100TH Anniversary

TERASAKI
Innovators in Protection Technology

TemBreak2

Mining Circuit Breakers

The Ultimate Safety Breaker

Catalogue '21-P67E

TABLE OF CONTENTS

RATINGS AND SPECIFICATIONS

MCCB Electrical characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 Ann.1, AS/NZS 60947-2

Frame	Quantity	Unit	Condition	125		250
Model				VS125	VS125	VS250
Number of Poles				3	3	3
Type				NJ	GJ	NJ
Nominal current ratings						
	I_n	(A)	50°C	20 32	50 63 100 125	50 63 100 125	160 250
Electrical characteristics						
Rated operational voltage	U_e	(V)	AC 50/60 Hz	1100	1100	1100
Rated insulation voltage	U_i	(V)		1100	1100	1100
Rated impulse withstand voltage	U_{imp}	(kV)		8	8	8
Ultimate breaking capacity	I_{cu}	(kA)	1100V AC	4	6	6	6
(IEC, JIS, AS/NZS)			1000V AC	4	6	10	–
Service breaking capacity	I_{cs}	(kA)	1100V AC	4	4	4	4
(IEC, JIS, AS/NZS)			1000V AC	4	4	5	–
Rated short-time withstand current	I_{cw}	(kA)	0.3 Seconds	–		–	–
Protection						
Adjustable thermal, adjustable magnetic				■		■	■
Fixed thermal, fixed magnetic							
Microprocessor							
Utilisation category				A		A	A
Installation						
Front connection (FC)				■		■	■
Extension bar (FB)				•		•	•
Cable clamp (FW)				–		–	–
Rear connection (RC)				•		•	•
Plug-in (PM)				•		•	•
Draw- out (DR)				–		–	–
DIN rail mounting (DA)				–		–	–
Dimensions	h	(mm)		155		155	165
	w	(mm)	3 pole	90		90	105
	d	(mm)		68		68	68
Weight	W	(kg)	3 pole	1.1		1.1	1.5
Operation						
Direct Opening Action				■		■	■
Toggle operation				■		■	■
Door mounted (HS, HP) / Breaker mounted handle (HB)				•		•	•
Motor operation (MC)				•		•	•
Endurance	Electrical	cycles	1100V AC	10,000		10,000	10,000
	Mechanical	cycles		30,000		30,000	30,000
Accessories installation	Field-installation			Yes		Yes	Yes
	Installed with factory			Yes		Yes	Yes

■ Standard • Optional – Not Available

		400		630	800		1250
	VS250	VE400	VS400	VS630	VS800	VS800	VS1250
	3 GJ	3 NE	3 NE	3 NE	3 NE	3 GE	3 NE
	160 250	250	63 125 250 400	630 ①	800 ②	800	1250 ③
	1100 1100 8	800 800 8	1100 1100 8	1100 1100 8	1100 1100 8	1100 1100 8	1100 1100 8
	6 10	– 30 (800V)	12.5 18	18 20	18 20	30 30	30 30
	4 5	– 15 (800V)	6.3 13.5	13.5 15	13.5 15	20 20	20 20
	–	5	–	–	–	–	15
	■ A	■ B	■ A	■ A	■ A	■ A	■ B
	■ • – • • – –	– ■ – – – – –	■ • – • • – –	– ■ – • • – –	– ■ – • • – –	– ■ – • • – –	– ■ – • • – –
	165	260	260	273	273	370	370
	105	140	140	210	210	210	210
	68	140	103	103	103	120	120
	1.5	14.5	4.9	9.6	9.7	19.8	19.8
	■ ■ • •	■ ■ • •	– ■ • •	– ■ • •	– ■ • •	■ ■ • •	■ ■ • •
	10,000	4,500 (800V)	1,000	1,000	500	4,000	4,000
	30,000	15,000 (800V)	5,000	5,000	3,000	5,000	5,000
	Yes	Yes	Non	Non	Non	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes
① : Max. rating 598.5A at 50°C
② : Max. rating 720A at 50°C
③ : Max. rating 1125A at 50°C for Rear and Plug-in connection.

RATINGS AND SPECIFICATIONS

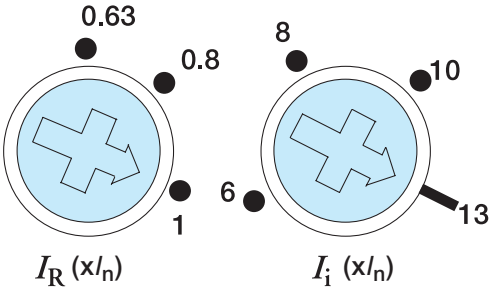
SWITCH-DISCONNECTOR Electrical characteristics to IEC 60947-3, EN 60947-3, AS/NZS 60947-3

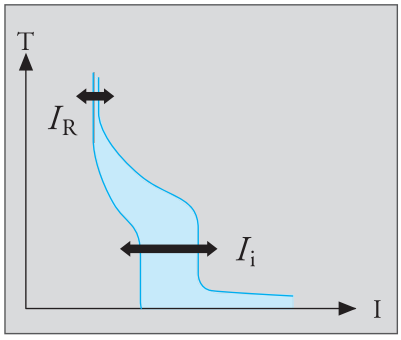
Frame	Quantity	Unit	Condition	400
Model				VE400
Number of Poles				3
Type				NN
Nominal current ratings				
	I_n	(A)	50°C	250
Electrical characteristics				
Rated operational voltage	U_e	(V)	AC 50/60 Hz	800
Rated insulation voltage	U_i	(V)		800
Rated impulse withstand voltage	U_{imp}	(kV)		8
Rated short-circuit making capacity	I_{cm}	(kA peak)		9
Rated short-time withstand current	I_{cw}	(kA rms)	0.3 Seconds	5
Utilisation category to IEC 60947-3			AC	
Installation				
Front connection (FC)				■
Extension bar (FB)				•
Cable clamp (FW)				–
Rear connection (RC)				•
Plug-in (PM)				•
Draw- out (DR)				–
DIN rail mounting (DA)				–
Dimensions	h	(mm)		260
	w	(mm)	3 pole	140
	d	(mm)		103
Weight	W	(kg)	3 pole	4.8
Operation				
Direct Opening Action				■
Toggle operation				■
Door mounted (HS, HP) / Breaker mounted handle (HB)				•
Motor operation (MC)				•
Endurance	Electrical	cycles	800V AC	1,000
	Mechanical	cycles		5,000

■ Standard • Optional – Not Available

THERMAL MAGNETIC PROTECTION

Adjustment Dials





1. I_R is the thermal element adjustment dial and is used to set the rated current to match the conductor rating.

   I_R can be set between 0.63 and 1.0 times I_n.

2. Ii is the magnetic element adjustment dial and is used to set the short circuit tripping threshold to suit the application.

Models, Types, Rated Currents and Magnetic trip currents of Thermal Elements

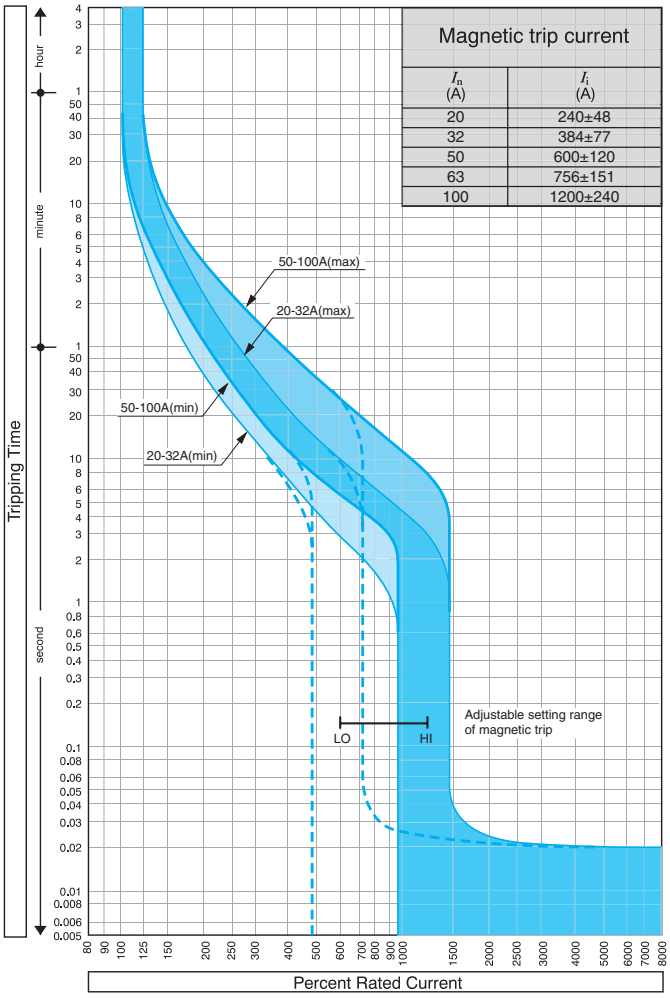
Model	Type	Rated current I_n (A)	Magnetic trip current I_i (A)
VS125	-NJ	20, 32, 50, 63, 100	6 – 12 xI_n
		125	6 – 10 xI_n
VS125	-GJ	50, 63, 100	6 – 12 xI_n
		125	6 – 10 xI_n
VS250	-NJ	160	6 – 13 xI_n
		250	6 – 10 xI_n
VS250	-GJ	160	6 – 13 xI_n
		250	6 – 10 xI_n

OPERATING CHARACTERISTICS

THERMAL MAGNETIC CHARACTERISTICS

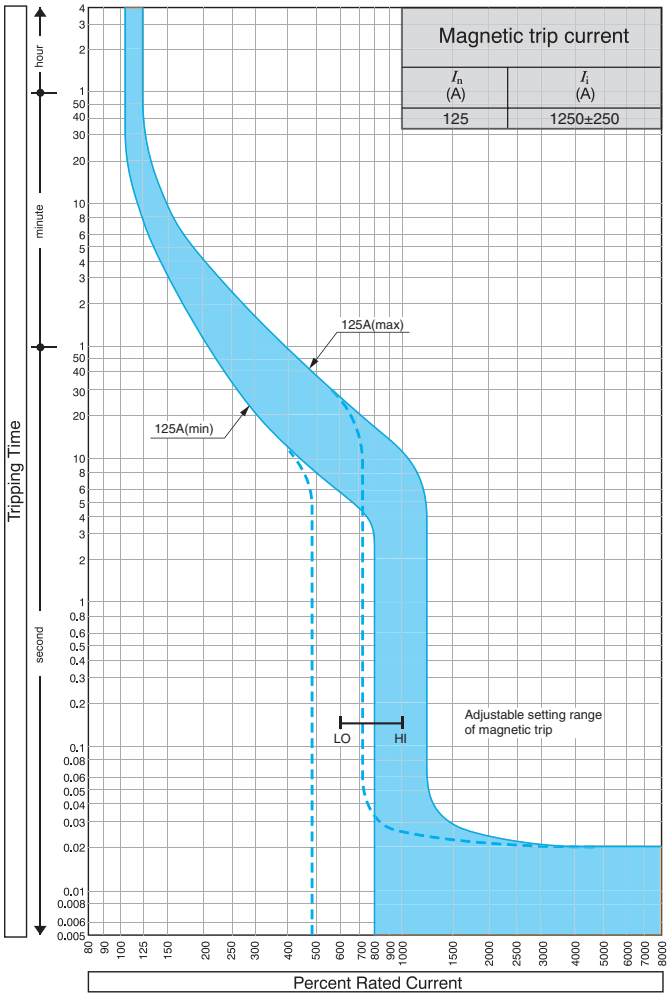
125A Frame

Time/current characteristic curves
VS125-NJ, VS125-GJ



Magnetic trip current	
I_n (A)	I_i (A)
20	240±48
32	384±77
50	600±120
63	756±151
100	1200±240

Time/current characteristic curves
VS125-NJ, VS125-GJ

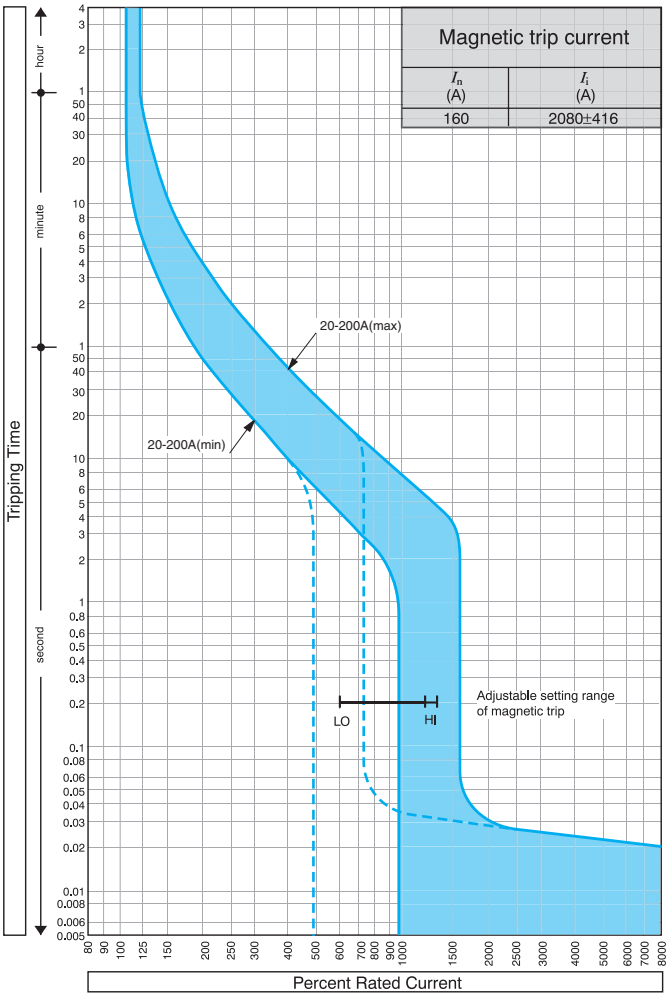


Magnetic trip current	
I_n (A)	I_i (A)
125	1250±250

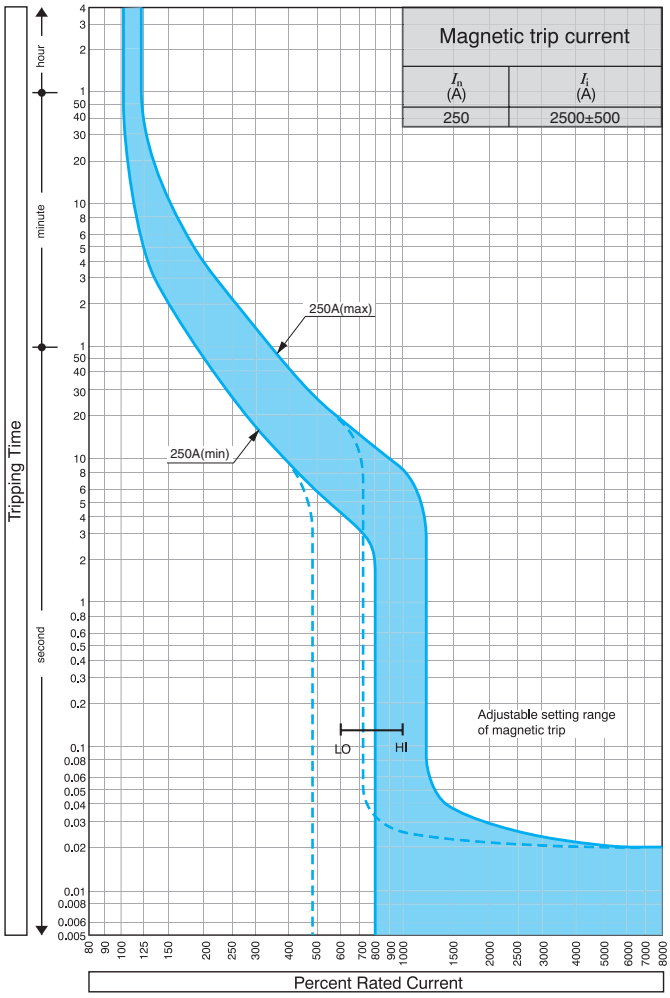
THERMAL MAGNETIC CHARACTERISTICS

160A and 250A Frames

Time/current characteristic curves
VS250-NJ, VS250-GJ



Time/current characteristic curves
VS250-NJ, VS250-GJ



OPERATING CHARACTERISTICS

Characteristics

In addition to the standard overload and short circuit protection, there are a number of options available to meet specific applications.

MCCB Type	LTD	STD	INST	PICK-UP LED	TEST PORT	GFT
VS400-NE	◉	◉	◉	◉	◉	–
VS630-NE	◉	◉	◉	◉	◉	○
VS800-NE	◉	◉	◉	◉	◉	○

◉ Standard
○ Optional
– Not available

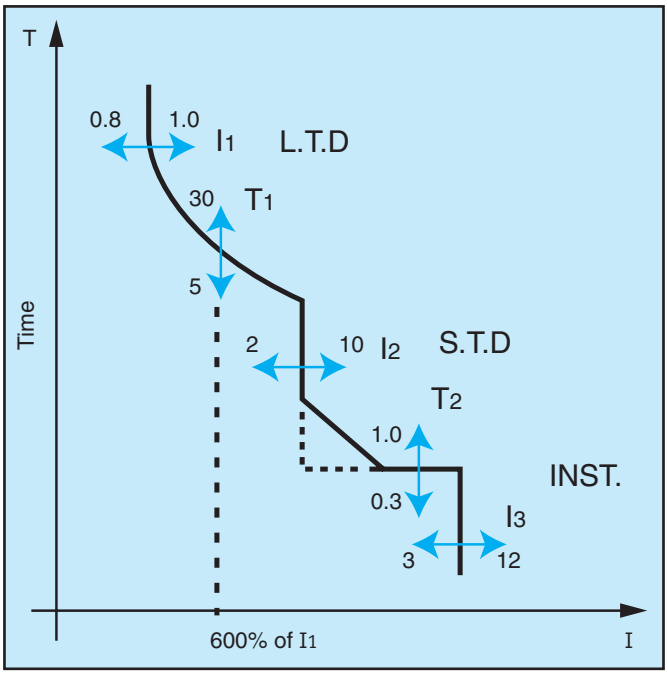
Legend		Application
LTD	Long Time Delay	: Overload protection, True R.M.S.
STD	Short Time Delay	: Short circuit protection and selectivity
INST	Instantaneous	: Short circuit protection, fast acting
Pick-up LED		: Lights on LTD overload, flashes on PTA pick-up
Test Port		: Facility for TNS-1 OCR checker for calibration checking
GFT	Ground Fault Trip	: Protection against ground faults

Access to Setting Dials

To adjust the settings on the microprocessor TemBreak2, the sealed label must be broken and the covering fixing screws removed. To adjust the individual trip settings, turn the setting dial with a flat bladed screw driver. Align the setting required between the black dots marked on the dial.

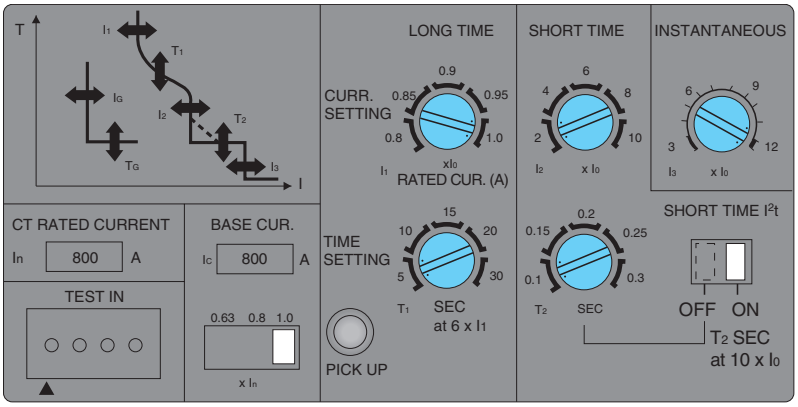
VS400-NE

Standard Time Currents Curves



Each part of the characteristic curve can be independently adjusted.

Standard Microprocessor Adjustments



Setting Dial — Available Adjustments

Base Current Setting	I_0	0.63 - 0.8 - 1.0 x I_n	Amps
LTD Pick up	I_1	0.8 - 0.85 - 0.9 - 0.95 - 1.0 x I_0	Amps
LTD Setting	T_1	5 - 10 - 15 - 20 - 25 - 30 (at I_1 x 600%)	Secs
STD Pick up	I_2	2 - 4 - 6 - 8 - 10 x I_0	Amps
STD Setting	T_2	0.1 - 0.15 - 0.2 - 0.25 - 0.3	Secs
INST Pick up	I_3	3 - 12 x I_0 (continuously adjustable)	Amps

OPERATING CHARACTERISTICS

Overload Adjustment

The rated current of the microprocessor based TemBreak2 is adjusted using two current multipliers. This process achieves high accuracy adjustment from 50% to 100%. These are the LTD pickup dial I_1 and the Base Current I_0 selector switch.

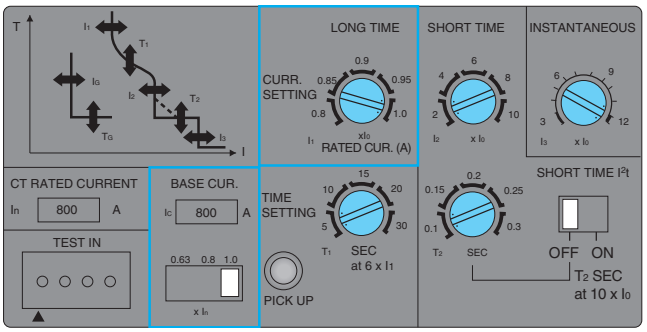
The rated current (LTD pickup) is achieved as follows:

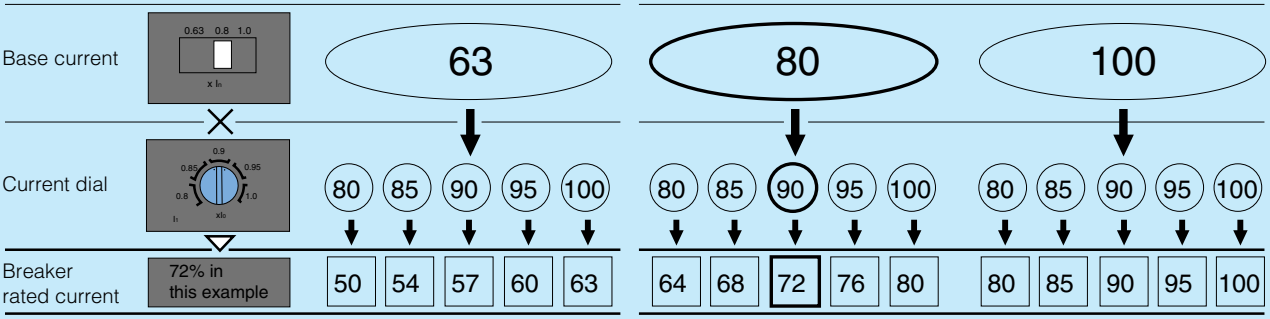
$$I_{RATED} = I_n \times I_0 \times I_1$$

In the example shown on the right the rating would be:

$$I_{RATED} = 1250 \times 1.0 \times 1.0 = 1250A$$

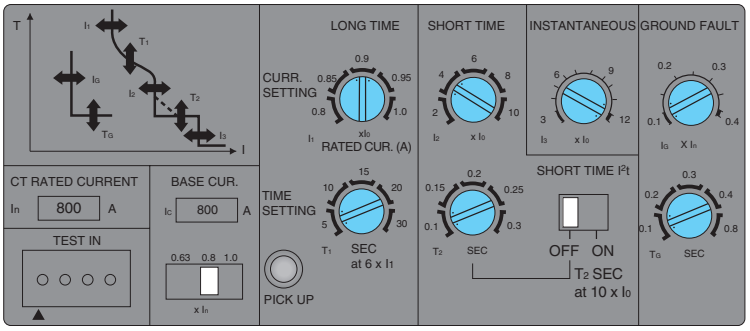
In total there are 15 possible increments of adjustment between 50 and 100% as shown below.





Example - Settings

In the example shown on the right what are all the settings in Amps?



Solution I_{RATING}

LTD pickup = $I_n \times I_0 \times I_1$
800 x 0.8 x 0.9 = 576A

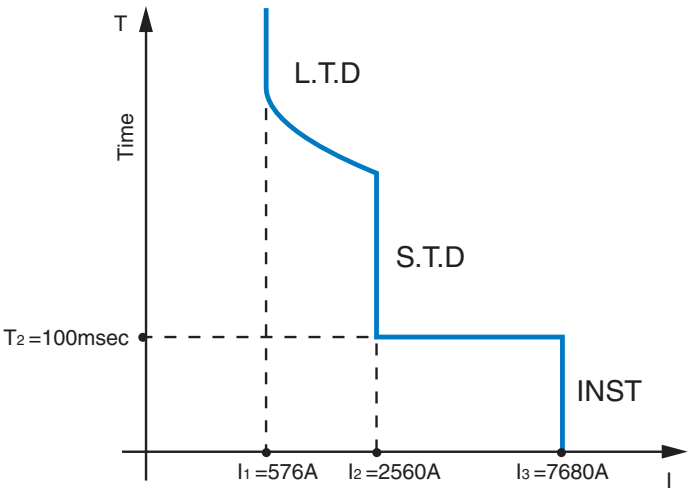
STD pickup = $I_n \times I_0 \times I_2$
800 x 0.8 x 4 = 2560A

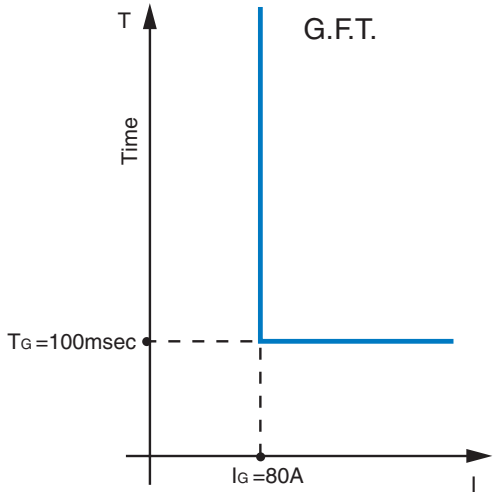
INST pickup = $I_n \times I_0 \times I_3$
800 x 0.8 x 12 = 7680A

GFT pickup = $I_n \times I_G$
800 x 0.1 = 80A

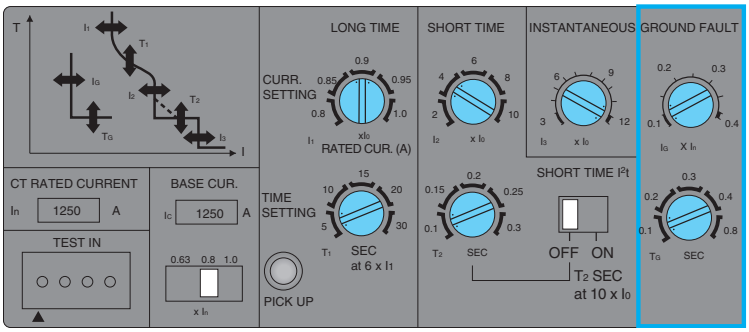
(Note that GFT is a function of I_n and not I_0)

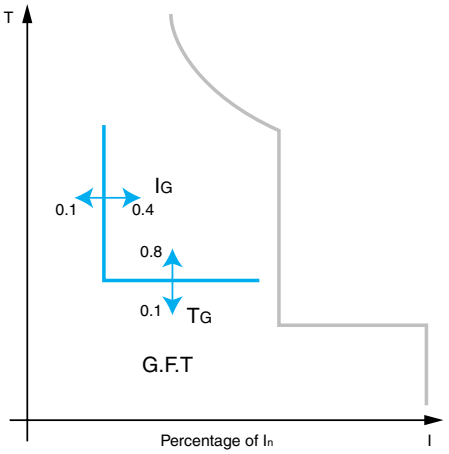
Example - Time/Current Curves





Ground Fault Adjustments





Setting Dial Available Adjustments

GFT Pickup	I_G	0.1 to 0.4 continuously adjustable x I_n	Amps
GFT Setting	T_G	0.1 - 0.2 - 0.3 - 0.4 - 0.8	seconds

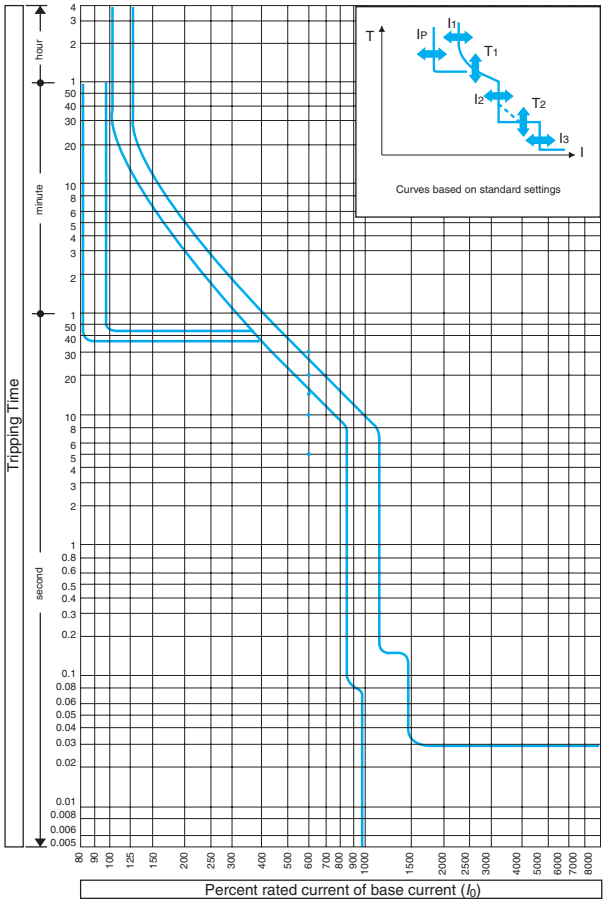
When a 3 pole MCCB is used on a 3 phase 4 wire system a separate CT is required for the neutral line. No control power is required for this option.

OPERATING CHARACTERISTICS

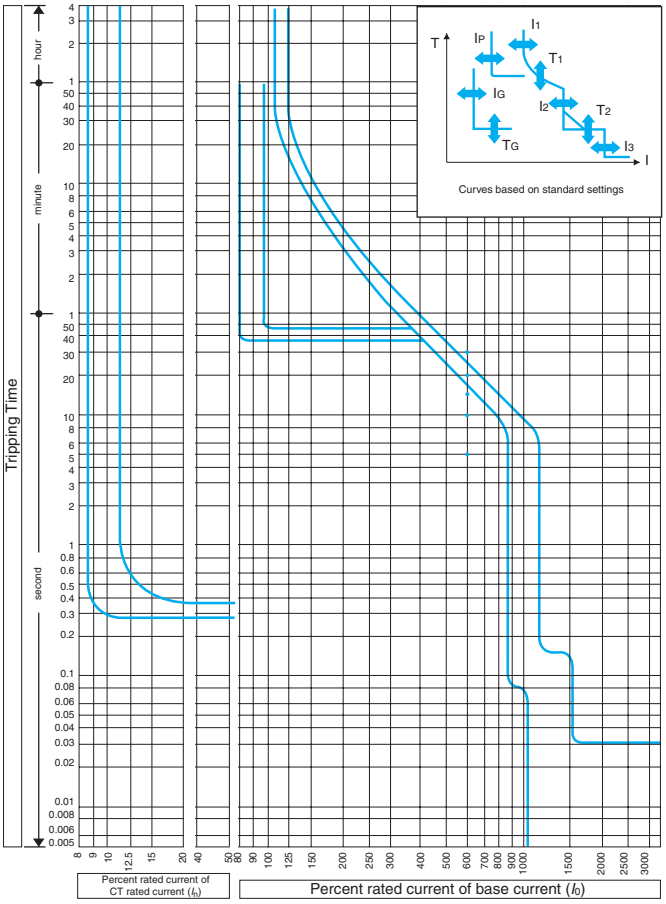
ELECTRONIC CHARACTERISTICS

400A, 630A and 800A Frames

Time/current characteristic curves
VS400-NE



Time/current characteristic curves
VS630-NE, VS800-NE



Overcurrent tripping characteristics

CT rated current (A) (I_n)	63, 125, 250, 400
Base current setting (A): (I_o)	(I_n) x (0.63-0.8-1.0)
Long time-delay pick-up current (A): (I_1)	(I_o) x (0.8-0.85-0.9-0.95-1.0) Non-tripping at (I_1) setting x 105% and below. Tripping at 125% and above.
Long time-delay time settings (S) (T_1)	(5–10–15–20–30) at (I_1) x 600% current. Setting tolerance ± 20%
Short time-delay pick-up current (A): (I_2)	(I_o) x (2-4-6-8-10) Setting tolerance ± 15%
Short time-delay time settings (S) (T_2)	Opening time (0.1, 0.15, 0.2, 0.25, 0.3) in the definite time-delay. Total clearing time is + 50 mS and resettable time -20mS for the time-delay setting
Instantaneous trip pick-up current (A) (I_3)	Continuously adjustable from (I_o) x (3 to12) Setting tolerance ± 20%

Note: * Optional
Note: The underlined values will be applied as standard ratings unless otherwise specified when ordering.

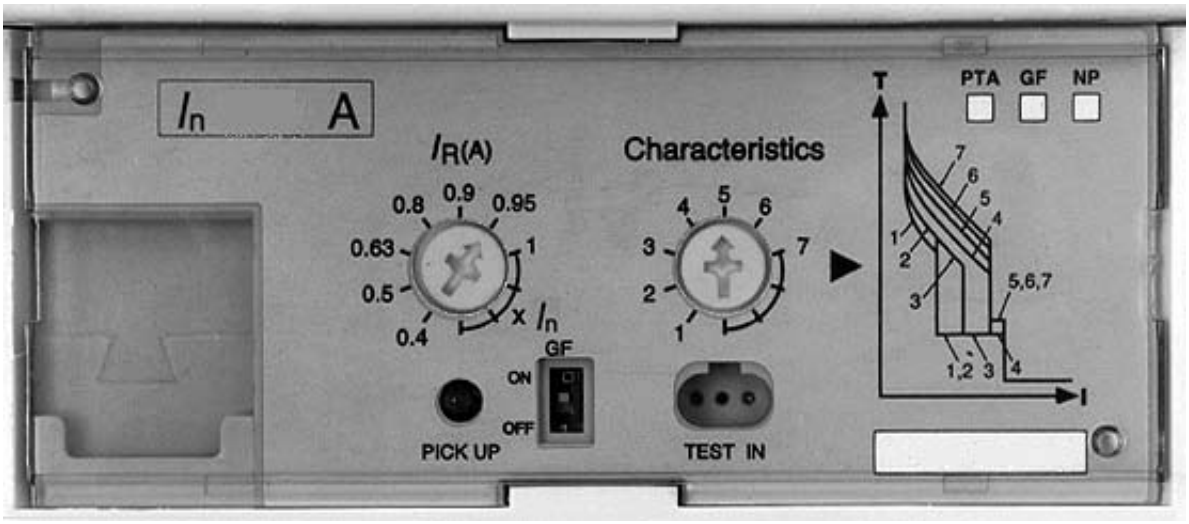
Overcurrent tripping characteristics

CT rated current (A) (I_n)	630, 800
Base current setting (A): (I_o)	(I_n) x (0.63-0.8-1.0)
Long time-delay pick-up current (A): (I_1)	(I_o) x (0.8-0.85-0.9-0.95-1.0) Non-tripping at (I_1) setting x 105% and below. Tripping at 125% & above.
Long time-delay time settings (S) (T_1)	(5–10–15–20–30) at (I_1) x 600% current. Setting tolerance ± 20%
Short time-delay pick-up current (A): (I_2)	(I_o) x (2-4-6-8-10) Setting tolerance ± 15%
Short time-delay time settings (S) (T_2)	Opening time (0.1, 0.15, 0.2, 0.25, 0.3) in the definite time-delay. Total clearing time is + 50 mS and resettable time -20mS for the time-delay setting.
Instantaneous trip pick-up current (A) (I_3)	Continuously adjustable from (I_o) x (3 to 12) Setting tolerance ± 20%
* Ground fault trip pick-up current (A): (I_G)	Continiuously adjustable from (I_n) x (0.1 to 0.4) Setting tolerance ± 15%
* Ground fault trip time setting (S): (T_G)	Opening time (0.1-0.2-0.3-0.4-0.8) in the definite time-delay. Total clearing time is + 50mS and resettable time is - 20mS for the time-delay settings

Note: * Optional
Note: The underlined values will be applied as standard ratings unless otherwise specified when ordering.

ELECTRONIC PROTECTION (STANDARD TYPE)

Adjustment Dials



The left adjustment dial sets the rated current to match the conductor rating. The right adjustment dial selects one of seven preset characteristics on 800A, 1250A models. The effects of the left adjustment dial (labelled I_R(A)), and the right adjustment dial (labelled Characteristics) are detailed in the tables shown underneath each time / current graph.

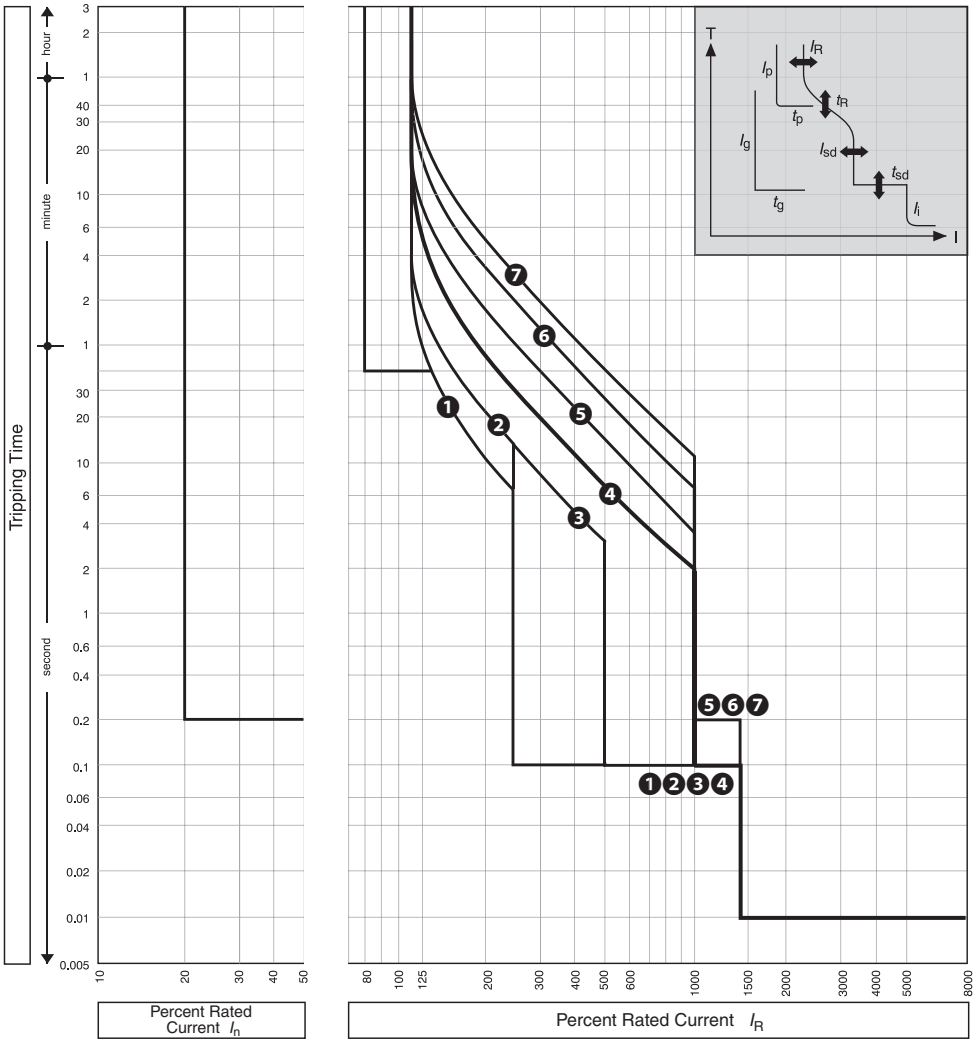
Tolerances of Characteristics

Characteristics		Tolerance
Long Time Delay	I_R	Tripping when (I_R×1.05) < load current ≦ (I_R×1.25)
	t_R	± 20%
Short Time Delay	I_{sd}	± 15%
	t_{sd}	Total clearing time +50ms, resettable time –20ms
Instantaneous	I_i	± 20%
Preferential Trip Alarm	I_p	± 10%
	t_p	± 10%
Ground Fault Trip	Ig	± 15%
	t_g	Total clearing time +50ms, resettable time –20ms

OPERATING CHARACTERISTICS

ELECTRONIC CHARACTERISTICS (STANDARD TYPE)

VE400-NE



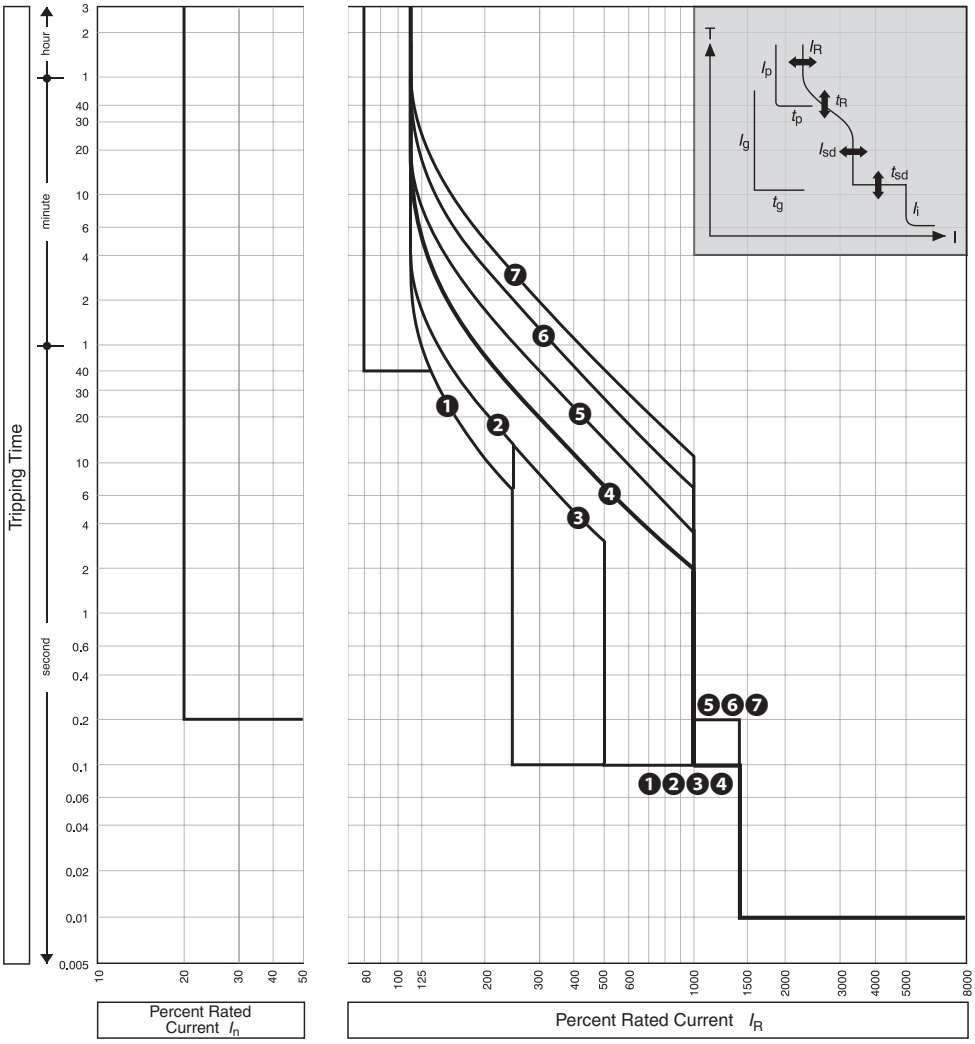
I_n = 250A

	I_R (A)										
	LTD Pick-up current I_R		x/I_n	0.4	0.5	0.63	0.8	0.9	0.95	1.0
	Characteristics		No.	1	2	3	4	5	6	7
Standard	LT	t_R	(s)	11	21	21	5	10	19	29
				at 200% x I_R			at 600% x I_R			
	ST	I_{sd}	x/I_R	2.5		5	10			
		t_{sd}	(s)	0.1			0.2			
	INST	I_i	x/I_R	14(Max: 13 x I_n) Note (1)						
Option	PTA	I_p	x/I_n	0.8						
		t_p	(s)	40						

Note:
(1) I_i max. = 13 x I_n.

ELECTRONIC CHARACTERISTICS (STANDARD TYPE)

VS800-GE, VS1250-NE



I_n = 800A; 1250A

				I_R (A)							
			LTD Pick-up current I_R	x/I_n	0.4	0.5	0.63	0.8	0.9	0.95	1.0
	Characteristics			No.	1	2	3	4	5	6	7
Standard	LT	t_R		(s)	11	21	21	5	10	19	29
					at 200% x I_R			at 600% x I_R			
	ST	I_{sd}		x/I_R	2.5		5	10			
		t_{sd}		(s)	0.1			0.2			
	INST	I_i		x/I_R	14(Max: 12 x I_n) Note (1)						
Option	PTA	I_p		x/I_R	0.8						
		t_p		(s)	40						
	GF Note (2)	I_g		x/I_n	0.2						
		t_g		(s)	0.2						

Note:

(1) I_i max. = 12 x I_n. (2) When you specify GF on MCCBs with 3 poles the terminal block is automatically fitted to connect with the external neutral CT for 3 phases 4 wires system.

OPERATING CHARACTERISTICS

TEMPERATURE RATINGS

Temperature Ratings for Thermal type MCCBs

MCCB Type	Connection Type	Rating at calibration temperature (50°C)	Rated Current (A)		
			55°C	60°C	65°C
VS125-NJ	Front Rear Plug-in	20A	18.5	18	17.5
		32A	30.5	30	29
VS125-NJ VS125-GJ		50A	45	43	41
		63A	57	55	52
		100A	94	90	87
		125A	117	113	109
VS250-NJ VS250-GJ	Front Rear Plug-in	160A	151	146	141
		250A	235	227	219

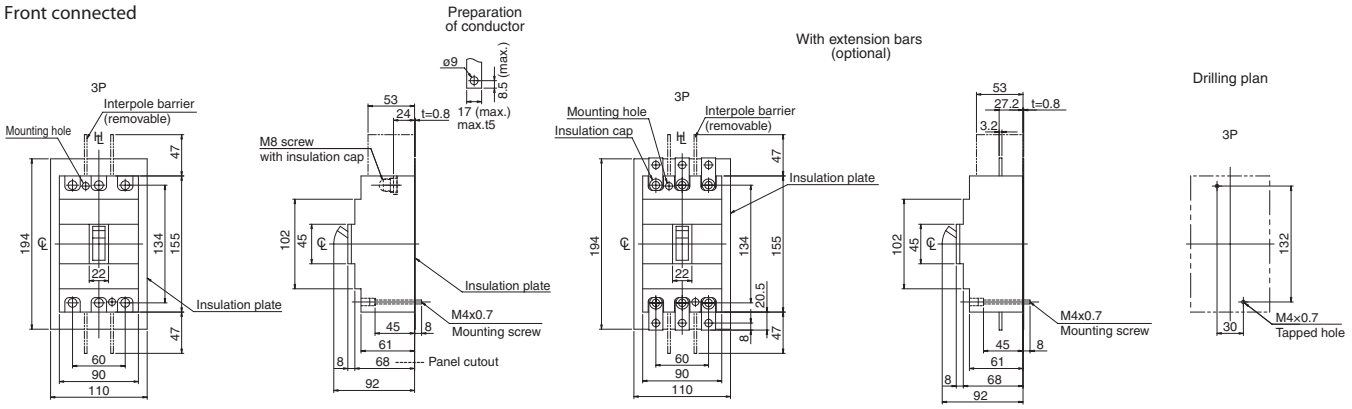
Temperature Ratings for Electronic type MCCBs

MCCB Type	Connection Type	Rating	Rated Current (A)				
			45°C	50°C	55°C	60°C	65°C
VE400-NE	Front	250A	250	250	250	225	200
VS400-NE	Front Rear Plug-in	63A	63	63	63	63	63
		125A	125	125	125	125	125
		250A	250	250	250	250	200
		400A	400	400	400	320	288
VS630-NE	Front Rear Plug-in	630A	630	598.5	535.5	478.8	403.2
VS800-NE	Front Rear Plug-in	800A	800	720	680	608	478.8
VS800-GE	Front Rear Plug-in	800A	800	800	800	787.5	787.5
VS1250-NE	Front	1250A	1250	1250	1000	787.5	787.5
	Rear Plug-in	1250A	1250	1125	1000	787.5	787.5

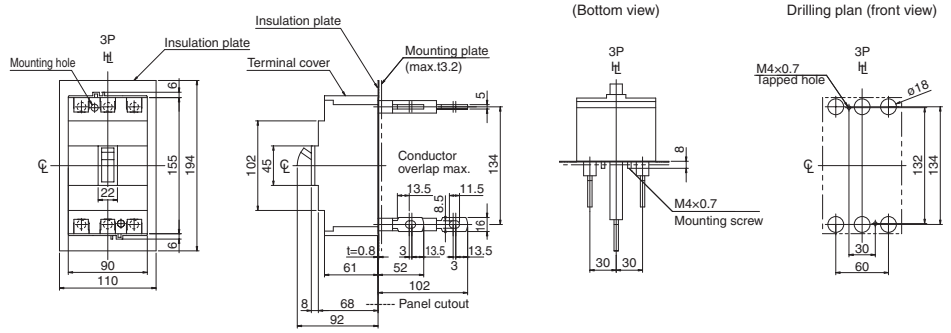
VS125-NJ, VS125-GJ

ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

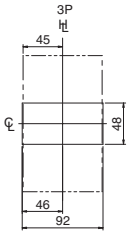
Front connected



Rear connected

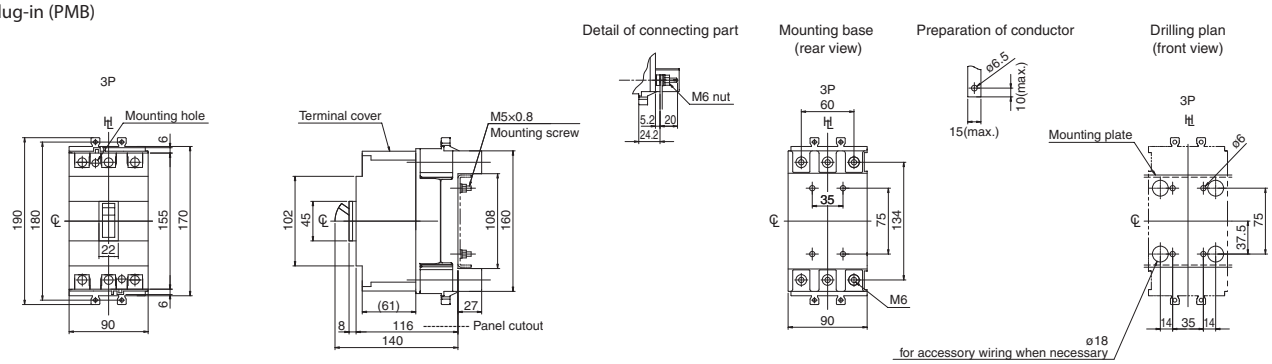


Panel cutout (front view)

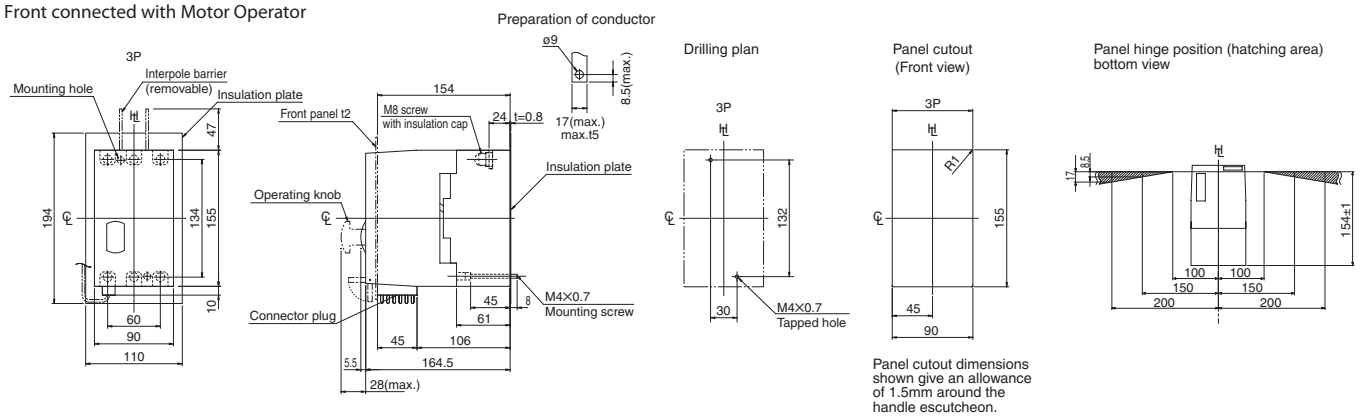


Panel cutout dimensions shown give an allowance of 1.0mm or more around the handle escutcheon.

Plug-in (PMB)



Front connected with Motor Operator



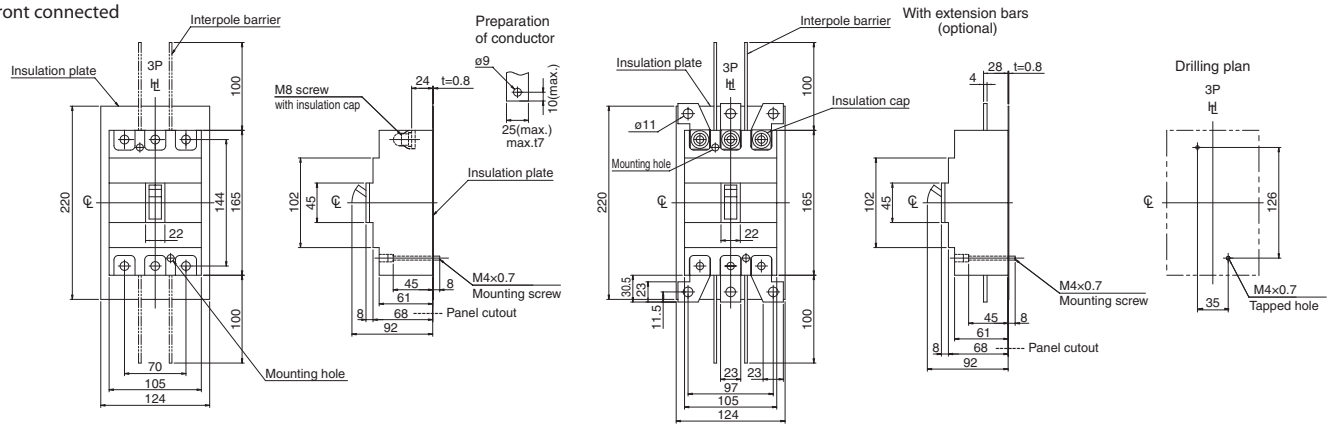
Panel cutout dimensions shown give an allowance of 1.5mm around the handle escutcheon.

DIMENSIONS

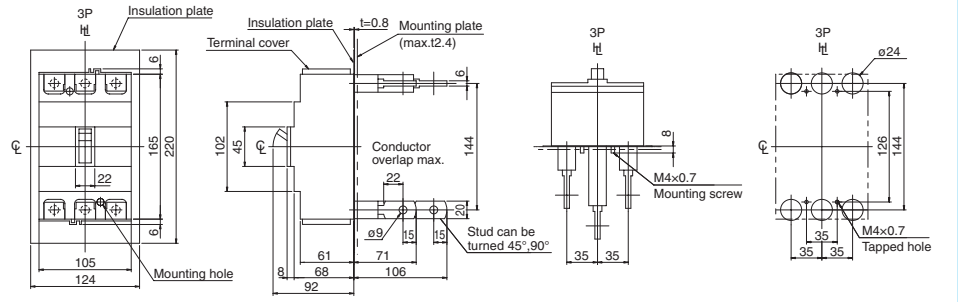
VS250-NJ, VS250-GJ

ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

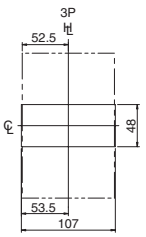
Front connected



Rear connected

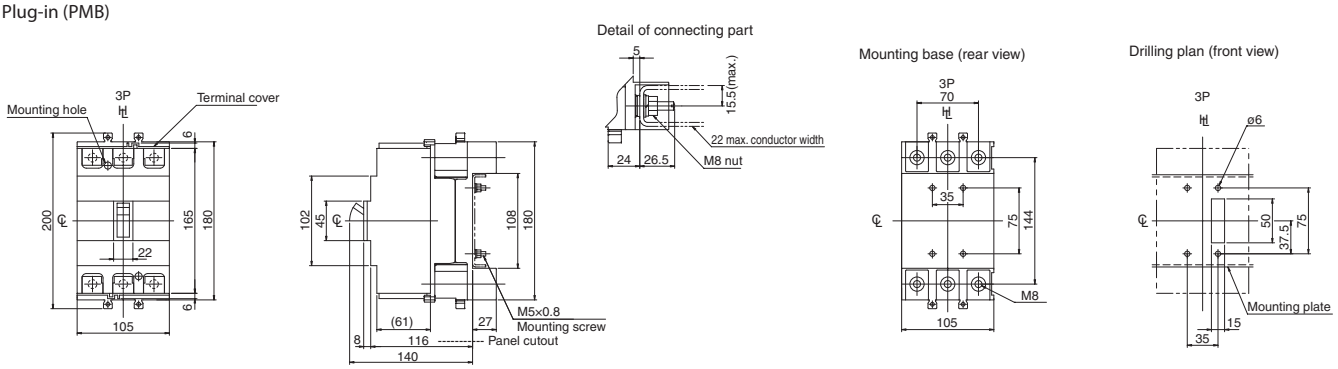


Panel cutout (front view)

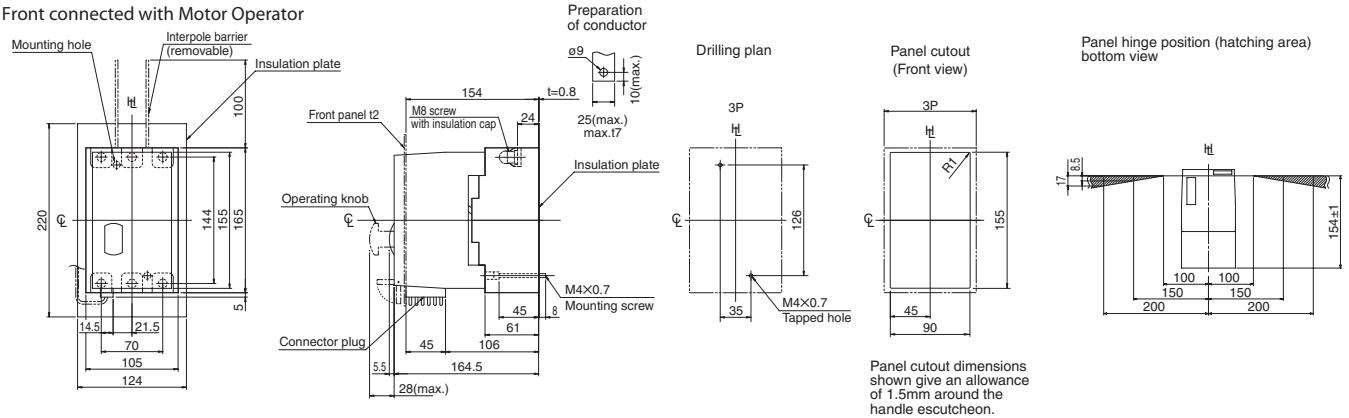


Panel cutout dimensions shown give an allowance of 1.0mm or more around the handle escutcheon.

Plug-in (PMB)



Front connected with Motor Operator

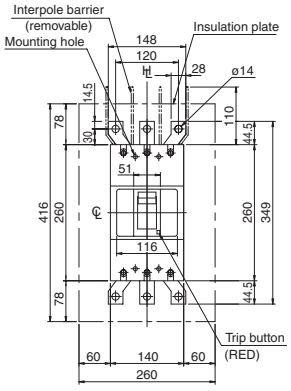


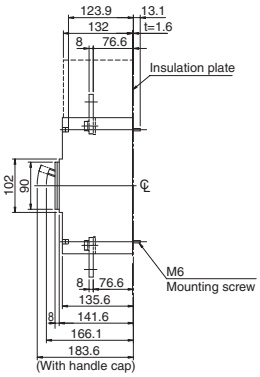
Panel cutout dimensions shown give an allowance of 1.5mm around the handle escutcheon.

VE400-NE

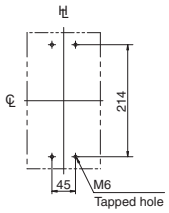
ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

Front connected

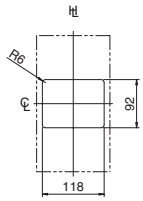




Drilling plan
(front view)

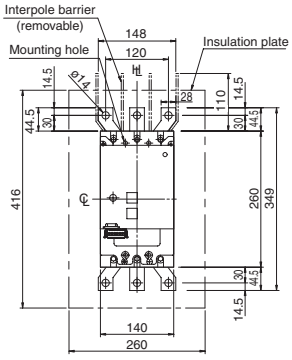


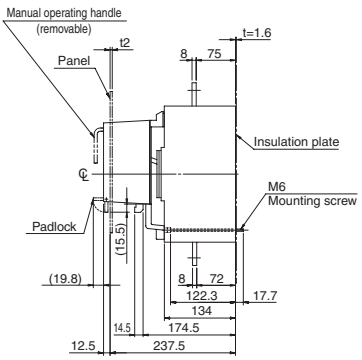
Panel cutout
(front view)



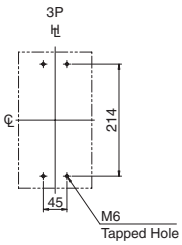
Panel cutout dimensions shown give an allowance of 1.0mm or more around the handle escutcheon.

Front connected with Motor Operator

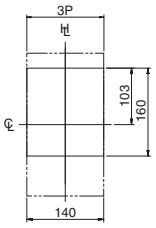




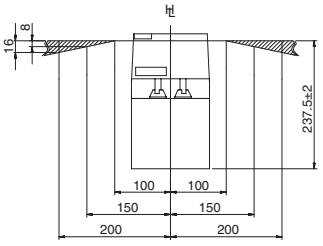
Drilling plan (front view)



Panel cutout
(front view)



Panel hinge position (hatching area)
bottom view



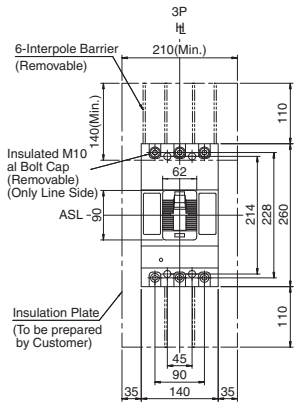
Panel cutout dimensions shown give an allowance of 1.5mm around motor operator.

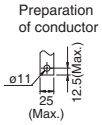
DIMENSIONS

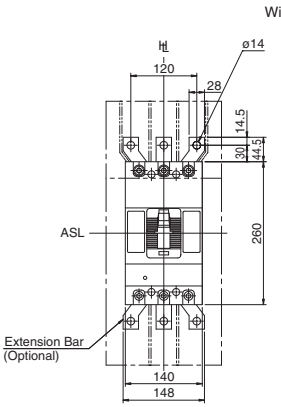
VS400-NE, VE400-NN

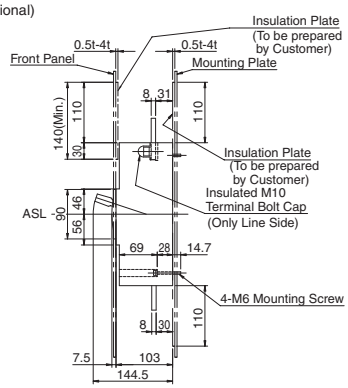
ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

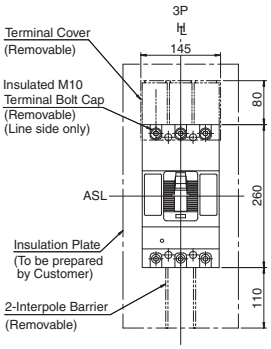
Front connected

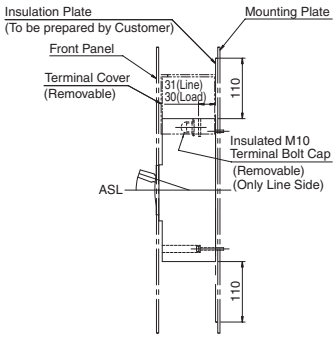


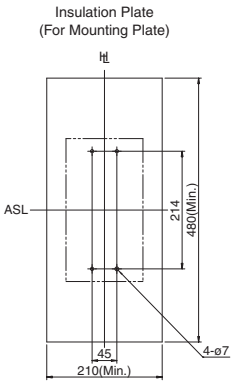


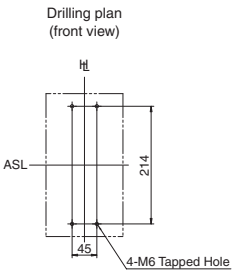




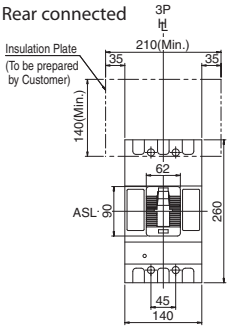


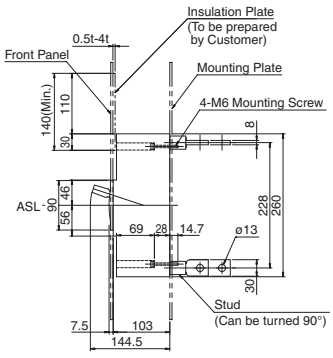


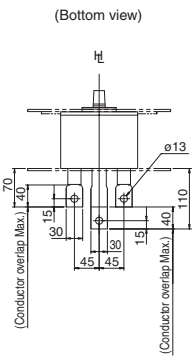


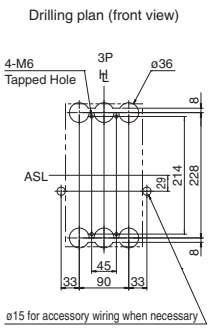


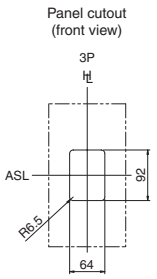
Rear connected





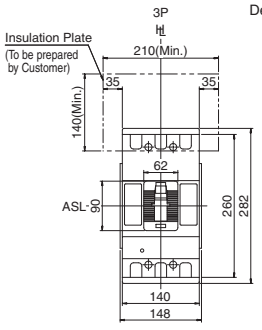


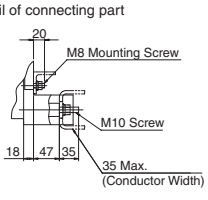


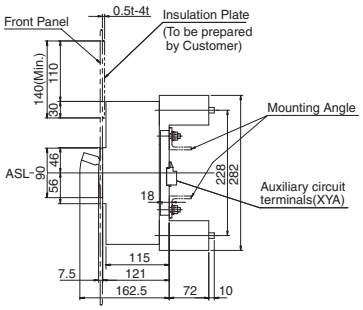


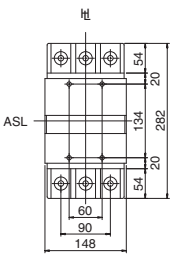
Panel cutout dimensions shown give an allowance of 1.0mm or more around the handle escutcheon.

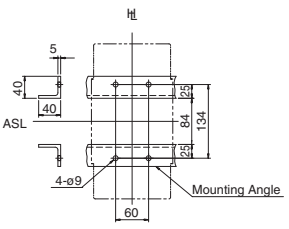
Plug-in (PMC)







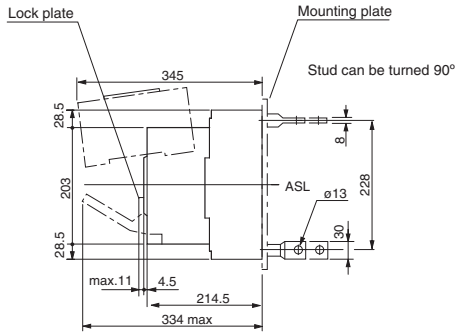


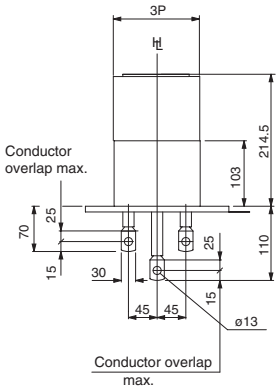


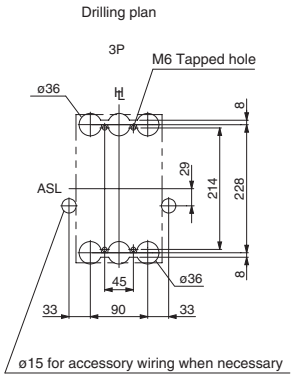
VS400-NE, VE400-NN

ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

Rear connected with Motor Operator





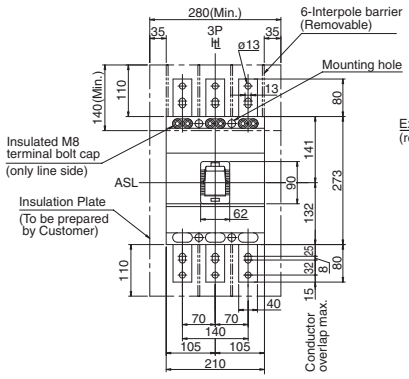


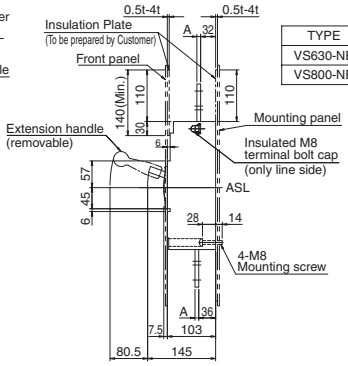
DIMENSIONS

VS630-NE, VS800-NE

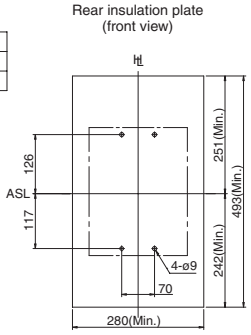
ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

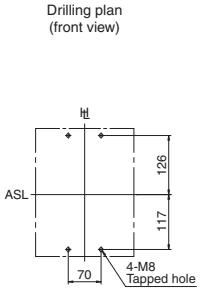
Front connected



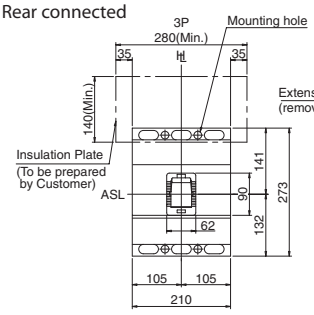


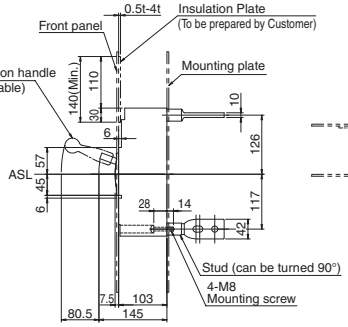
TYPE	A
VS630-NE	8
VS800-NE	10

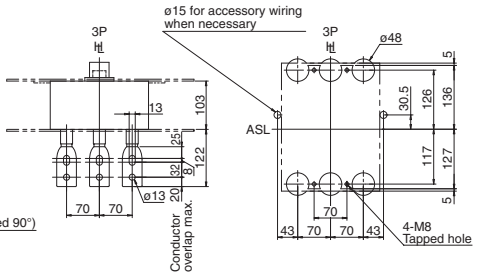


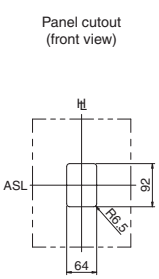


Rear connected



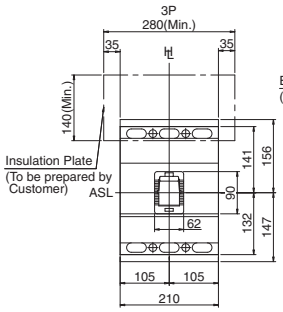


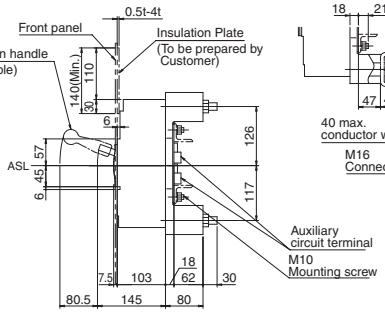


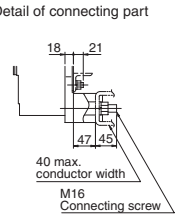


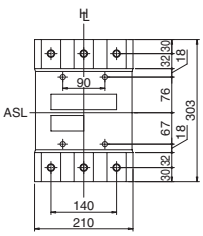
Panel cutout dimen-sions shown give an allowance of 1.0mm around the handle escutcheon

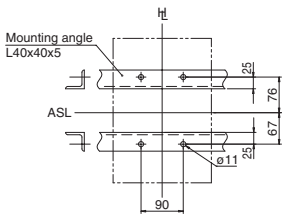
Plug-in (PMC)







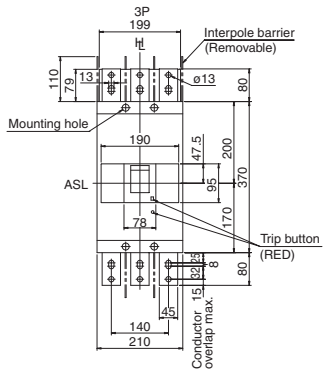


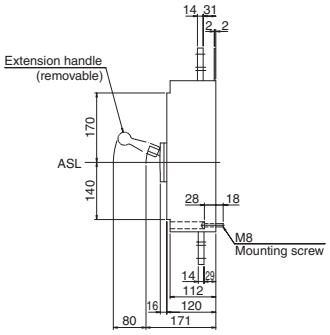


VS800-GE, VS1250-NE

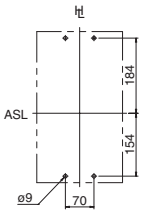
ASL : Arrangement Standard Line ℄ : Handle Centre Line ℍ : Handle Frame Centre Line

Front connected

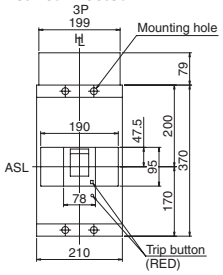


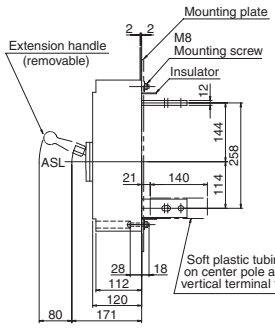


Drilling plan (front view)

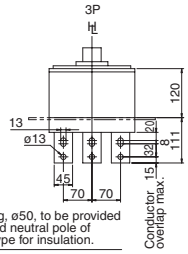


Rear connected

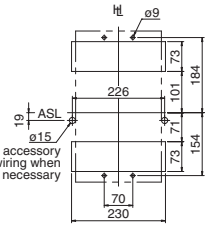




(Bottom view)

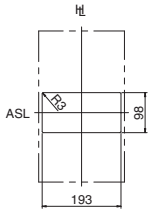


Drilling plan (front view)



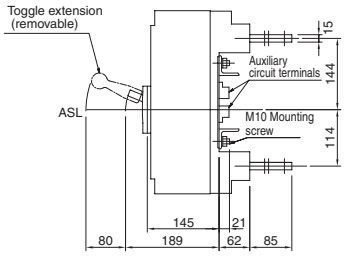
NOTE) In the standard shipment mode, both terminals on the line side and the load side are in horizontal direction.

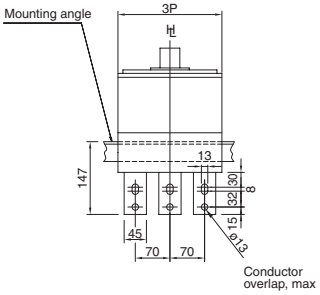
Panel cutout
(front view)



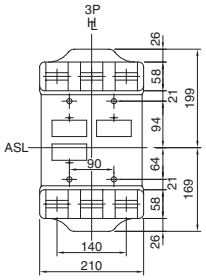
Panel cutout dimen-sions shown give an allowance of 1.5mm around the handle escutcheon.

Plug-in connected

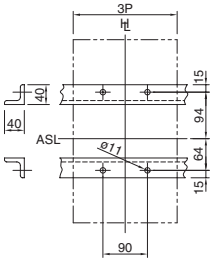




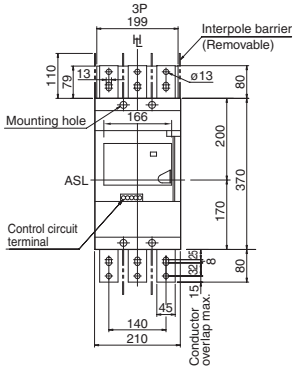
Mounting base
(rear view)

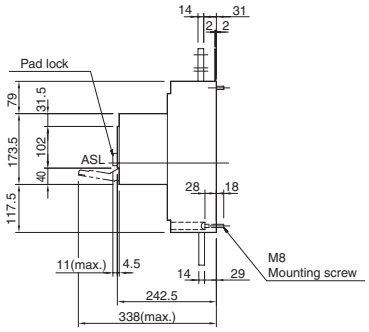


Drilling plan (front view)

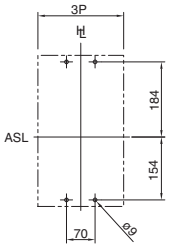


Front connected with Motor Operator

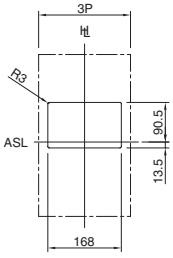




Drilling plan (front view)



Panel cutout (front view)



Panel cutout dimensions shown give an allowance of 1.0mm around motor operator.

TERASAKI ELECTRIC (EUROPE) LTD.
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(CHINA) LTD.
(China)

Since 1971 when we established TERASAKI ELECTRIC Europe, our first overseas subsidiary, in the UK, we have assembled a global network of 10 overseas subsidiaries and 72 agents to provide sales and technical supports to customers worldwide.

⚠ Safety Notice

Carefully read instruction manual to ensure proper installation, connection, operation, handling and maintenance of the product.

TERASAKI ELECTRIC CO., LTD.

Head Office: 6-13-47 Kamihigashi, Hirano-ku, Osaka 547-0002, Japan
Circuit Breaker Division: 6-13-47 Kamihigashi, Hirano-ku, Osaka 547-0002, Japan
TEL +81-6-6791-2763
FAX +81-6-6791-2732
int-sales@terasaki.co.jp
https://www.terasaki.co.jp/

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