MI	Mechanical interlock
A1	AL1+MRB +RES(AC110~130V) *AC only		D	DI or MOC	Door Interlock or MOC(Mechanism operated cell switch)
A2	AL1+AL2 +MRB		K	K1	Key Lock
A3	AL1+MRB +RES(DC110~125V) *DC only		K2	K2	Key Interlock Set
A4	AL1+MRB +RES(AC200~250V) *AC only		K3	K3	Key Interlock Double
A5	AL1+MRB +Auto Reset		R	RCS	Ready to Close switch
A6	AL1+AL2 +MRB +Auto Reset		T	TM	Temperature Monitoring
A7	AL1+MRB +RES(DC110~125V) +Auto Reset *DC only		H1	SHT2 Note 2)	AC/DC 100V ~125V, Double Shunt coil
A8	AL1+MRB +RES(AC200~250V) +Auto Reset *AC only		H2		AC/DC 200V ~250V, Double Shunt coil
A9	AL1+MRB +RES(AC110~130V) +Auto Reset *AC only		H3		DC 125V, Double Shunt coil
C	C	COUNTER	H4		DC 24V ~30V, Double Shunt coil
S	CS2	Charge switch communication	H5		DC 48V ~60V, Double Shunt coil
B	B	On/Off Button lock	H7		AC 48V, Double Shunt coil

N01	A4 (AL1+MRB +RES(AC200~250V))+C(Counter)+B(ON/OFF Button Lock)+K(Key Lock)+R(Ready to Close switch)+M(Mechanic Interlock)+E(Spring Auto Release)
N02	AL (AL1+MRB)+K(Key Lock(OFF Lock))+R(Ready to Close switch)+D(Door Interlock or MOC)+H1(AC/DC 100V ~ 130V, Double Shunt coil)+E(Spring Auto Release)
N03	C(Counter)+B(ON/OFF Button Lock)+K2(Key Interlock Set)+R(Ready to Close switch)+T(Temperature Monitoring)
N04	A4(AL1+MRB+RES(AC200~250V))+B(ON/OFF Button Lock)+K(Key Lock(OFF Lock))+M(Mechanical Interlock)+T(Temperature Monitoring)
N05	A1(AL1+MRB+RES110~130V)+B(ON/OFF Button Lock)+K(Key Lock(OFF Lock))+R(Ready to Close switch)+M(Mechanical Interlock)+T(Temperature Monitoring)
N06	A2(AL1+AL2+MRB)+C(Counter)+K(Key Lock(OFF Lock))+R(Ready to Close switch)+T(Temperature Monitoring)

Note) * Codes for over 5 optional accessories are composed separately
**UVT and SHT2 can not be selected together. Select one of two.

Air circuit breakers

Numbering system

Adapter (Cradle)

UAL — **S16D** **3** — **A** **H** **E** **S**

UAL — For UL ACB Cradle type

S16D — Frame Size Note)

S16D	1600AF
S20E	2000AF
S25E	2500AF
S32E	3200AF
S40E	4000AF
S50G	5000AF

3 — Number of poles

3	3P
4	4P

A — Secondary Connector type

A	Connector type
B	Screw joint type
C	Spring tension type

H — Terminal configuration

H	Horizontal type
V	Vertical type
M	Line: Horizontal Load: Vertical
N	Line: Vertical Load: Horizontal
P	Front type
G	Horizontal-con type
W	Vertical-con type

E — Shutter

E	Without safety shutter
F	With safety shutter

S — Other options

S	Arc cover

* Terminals for P type must be ordered separately
* G and W types can be applicable to S16D (1600AF) only.

Note) The corresponding Breaker Adapter

Breaker		Adapter
UAS-08D	UAS-08W	S16D
UAS-16D	UAS-16W	
UAH-08E	UAH-08X	S20E
UAH-16E	UAH-16X	
UAH-20E	UAH-20X	
UAH-25E	UAH-25X	S25E
UAH-32E	UAH-32X	S32E
UAH-32G	UAH-32Z	S50G
UAH-40G	UAH-40Z	
UAH-50G	UAH-50Z	

Trip relay

N	G	O
OCR(Trip Unit) type	Communication & Ground fault protection	Control voltage & frequency

0	No OCR

N		G		O		
N	Normal	G	Ground fault, No Communication	0	Self-power	60Hz
				5	Self-power	50Hz

A		G		O		
A	Ammeter	G	Ground fault, No Communication	0	No Control voltage	60Hz
		C	Ground fault and Communication	1	AC/DC 110V~250V	60Hz
		E	Ground fault(with external CT), No Communication	2	DC 24V~60V	60Hz
		X	Ground fault(with external CT) and Communication	5	No Control voltage	50Hz
				6	AC/DC 110V~250V	50Hz
				7	DC 24V~60V	50Hz

P		C		1		
P	Power meter	C	Ground fault and Communication	1	AC/DC 110V~250V	60Hz
		X	Ground fault(with external CT) and Communication	2	DC 24V~60V	60Hz
				6	AC/DC 110V~250V	50Hz
				7	DC 24V~60V	50Hz

S		C		1		
S	Supreme meter	C	Communication	1	AC/DC 110V~250V	60Hz
		X	Ground fault and Communication	2	DC 24V~60V	60Hz
				6	AC/DC 110V~250V	50Hz
				7	DC 24V~60V	50Hz

* Ground fault detection by current vector sum of 4 phase (R,S,T,N)
* Communication and output contacts for L,S,I,G do not work except OCR LED without control power supply.
* P and S types require Voltage Module to be ordered separately.
* LCD in trip unit can be display more than 10% of rated current.
* Currnet measuring value display more than 15% of rated current.

Molded case circuit breakers

UTE/UTS 2, 3 pole series up to 1200AF

Maximum
Rated Current
(Amperes)

Circuit Breaker		UTE100		UTE100		UTS150		
Breaker Type		E	N	E	N	N	H	L
Pole		2		3		2, 3		
Breaker Capacity	120/240V	50	65	50	65	-	-	-
(kA rms)	240V	50	65	50	65	65	100	150
ac50~60Hz	480V	25	35	25	35	35	65	100
NEMA, UL	600V	-	-	-	-	18	35	50
	600Y347V	14	18	14	18	-	-	-
MCCB	Amperes	15~100A		15~100A		40~150A		
Trip Units	ATU	-		-		●		
F : Fixed A : Adjustable	FMU	-		●		●		
T : Thermal M : Magnetic	FTU	●		●		●		
E : Electronics	ETM	-		-		-		
MCP	Amperes	-		-		1.6~60A		
						70~150A		
	MCP	-		-		●		
MCS	Amperes	100A		100A		150A		
	MCS	●		●		●		
Unit Mounted		●		●		●		
Rear Connection		-		-		-		
Mechanical Lugs		●		●		●		
Power Distribution connectors		-		-		-		
Busbar connectors		●		●		●		
Control Wire Terminal Kit		-		-		●		
Terminal Shields		-		-		-		
Interphase Barriers		●		●		●		
Shunt Trip		●		●		●		
Undervoltage Trip		●		●		●		
Auxiliary Switch		●		●		●		
Alarm Switch		●		●		●		
Flange Cable Handle		-		●		●		
Flange Variable-Depth Mechanism		-		●		●		
Directly-Mounted Rotary Operating Handle		-		●		●		
NEMA-Door-Mounted Operating Mechanisms		-		●		●		
IEC-Door-Mounted Operating Mechanisms		-		●		●		
Mechanical Interlocks		-		●		●		
Handle Padlock Attachment		●		●		●		
Dimensions		W	H	D		W	H	D
Inches(mm)	2-Pole	2.01(51)	5.12(130)	3.23(82)		4.13(105)	6.46(165)	3.39(86)
	3-Pole	2.99(76)	5.12(130)	3.23(82)		4.13(105)	6.46(165)	3.39(86)

UTS250			UTS400			UTS600			UTS800			UTS1200			
N	H	L	N	H	L	N	H	L	N	H	L	N	H	P	L
2, 3			2, 3			2, 3			3			3			
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	100	150	65	100	150	65	100	150	65	100	150	50	100	65	150
35	65	100	35	65	100	35	65	100	35	65	100	35	65	50	100
18	35	50	18	35	50	18	35	50	18	35	50	18	25	50	35
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
150~250A			250/300/350/400A			500/600A			400/600/630/800A			800/1000/1200A			
●			●			●			-			-			
●			●			●			-			-			
●			●			●			-			-			
-			-			-			●			●			
150~250A			320A			500A			800A			1200A			
-			-			-			-			-			
●			●			●			●			●			
250A			400A			600A			800A			1200A			
●			●			●			●			●			
●			●			●			●			●			
-		-			-			-				-			
●			●			●			●			●			
-			-			-			-			-			
●			●			●			●			●			
●			-			-			-			-			
-			●			●			●			●			
●			●			●			●			●			
●			●			●			●			●			
●			●			●			●			●			
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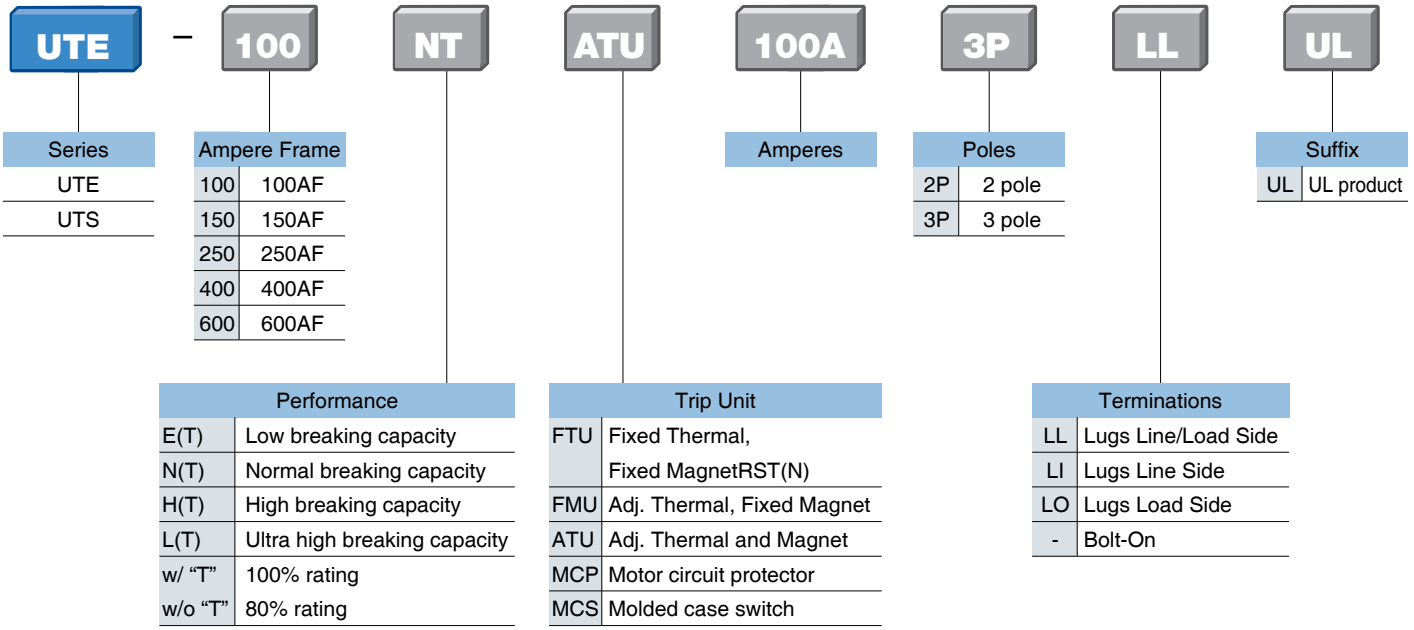
●			●			●			●			●			
●			●			●			●			●			
●			●			●			●			●			
●			●			●			●			●			
W	H	D	W	H	D	W	H	D	W	H	D	W	H	D	
4.13(105)	7.48(190)	3.39(86)	5.51(140)	11.5(292)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	8.5(216)	13(330)	6(152.5)	8.5(216)	16.26(413)	6(152.5)	
4.13(105)	7.48(190)	3.39(86)	5.51(140)	11.5(292)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	8.5(216)	13(330)	6(152.5)	8.5(216)	16.26(413)	6(152.5)	

Molded case circuit breakers

Numbering system

UL MCCB 100~600AF



Series
UTE
UTS

Ampere Frame	
100	100AF
150	150AF
250	250AF
400	400AF
600	600AF

Performance	
E(T)	Low breaking capacity
N(T)	Normal breaking capacity
H(T)	High breaking capacity
L(T)	Ultra high breaking capacity
w/ “T”	100% rating
w/o “T”	80% rating

Trip Unit	
FTU	Fixed Thermal, Fixed MagnetRST(N)
FMU	Adj. Thermal, Fixed Magnet
ATU	Adj. Thermal and Magnet
MCP	Motor circuit protector
MCS	Molded case switch

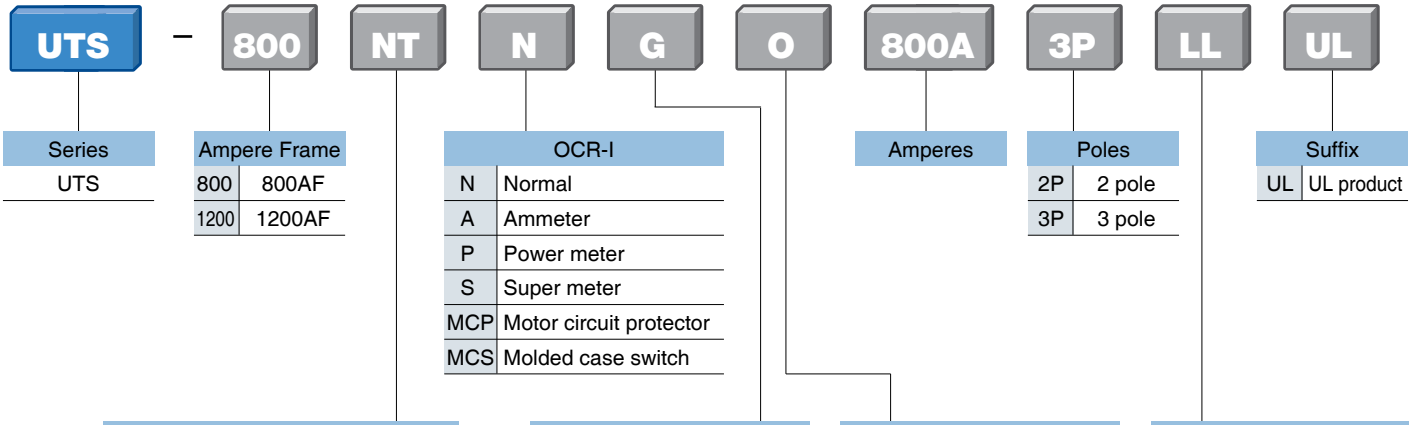
Amperes

Poles	
2P	2 pole
3P	3 pole

Terminations	
LL	Lugs Line/Load Side
LI	Lugs Line Side
LO	Lugs Load Side
-	Bolt-On

Suffix	
UL	UL product

UL MCCB 800~1200AF



Series
UTS

Ampere Frame	
800	800AF
1200	1200AF

OCR-I	
N	Normal
A	Ammeter
P	Power meter
S	Super meter
MCP	Motor circuit protector
MCS	Molded case switch

Amperes

Poles	
2P	2 pole
3P	3 pole

Suffix	
UL	UL product

Performance	
E(T)	Low breaking capacity
N(T)	Normal breaking capacity
H(T)	High breaking capacity
L(T)	Ultra high breaking capacity
w/ “T”	100% rating
w/o “T”	80% rating

OCR-II	
G	Communication(X)
E	Com.(O)+Outer CT(G/F)
C	Communication(O)
X	Com.(O)+Outer CT(G/F)

OCR-III	
0	Power(x), 60Hz
1	AC/DC 110~220V, 60Hz
2	AC/DC 24~48V, 60Hz
5	Power(x), 50Hz
6	AC/DC 110~220V, 50Hz
7	AC/DC 24~48V, 50Hz

Terminations	
LL	Lugs Line/Load Side
LI	Lugs Line Side
LO	Lugs Load Side
-	Bolt-On

Miniature circuit breakers

UL MCB

BK63H-UL 1P

BK63H-UL 2P

BK63H-UL 3P

BK63H-UL 4P

Ratings

Performance	UL489 MCB *	UL1077 MCB
Standard	UL489, UL486E(Lug)	UL 1077
Protection	Overload, Short circuit	Overload, Short circuit
Rated current	1, 2, 3, 4, 6, 10 ,16, 20 ,25, 32, 40, 50, 63A	1, 2, 3, 4, 6, 10 ,16, 20 ,25, 32, 40, 50, 63A
Number of poles	1P, 2P, 3P	1P, 2P, 3P, 4P
Rated short circuit capacity	1P: 10kA @120/240VAC,1~63A 2~3P: 10kA @240VAC, 1~63A 1P: 10kA @277VAC, 1~25A 2~3P: 10kA @480Y/277VAC, 1~25A	1P: 10kA @120/240VAC 6kA @277VAC 2~4P: 10kA @120/240VAC 6kA @480Y/277VAC
Rated frequency	50/60 Hz	50/60 Hz
Reference temperature	40℃	40℃
Normal ambient temperature	-5 ~ 40℃	-5 ~ 40℃
Tripping curve	B, C, D Curve	B, C, D Curve
Trip type	Thermal Magnetic	Thermal Magnetic
Type of terminals	Terminal with stirrup(indirect pressure)	Terminal with stirrup(indirect pressure)
Terminal size acceptability - Min/Max	14 / 4AWG	14 / 4AWG
Tightening Torque	3.9 Nm (35 lbf-in)	2Nm (17.5 lbf-in)
Installation	Mounting on 35mm Din rail	Mounting on 35mm Din rail
Dimension of specimen (W×H×D)	18×105×66 (1P)	18×81×66 (1P)
Protection degree	IP20	IP20
Accessory	AX-HU, AL-HU, SHT-HU, UVT-HU	AX-H, AL-H, SHT-H, UVT-H
Relative humidity	45~85%RH	45~85%RH
Electrical Endurance	6,000	6,000
Maximum switching frequency (time/h)	360/h	360/h
Approvals	UL	UL, CB, CCC

* Will be available within 2015

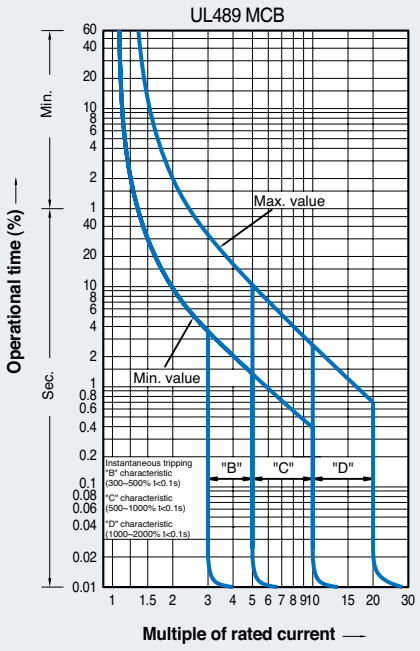
Miniature circuit breakers

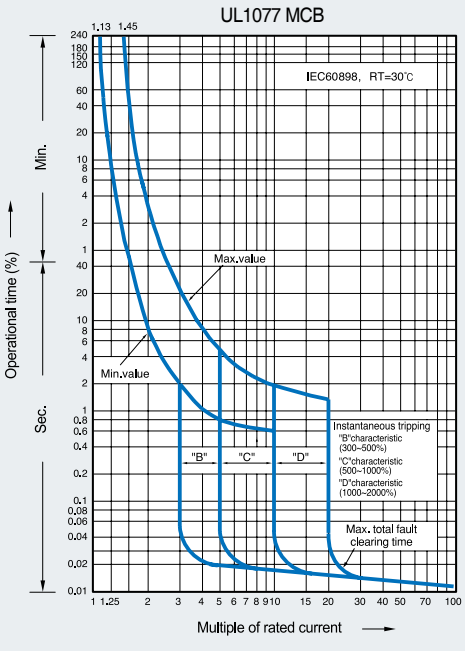
Operating curve/Numbering system

UL489/1077 MCB

BK	63H	U	1P	B	63A	10kA	240VAC	UL489
Series	AF	Standard	Pole	Type	A	KA	Rated voltage	Standard
MCB	63	U UL489	1P	B-Type	1, 2, 3, 4, 6, 10, 20, 25, 32, 40, 50, 63A	6	120/240VAC	UL489
		UL1077	2P	C-Type		10	240VAC	UL1077
			3P	D-Type			277VAC	
			4P				480Y/277VAC	

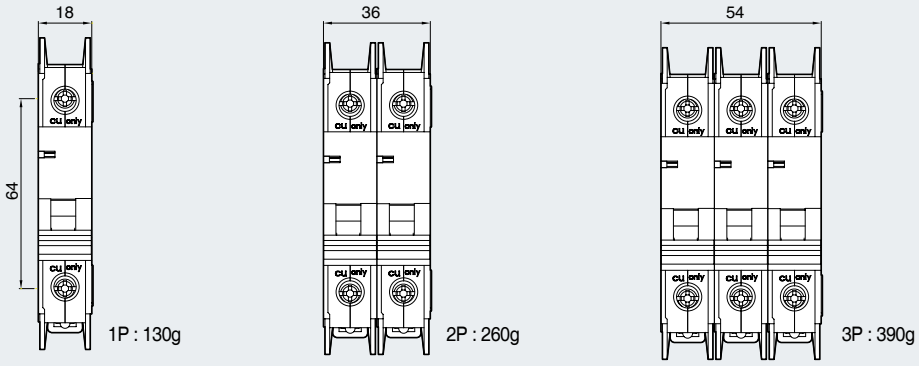
Operating curve

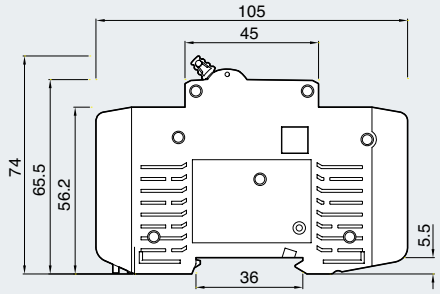




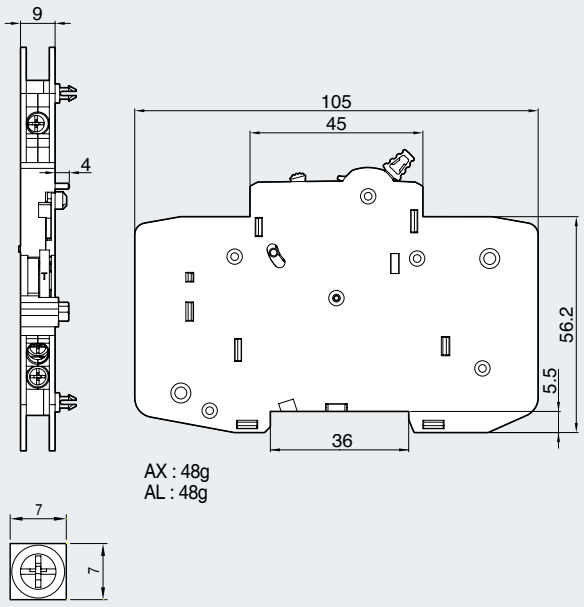
Dimensions

UL489 MCB



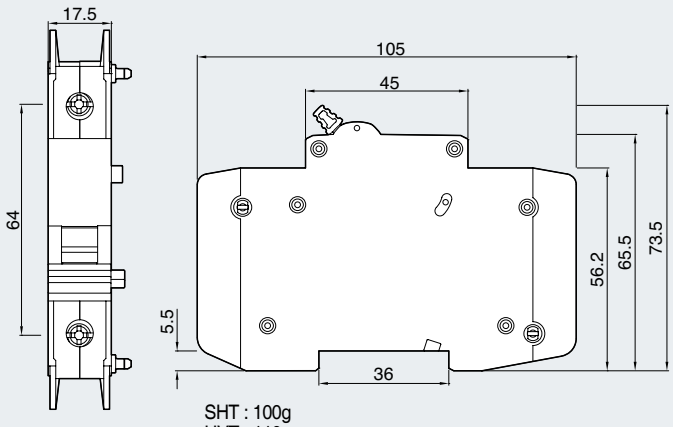


AX-HU/AL-HU



AX : 48g
AL : 48g

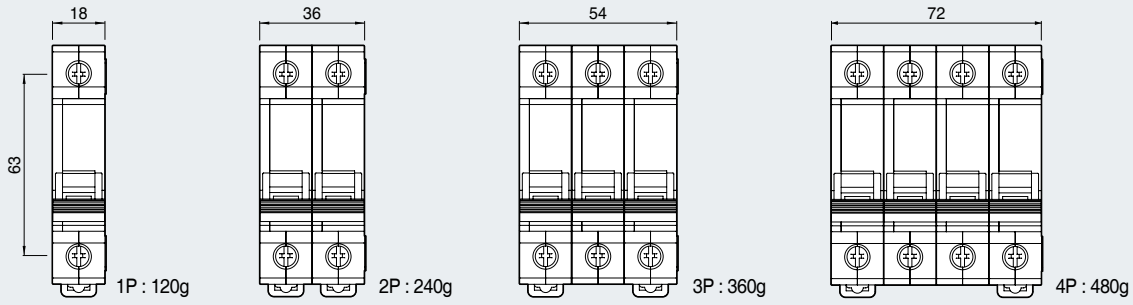
SHT-HU/UVT-HU

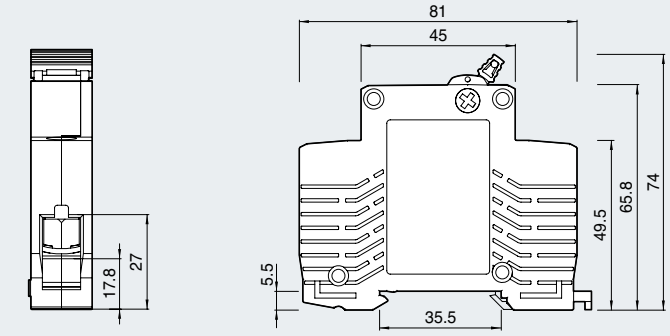


SHT : 100g
UVT : 110g

Dimensions

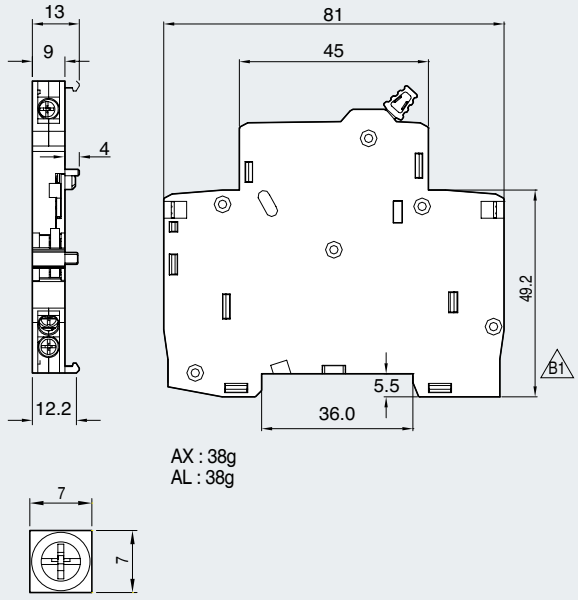
UL1077 MCB

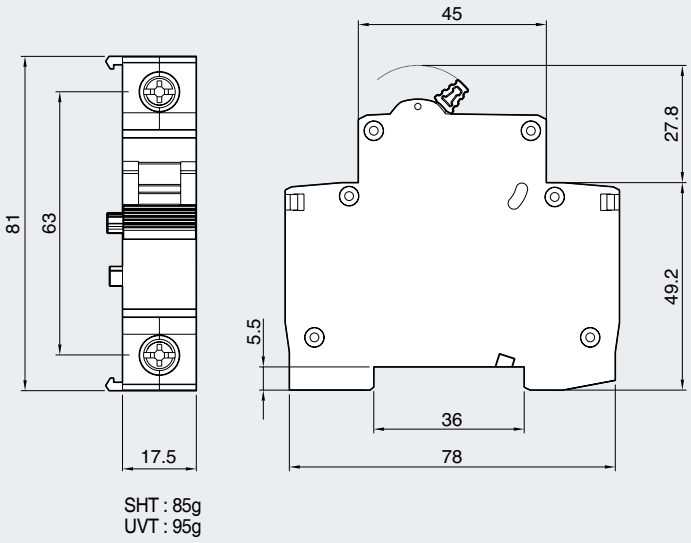




AX-H/AL-H

SHT-H/UVT-H





Accessory

Accessory numbering

AX — **H** **UL1077**

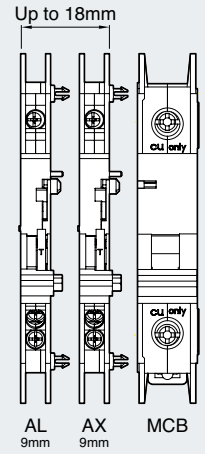
Accessory	
AX	Auxiliary switch
AL	Alarm switch
SHUT	shunt trip device
UVT	Under voltage trip device

applicable product	
H (UL1077)	BK63H
HU (UL489)	BK63HU

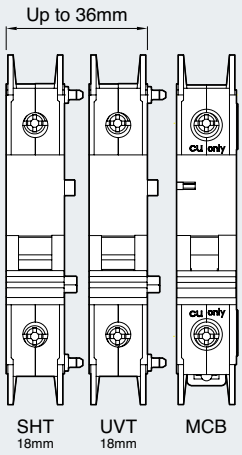
applied standard	
UL1077	UL1077
UL489	UL489

Accessory connecting

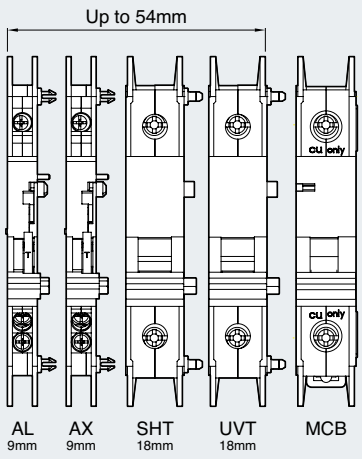
• Aux. contacts



• Tripping devices



• Both Aux. contacts and Tripping devices



Contactors & Overload relays

Metasol MC 3P 18 to 150A

MC type
Magnetic Contactors

Frame size				18AF				22AF			
Type				MC-6a	MC-9a	MC-12a	MC-18a	MC-9b	MC-12b	MC-18b	MC-22b*
	screws clamp terminals			●	●	●	●	●	●	●	●
Number of poles				3pole				3pole			
Rated operational voltage, Ue				690V				690V			
Rated insulation voltage, Ui				690V				690V			
Rated frequency				50/60Hz				50/60Hz			
Rated impulse withstand voltage, Uimp				6kV				6kV			
Maximum operating rate in operating cycles per hour(AC3)				1800 operations per hour				1800 operations per hour			
Durability	Mechanical			15 mil. operations				15 mil. operations			
	Electrical			2.5 mil. operations				2.5 mil. operations			
UL rating (50/60Hz)	Continuous current		A	25	25	25	32	25	25	40	40
	Single phase	110~120V	HP	0.5	0.5	0.75	1	0.5	0.75	1	2
		220~240V	HP	1.5	1.5	2	3	1.5	2	3	3
	Three phase	200~208V	HP	2	2	3	5	2	3	5	7.5
		220~240V	HP	3	3	5	7.5	3	5	7.5	10
		440~480V	HP	5	5	7.5	10	5	7.5	10	15
		550~600V	HP	7.5	7.5	10	15	7.5	10	15	20
	NEMA size			00	00	0	1	00	00	1	
Size and weight	AC control	Weight	kg	0.33				0.34			
		Size	inch	1.77×2.89×3.17				1.77×2.89×3.44			
		W×H×D	(mm)	(45×73.5×80.4)				(45×73.5×87.4)			
	DC control	Weight	kg	0.5				0.51			
		Size	inch	1.77×2.89×4.36				1.77×2.89×4.63			
		W×H×D	(mm)	(45×73.5×110.7)				(45×73.5×117.7)			
Auxiliary(standard)				1NO or 1NC				1NO1NC			
Auxiliary	Side mount			UA-1				UA-1			
	Front mount			UA-2, UA-4				UA-2, UA-4			

Note) Minimum conduct current of Auxiliary contactor is DC 17V 5mA.

MT type
Thermal Overload Relays

Type				MT-12/□	MT-32/□
	Screws clamp terminals			●	●
Rated operational voltage, Ue				690V	690V
Rated insulation voltage, Ui				690V	690V
Rated impulse withstand voltage, Uimp				6kV	6kV
Trip class				10A, 20	10A, 20
Setting range				0.1~18A	0.1~40A
Size and weight		Weight	kg	0.1	0.17
		Size	inch	1.77×2.88×2.51	1.77×2.95×3.54
		W×H×D	(mm)	(45×73.2×63.7)	(45×75×90)

* The safety cover of magnetic contactor and thermal overload relay is optional.

40AF		65AF		100AF			150AF	
MC-32a	MC-40a	MC-50a	MC-65a	MC-75a	MC-85a	MC-100a	MC-130a	MC-150a
●	●	●	●	●	●	●	●	●
3pole		3pole		3pole			3pole	
690V		690V		690V			690V	
1000V		1000V		1000V			1000V	
50/60Hz		50/60Hz		50/60Hz			50/60Hz	
8kV		8kV		8kV			8kV	
1800 operations per hour		1800 operations per hour		1800 operations per hour			1200 operations per hour	
12 mil. operations		12 mil. operations		12 mil. operations			5 mil. operations	
2 mil. operations		2 mil. operations		2 mil. operations			1 mil. operations	
50	60	70	100	110	135	160	160	210
2	3	3	5	5	7.5	10	10	15
5	7.5	10	15	15 15	20		20	25
7.5	15	20	25	25	30	30	40	40
10	15	25	30	30	40	40	40	50
20	30	40	50	50	60	75	75	100
25	30	50	60	60	75	75	75	75
1P	2				3			4
0.4		0.9		1.6			2.4	
1.77×3.27×3.54 (45×83×90)		2.17×4.17×4.69 (55×106×119)		2.76×5.51×5.35 (70×140×135.8)			3.74×6.22×5.20 (95×158×132)	
0.6		1.2		2.6			2.3	
1.77×3.27×4.61 (45×83×117.1)		2.17×4.17×5.76 (55×106×146.4)		2.76×5.51×6.78 (70×140×172.3)			3.74×6.22×5.20 (95×158×132)	
UA-1		UA-1		UA-1			UA-1	
UA-2, UA-4		UA-2, UA-4		UA-2, UA-4			UA-2, UA-4	

MT-32/□	MT-63/□	MT-95/□	MT-150/□
●	●	●	●
690V	690V	690V	690V
690V	690V	690V	690V
6kV	6kV	6kV	6kV
10A, 20	10A, 20	10A, 20	10A, 20
0.1~40A	0.1~40A	7~100A	0.1~40A
0.17	0.17	0.48/0.5	0.17
1.77×2.95×3.54 (45×75×90)	1.77×2.95×3.54 (45×75×90)	2.76×3.82×4.33 (70×97×110)	1.77×2.95×3.54 (45×75×90)

Contactors & Overload relays

Metasol MC 3P 225 to 2100A

MC type
Magnetic Contactors

Frame size				225AF		400AF		
Type				MC-185a	MC-225a	MC-265a	MC-330a	MC-400a
	screws clamp terminals			●	●	●	●	●
Number of poles				3pole		3pole		
Rated operational voltage, Ue				690V		690V		
Rated insulation voltage, Ui				1000V		1000V		
Rated frequency				50/60Hz		50/60Hz		
Rated impulse withstand voltage, Uimp				8kV		8kV		
Maximum operating rate in operating cycles per hour(AC3)				1200 operations per hour		1200 operations per hour		
Durability	Mechanical			5 mil. operations		5 mil. operations		2.5 mil. operations
	Electrical			1 mil. operations		1 mil. operations		0.5 mil. operations
UL rating	Continuous current		A	230	275	300	350	450
(50/60Hz)	Single	110~120V	HP	15	15	-	-	-
	phase	220~240V	HP	30	40	-	-	-
		200~208V	HP	60	60	75	100	125
	Three	220~240V	HP	60	75	100	125	150
	phase	440~480V	HP	125	150	200	250	300
		550~600V	HP	125	150	200	250	300
	NEMA size					5		
Size and weight	AC control	Weight	kg	5.4		9.2		
		Size W×H×D	inch (mm)	5.43×7.99×7.16 (138×203×181)		6.48×9.92×7.80 (163×243×198)		
	DC control	Weight	kg					
		Size W×H×D	inch (mm)					
Auxiliary(standard)				2NO2NC		2NO2NC		
Auxiliary	Side mount			AU-100 (Max.4NO4NC)		AU-100 (Max.4NO4NC)		
	Front mount			-		-		

MT type
Thermal Overload Relays

Type				MT-225/□	MT-400/□
	Screws clamp terminals			●	●
Rated operational voltage, Ue				690V	690V
Rated insulation voltage, Ui				690V	690V
Rated impulse withstand voltage, Uimp				6kV	6kV
Trip class				10A, 20	10A, 20
Setting range				65~240A	85~400A
Size and weight		Weight	kg	2.5	2.6
		Size W×H×D	inch (mm)	5.79×5.55×7.24 (147×141×184)	5.94×6.73×7.79 (151×171×198)

* The safety cover of magnetic contactor and thermal overload relay is optional.

800AF		
MC-500a	MC-630a	MC-800a
●	●	●
3pole		
690V		
1000V		
50/60Hz		
8kV		
1200 operations per hour		
2.5 mil. operations		
0.5 mil. operations		
580	660	900
-	-	-
-	-	-
150	200	200
200	250	300
400	500	600
400	500	600
6		7
22.4		
11.22×12.29×9.53		
(285×312×242)		

2NO2NC
AU-100 (Max.4NO4NC)
-

MT-800/□
●
690V
690V
6kV
10A, 20
200~800A
11.5
14.17×20.87×8.35
(360×530×212)

2100AF		
MC-1400a	MC-1700a	MC-2100a
●	●	●
3pole		
1000V		
1040V		
50/60Hz		
8kV		
3000 operations per hour		
0.5 mil. operations		
0.05 mil. operations		
1400	1700	2100
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
33.8		
17×15×9.7		
(431×380×246)		

2NO2NC
AU-100, AU-100E (Max.4NO4NC)
-

Contactors & Overload relays

Metasol MC 4P 18 to 85A

MC type
Magnetic Contactors

Frame size				18AF			
Type				MC-6a/4	MC-9a/4	MC-12a/4	MC-18a/4
	Screw clamp terminal			●			
Number of poles				4pole			
Rated operational voltage (Ue)				690V			
Rated insulation voltage (Ui)				690V			
Rated frequency				50/60Hz			
Rated impulse withstand voltage, Uimp				6kV			
Maximum operating rate in operating cycles per hour(AC1)				1800 operations per hour			
Durability	Mechanical			15 mil. Operations			
	Electrical			0.5 mil. Operations		0.8 mil. Operations	
UL rating	Continuous current		A	25	25	25	32
(50/60Hz)	Single	110~120V	HP	0.5	0.5	0.75	1
	Phase	220~240V	HP	1.5	1.5	2	3
		200~208V	HP	2	2	3	5
	Three	220~240V	HP	3	3	5	7.5
	Phase	440~480V	HP	5	5	7.5	10
		550~600V	HP	7.5	7.5	10	15
	NEMA Size		Size and	00	00	0	0
AC	Weight	kg		0.33			
weight	Control	Size	inch	1.77×2.89×3.11			
		W×H×D	(mm)	(45×73.5×79)			
	DC	Weight	kg	0.5			
	Control	Size	inch	1.77×2.89×4.36			
		W×H×D	(mm)	(45×73.5×110.7)			
Auxiliary(standard)				-			
Auxiliary	Side Mount			UA-1			
	Front Mount			AU-2, AU-4			

22AF	40AF		85AF			
MC-22a/4	MC-32a/4	MC-40a/4	MC-50a/4	MC-65a/4	MC-75a/4	MC-85a/4
●	●		●			
4pole	4pole		4pole			
690V	690V		690V			
690V	690V		1000V			
50/60Hz	50/60Hz		50/60Hz			
6kV	6kV		8kV			
1800 operations per hour	1800 operations per hour		1800 operations per hour			
15 mil. Operations	15 mil. Operations		12 mil. Operations			
1 mil. Operations	1 mil. Operations		1 mil. Operations			
32	45	50	70	80	90	100
2	2	3	3	5	5	7.5
3	5	5	7.5	10	15	15
7.5	7.5	10	10	15	20	25
7.5	10	10	15	20	25	30
10	20	25	30	40	50	50
15	20	25	30	40	50	50
1	1	1	2	2	2	3
0.4	0.59		1.2			
1.86×3.15×3.42	2.32×3.29×3.72		3.58×4.86×4.64			
(47.2×80×86.8)	(59×83.5×94.5)		(91×123.5×117.8)			
0.5	0.7		1.29			
1.86×3.15×4.47	2.32×3.29×4.76		3.58×4.86×4.64			
(47.2×80×113.2)	(59×83.5×121)		(91×123.5×117.8)			
-	-		-			
AU-1	AU-1		AU-1			
AU-2, AU-4	AU-2, AU-4		AU-2, AU-4			

MC type
Magnetic Contactors

Frame size				225AF				
Type				MC-100a/4	MC-130a/4	MC-150a/4	MC-185a/4	MC-225a/4
	Screw clamp terminal					●		
Number of poles				4pole				
Rated operational voltage (Ue)				690V				
Rated insulation voltage (Ui)				1000V				
Rated frequency				50/60Hz				
Rated impulse withstand voltage, Uimp				8kV				
Maximum operating rate in operating cycles per hour(AC1)				1200 operations per hour				
Durability	Mechanical			5 mil. Operations				
	Electrical			0.8 mil. Operations				
UL rating	Continuous current		A	160	160	210	230	275
(50/60Hz)	Single	110~120V	HP	7.5	10	15	15	15
	Phase	220~240V	HP	15	20	25	30	40
		200~208V	HP	30	40	40	60	60
	Three	220~240V	HP	30	40	50	60	75
	Phase	440~480V	HP	60	75	100	125	150
		550~600V	HP	60	75	100	125	150
	NEMA Size		Size and	3	3	4	4	4
AC	Weight	kg						
weight	Control	Size	inch			5.6		
		W×H×D	(mm)			6.89×7.99×7.28		
	DC	Weight	kg			(175×203×185)		
	Control	Size	inch					
		W×H×D	(mm)					
Auxiliary(standard)				2a2b				
Auxiliary	Side Mount			AU-100				
	Front Mount			-				

* - FLA = 722 A, LRA = 5618 A
** - FLA = 566 A, LRA = 4495 A

400AF		
MC-265a/4	MC-330a/4	MC-400a/4
	●	
	4pole	
	690V	
	1000V	
	50/60Hz	
	8kV	
	1200 operations per hour	
	2.5 mil. Operations	
	0.5 mil. Operations	
300	350	450
-	-	-
-	-	-
75	100	125
100	125	150
200	250	300
200	250	300
5	5	5
	9.9	
	8.11×9.57×8.07	
	(206×243×205)	

800AF		
MC-500a/4	MC-630a/4	MC-800a/4
	●	
	4pole	
	690V	
	1000V	
	50/60Hz	
	8kV	
	1200 operations per hour	
	2.5 mil. Operations	
	0.5 mil. Operations	
580	660	900
-	-	-
-	-	-
150	200	200
200	250	300
400	500	600 *
400	500	600 **
6	6	7
	26.3	
	13.62×12.20×9.61	
	(346×310 ×244)	

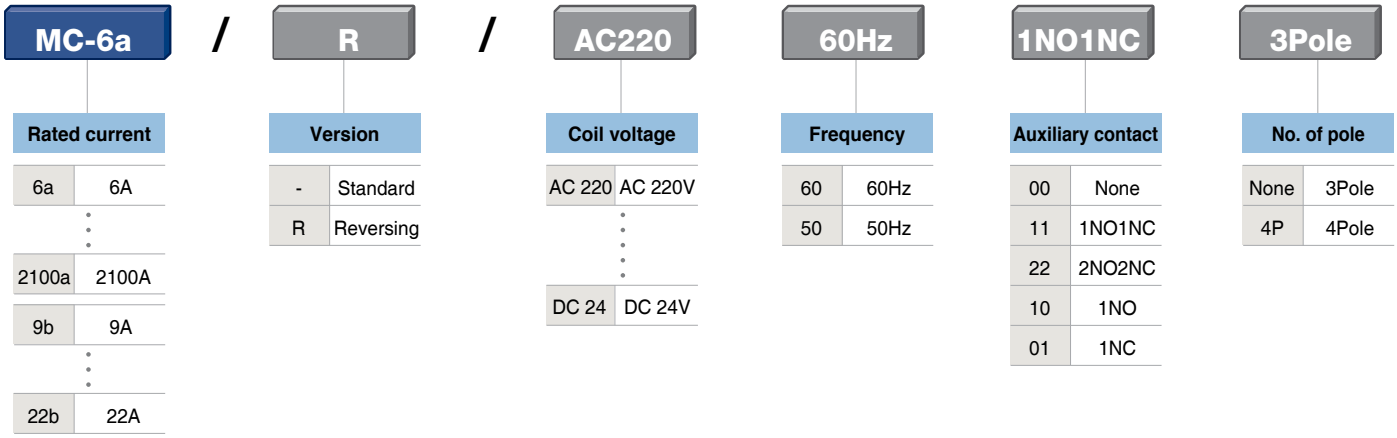
2a2b
AU-100
-

2a2b
AU-100
-

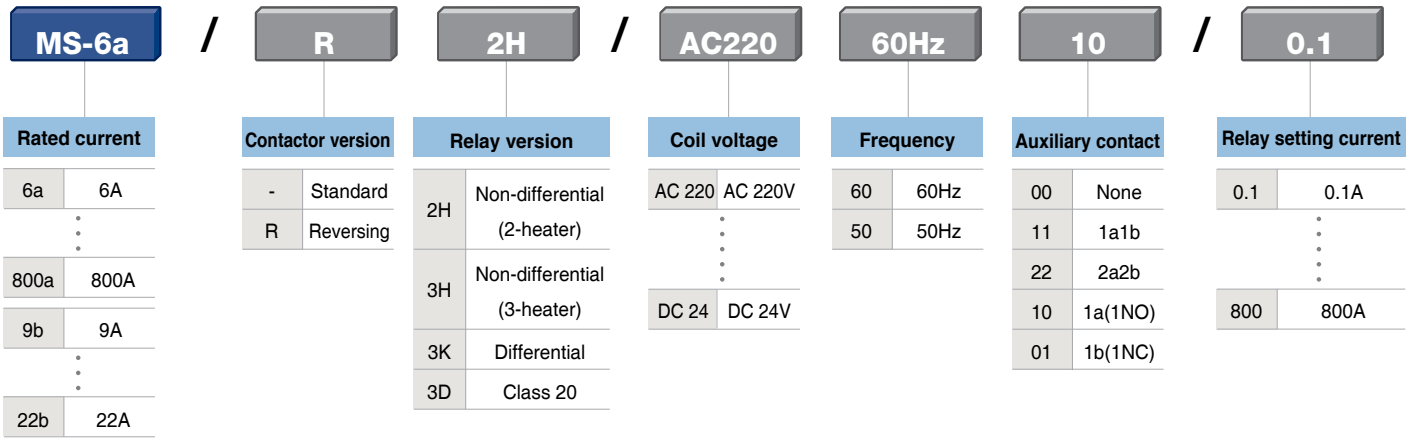
Contactors & Overload relays

Numbering system

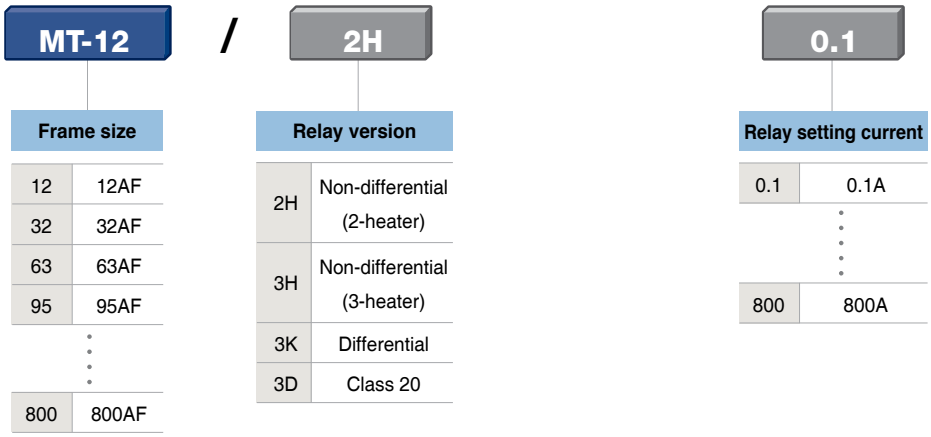
Contactors



Starters



Thermal Overload Relay



Optional Accessories

Auxiliary contact unit

UA-1 **11**

Version	
UA-1 AU-100 AU-100E	Side mount
UA-2	Front mount(2P)
UA-4	Front mount(4P)

Note) UA-2: 2NO, 1NO1NC, 2NC
UA-4: 4NO, 3NO1NC, 4NC, 2NO2NC, 1NO3NC

Contact composition	
11	1NO+1NC
20	2NO
02	2NC
40	4NO
31	3NO+1NC
22	2NO+2NC
13	1NO+3NC
04	4NC

Surge absorber

US11

Composition and voltage		
1	Varistor+RC	AC/DC 24~48V
2	Varistor+RC	AC/DC 100~125V
3	Varistor+RC	AC/DC 200~240V
4	Varistor+RC	AC 380~440V
5	Varistor+RC	AC 24~48V
6	Varistor+RC	AC 100~125V
11	Varistor	AC 200~240V
12	Varistor	DC 24~48V
13	Varistor	DC 100~125V
14	Varistor	DC 200~220V
22	RC	AC 100~125V

Interlock unit

UR02

Contact composition	
02	2NC
00	None

Wire kit for Interlocking

UW32

Frame size	
18	18AF
22	22AF
32	32AF
63	63AF
95	95AF

Interlock set (UR+UW)

RK32

Frame size	
32	32AF
63	63AF
95	95AF

Separate mounting unit (For relay)

UZ32

Frame size	
32	32AF
63	63AF
95	95AF
150	150AF

Remote reset unit (For relay)

UM

Cable length	
4R	400
5R	500
6R	600

Mini contactors

6 to 16A

Mini contactors 3NO main contacts 1 auxiliary contacts		 **Screw clamp type**		 **Fast-on type**		 **Cage clamp type**		 **Solder pin type**	
Frame size		***6A***		***9A***		***12A***		***16A***	
Screw clamp type	AC coil	GMC-6M		GMC-9M		GMC-12M		GMC-16M	
	DC coil	GMD-6M		GMD-9M		GMD-12M		GMD-16M	
Fast-on type	AC coil	GMC-6MF		GMC-9MF		GMC-12MF		GMC-16MF	
	DC coil	GMD-6MF		GMD-9MF		GMD-12MF		GMD-16MF	
Cage clamp type	AC coil	GMC-6MC		GMC-9MC		GMC-12MC		GMC-16MC	
	DC coil	GMD-6MC		GMD-9MC		GMD-12MC		GMD-16MC	
Solder pin type	AC coil	GMC-6MP		GMC-9MP		GMC-12MP		GMC-16MP	
	DC coil	GMD-6MP		GMD-9MP		GMD-12MP		GMD-16MP	
Ratings / IEC60947-4		kW	A	kW	A	kW	A	kW	A
AC1			20		20		20		20
AC3	200/240V	1.5	7	2.2	9	3	12	4	15
	380/440V	2.2	6	4	9	5.5	12	7.5	16
	500/550V	3	5	3.7	6	4	7	5.5	9
	690V	3	4	4	5	4	5	4	5
Ratings / UL508		hp	A	hp	A	hp	A	hp	A
continuous current		Ith = 20A (maximum for cage clamp type is 10A)							
single phase	120V	1/2		1/2		1 *		-	
	230V/240V	1		1.5		2 * *		-	
three phase	240V	1.5		3		3		-	
	480V	3		5		7.5 * * *		-	
	600V	3		5		7.5		-	
	Wire Range : Copper, 75°C, Stranded, 18-12AWG								
NEMA size		00		00		00		0	
Additional auxiliary contacts		**Screw clamp type**		**Fast-on type**		**Cage clamp type**		**Solder pin type**	
	2-pole, Front mount	AU-2M		AU-2MF		AU-2MC			
	4-pole, Front mount	AU-4M		AU-4MF		AU-4MC		AU-1MP	
	2-pole, Side mount	AU-1M		AU-1MF		AU-1MC			

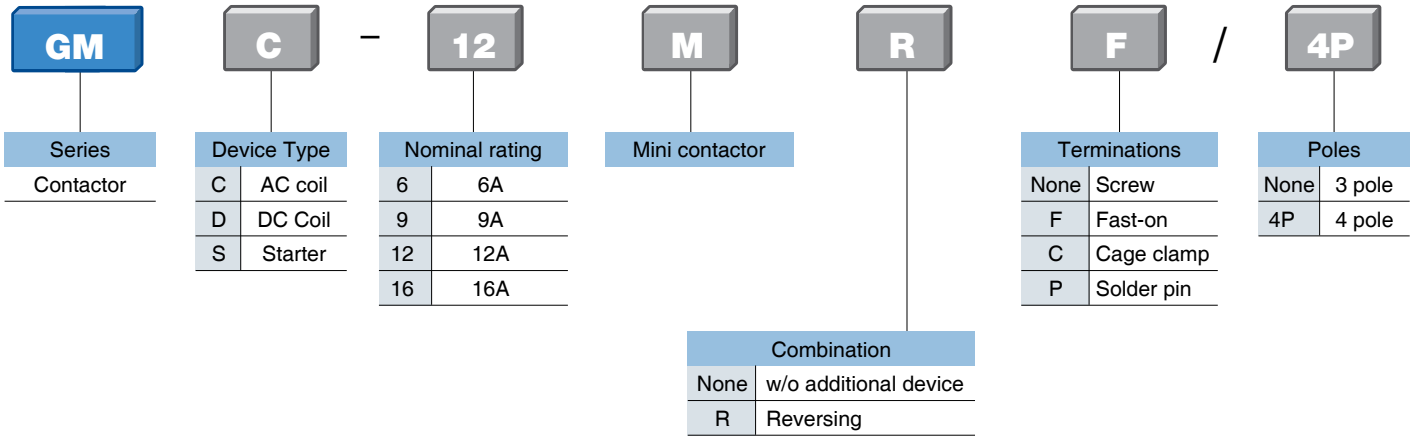
Note) * = 1/2 for cage clamp type, ** = 1.5hp for cage clamp type, *** = 5hp for cage clamp type
16AF : not approved from UL

Overload Relays

Bimetallic style Type GT	 GT-12M **Setting ranges (A)**: 0.1 - 0.16, 0.16 - 0.25, 0.25 - 0.4, 0.4 - 0.63, 0.63 - 1, 1 - 1.6, 1.6 - 2.5, 2.5 - 4, 4 - 6, 5 - 8, 6 - 9, 7 - 10, 9 - 13, 12 - 16 Base for separate mount
Differential	GTK-12M
Non-differential (3-heater)	GTH-12M/3
Non-differential (2-heater)	GTH-12M

Numbering system

Catalog Numbering [Mini-MC]



Series
Contactor

Device Type	
C	AC coil
D	DC Coil
S	Starter

Nominal rating	
6	6A
9	9A
12	12A
16	16A

Mini contactor

Combination	
None	w/o additional device
R	Reversing

Terminations	
None	Screw
F	Fast-on
C	Cage clamp
P	Solder pin

Poles	
None	3 pole
4P	4 pole

Catalog Numbering [Mini-TOR]

Series
Thermal Overload Relay

Device Type	
K	Differential type
H	Non-differential

Ampere frame	
12M	12AF Mini

No. of thermal elements (just for H type device)	
/3	3 elements
None	2 elements

Current range	
0.14	0.1 ~ 0.16A
⋮	
14	12 ~ 16A

Manual motor starters

Technical information

Manual motor controller (UL 508, CSA C22.2 as Manual motor controllers)

Combination Motor Controller
- Group Installation
- Type E starter

MMS 32S

Rated operational current Ie	*[A]*	*0.16*	*0.25*	*0.4*	*0.63*	*1*	*1.6*	*2.5*	*4*	*6*	*8*	*10*	*13*	*17*	*22*	*26*	*32*	*40*
Max. short-circuit current																		
240V	[kA]	100	100	100	100	100	100	100	100	100	100	50	50	40	30	30	20	20
480V	[kA]	50	50	50	50	50	50	50	50	25	25	10	10	10	10	7.5	7.5	7.5
600V	[kA]	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	5	5
Motor load																		
1 Phase 115V	[HP]	-	-	-	-	-	-	-	1/8	1/4	1/3	1/2	1/2	1	1½	2	2	3
230V	[HP]	-	-	-	-	-	1/10	1/6	1/3	1/2	1	1½	2	3	3	3	5	7½
3 Phase 200V	[HP]	-	-	-	-	-	-	1/2	3/4	1	2	2	3	3	5	7½	7½	10
230V	[HP]	-	-	-	-	-	-	1/2	3/4	1½	2	3	3	5	7½	7½	10	10
460V	[HP]	-	-	-	-	-	3/4	1	2	3	5	5	7½	10	15	15	20	30
575V	[HP]	-	-	-	-	1/2	3/4	1½	3	5	5	7½	10	15	20	20	30	30
Max. fuse size	[A]	1	1	1	1	3	6	10	15	20	30	40	50	60	80	100	125	125
Max. breaker size	[A]	15	15	15	15	15	15	15	15	20	30	40	50	60	80	100	125	125

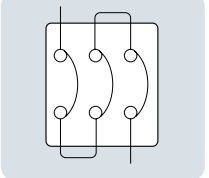
MMS 63S

Rated operational current Ie	*[A]*	*10*	*13*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*65*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	50	50	40	40	40	40	40	40	40	40
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1/2	1/2	1	1½	2	2	3	3	5	5
230V	[HP]	1½	2	3	3	3	5	7½	10	10	10
3 Phase 200V	[HP]	2	3	3	5	7½	7½	10	15	20	20
230V	[HP]	3	3	5	7½	7½	10	10	15	20	20
460V	[HP]	5	7½	10	15	15	20	30	30	40	40
575V	[HP]	7½	10	15	20	20	30	30	40	60	60
Maximum rated current of fuse or breaker	[A]	600	600	600	600	600	600	600	600	600	600

MMS 100S

Rated operational current Ie	**[A]**	**17**	**22**	**26**	**32**	**40**	**50**	**63**	**75**	**90**	**100**
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	50	50	50	50	50	50	40	40	40	40
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1	1½	2	2	3	3	5	5	7½	10
230V	[HP]	3	3	3	5	7½	10	10	15	20	20
3 Phase 200V	[HP]	3	5	7½	7½	10	15	20	20	25	30
230V	[HP]	5	7½	7½	10	10	15	20	25	30	30
460V	[HP]	10	15	15	20	30	30	40	50	60	75
575V	[HP]	15	20	20	30	30	40	60	60	75	100
Maximum rated current of fuse or breaker	[A]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

In case of 1-phase use in series as shown below



Combination Motor Controller
- Group Installation
- Type E starter

MMS 32H

Rated operational current Ie	*[A]*	*0.16*	*0.25*	*0.4*	*0.63*	*1*	*1.6*	*2.5*	*4*	*6*	*8*	*10*	*13*	*17*	*22*	*26*	*32*	*40*
Max. short-circuit current																		
240V	[kA]	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
480V	[kA]	65	65	65	65	65	65	65	65	65	65	65	65	30	30	30	30	30
600V	[kA]	25	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10
Motor load																		
1 Phase 115V	[HP]	-	-	-	-	-	-	-	1/8	1/4	1/3	1/2	1/2	1	1½	2	2	3
230V	[HP]	-	-	-	-	-	1/10	1/6	1/3	1/2	1	1½	2	3	3	3	5	7½
3 Phase 200V	[HP]	-	-	-	-	-	-	1/2	3/4	1	2	2	3	3	5	7½	7½	10
230V	[HP]	-	-	-	-	-	-	1/2	3/4	1½	2	3	3	5	7½	7½	10	10
460V	[HP]	-	-	-	-	-	3/4	1	2	3	5	5	7½	10	15	15	20	30
575V	[HP]	-	-	-	-	1/2	3/4	1½	3	5	5	7½	10	15	20	20	30	30
Maximum rated current of fuse or breaker	[A]	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500

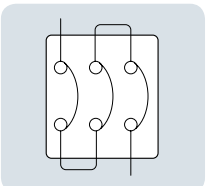
MMS 63H

Rated operational current Ie	*[A]*	*10*	*13*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*65*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	65	65	50	50	50	50	50	50	50	50
600V	[kA]	25	25	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1/2	1/2	1	1½	2	2	3	3	5	5
230V	[HP]	1½	2	3	3	3	5	7½	10	10	10
3 Phase 200V	[HP]	2	3	3	5	7½	7½	10	15	20	20
230V	[HP]	3	3	5	7½	7½	10	10	15	20	20
460V	[HP]	5	7½	10	15	15	20	30	30	40	40
575V	[HP]	7½	10	15	20	20	30	30	40	60	60
Maximum rated current of fuse or breaker	[A]	600	600	600	600	600	600	600	600	600	600

MMS 100H

Rated operational current Ie	*[A]*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*75*	*90*	*100*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	65	65	65	65	65	65	50	50	50	50
600V	[kA]	25	25	25	20	20	20	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1	1½	2	2	3	3	5	5	7½	10
230V	[HP]	3	3	3	5	7½	10	10	15	20	20
3 Phase 200V	[HP]	3	5	7½	7½	10	15	20	20	25	30
230V	[HP]	5	7½	7½	10	10	15	20	25	30	30
460V	[HP]	10	15	15	20	30	30	40	50	60	75
575V	[HP]	15	20	20	30	30	40	60	60	75	100
Maximum rated current of fuse or breaker	[A]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

In case of 1-phase use in series as shown below



Manual motor starters

Technical information

Manual motor controller (UL508)

MMS 32S

Rated operational current Ie	*[A]*	*0.16*	*0.25*	*0.4*	*0.63*	*1*	*1.6*	*2.5*	*4*	*6*	*8*	*10*	*13*	*17*	*22*	*26*	*32*	*40*
Max. short-circuit current																		
240V	[kA]	100	100	100	100	100	100	100	100	100	100	50	50	40	30	30	20	20
480V	[kA]	50	50	50	50	50	50	50	50	25	25	10	10	10	10	7.5	7.5	7.5
600V	[kA]	10	10	10	10	10	10	10	5	5	5	5	5	5	5	5	5	5
Motor load																		
1 Phase 115V	[HP]	-	-	-	-	-	-	-	1/8	1/4	1/3	1/2	1/2	1	1½	2	2	3
230V	[HP]	-	-	-	-	-	1/10	1/6	1/3	1/2	1	1½	2	3	3	3	5	7½
3 Phase 200V	[HP]	-	-	-	-	-	-	1/2	3/4	1	2	2	3	3	5	7½	7½	10
230V	[HP]	-	-	-	-	-	-	1/2	3/4	1½	2	3	3	5	7½	7½	10	10
460V	[HP]	-	-	-	-	-	3/4	1	2	3	5	5	7½	10	15	15	20	30
575V	[HP]	-	-	-	-	1/2	3/4	1½	3	5	5	7½	10	15	20	20	30	30
Max. fuse size	[A]	1	1	1	1	3	6	10	15	20	30	40	50	60	80	100	125	150
Max. breaker size	[A]	15	15	15	15	15	15	15	15	20	30	40	50	60	80	100	125	150

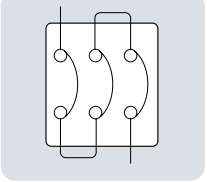
MMS 63S

Rated operational current Ie	*[A]*	*10*	*13*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*65*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	25	25	25	25	25	25	25	25	25	25
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1/2	1/2	1	1½	2	2	3	3	5	5
230V	[HP]	1½	2	3	3	3	5	7½	10	10	10
3 Phase 200V	[HP]	2	3	3	5	7½	7½	10	15	20	20
230V	[HP]	3	3	5	7½	7½	10	10	15	20	20
460V	[HP]	5	7½	10	15	15	20	30	30	40	40
575V	[HP]	7½	10	15	20	20	30	30	40	60	60
Max. fuse size	[A]	40	50	60	80	100	125	150	200	250	250
Max. breaker size	[A]	40	50	60	80	100	125	150	200	250	250

MMS 100S

Rated operational current Ie	*[Ie]*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*75*	*90*	*100*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	25	25	25	25	25	25	25	25	25	25
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1	1½	2	2	3	3	5	5	7½	10
230V	[HP]	3	3	3	5	7½	10	10	15	20	20
3 Phase 200V	[HP]	3	5	7½	7½	10	15	20	20	25	30
3 Phase 230V	[HP]	5	7½	7½	10	10	15	20	25	30	30
460V	[HP]	10	15	15	20	30	30	40	50	60	75
575V	[HP]	15	20	20	30	30	40	60	60	75	100
Max. fuse size	[A]	60	80	100	125	150	200	250	300	350	400
Max. breaker size	[A]	60	80	100	125	150	200	250	300	350	400

In case of 1-phase use in series as shown below



MMS 32H

Rated operational current Ie	*[A]*	*0.16*	*0.25*	*0.4*	*0.63*	*1*	*1.6*	*2.5*	*4*	*6*	*8*	*10*	*13*	*17*	*22*	*26*	*32*	*40*
Max. short-circuit current																		
240V	[kA]	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
480V	[kA]	50	50	50	50	50	50	50	50	50	50	50	50	30	30	30	30	30
600V	[kA]	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Motor load																		
1 Phase 115V	[HP]	-	-	-	-	-	-	-	1/8	1/4	1/3	1/2	1/2	1	1½	2	2	3
230V	[HP]	-	-	-	-	-	1/10	1/6	1/3	1/2	1	1½	2	3	3	3	5	7½
3 Phase 200V	[HP]	-	-	-	-	-	-	1/2	3/4	1	2	2	3	3	5	7½	7½	10
230V	[HP]	-	-	-	-	-	-	1/2	3/4	1½	2	3	3	5	7½	7½	10	10
460V	[HP]	-	-	-	-	-	3/4	1	2	3	5	5	7½	10	15	15	20	30
575V	[HP]	-	-	-	-	1/2	3/4	1½	3	5	5	7½	10	15	20	20	30	30
Max. fuse size	[A]	1	1	1	1	3	6	10	15	20	30	40	50	60	80	100	125	150
Max. breaker size	[A]	15	15	15	15	15	15	15	15	20	30	40	50	60	80	100	125	150

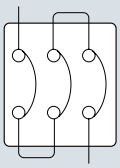
MMS 63H

Rated operational current Ie	*[A]*	*10*	*13*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*65*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	50	50	50	50	50	50	50	50	50	50
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1/2	1/2	1	1½	2	2	3	3	5	5
230V	[HP]	1½	2	3	3	3	5	7½	10	10	10
3 Phase 200V	[HP]	2	3	3	5	7½	7½	10	15	20	20
230V	[HP]	3	3	5	7½	7½	10	10	15	20	20
460V	[HP]	5	7½	10	15	15	20	30	30	40	40
575V	[HP]	7½	10	15	20	20	30	30	40	60	60
Max. fuse size	[A]	40	50	60	80	100	125	150	200	250	250
Max. breaker size	[A]	40	50	60	80	100	125	150	200	250	250

MMS 100H

Rated operational current Ie	*[Ie]*	*17*	*22*	*26*	*32*	*40*	*50*	*63*	*75*	*90*	*100*
Max. short-circuit current											
240V	[kA]	100	100	100	100	100	100	100	100	100	100
480V	[kA]	50	50	50	50	50	50	50	50	50	50
600V	[kA]	10	10	10	10	10	10	10	10	10	10
Motor load											
1 Phase 115V	[HP]	1	1½	2	2	3	3	5	5	7½	10
230V	[HP]	3	3	3	5	7½	10	10	15	20	20
3 Phase 200V	[HP]	3	5	7½	7½	10	15	20	20	25	30
230V	[HP]	5	7½	7½	10	10	15	20	25	30	30
460V	[HP]	10	15	15	20	30	30	40	50	60	75
575V	[HP]	15	20	20	30	30	40	60	60	75	100
Max. fuse size	[A]	60	80	100	125	150	200	250	300	350	400
Max. breaker size	[A]	60	80	100	125	150	200	250	300	350	400

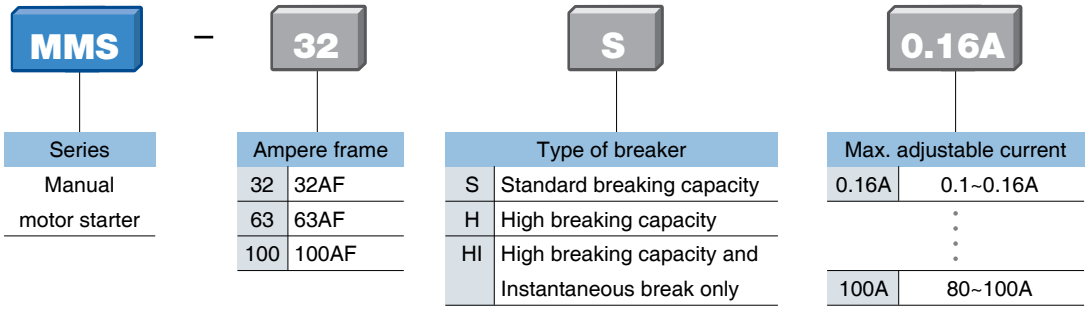
In case of 1-phase use in series as shown below



Manual motor starters

Numbering system

Numbering [Manual Motor Starter]



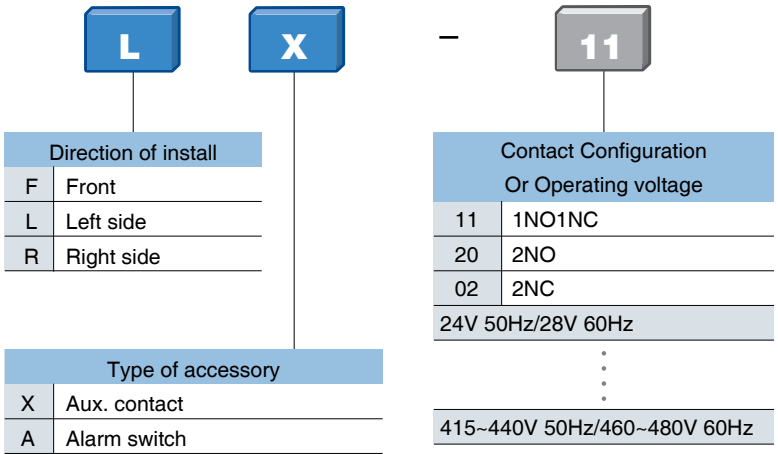
Series
Manual motor starter

Ampere frame	
32	32AF
63	63AF
100	100AF

Type of breaker	
S	Standard breaking capacity
H	High breaking capacity
HI	High breaking capacity and Instantaneous break only

Max. adjustable current	
0.16A	0.1~0.16A
⋮	
100A	80~100A

Catalog Numbering [Aux. contact, Alarm, Release unit]



Direction of install	
F	Front
L	Left side
R	Right side

Type of accessory	
X	Aux. contact
A	Alarm switch
AM	Short circuit alarm
U	Under voltage release (UVT)
UX	UVT operating with MMS handle
S	Shunt release (SHT)

Contact Configuration Or Operating voltage	
11	1NO1NC
20	2NO
02	2NC
24V 50Hz/28V 60Hz	
⋮	
415~440V 50Hz/460~480V 60Hz	

Electronic motor protection relays

GMP Series

Ratings										
Model			**GMP22-2P (1c)**	**GMP22-2P(1a1b)**	**GMP22-3P/3PR**	**GMP22-2S**	**GMP22-3S/3SR**	**GMP22-2T**	**GMP22-3T/3TR**
Type			Pin type			Screw type		Tunnel type	
No. of CT			2CT	2CT	3CT	2CT	3CT	2CT	3CT
Protection		Overcurrent	●	●	●	●	●	●	●
		Phase failure [Note 1)]	●	●	●	●	●	●	●
		Lock/Stall	●	●	●	●	●	●	●
		Phase unbalance	-	-	●	-	●	-	●
		Reverse phase	-	-	●(3PR)	-	●(3PR)	-	●(3PR)
Current setting range (A)			0.3~1.5, 1~5, 4.4~22						
Operating time characteristics			Inverse time (GMP22-2PD: Definite time)						
Time setting (sec)	Inverse time		0~30 sec						
	Definite	D-time	0.2~60 sec for GMP22-2PD						
		O-time	5sec (Fixed) for GMP22-2PD						
	Reset-time		Manual reset						
Tolerance	Current		±5%						
	Time		±5%(or±0.5sec)						
Control power	Voltage		AC 110V/220V(±10%)	AC 100~260V(±10%)					
	Frequency		50/60Hz						
Aux. contact	Contact [Note 3)]		1SPDT (1c)	2SPST (1a1b)					
	Ratings		5A/250VAC Resistive load	3A/250VAC Resistive load					
	Operate		(95 ㅓ 96 Close)	(95 ㅓ 96 Close) (97ㅓ 98 Open)					
Insulation resistance			Min 100㏁ at 500Vdc						
Surge endurance (IEC 61000-4-5)			5kV Apply the standard wave						
Fast transient burst (IEC 61000-4-4)			2kV						
Environment	Operation		-25~70℃						
Temperature	Storage		-30~80℃						
	Relative humidity		30~90%RH(No freezing)						
Trip indicator			Red LED	Red/Green LED		Red LED	Red/Green LED	Red LED	Red/Green LED
Dimension	W×H×D	inch	1.73×2.80×3.07	2.09×3.07×3.44		2.87×2.68×3.44		2.09×1.50×3.44	
		(mm)	(44×71×78)	(53×78×87.5)		(53×68×87.5)		(53×38×87.5)	
Mounting type			Direct mount onto a Metasol MC (MC-9b-22b)			Separate mount (Screw or Din-rail) [Note 2)]			
Certification			UL, cUL, CE						

Note) 1. When it is 2CT model, only two-phase protection is available
2. The bracket for Din-rail mount is optional
3. When power applied Aux. contact operate

Electronic motor protection relays

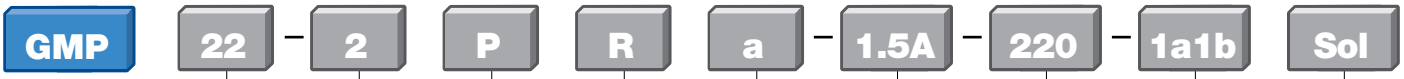
GMP Series

Ratings											
Model		**GMP40-2P**	**GMP40-3P/3PR**	**GMP40-2S**	**GMP40-3S/3SR**	**GMP40-2T**	**GMP40-3T/3TR**	**GMP80-2S**	**GMP80-3S/3SR**	**GMP60T**	**GMP60TE**
Type		Pin type *		Screw type		Tunnel type		Screw type		Tunnel type	
No. of CT		2CT	3CT	2CT	3CT	2CT	3CT	2CT	3CT	2CT	
Protection	Overcurrent	●	●	●	●	●	●	●	●	●	
	Phase failure Note 1)	●	●	●	●	●	●	●	●	●	
	Lock/Stall	●	●	●	●	●	●	●	●	●	
	Phase unbalance	-	●	-	●	-	●	-	●	-	
	Reverse phase	-	●(3PR)	-	●(3PR)	-	●(3PR)	-	●(3PR)	-	
Current setting range(A)		4~20, 8~40						16~80		0.5~6, 3~30, 5~60	
Operating time characteristics		Inverse time characteristics, Definite (GMP-PD Type)								Definite	
Time setting (sec)	Inverse time	0~30 sec								-	
	Definite D-time	0.2~60 sec (GMP40-2PD)								0.2~30 sec	
	O-time	5sec (Fixed) (GMP40-2PD)								0.2~30 sec	5 sec (Fixed)
	Reset time	Manual reset (Auto Reset type : GMP□-A)								-	GMP-TA
Tolerance	Current	±5%								±5%	
	Time	±5% (or±0.5 sec)								±5% (or±5 sec)	
Control power	Voltage Note 3)	AC 100~260V								AC 110V/260V	
	Frequency	50/60Hz								50/60Hz	
Aux. contact	Contact Note 4)	2SPST (1a1b)								1SPDT (1c)	
	Ratings	3A/250VAC Resistive load								1A/250VAC Resistive load	
	Operate	(95 ⊬ 96 Close) (97 ⊣ 98 Open)								-	
Insulation resistance		Min 100㏁ at 500Vdc								Min 100㏁ at 500Vdc	
Surge endurance (IEC 61000-4-5)		5kV Apply the standard wave								5kV Apply the standard wave	
Fast transient burst (IEC 61000-4-4)		2kV								2kV	
Environment	Operation	-25~70°C								-25~70°C	
Temperature	Storage	-30~80°C								-30~80°C	
	Relative humidity	30~90%RH (No freezing)								30~90%RH (No freezing)	
Trip indicator		Red LED	Red/Green LED	Red LED	Red/Green LED	Red LED	Red/Green LED	Red LED	2Red LEDs	Red LED	
Dimension	W×H×D inch	2.09×3.07×3.44		2.09×2.68×3.44		2.09×2.68×3.44		3.50×3.05×3.83		2.83×2.64×2.72	
	(mm)	(53×78×87.5)		(53×68×87.5)		(53×38×87.5)		(89×77.5×97.4)		(72×67×69)	
Mounting type		Direct mount onto a Metasol MC (MC-32a, 40a)		Separate mount (Screw or Din-rail)						Separate mount (Screw or Din-rail)	
Certification		UL, cUL, CE									

Note) 1. When it is 2CT model, only two-phase protection is available.
2. GMP60T/TE: AC24V, 48V or 380V, 50/60Hz types a option.
3. When power applied the Aux. contact operate.

Numbering system

GMP series - ordering



Frame	Nominal Current	Type
22	1.5A	P, S, T*
	5A	
	22A	
40	20A	
	40A	
60	06A	T*
	30A	
	60A	
80	80A	S*

* Refer to 'Type' for details

CT Type	
2	2CT
2	3CT

Classification	
-	Existing model
a	Operation time function

Reverse Phase	
-	No reverse protection
R	Reverse protection available
A	Automatic recovery

Control Voltage	
110/220	AC 100~160V
24	AC 24V
48	AC 48V
110	AC 110V
220	AC 220V
380	AC 380 (440V)

Note) AC24V, AC48V and AC380(440)V are for GMP60T

Type	
P	Direct Coupling(Pin)
S	Terminal Connection(Screw)
T	Penetration(Tunnel)
TE	Economic
PD	Direct Coupling (Definite Time)
TD	Current Display (Definite Time)
TZ	Ground Fault Protection (Zero-Phase Sequence Current Detection)
TN	Ground Fault Protection (Residual Current Detection)

Nominal Current	Current Adjustment Range (A)
1.5A	0.3~1.5
5A	1~5
22A	4.4~22
20A	4~20
40A	8~40
80A	16~80
06A	0.5~6
30A	3~30
60A	0.5~6

Note) For GMP60-TD, GMP60-TDa 6/60A, GMP60-3TZ(R), 3TN(R), 3T(R)

Aux. contactor
1c(N)
1a1b

Note) When the power is applied, the system is in the contacting status
Note) 1c(R) type is optional

Model Type	
-	Terminal(Screw) Penetration (Tunnel)
Sol	Metasol direct coupling(Pin)

Electronic motor protection relays

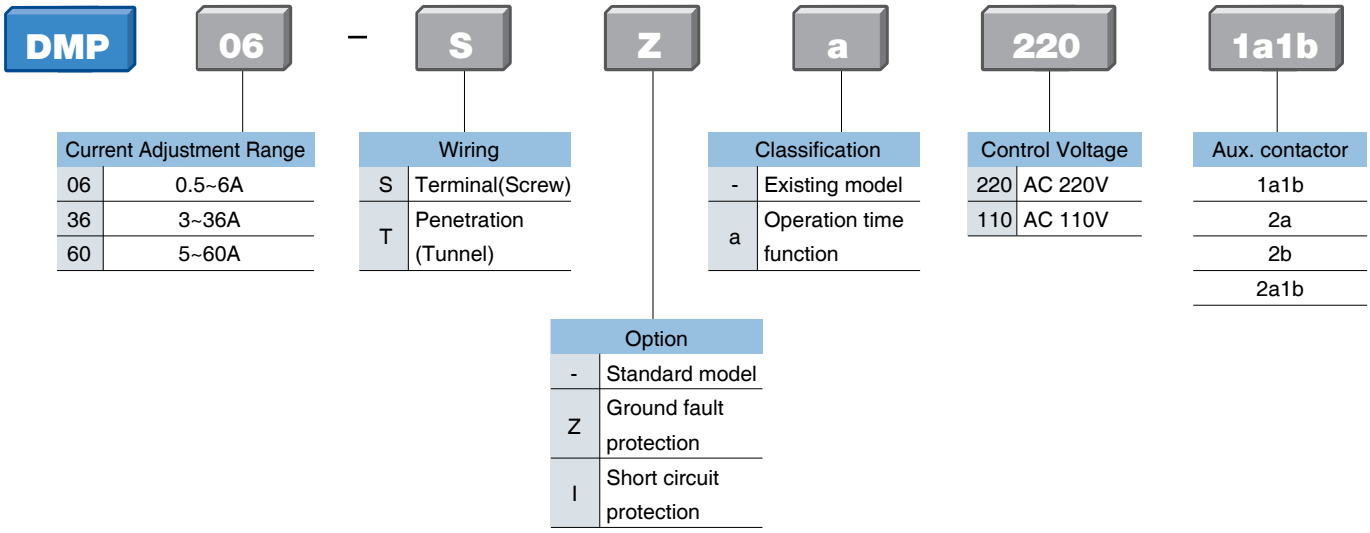
DMP Series

Ratings					
Model		***DMP06-S/SZ/SI***	***DMP60-Sa/SZa***	***DMP06-T/TZ/TI***	***DMP60-Ta/TZa***
Wiring		Screw type		Tunnel type	
Panel mount		Unit or Extension Note 1)		Unit or Extension Note 1)	
Operation time		Inverse/Definite		Inverse/Definite	
Protection	Over current	According to the setting time		According to the setting time	
	Phase failure	3 sec		3 sec	
	Reverse phase	Within 0.1 sec		Within 0.1 sec	
	Lock/Stall	Within 0.5 sec		Within 0.5 sec	
	Phase unbalance	5 sec		5 sec	
	Under current	3 sec		3 sec	
	Ground fault	Within 0.05~1 sec. (DMP□-Z/Za)		Within 0.05~1 sec. (DMP□-T/Ta)	
	Short circuit	Within 50ms (DMP□-SI)		Within 50ms (DMP□-TI)	
Alarm		Variable (60~110% of the setting current)		Variable (60~110% of the setting current)	
Current setting range (A)		6: 0.5~6A, 60: 5~60A		6: 0.5~6A, 60: 5~60A	
Time setting (sec)	Definite D time	0~60 sec		0~60 sec	
	O time	0~30 sec		0~30 sec	
	Inverse time	0~60 sec		0~60 sec	
	A time (Reset)	Manual reset		Manual reset	
Tolerance	Current	±5%		±5%	
	Time	±5% (or±0.5 sec)		±5% (or±0.5 sec)	
Operating power	Voltage	AC 110V or 220V, 50/60Hz		AC 110V or 220V, 50/60Hz	
Aux. contact		S, SI Type: 2a1b, SZ Type: 2a, 1a1b, 2b		T, TI Type: 2a1b, TZ Type: 2a, 1a1b, 2b	
Insulation resistance		Over DC 500V 100㏁		Over DC 500V 100㏁	
Surge impulse voltage (IEC 61000-4-5)		5kV		5kV	
Fast transient burst (IEC 61000-4-4)		2kV		2kV	
Environment Temperature	Operation	-25~70℃		-25~70℃	
	Storage	-30~80℃		-30~80℃	
	Relative humidity	30~90% RH (No freezing)		30~90% RH (No freezing)	
Display	7-Segment	Cause of a fault, Current		Cause of a fault, Current	
	Bar-Graph	60~110% of real load current		60~110% of real load current	
Mounting type		35mm Din-rail/Panel		35mm Din-rail/Panel	
Certification		UL, cUL, CE (Except DMP36 type), KR, LR, ABS			

Note) 1. In extension type, the digital EMPR is calibrated with combining the display past and main body so, please cautious not to combine the display part and main body with different part No.
2. Zero current sensing by zero sequence CT and Residual circuit.
3. DMP-a Type option : Operating time, Fault event save, 3phase current Ampere meter Function

Numbering system

DMP series - Ordering



Current Adjustment Range	
06	0.5~6A
36	3~36A
60	5~60A

Wiring	
S	Terminal(Screw)
T	Penetration (Tunnel)

Option	
-	Standard model
Z	Ground fault protection
I	Short circuit protection

Classification	
-	Existing model
a	Operation time function

Control Voltage	
220	AC 220V
110	AC 110V

Aux. contactor
1a1b
2a
2b
2a1b

Aux. contact		95-96	97-98	07-08
SE - standard		b(OL) *	a(OL)	a(AL)
SEZ - ground fault protection	2a	a(OL)	a(GR)	ZCT input
	2b	b(OL)	b(GR)	
SEI - short circuit protection		b(OL) *	a(OL)	a(SR)

* Contact °¶ when power applied

Electronic motor protection relays

Accessories

CT, ZCT, Cable and Terminal

CT Ratings

Type		2CT	3CT
CT ratio	100 : 5A	DCT-100	
	150 : 5A	DCT-150	SCT-150
	200 : 5A	DCT-200	SCT-200
	300 : 5A	DCT-300	SCT-300
	400 : 5A	DCT-400	SCT-400
Class		1.0	
Burden		5VA	
Insulation voltage		600VAC	
Insulated impulse voltage		2kV	
Insulation resistance		10㏁(DC 500V Megger)	
Mounting		Panel	

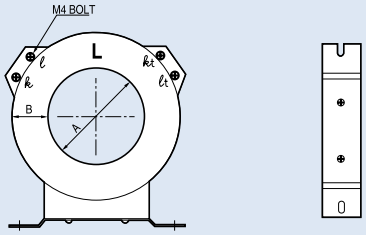
Note) Please use DCT for LS Electronic Motor Protection Relay only.

DCT

SCT

ZCT (Zero Sequence CT) Ratings

Type	Diameter (A)	Ratio	Diameter (A)
LZT-030	30	0.5	
LZT-050	50	0.7	100mA/40~55mV
LZT-065	65	0.9	200mA/100mV
LZT-080	80	1.5	

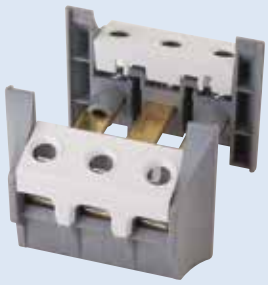


Cable

Applicable Type	DMP, IMP Series
Spec.	1m, 1.5m, 2m, 3m, 4m

* Panel mount: Extension cable

Terminal Block



Applicable Type	DMP Series, GMP60-3T, 3TZ, 3TN
Spec.	60A bellow

Vacuum Circuit Breakers

Susol VCB Series

4.76/15kV 25/31.5kA 1200/2000A

VL-05/15

Item			VL-05□25, 32□12, 20				VL-15□25, 32□12, 20			
Rated voltage		Ur (kV)	4.76				15			
Rated current		Isc (kA)	1200	2000	1200	2000	1200	2000	1200	2000
Pole distance		(mm)	150	210	150	210	150	210	150	210
Weight(H, Cradle)		(kg)	430	510	430	510	430	510	430	510
Weight(H, Circuit Cradle)		(kg)	115	140	115	140	115	140	115	140
Weight(P, Circuit Cradle)		(kg)	85	130	85	130	85	130	85	130
Rated frequency		fr (Hz)	60							
Rated interrupting current		Ik (kA)	25	31.5	25	31.5	25	31.5	25	31.5
Rated interrupting capacity		(MVA)	207	260	207	260	650	820	650	820
Rated short-time current		Ik/tk (kA)	31.5/2s							
Rated making current		Ip (kA)	81.9							
Rated interrupting time		(cycle)	3							
Withstand Voltage	Frequency	Ud (kV)	19				95			
	Impulse	Ud (kV/1.2×50㎲)	60				95			
Operating duty			O-0.3s-CO-3min-CO							
Rated Closing Control voltage		(V)	DC 24~30V, DC 48~60V, DC110V, DC125V, DC220V, AC 48V, AC100~130V, AC220~250V							
Rated Trip Control voltage		(V)	DC 24~30V, DC 48~60V, DC110V, DC125V, DC220V, AC 48V, AC100~130V, AC220~250V							
Standard aux. contacts			4a4b, 10a10b							
Rated opening time		(s)	0.04							
No-load closing time		(s)	0.06							
Mechanical Endurance		(Operations)	10,000							
Electrical Endurance			Reference Standard							
Capacitive current switching			C2							
Life time	Electrical	(Operations)	Reference Electrical Life Graph							
Installation	Fixed		P Type							
	Draw-out		H Type							
Applicable standard			IEEE Std C37.09, IEEE Std C37.20.2, ANSI C37.54, ANSI C37.55							

* Lifetime with maintenance.
** H type is a box type cradle with CB compartment style structure.

Vacuum Circuit Breakers

Numbering system

4.76/15kV 25/31.5kA 1200/2000A

Breaker

VL — 15 H 32 A 20

Basic model name	
VL	Susol VCB

Rated voltage (kV)	
05	4.76
15	15

Version	
P	Fixed
H	H type drawout (for MESG)

Interrupting current (kA)	
25	25
32	31.5

Phase distance/Compatibility	
A	150
B	210

* A is for 1200A only
B is for 2000A only

Rated current (A)	
12	1200A
20	2000A

M1 C1 T1 SB2 U1 A 147

Motor control voltage	
M0	motor none
M1	DC 110V
M2	DC 220V
M3	DC 125V
M4	DC 24V~30V
M5	AC 48V~60V
M6	AC 48V
M7	AC 100V~130V
M8	AC 200V~250V

Trip coil voltage	
T0	Trip Coil none
T1	DC 110V
T2	DC 220V
T3	DC 125V
T4	DC 24V~30V
T5	AC 48V~60V
T6	AC 48V
T7	AC 100V~130V
T8	AC 200V~250V

UVT	
U0	UVT none
U1	DC 110V
U2	DC 220V
U3	DC 125V
U4	DC 24V~30V
U5	AC 48V~60V
U6	AC 48V
U7	AC 100V~130V
U8	AC 200V~250V

Other accessories Note)	
A1	Secondary Trip coil
A2	Secondary Trip Coil with TCS Contact
A3	Position s/w(Test:1a1b,Service:2b)
A4	Position s/w(Test:2a,Service:2a)
A5	Position s/w(Test:1a1b,Service:1a1b)
A6	Latch checking s/w
A7	Keylock
A8	Button Padlock
A9	Button cover
AA	Lead Wire
AB	User Plug(Part)
AC	Plug Interlock
AD	Padlock(H type)
AE	MOC
AF	Locking Magnet
AJ	Door Interlock
AO	Lead Wire Special Color(Blue)
AP	Truck removed
AR	3 Position
AS	Back to back switching
AT	Low Engergy Trip Device 25mJ
AU	Low Engergy Trip Device 100mJ
AV	CT operated coil 1A
AW	CT operated coil 5A

Closing coil voltage	
C0	Without closing coil
C1	DC 110V
C2	DC 220V
C3	DC 125V
C4	DC 24V~30V
C5	DC 48V~60V
C6	AC 48V
C7	AC 100V~130V
C8	AC 200V~250V

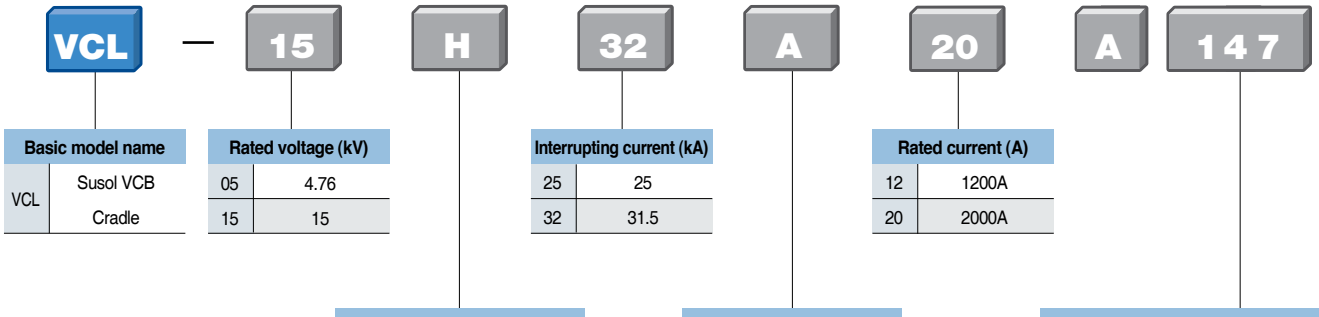
Connector and wire		
SA2	Standard	A type connector, 4a4b
SA4		A type connector, 10a10b
SB2		B type connector, 4a4b
SA4		B type connector, 10a10b
DA1		Dummy A type connector
DB1		Dummy B type connector
SB6	Flame retardant	B type connector, 4a4b
DA1		Dummy A type connector
DB1		Dummy B type connector

Note)
1. In the case of selecting accessories such as A1(Secondary coil), A4(position S/W 2a2a), A7(key lock), A147 is type name in the ordering.
2. Unable to select A1(Secondary Trip Coil), U1~U8(UVT) simultaneously.
3. A3(Position S/W 1a3b), A4(Position S/W 2a2b) and A5(Position S/W 2a2b) can not be selected simultaneously.
4. A8(Button Padlock) and A9(Button Cover) can not be selected simultaneously.
5. When A1(Secondary Trip Coil) is selected the maximum available auxiliary contacts are 9a9b.
6. When A2(Secondary Trip Coil with TCS Contact) is selected the maximum available auxiliary contacts are 4a3b, 9a8b.
7. The flame retardant wire is applicable to auxiliary contacts 4a4b, not to 10a10b.
8. Locking magnet of breaker use the same control power supply as motor.
9. In case of UL Type, AC(Plug Interlock), AD(Padlock(H type)) and AE(MOC) are included as standard.

Numbering system

4.76/15kV 25/31.5kA 1200/2000A

Cradle



Basic model name	
VCL	Susol VCB
	Cradle

Rated voltage (kV)	
05	4.76
15	15

Interrupting current (kA)	
25	25
32	31.5

Rated current (A)	
12	1200A
20	2000A

Version	
H	H type drawout (for MESG)
Hb	Hb type drawout (for MESG) +Lower PT room added

Phase distance/Compatibility	
A	150
B	210
M	210

A is for 1200A only.
B provides three bushing CTs and available for 2000A only.
M provides six bushing CTs and available for 2000A only.

Other accessories	
A1	ES(Earthing Switch) without option
A2	ES(Earthing Switch) with position S/W(2a2b)
A3	ES(Earthing Switch) with position S/W(4a4b)
A4	ES(Earthing Switch) with position S/W(6a6b)
A5	ES(Earthing Switch) with Keylock
A6	ES with Locking magnet: DC110V
A7	ES with Locking magnet: DC220V
A8	ES with Locking magnet: DC125V
A9	ES with Locking magnet: DC24V
AA	ES with Locking magnet: DC48V
AB	ES with Locking magnet: AC48V
AC	ES with Locking magnet: AC110V
AD	ES with Locking magnet: AC220V
AE	Shutter padlock
AF	TOC
AG	MOC
AH	Door
AJ	Door Interlock
AK	Door Emergency Push Button
AL	Temperature Sensor
AM	H type, Lead Wire 4a4b(Standard)
AN	H type, Lead Wire 10a10b(Standard)
AO	H type, Lead Wire 4a4b (Flame retardant)
AP	ES(Earthing Switch) with making
AR	3 Position
AX	VL-Type 1250A,2000A (Phase distance 150mm)
Y~	For retrofit

Note) 1. AJ and AK can not be selected without door(AH).
2. TM(Temperature Monitoring) should be used with AL(Temperature Sensor).
3. H type lead wire(AM, AN) is required for cradle in case of using H type breaker.
4. If H type breaker options A8 (Button Padlock) and A9 (Button Cover) are selected the cradle option AK (Door Emergency Push Button) is not available.
5. Earthing Switch (A1) includes Keylock (A5) as standard.
6. H type breaker includes options such as AE (Shutter padlock), AE (TOC, AG (MOC), AH (Door), AJ (Door Interlock) as standard.

Vacuum Circuit Breakers

Susol VCB Series

27kV 25kA 1200/2000A

VH-27

Item			VH-27 25 12	VH-27 25 20
Rated voltage		Ur (kV)	27	
Rated short-circuit current		Isc (kA)	25	
Rated normal current		Ir (A)	1200	2000
Rated withstand voltage	Power frequency (1 min)	Ud (kV)	60	
	Impulse (1.2×50㎲)	Up (kV)	150	
Rated frequency		fr (Hz)	60	
Rated short-circuit making current		Ip (kA)	65	
Rated short-time withstand current		Ik/tk (kA/s)	25/2	
Rated breaking time		(cycle)	3	
Rated operating sequence			O-0.3s-CO-3min-CO	
Control voltage	Closing coil	(V)	DC 125V	
	Trip coil	(V)	DC 125V	
Auxiliary contacts	Point of contacter		4a4b, 10a10b	
	Class		Class 1	
Trip coil resistance		(Ω)	37±10%	
Closing coil resistance		(Ω)	37±10%	
Rated short-circuit breaking capacity		(MVA)	1169	
Rated opening time		(sec)	≤ 40	
No-load closing time		(sec)	≤ 60	
VI stroke		(mm)	17~18	
Weight	Breaker	(kg)	400	
	Cradle	(kg)	400	

* Lifetime with maintenance.
** H type is a box type cradle with CB compartment style structure.

Numbering system

27kV 25kA 1200/2000A

Breaker

VH — 27 H 25 E 12

Basic model name	
VH	Susol VCB

Rated voltage (kV)	
27	27

Version	
H	H type drawout (for MCSG)

Interrupting current (kA)	
25	25

Phase distance/Compatibility	
E	300mm

Rated current (A)	
12	1200A

VH-06H50B32 — M1 C1 T1 SB2 U1 A 1 4 7

Motor control voltage	
M0	Without motor
M1	DC 110V
M2	DC 220V
M3	DC 125V
M5	DC 48V
M6	AC 48V
M7	AC 110V
M8	AC 220V

Trip coil voltage	
T0	Without trip coil
T1	DC110V
T2	DC220V
T3	DC125V
T5	DC48V
T6	AC 48V
T7	AC 110V
T8	AC 220V

UVT	
U0	Without UVT
U1	DC 110V
U2	DC 220V
U3	DC 125V
U5	DC 48~60V
U6	AC 48V
U7	AC 110V
U8	AC 220

Closing coil voltage	
C0	Without closing coil
C1	DC 110V
C2	DC 220V
C3	DC 125V
C5	DC 48V
C6	AC 48V
C7	AC 110V
C8	AC 220V

Connector and wire		
SB2	Standard	B type connector, 4a4b
SB4		B type connector, 10a10b
SB6	Flame retardant	B type connector, 4a4b

Other accessories Note)	
A1	Secondary Trip coil
A4	Position s/w(2a2a)
A5	Position s/w(2a2b)
A6	Latch checking s/w
A7	Keylock
A8	Button Padlock
A9	Button cover
AA	Lead Wire
AB	User Plug(Part)
AC	Plug Interlock
AD	Padlock(H type Door Interlock)
AE	MOC
AF	Locking Magnet
AG	ANSI type Charge interlock
AP	Trip Coil Monitoring Contact

Note) A is written only once in case of more than one.

Note)
1. If A2 (UVT), A4 (Position S/W 2a2b) and A7 (Keylock) are selected, A247 is the type name in the ordering.
2. A1 (Secondary Trip Coil) and A2 (UVT) can not be selected simultaneously.
3. A4 (Position S/W 2a2a) and A5 (Position S/W 2a2b) can not be selected simultaneously.
4. A8 (Button Padlock) and A9 (Button Cover) can not be selected simultaneously.
5. AC (Plug interlock),AD (H type Door interlock), AE (MOC) and AF (Locking magnet) are available only for H type.
6. In case of B-type connector the flame retardant wire is applicable to auxiliary contacts 4a4b, not to 10a10b.
7. Locking magnet can be applied only to H type VCB - breaker and cradle.
8. Locking magnet of H type breaker use the same control power supply as motor.
8. A-type connector is applicable to P/E/F/G type and B-type connector to H type.
9. In case of selecting UVT A6 (Latch checking S/W) is not allowed. A6 (Latch checking S/W) is installed by default to make electrical interlock with UVT.
10. Lead wire is enclosed in the breaker in case of ordering fixed type or H type breaker without cradle, installed of cradle in case of ordering the breaker with cradle. If user plug is selected it will be enclosed in the breaker.

Vacuum Circuit Breakers

Numbering system

27kV 25kA 1200/2000A

Cradle

Basic model name	
VCL	Susol VCB Cradle

Rated voltage (kV)	
27	27

Interrupting current (kA)	
25	25

Rated current (A)	
12	1200A

Version	
H	H type drawout (for MCSG)

Phase distance/Compatibility	
E	300mm

Other accessories (H type)	
AE	Shutter padlock
AF	TOC
AG	MOC
AH	Door
AJ	Door Interlock
AK	Door Emergency Push Button
AL	Temperature Sensor
AM	H type Lead Wire 4a4b (Flame retardant wire)
AN	H type Lead Wire 10a10b (Flame retardant wire)
AO	H type Lead Wire 4a4b (Rated short time current)
AQ	ANSI type Charge interlock

Note) A is written only once in case of more than one.

Note) 1.These accessories for cradle and TM can be applied only to H type.
2. AJ and AK can not be selected without door (AH).
3. TM (Temperature Monitoring) should be used with AL (Temperature Sensor).
4. H type lead wire - one of AM, AN or AO is required for cradle in case of H type breaker.

Susol VCB Series

4.76/15kV 40/50kA 1250/2000/3150A

VH-05/15

Item			VH-05H50C12/20/30			VH-15H40,50C12/20/30		
Rated voltage		Ur (kV)	4.76			15		
Rated normal current		Ir (A)	1250	2000	3150	1250	2000	3150
Rated frequency		fr (Hz)	50/60					
Rated short-circuit current		Isc (kA)	50			40, 50		
Rated short-time withstand current		Ik/tk (kA/s)	50/2			40/2, 50/2		
Rated short-circuit breaking capacity		(MVA)	412			1039, 1299		
Rated short-circuit making current		Ip (kA)	2.5 × Isc (50㎐)/2.6 × Isc (60㎐)					
Rated breaking time		(Cycle)	3					
Rated withstand voltage	Power frequency (1 min)	Ud (kV)	19			36		
	Impulse (1.2×50㎲)	Up (kV)	60			95		
Rated operating sequence			O-0.3s-CO-3min-CO					
Control voltage	Closing coil	(V)	DC 125V					
	Trip coil	(V)	DC 125V					
Auxiliary contacts *			3a3b					
Rated opening time		(sec)	≤ 0.04					
No-load closing time		(sec)	≤ 0.06					
Lifetime	Mechanical		10,000					
	Electrical		See graph					
Installation version	Drawout		H type (for MESG)					
Phase distance		(mm)	254					
Weight	Breaker (MESG, MCSG)	(kg)	230	230	265	230	230	265
	Cradle (MESG, MCSG)	(kg)	248	248	286	248	248	286
Applicable standard			ANSI/IEEE Std. C37.09, KEPIC EED 1100					

* Two(2) “Early b” auxiliary contact is provided.

Vacuum Circuit Breakers

Numbering system

4.76/15kV 40/50kA 1250/2000/3150A

Breaker

VH — **15** **H** **50** **C** **30**

Basic model name	
VH	Susol VCB

Rated voltage (kV)	
05	4.76
15	15

Version	
H	MCSG type drawout

Interrupting current (kA)	
40	40
50	50

Note) 4.76kV is for 50kA

Phase distance/Compatibility	
C	254

Rated current (A)	
12	1200A
20	2000A
30	3000A

VH-15H50C30 — **M3** **C3** **T3** **SC1** **U0** — **N** **1 2 3 4 5**

Motor control voltage	
M0	Without motor
M3	DC125V

Trip coil voltage	
T0	Without trip coil
T3	DC125V

UVT	
U0	Without UVT

Closing coil voltage	
C0	Without closing coil
C3	DC125V

Connector and wire	
SC1	Standard, 3a3b
DC0	Dummy
EC0	Earthing truck

Other accessories Note)	
N1	Non-1E Class
N2	1E Class
N3	Dummy
N4	Earthing truck (Upper)
N5	Earthing truck (Lower)

Note) In the case ordering Dummy, Earthing truck, only please select M0(Without motor), C0(Without closing coil) and T0(Without trip coil).

Cradle

VCL — **15** **H** **50** **C** **30** — **N** **1 2 3 4 5**

Basic model name	
VCL	Susol VCB Cradle

Rated voltage (kV)	
05	4.76
15	15

Version	
H	MCSG type drawout

Interrupting current (kA)	
40	40
50	50

Note) 4.76kV is for 50kA

Phase distance/Compatibility	
C	254

Rated current (A)	
12	1200A
20	2000A
30	3000A

Other accessories	
N1	Non-1E
N2	1E (RED)
N3	1E (GREEN)
N4	1E (YELLOW)
N5	1E (BLUE)

FUTURING SMART ENERGY

Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact a qualified service technician when you need maintenance.

  Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

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