ADVANCED AND EVER ADVANCING MITSUBISHI ELECTRIC

MITSUBISHI

Mitsubishi Low Voltage Air Circuit Breaker
AE-SS AE-SH

Super AE

ISO 14001 JACO

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

BVQI ISO 9001

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

99 A

Mitsubishi Electric Corporation's Fukuyama Works,
which produces these products, is certified as meeting
the ISO 14001 environmental management system standard.
Certification No.: EC70J1128 Date of Certification: Nov. 26, 1997

Super AE

Introduction of the new advanced Super AE series, heralding a new age of Air Circuit Breakers

With the highly advanced information technologies, dependability as well as safety and ease of handling of the electrical power supply are ever-growing requirements. The recent introduction of systemized and intelligent buildings, upgrading, and space-saving, and severe safety standard of power distribution has become a major subject within the electrical power supply industry. To cope with all these circumstances, Mitsubishi now presents the Super AE series Low Voltage Air Circuit Breakers.

This catalogue is intended for managers, engineers and working staffs to understand the outline of Mitsubishi Super AE series.
For further details of operation and maintenance please examine the "instruction manual" that comes along with the product.

Contents

Main unit features

Easier Operation

Plenty Type Composition

- The addition of 4000A, 5000A and 6300A frame to the universal series makes applicable for a wide range of types from 630A to 6300A.
- The addition of high breaking capacity (AE-SH) series (630A-3200A frame) has enabled the design of economic sequences.

Expanded selective interruption range

- With the increased short-time current rating, the selective interruption range can be expanded with the use of the electronic trip relays with MCR function.

AE630-SS ~ AE3200-SS 65kA	AE4000-SSC 75kA	AE4000-SS AE5000-SS 85kA AE6300-SS

Full moulding

- Since the breaker is fully insulated with mouldings, it is safe to use for a wide range of applications.

Long service life

- 10,000 mechanical open/close operations for all types. (Except for AE4000-SS~AE6300-SS, AE4000-SSC)

Zero arc space

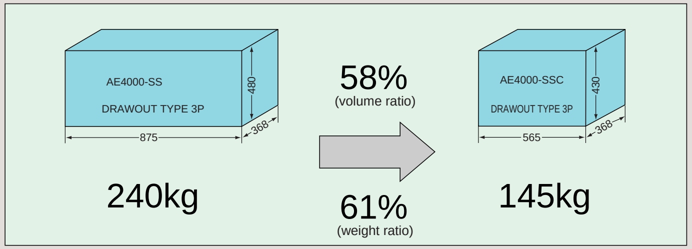
- Arc exhaust space to the outside of the breaker is drastically reduced for safer operation. (AE630-SS ~ AE3200-SS, AE4000-SSC ≤ 600VAC)

Reverse connection available

- Line and Load is not defined on the Main circuit terminals.
  Therefore reverse connection is available without any limitation.

More complete New AE4000-SSC

- The new AE4000-SSC which is smaller and economical makes fill up the AE-SS series.
- AE4000-SSC has realized smaller and lighter than AE4000-SS.



- Number of Operating cycles has been increased (2000 cycles→5000 cycles).

note 1: Only 3-pole type is available.
note 2: The Max. rated current is 3600A on JIS C8372.

Electronic trip relay features (1/2)

Multi functions available

1 Electronic trip relay series

Grouped electronic trip relays for easier selection

Control Method	Application	Relay type	Remarks	Function
Digital	General use	US	Provides transmission and monitoring functions for adaptation to networking systems as well as various characteristics for facilitating protection coordination.	**US, UM type** • Display of each phase current • Maintenance information • Transmission • Zone interlock • Measurement **S,SL,M type** • Ground fault/ Earth Leakage protection • Trip indication **C type** • Overcurrent protection • Maximum phase current indication • Test functions
	Generator use	UM		
Analog	General use	C	A standard type that provides the basic functions of a circuit breaker (long time delay tripping, short time delay tripping, instantaneous tripping).	
		S	A multi-function type that provides all the characteristics required for the main circuit	
		SL (special "long time delay" type)		
	Generator use	M	Provided with characteristics for protecting generators for private power generation and marine vessels.	

- Meets with a wide range of need depending on the application.
- Contributes to selective co-ordination, and ensures fine characteristic setting.
- Inquire for the details of digital relay.

2 Common features

Option Pre-alarm function (PAL)

The load current exceeds the value of the setting, before the breaker trips, the PAL operates, it contributes electrical continuity and easy maintenance.

Option Trip indicator (TI)

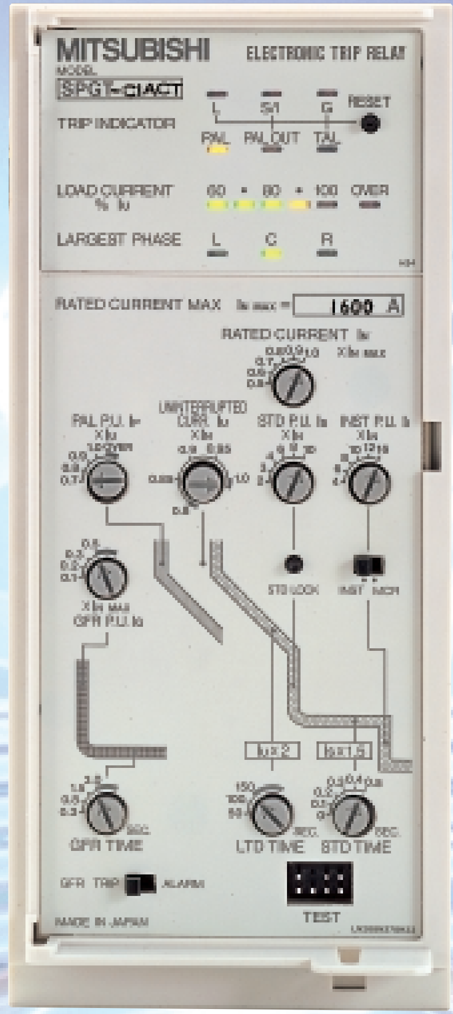
The trip indicator (TI) is operated simultaneously with the OCR alarm (AL), when the breaker trips because of Long time delay, short time delay/Instantaneous and Ground fault or Earth leakage. The relavent cause of tripping will be displayed on the appropriate indication LED and a relay contact will provide an output signal.

Option Temperature alarm (TAL)

The TAL is operated by an unusual temperature of the breaker contacts.

Option Earth leakage protection (ER)

A choice of earth leakage alarm or earth leakage tripping function is available improving the discrimination and the safety in circuit design.



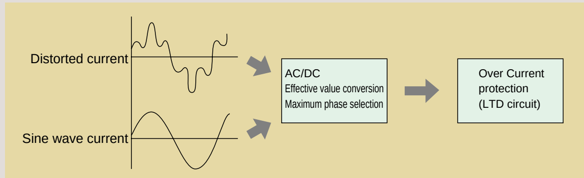
Meets Many Needs

Option Overcurrent protection on the neutral pole (NP)

In a 3-phase 4-wire circuit such that as provided to a computer, DC power unit or other load devices, higher harmonics are liable to be generated which could cause damage as more load current flows in the neutral plole.
NP will eliminate such a possibility.

More secure protection owing to detection of effective value (RMS)

Effective value detection that is most suitable for the protection of electronic devices. Effective value detection independently provided for each phase, which is effective for distorted wave forms, is used to cope with the increasing use of electronics devices, including inverters.



Option Ground fault protection (GFR)

Either a ground fault trip or alarm function can be selected by a change-over switch.
A control supply is not necessary.

Load current indication LEDs

The load current can be easily checked with the indication LEDs on the electronic trip relay.

Option Load current measurement (LM)

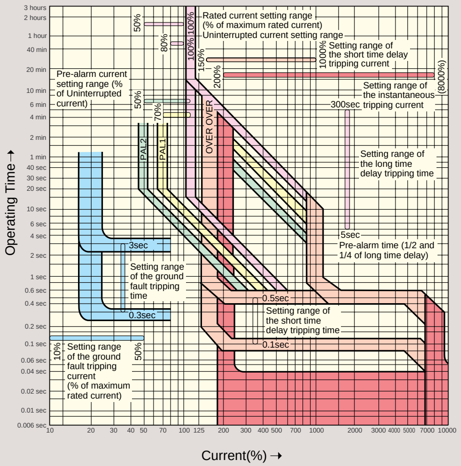
The largest phase current can be measured. The ammeter should be a DC voltage type 0-10V.

Electronic trip relay features (2/2)

Enhanced Further with a Wide Variety of Functions

Wide-Range High Accuracy Protection Characteristics

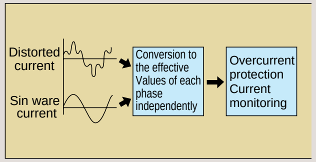
● Operating characteristics



●The setting range of the instantaneous tripping current has been extended to allow setting of values equivalent to the rated breaking current.
(Max 50 kA)

●A Wide range of long time delay operation time can be set.

●A method for detecting the effective values of each phase independently has been adapted as a powerful monitoring method for distorted waveforms to meet with inverters and other electronic devices that are becoming in creasingly popular.



Advanced Fault Information Management

●The faulty phase and the fault currents of each phase are monitored and displayed.

●Records of the causes of faults, fault currents and fault current levels are stored in the EEPROM ; these records remain even if the control power supply fails.

●The fault current level records contribute to the understanding of past fault conditions and the stress levels on the breaker.

Monitoring and Displayed Information

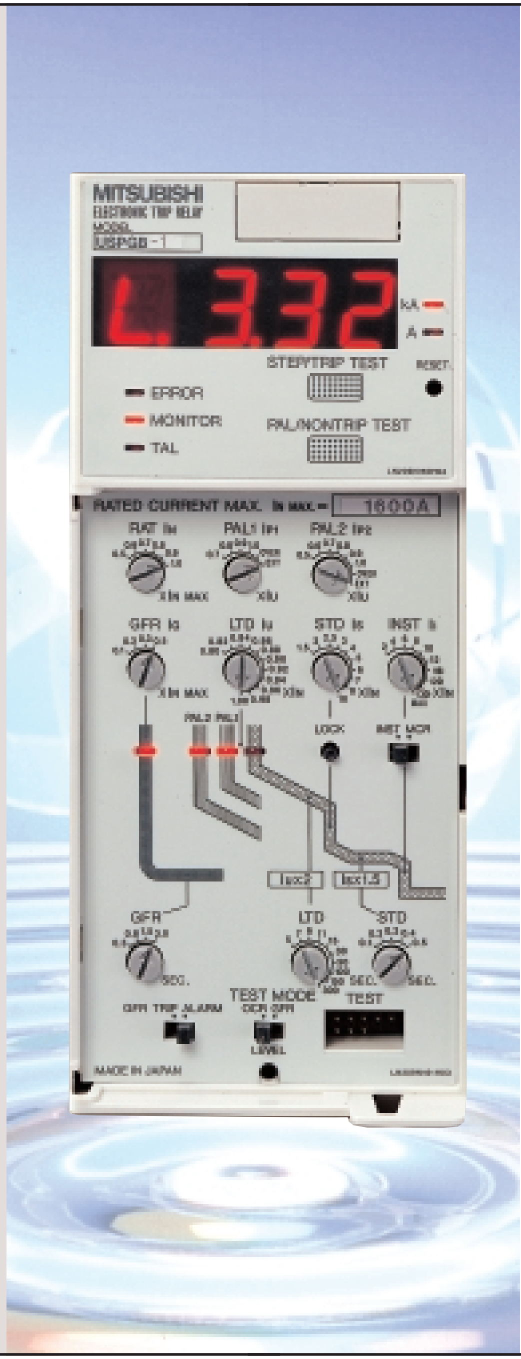
●The effective values of the current of each phase, the maximum phase current and ground fault/earth leakage current are monitored and displayed.

●The measured data of watt, watt hour, etc. can be transmitted to B/NET by using the power measurement control unit (option).

Multi-function pre-alarm

●Equipped with a double pre-alarm and an earth leakage pre-alarm.

●Functions for the remote setting of pre-alarm characteristics and alarms for the upper/lower limit of the monitored current enable detailed monitoring of the circuit.



Realization of Advanced Circuit Monitoring and User-Friendly Networking

Incorporation of Transmission Function

●Connection to the Mitsubishi Distribution Control Network (B/NET) System is facilitated by incorporating transmission interface.

Function	Contents
Monitoring (ordinary)	Breaker status (ON,OFF,TRIP) Circuit condition (pickup, alarm outputs) Measured current value Fault information Preset characteristic values Status of self-diagnosis
Alarms (emergency)	Changes in the status of the breaker Changes in the status of the circuit Load current (upper/lower limit) alarm
Control	Remote control of circuit breaker Remote setting of pre-alarm characteristics

Substantiation of Test Function

●The characteristics of all zones can be confirmed with simulated currents provided by the internal testing circuit.

●Independent testing of each phase is possible with a field tester.

Neutral Pole Protection

●The long time delay tripping characteristics of the neutral pole can be set at 50% or 100% of the main pole.
Designation of the short time delay and instantaneous tripping characteristics are also possible.

Substantiation of Self-Diagnosis

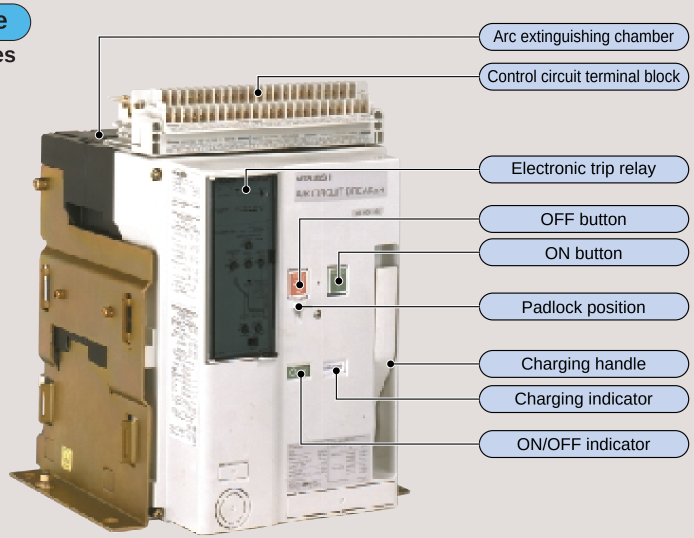
●Substantial self-diagnosis features, including monitoring of the switching and breaking operation, monitoring of the temperature of the around contact and the controlled circuit, provide higher reliability for continuous supply distribution.

Improved selective co-ordination

●Selective co-ordination is improved by the zone interlock functions for ground fault/earth leakage protection and the ramp characteristics immediately prior to the instantaneous tripping zone.

External view and Internal construction

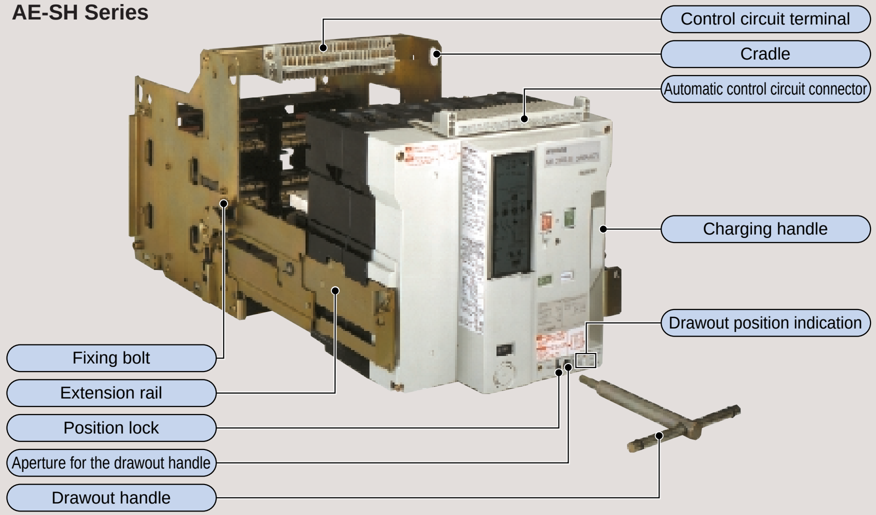
Fixed type
AE-SS Series



Lifting hooks (HP) is supplied in the case of a fixed type AE-SS series.

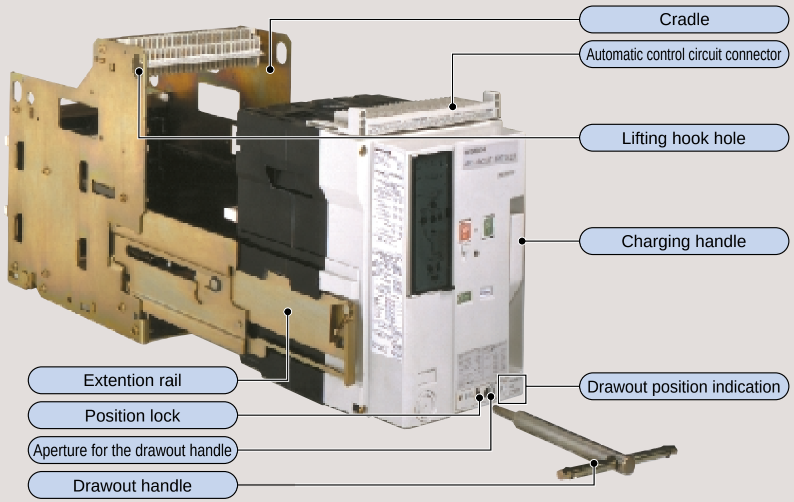
AE1600-SS 3P

Drawout type
AE-SH Series



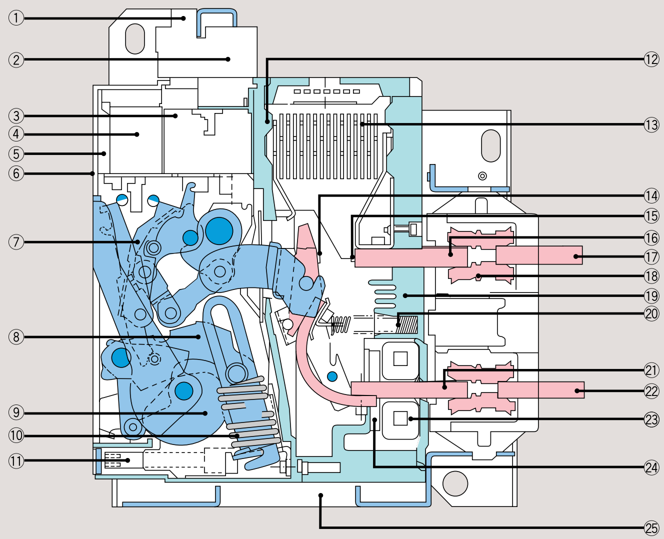
AE3200-SH 3P

Drawout type
AE-SS Series



AE1600-SS 3P

Internal Construction
AE-SS Series



①Control circuit terminal block
②Automatic Control circuit connector
③Auxiliary switches
④Shunt trip device, Closing coil
⑤Electronic trip relay
⑥Front Cover
⑦Tripping mechanism
⑧Closing mechanism
⑨Charging mechanism
⑩Closing spring
⑪Draw-out mechanism
⑫Insulated base
⑬Arc extinguishing chamber
⑭Main movable contacts
⑮Main fixed contacts
⑯Conductors on the breaker
⑰Conductors on the cradle
⑱Main circuit junction
⑲Base
⑳Contact spring
㉑Conductors on the breaker
㉒Conductors on the cradle
㉓Power supply CT
㉔Current sensor coil
㉕Cradle

SuperAE

Super AE series allows easier customer selection

1

Type		Page
Standard model	AE630-SS AE1000-SS AE1250-SS AE1600-SS AE2000-SS AE2500-SS AE3200-SS AE4000-SSC AE4000-SS AE5000-SS AE6300-SS	13 ~ 16
High breaking model	AE630-SH AE1000-SH AE1250-SH AE1600-SH AE2000-SH AE2500-SH AE3200-SH	

2

Standard	Page
IEC 60947-2 BS EN 60947-2 VDE 0660 JIS C8372 JIS C8370 Shipping standard LR GL DNV AB BV NK	15 ~ 16

3

Connecting method	Page
Draw-out type ● Horizontal terminals ● Vertical terminals ● Front terminals	17
Fixed type	

Cradle	Page
Cell switch Shorting-B contact Lifting hooks Safety shutter Safety shutter lock Mis-insertion preventor Test jumper Lifting truck	23, 24

4

Accessories		Page
Electrical accessories	Auxiliary switch Motor charging device Closing coil Shunt trip device Under voltage trip device Condenser trip device	18 ~ 20
Mechanical accessories	Push button cover Counter Cylinder lock Door interlock Terminal cover Door frame Dust cover Interphase barrier Mechanical interlock	21, 22

5

Electronic trip relay		Page
Analog	General use: • C type • S type • SL type Generator protection use • M type Special use • B-C0 type	25 ~ 34
Digital	General use: • US type Generator protection use • UM type Note: Make inquiry for the details.	7, 8

Relay accessories	Page
Trip indicator Ground fault Protection Earth Leakage Protection Neutral pole Protection Prealarm OCR-alarm Load current measurement Temperature alarm	35, 36
Neutral CT External ZCT Field test device External power supply unit	37 ~ 39

6

Special environment	Page
Moisture-fungus treatment Extra-corrosion proof specifications	66

Terminal adapter	Page
Vertical terminal adapter Front terminal adapter	17, 64

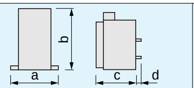
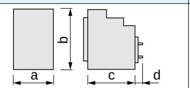
Electromagnetic Compatibility

	Description	Standard	test procedure
Emission	Conducted RF disturbances	IEC60947-2	EN55011:1991 (Class A, Group 1)
	Radiated RF disturbances		EN55011:1991 (Class A, Group 1)
Immunity	Electrostatic discharge		IEC61000-4-2 (contact Level 4)
	Electromagnetic field		IEC61000-4-3 (Level 3)
	Fast transients / burst		IEC61000-4-4 (Level 4)
	Surge		IEC61000-4-5 (Level 4)
	Conducted radio frequency		IEC61000-4-6 (Level 3)

Tests are certified by TÜV Reinland Product Safety GmbH köln.
Earthleakage protection is not applicable for these tests.

■ Product Specification(SS)

● Specification <IEC 60947-2, BS EN60947-2, VDE0660 Ics/Icu>

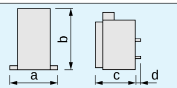
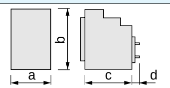
Type			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
			SS type (standard model)										
Frame size (A)			630	1000	1250	1600	2000	2500	3200	4000	4000	5000	6300
Rated insulation voltage (VAC)			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated operating voltage (VAC)			690	690	690	690	690	690	690	690	690	690	690
Number of poles (P)			3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3	3 / 4	3 / 4	3 / 4
Rated current (IN) (A)	General use (Current rating adjustable)		315-378-441-504-567-630 250-300-350-400-450-500 157-189-220-252-284-315	500-600-700-800-900-1000	625-750-875-1000-1125-1250	800-960-1120-1280-1440-1600	1000-1200-1400-1600-1800-2000 800-960-1120-1280-1440-1600 625-750-875-1000-1125-1250	1250-1500-1750-2000-2250-2500	1600-1920-2240-2560-2880-3200	3200-3600-4000	2000-2400-2800-3200-3600-4000	2500-3000-3500-4000-4500-5000	3150-3780-4410-5040-5670-6300
	Generator protection use (Current rating fixed)		315<IN≤630 200≤IN≤315	500≤IN≤1000	625≤IN≤1250	800≤IN≤1600	1000<IN≤2000 625≤IN≤1000	1250≤IN≤2500	1600≤IN≤3200	3200≤IN≤4000	2000≤IN≤4000	2500≤IN≤5000	3150≤IN≤6000
Rated current of neutral pole (A)			630	1000	1250	1600	2000	2500	3200	—	3200	3200	3200
Rated breaking capacity Ics/ Icu (RMS kA)	With instantaneous trip	690VAC	50/50	50/50	50/50	50/50	50/65	50/65	50/65	50/50	50/50	50/50	50/50
		600VAC	50/50	50/50	50/50	50/50	65/65	65/65	65/65	65/65	85/85	85/85	85/85
		500VAC	65/65	65/65	65/65	65/65	85/85	85/85	85/85	85/85	130/130	130/130	130/130
		240VAC	65/85	65/85	65/85	65/85	85/85	85/85	85/85	85/85	130/130	130/130	130/130
	With MCR	690VAC	42/42	42/42	42/42	42/42	50/50	50/50	50/50	50/50	50/50	50/50	50/50
		600VAC	50/50	50/50	50/50	50/50	65/65	65/65	65/65	65/65	85/85	85/85	85/85
		500VAC	65/65	65/65	65/65	65/65	65/65	65/65	65/65	75/75	85/85	85/85	85/85
		240VAC	65/65	65/65	65/65	65/65	65/65	65/65	65/65	75/75	85/85	85/85	85/85
	Without instantaneous (Note2)	690VAC	25/25	25/25	25/25	25/25	45/45	45/45	45/45	45/45	50/50	50/50	50/50
		500VAC	25/25	25/25	25/25	25/25	45/45	45/45	45/45	45/45	65/65	65/65	65/65
Rated making capacity Icm (Peak kA)	With instantaneous trip	690VAC	105	105	105	105	143	143	143	105	105	105	105
		600VAC	105	105	105	105	143	143	143	143	187	187	187
		500VAC	143	143	143	143	187	187	187	187	286	286	286
		240VAC	187	187	187	187	187	187	187	187	286	286	286
	With MCR	690VAC	88.2	88.2	88.2	88.2	105	105	105	105	105	105	105
		600VAC	105	105	105	105	143	143	143	143	187	187	187
		500VAC	143	143	143	143	143	143	143	165	187	187	187
		240VAC	143	143	143	143	143	143	143	165	187	187	187
	Without instantaneous (Note2)	690VAC	52.5	52.5	52.5	52.5	94.5	94.5	94.5	94.5	105	105	105
		500VAC	52.5	52.5	52.5	52.5	94.5	94.5	94.5	94.5	143	143	143
Rated short time current Icw (RMS kA)		1sec	65	65	65	65	65	65	65	75	85	85	85
		2sec	40	40	40	60	65	65	65	65	65	65	65
		3sec	30	30	30	50	65	65	65	65	65	65	65
Maximum total breaking time (sec)			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
Closing time (sec)			0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Number of operating cycles. (Note 1)		With rated current	5000	5000	5000	5000	1500	1500	1000	500	500	500	500
		Without rated current	10000	10000	10000	10000	10000	10000	10000	5000	2000	2000	2000
Outline dimension (mm)	Fixed type 	a	340 / 425	340 / 425	340 / 425	340 / 425	475 / 605	475 / 605	475 / 605	605	— / —	— / —	— / —
		b	410 / 410	410 / 410	410 / 410	410 / 410	410 / 410	410 / 410	410 / 410	414	— / —	— / —	— / —
		c	290 / 290	290 / 290	290 / 290	290 / 290	290 / 290	290 / 290	290 / 290	290	— / —	— / —	— / —
		d	38 / 38	38 / 38	38 / 38	38 / 38	38 / 38	38 / 38	38 / 38	136	— / —	— / —	— / —
	Drawout type 	a	300 / 385	300 / 385	300 / 385	300 / 385	435 / 565	435 / 565	435 / 565	565	875 / 1005	875 / 1005	875 / 1005
		b	430 / 430	430 / 430	430 / 430	430 / 430	430 / 430	430 / 430	430 / 430	430	480 / 480	480 / 480	480 / 480
		c	368 / 368	368 / 368	368 / 368	368 / 368	368 / 368	368 / 368	368 / 368	368	368 / 368	368 / 368	368 / 368
		d	61 / 61	61 / 61	61 / 61	61 / 61	61 / 61	61 / 61	61 / 61	151	123 / 123	123 / 123	123 / 123
Weight (kg)	Fixed type	Manual charging type	40 / 50	41 / 51	41 / 51	42 / 52	60 / 72	61 / 73	63 / 75	109	— / —	— / —	— / —
		Motor charging type	43 / 53	44 / 54	44 / 54	45 / 55	63 / 75	64 / 76	66 / 78	112	— / —	— / —	— / —
	Drawout type (including cradle)	Manual charging type	63 / 77	64 / 78	64 / 78	65 / 79	92 / 113	93 / 114	95 / 116	145	240 / 263	240 / 263	240 / 263
		Motor charging type	66 / 80	67 / 81	67 / 81	68 / 82	95 / 116	96 / 117	98 / 119	148	244 / 267	244 / 267	244 / 267
	Cradle only		26 / 30	26 / 30	26 / 30	26 / 30	35 / 43	35 / 43	36 / 44	75	125 / 140	125 / 140	125 / 140

Note 1 : The number of operating cycles without rated current also include the number of operating cycles with rated current.

Note 2 : The columns for "without instantaneous tripping" are the values when the bare (without electronic trip relay) main body and the external relay are combined. Please apply for further detail.

■Product Specification(SH)

● Specification <IEC 60947-2, BS EN60947-2, VDE0660 Ics/Icu>

Type			SH type (High breaking model)													
Type			AE630-SH		AE1000-SH		AE1250-SH		AE1600-SH		AE2000-SH		AE2500-SH		AE3200-SH	
Frame size		(A)	630		1000		1250		1600		2000		2500		3200	
Rated insulation voltage		(VAC)	1000		1000		1000		1000		1000		1000		1000	
Rated operating voltage		(VAC)	690		690		690		690		690		690		690	
Number of poles		(P)	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Rated current (In) (A)	General use (Current rating adjustable)		315-378-441-504-567-630		500-600-700-800-900-1000		625-750-875-1000-1125-1250		800-960-1120-1280-1440-1600		1000-1200-1400-1600-1800-2000		1250-1500-1750-2000-2250-2500		1600-1920-2240-2560-2880-3200	
	Generator protection use (Current rating fixed)		315≤In≤630		500≤In≤1000		625≤In≤1250		800≤In≤1600		1000≤In≤2000		1250≤In≤2500		1600≤In≤3200	
Rated current of neutral pole		(A)	630		1000		1250		1600		2000		2500		3200	
Rated breaking capacity Ics/ Icu (RMS kA)	With instantaneous trip	690VAC	65/65		65/65		65/65		65/65		65/65		65/65		65/65	
		600VAC	85/85		85/85		85/85		85/85		85/85		85/85		85/85	
		500VAC	130/130		130/130		130/130		130/130		130/130		130/130		130/130	
		240VAC	130/130		130/130		130/130		130/130		130/130		130/130		130/130	
	With MCR	690VAC	—		—		—		—		—		—		—	
		600VAC	—		—		—		—		—		—		—	
		500VAC	—		—		—		—		—		—		—	
		240VAC	—		—		—		—		—		—		—	
	Without instantaneous (Note2)	690VAC	—		—		—		—		—		—		—	
		500VAC	—		—		—		—		—		—		—	
Rated making capacity Icm (Peak kA)	With instantaneous trip	690VAC	65/65		65/65		65/65		65/65		65/65		65/65		65/65	
		600VAC	85/85		85/85		85/85		85/85		85/85		85/85		85/85	
		500VAC	130/130		130/130		130/130		130/130		130/130		130/130		130/130	
		240VAC	130/130		130/130		130/130		130/130		130/130		130/130		130/130	
	With MCR	690VAC	—		—		—		—		—		—		—	
		600VAC	—		—		—		—		—		—		—	
		500VAC	—		—		—		—		—		—		—	
		240VAC	—		—		—		—		—		—		—	
	Without instantaneous (Note2)	690VAC	—		—		—		—		—		—		—	
		500VAC	—		—		—		—		—		—		—	
Rated short time current Icw (RMS kA)		1sec	—		—		—		—		—		—		—	
		2sec	—		—		—		—		—		—		—	
		3sec	—		—		—		—		—		—		—	
Maximum total breaking time		(sec)	0.04		0.04		0.04		0.04		0.04		0.04		0.04	
Closing time		(sec)	0.08		0.08		0.08		0.08		0.08		0.08		0.08	
Number of operating cycles. (Note 1)		With rated current	3000		3000		3000		2000		1500		1500		1000	
		Without rated current	10000		10000		10000		10000		10000		10000		10000	
Outline dimension (mm)	 Fixed type	a	475	605	475	605	475	605	475	605	475	605	475	605	475	605
		b	410	410	410	410	410	410	410	410	410	410	410	410	410	410
		c	290	290	290	290	290	290	290	290	290	290	290	290	290	290
		d	68	68	68	68	68	68	68	68	68	68	68	68	68	68
	 Drawout type	a	485	615	485	615	485	615	485	615	485	615	485	615	485	615
		b	430	430	430	430	430	430	430	430	430	430	430	430	430	430
		c	398	398	398	398	398	398	398	398	398	398	398	398	398	398
		d	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Weight (kg)	Fixed type	Manual charging type	66	79	66	79	66	79	66	79	66	79	66	79	68	81
		Motor charging type	69	82	69	82	69	82	69	82	69	82	69	82	71	84
	Drawout type (including cradle)	Manual charging type	105	127	105	127	105	127	105	127	105	127	105	127	107	129
		Motor charging type	108	130	108	130	108	130	108	130	108	130	108	130	110	132
	Cradle only		42	50	42	50	42	50	42	50	42	50	42	50	43	51

Note 1 : The number of operating cycles without rated current also include the number of operating cycles with rated current.

Note 2 : The columns for “without instantaneous tripping” are the values when the bare (without electronic trip relay) main body and the external relay are combined. Please apply for further detail.

Product Specification(SS)

SuperAE

● Specification <JIS C 8372 (o-co-co duty) /JIS C 8370 (o-co duty)>

Type			SS type (standard model)										
Type			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
Frame size (A)			630	1000	1250	1600	2000	2500	3200	4000	4000	5000	6300
Rated insulation voltage (VAC)			600	600	600	600	600	600	600	600	600	600	600
Rated operating voltage (VAC)			550	550	550	550	550	550	550	550	550	550	550
Number of poles (P)			3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3 / 4	3	3 / 4	3 / 4	3 / 4
Rated current (I_N) (A)	General use (Current rating adjustable)		315-378-441-504-567-630 250-300-350-400-450-500 157-189-220-252-284-315	500-600-700-800-900-1000	625-750-875-1000-1125-1250	800-960-1120-1280-1440-1600	1000-1200-1400-1600-1800-2000 800-960-1120-1280-1440-1600 625-750-875-1000-1125-1250	1250-1500-1750-2000-2250-2500	1600-1920-2240-2560-2880-3200	3200-3600	2000-2400-2800-3200-3600-4000	2500-3000-3500-4000-4500-5000	3000-3600-4200-4800-5400-6000
	Generator protection use (Current rating fixed)		315<I_N≤630 200≤I_N≤315	500≤I_N≤1000	625≤I_N≤1250	800≤I_N≤1600	1000<I_N≤2000 625≤I_N≤1000	1250≤I_N≤2500	1600≤I_N≤3200	3200≤I_N≤3600	2000≤I_N≤4000	2500≤I_N≤5000	3150≤I_N≤6300
Rated current of neutral pole (A)			630	1000	1250	1600	2000	2500	3200	—	3200	3200	3200
Rated breaking capacity (kA RMS symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO — JIS C8372 O-CO-CO	With instantaneous trip	550VAC	50/105	50/105	50/105	50/105	65/143	65/143	65/143	65/143	85/195.5	85/195.5	85/195.5
		460VAC	65/143	65/143	65/143	65/143	85/195.5	85/195.5	85/195.5	85/195.5	130/299	130/299	130/299
	With MCR	550VAC	50/105	50/105	50/105	50/105	65/143	65/143	65/143	65/143	85/195.5	85/195.5	85/195.5
		460VAC	65/143	65/143	65/143	65/143	65/143	65/143	65/143	75/165	85/195.5	85/195.5	85/195.5
	Without instantaneous (Note2)	550VAC	25/52.5	25/52.5	25/52.5	25/52.5	45/94.5	45/94.5	45/94.5	45/94.5	65/143	65/143	65/143
JIS C8370 O-CO	With instantaneous trip	550VAC	50/105	50/105	50/105	50/105	65/143	65/143	65/143	65/143	—	—	—
		460VAC	65/143	65/143	65/143	65/143	85/195.5	85/195.5	85/195.5	85/195.5	—	—	—
		220VAC	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	—	—	—
	With MCR	550VAC	50/105	50/105	50/105	50/105	65/143	65/143	65/143	65/143	—	—	—
		460VAC	65/143	65/143	65/143	65/143	65/143	65/143	65/143	75/165	—	—	—
		220VAC	65/143	65/143	65/143	65/143	65/143	65/143	65/143	75/165	—	—	—
Rated short time current (RMS kA)		1sec	65	65	65	65	65	65	65	75	85	85	85
		2sec	40	40	40	60	65	65	65	65	85	85	85
		3sec	30	30	30	50	65	65	65	65	70	70	70
Maximum total breaking time (sec)			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05
Closing time (sec)			0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Number of operating cycles. (Note 1)	With rated current		5000	5000	5000	5000	1500	1500	1000	500	500	500	500
	Without rated current		10000	10000	10000	10000	10000	10000	10000	5000	2000	2000	2000

Note 1 : The number of operating cycles without read current also include the number of operating cycles with rated current.
Note 2 : The columns for "without instantaneous tripping" are the values when the bare (without electronic trip relay) main body and the external relay are combined. Please apply for further detail.

● Shipping Standard <LR, AB, GL, DNV, BV, NK >

✻ DNV:Under application

Type			SS type (standard model)										
Type			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
Frame size (A)			630	1000	1250	1600	2000	2500	3200	4000	4000	5000	6300
Rated insulation voltage (VAC)			1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Number of poles (P)			3	3	3	3	3	3	3	3	3	3	3
Rated current (I_N) (A)	General use (Fixed rated current)		315<I_N≤630 200≤I_N≤315	500≤I_N≤1000	625≤I_N≤1250	800≤I_N≤1600	1000<I_N≤2000 625≤I_N≤1000	1250≤I_N≤2500	1600≤I_N≤3200	3200≤I_N≤3800 3200≤I_N≤3500 (for NK)	2000≤I_N≤4000	2500≤I_N≤5000	3150≤I_N≤6300 3150≤I_N≤5700 (for NK)
Rated breaking capacity (kA RMS Symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO — LR	With instantaneous trip	690VAC	50/106	50/106	50/106	50/106	50/106	50/106	50/106	—	—	—	—
		600VAC	—	—	—	—	65/143	65/143	65/143	—	87/211	87/211	87/211
		500VAC	65/151	65/151	65/151	65/151	85/196	85/196	85/196	—	133/330	133/330	133/330
AB	With instantaneous trip	690VAC	50/105	50/105	50/105	50/105	50/105	50/105	50/105	—	—	—	—
		600VAC	—	—	—	—	65/143	65/143	65/143	—	—	—	—
		500VAC	65/143	65/143	65/143	65/143	85/187	85/187	85/187	—	—	—	—
GL	With instantaneous trip	690VAC	50/106	50/106	50/106	50/106	50/106	50/106	50/106	—	—	—	—
		600VAC	—	—	—	—	65/143	65/143	65/143	—	—	—	—
		500VAC	65/151	65/151	65/151	65/151	85/196	85/196	85/196	—	—	—	—
DNV	With instantaneous trip	690VAC	50/106	50/106	50/106	50/106	50/106	50/106	50/106	—	—	—	—
		600VAC	—	—	—	—	65/143	65/143	65/143	—	—	—	—
		500VAC	65/151	65/151	65/151	65/151	85/196	85/196	85/196	—	—	—	—
BV	With instantaneous trip	690VAC	50/105	50/105	50/105	50/105	50/105	50/105	50/105	—	—	—	—
		600VAC	—	—	—	—	65/143	65/143	65/143	—	—	—	—
		500VAC	65/143	65/143	65/143	65/143	85/187	85/187	85/187	—	—	—	—
NK	With instantaneous trip	600VAC	50/112	50/112	50/112	50/112	65/143	65/143	65/143	65/143	87/211	87/211	87/211
		500VAC	65/147	65/147	65/147	65/147	85/196	85/196	85/196	85/196	133/330	133/330	133/330

Product Specification(SH)

● Specification <JIS C 8372 (o-co-co duty) /JIS C 8370 (o-co duty)>

Type				SH type (High breaking model)						
Type				AE630-SH	AE1000-SH	AE1250-SH	AE1600-SH	AE2000-SH	AE2500-SH	AE3200-SH
Frame size			(A)	630	1000	1250	1600	2000	2500	3200
Rated insulation voltage			(VAC)	600	600	600	600	600	600	600
Rated operating voltage			(VAC)	550	550	550	550	550	550	550
Number of poles			(P)	3 4	3 4	3 4	3 4	3 4	3 4	3 4
Rated current (I_N) (A)	General use (Current rating adjustable)			315-378-441 -504-567-630	500-600-700 -800-900-1000	625-750-875 -1000-1125-1250	800-960-1120 -1280-1440-1600	1000-1200-1400 -1600-1800-2000	1250-1500-1750 -2000-2250-2500	1600-1920-2240 -2560-2880-3200
	Generator protection use (Current rating fixed)			$315 \leq I_N \leq 630$	$500 \leq I_N \leq 1000$	$625 \leq I_N \leq 1250$	$800 \leq I_N \leq 1600$	$1000 \leq I_N \leq 2000$	$1250 \leq I_N \leq 2500$	$1600 \leq I_N \leq 3200$
Rated current of neutral pole			(A)	630	1000	1250	1600	2000	2500	3200
Rated breaking capacity (kA RMS symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO	JIS C8372 O-CO-CO	With instantaneous trip	550VAC	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5
			460VAC	130/299	130/299	130/299	130/299	130/299	130/299	130/299
		With MCR	550VAC	—	—	—	—	—	—	—
			460VAC	—	—	—	—	—	—	—
		Without instantaneous (Note2)	550VAC	—	—	—	—	—	—	—
	JIS C8370 O-CO	With instantaneous trip	550VAC	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5	85/195.5
			460VAC	130/299	130/299	130/299	130/299	130/299	130/299	130/299
			220VAC	130/299	130/299	130/299	130/299	130/299	130/299	130/299
		With MCR	550VAC	—	—	—	—	—	—	—
			460VAC	—	—	—	—	—	—	—
			220VAC	—	—	—	—	—	—	—
Rated short time current (RMS kA)			1sec	—	—	—	—	—	—	—
			2sec	—	—	—	—	—	—	—
			3sec	—	—	—	—	—	—	—
Maximum total breaking time			(sec)	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Closing time			(sec)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Number of operating cycles. (Note 1)			With rated current	3000	3000	3000	2000	1500	1500	1000
			Without rated current	10000	10000	10000	10000	10000	10000	10000

Note 1 : The number of operating cycles without read current also include the number of operating cycles with rated current.
Note 2 : The columns for "without instantaneous tripping" are the values when the bare (without electronic trip relay) main body and the external relay are combined. Please apply for further detail.

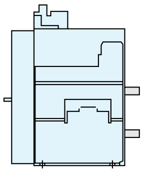
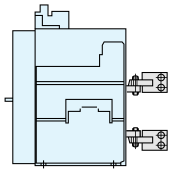
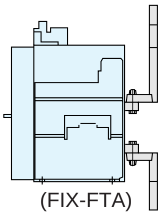
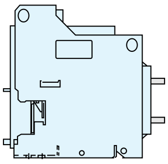
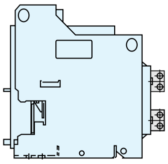
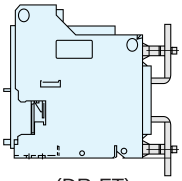
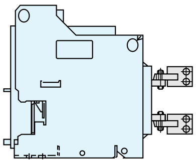
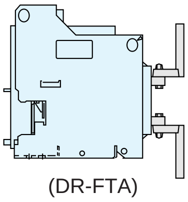
● Shipping Standard <LR, AB, GL, DNV, BV, NK >✻ DNV:Under application

Type				SH type (High breaking model)						
Type				AE630-SH	AE1000-SH	AE1250-SH	AE1600-SH	AE2000-SH	AE2500-SH	AE3200-SH
Frame size			(A)	630	1000	1250	1600	2000	2500	3200
Rated insulation voltage			(VAC)	1000	1000	1000	1000	1000	1000	1000
Number of poles			(P)	3	3	3	3	3	3	3
Rated current (I_N) (A)	General use (Fixed rated current)			$315 \leq I_N \leq 630$	$500 \leq I_N \leq 1000$	$625 \leq I_N \leq 1250$	$800 \leq I_N \leq 1600$	$1000 \leq I_N \leq 2000$	$1250 \leq I_N \leq 2500$	$1600 \leq I_N \leq 3200$
Rated breaking capacity (kA RMS Symmetrical) / Rated making capacity (kA peak value) Breaking duty O-CO-CO	LR	With instantaneous trip	690VAC	68/173	68/173	68/173	68/173	68/173	68/173	68/173
			600VAC	87/211	87/211	87/211	87/211	87/211	87/211	87/211
			500VAC	133/330	133/330	133/330	133/330	133/330	133/330	133/330
	AB	With instantaneous trip	690VAC	—	—	—	—	—	—	—
			600VAC	—	—	—	—	—	—	—
			500VAC	—	—	—	—	—	—	—
	GL	With instantaneous trip	690VAC	—	—	—	—	—	—	—
			600VAC	—	—	—	—	—	—	—
			500VAC	—	—	—	—	—	—	—
	DNV	With instantaneous trip	690VAC	—	—	—	—	—	—	—
			600VAC	—	—	—	—	—	—	—
			500VAC	—	—	—	—	—	—	—
	BV	With instantaneous trip	690VAC	—	—	—	—	—	—	—
			600VAC	—	—	—	—	—	—	—
			500VAC	—	—	—	—	—	—	—
	NK	With instantaneous trip	600VAC	—	—	—	—	—	—	—
			500VAC	130/317	130/317	130/317	130/317	130/317	130/317	130/317

Connecting methods

Connection arrangements

The following connecting methods are available for the AE type air circuit breaker.

Mounting method \ Connecting method	Horizontal connection (Standard)	Vertical connection (VT)	Front connection (FT)	Vertical terminal adapter (VTA)	Front terminal adapter (FTA)
Fixed type (FIX)		———	———	 (VTA)	 (FIX-FTA)
Draw-out type (DR)		 (DR-VT)	 (DR-FT)	 (VTA)	 (DR-FTA)

●**Connecting Methods**

Connecting method \ Type			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
Fixed type (FIX)		Horizontal terminal (Standard)	●	●	●	●	●	●	●	–	–	–	–
		Vertical terminal	–	–	–	–	–	–	–	●	–	–	–
	Options	(VTA)	○	○	○	○	○	○	○	–	–	–	–
		(FIX-FTA)	○	○	○	○	○	○	○	–	–	–	–
Draw-out type (DR)		Horizontal terminal (Standard)	●	●	●	●	●	●	●	–	–	–	–
		(DR-VT) (Note 1)	○	○	○	○	○	○	○	●	●	●	●
		(DR-FT)	○	○	○	○	○	○	○	–	–	–	–
	Options	(VTA)	○	○	○	○	○	○	○	–	–	–	–
		(DR-FTA)	○	○	○	○	○	○	○	–	–	–	–

Connecting method \ Type			AE630-SH	AE1000-SH	AE1250-SH	AE1600-SH	AE2000-SH	AE2500-SH	AE3200-SH
Fixed type (FIX)		Horizontal terminal (Standard)	●	●	●	●	●	●	●
	Options	(VTA)	○	○	○	○	○	○	○
		(FIX-FTA)	○	○	○	○	○	○	○
Draw-out type (DR)		Horizontal terminal (Standard)	●	●	●	●	●	●	●
		(DR-VT)	○	○	○	○	○	○	○
		(DR-FT)	○	○	○	○	○	○	○
	Options	(VTA)	○	○	○	○	○	○	○
		(DR-FTA)	○	○	○	○	○	○	○

Note1: The terminal for AE4000-SSC, AE4000-SS∼AE6300-SS shall be vertical terminal.

(Remarks) The white circle "○" indicates that the product can be manufactured, while the blue "●" indicates the standard connecting method.

■ Charging methods

Manual charging

The spring is charged by the manual charging handle. The breaker is closed when the ON button is pressed, and opened when the OFF button is pressed.

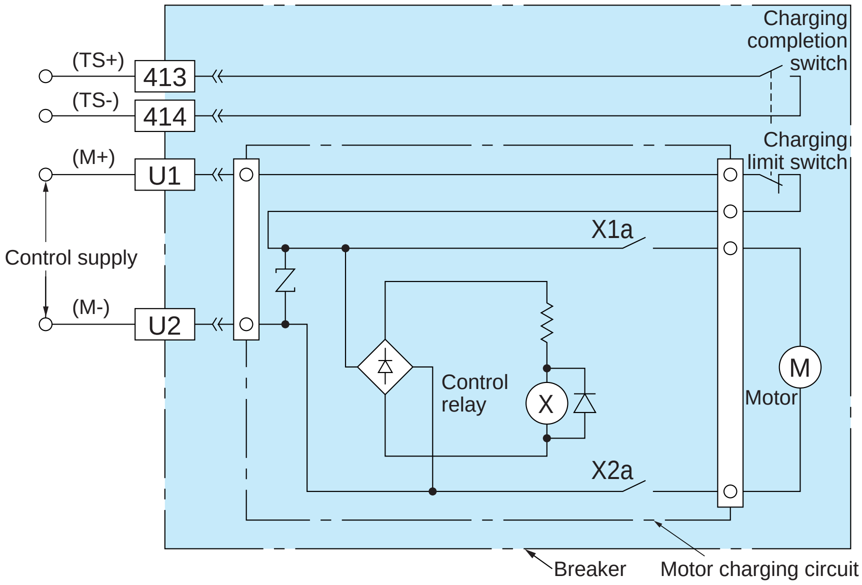
- When the closing spring charging is completed, the charging indicator displays CHARGED.
- The indicator displays ON or OFF state of the main contacts.
- The breaker cannot be closed while the OFF button is being pressed. (Safety feature)
  OFF lock is available by padlock (See P9, P24) as standard.

Option

Motor charging device (MD)

The closing spring is charged by an electric motor. When the breaker is closed, the spring is charged automatically (ON-charge method.) The closing coil (CC) is required to remotely close, and the shunt trip device is required to remotely open the breaker.

- Manual charging is also available.
- Pumping prevention is assured both electrically and mechanically.
- As the charging completion contact is separate from the electrical charging circuit, its function in the control scheme can be arranged as desired.



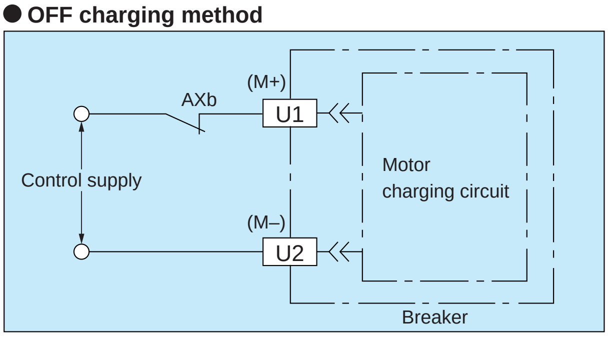
Apply for further details of 24V DC and 48V DC.

● Motor charging rating

Rated voltage	Applicable voltage range (V)	Applied voltage (V)	Inrush current (peak value)(A)	Steady current (A)	Charging time (sec.)
DC24V	20.4~26.4	24	22	6	≦5
DC48V	36~52.8	48	14	3	≦5
AC-DC 100~125V	85~137.5	100	10(10)	3(4)	≦5
		125	12(12)	3(4)	≦5
AC-DC 200~250V	170 ~275	200	5(7)	1(2)	≦5
		250	6(8)	1(2)	≦5

( ): AE4000-SS~AE6300-SS
DC24, DC48V is not available for AE4000-SS~AE6300-SS

● OFF charging method



A OFF charging method is also available. The closing spring is charged automatically when the breaker is opened. This is available only by externally connecting in series b contact (AXb) of the auxiliary switch to the motor charging circuit.
In case of DC power supply, please use high capacity auxiliary switch (HAX).

Accessories (for Breaker unit 1/2)

Option

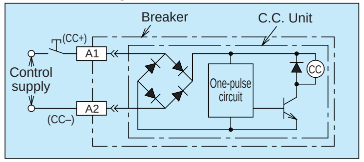
Closing coil (CC)

The closing coil is a device to close the breaker by remote control.
● An interlock to prevent pumping is provided electrically.

Rated voltage (Applicable voltage range)	Operating voltage • Operating inrush current (VA) AC	DC	Closing time
DC24-48V (18 ~ 52.8)	—	DC24V 3.5A (100W)	0.08 sec. or less
	—	DC48V 7.0A (200W)	
AC • DC common 100-250V (75-275)	AC100V 0.5A (100VA)	DC100V 0.6A (100W)	
	AC250V 1.0A (150VA)	DC250V 1.3A (200W)	

● Closing time is from the initial energization of the closing coil to the completion of the closing of the main contacts.
● Because of pumping prevention is not performed, do not use AXb contact for a cut-off switch.

● **CC circuit diagram**



Diode rectifier is not used for control source 24-48V DC.

Option

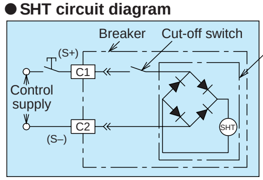
Shunt trip device (SHT)

This is the switch used to open the breaker by remote control. A cut-off switch is included.

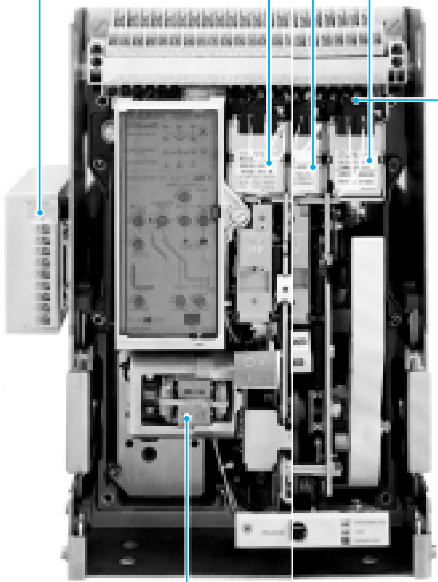
Rated voltage (Applicable voltage range)	Operating voltage • Operating inrush current (VA) AC	DC	Operating time
DC24 ~ 48V (16.8 ~ 52.8)	—	DC24V 3.5A (100W)	0.04sec. or less
	—	DC48V 7.0A (200W)	
AC • DC common 100 ~ 250V (75 ~ 275)	AC100V 0.6A (100VA)	DC100V 0.8A (100W)	
	AC250V 1.7A (150VA)	DC250V 2.0A (250W)	
AC380 ~ 500V (266 ~ 550)	AC460V 0.6A (200VA)	—	

Operating time AE4000-SS~AE6300-SS is 0.05 sec. or less.

● **SHT circuit diagram**



Diode rectifier is not used for control source 24-48V DC.



Option

Motor charging device (MD)

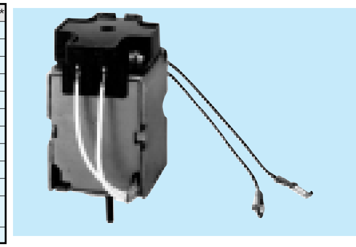
The closing spring is charged electrically, and the breaker will be ready to be closed.
● When specifying the motor charging device, be sure to order the closing coil (CC) and the shunt trip device (SHT) for remote operation.
● Refer to page 18 for details.

Option

Under voltage trip device (UVT)

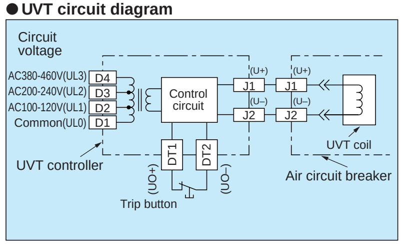
This device is used to trip the breaker if the supply voltage is reduced below its nominal value, and consists of a UVT coil and UVT controller. Two types are available: the instantaneous type which trips the breaker instantly, and a time delay type which trips the breaker after a delay of 0.5 or 3 seconds from when the supply voltage has reduced below its nominal value. The UVT controller can be mounted on the lefthand side of the breaker looking from the front.

Type	UVT-SSB*	UVT-05SSB*	UVT-30SSB*
Operation	Instantaneous	Time delay	
Operation time(Note 3)	0.1 sec max.	0.5 sec min.	3 sec min.
Rated voltage (+10% –15%)	100-120/200-240/380-460VAC		
	24VDC		
	48VDC		
	100-110VDC		
	120-125VDC		
Frequency	50/60 Hz(AC)		
Pick-up voltage	65 ~ 85% (Note 1)		
Drop-out voltage	45 ~ 70% (Note 1)		
Trip function (Note 2)	With open circuit of terminals (DT1, DT2) operation time 0.1 sec max.		
Power consumption	20 VA		

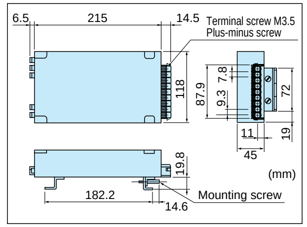


(Note 1) If dual rated voltages are used, a lower value is applied.
(Note 2) If a remote trip function is required remove the wire shorting terminals DT1 DT2 and connect a normally closed switch, rated 1mA at 100VDC across them.
(Note 3) The operating time is a guarantee value when it drops from 85% or more of the rated voltage.
● The following delay should be allowed between applying the voltage to the UVT, and closing the breaker.
UVT-SSB* : 1.5 sec., UVT-05SSB* : 1.5 sec., UVT-30SSB* : 3 sec.

● **UVT circuit diagram**



● **UVT controller**



Option

Auxiliary switch (AX-standard, HAX-high capacity type)

This is the contact that is used to remotely indicate the ON or OFF status of the breaker.

Type			AX(standard) Resistance load	AX(standard) Inductive load	HAX (high capacity type) Resistance load	HAX (high capacity type) Inductive load
Contact capacity (A)	A C	460V	5	2	5	2.5
		250V	10	10	10	10
		125V	10	10	10	10
	D C	250V	0.3	0.3	3	1.5
		125V	0.6	0.6	10	6
		30V	10	6	10	10
Maximum contacts			5 a 5 b		5 a 5 b	

Change-over sequence	Breaker state	a-contact (NO)	b-contact (NC)
	ON	ON	OFF
	OFF	OFF	ON

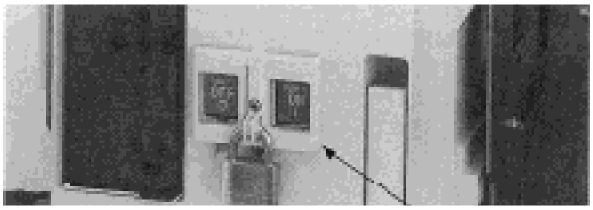
● The a and b contacts may turn simultaneously to ON instantaneously at the time of changing the contact; Pay attention to the contact state when designing circuits.
● The chattering time at the time of contact ON-OFF is below 0.025 sec.
● For special environment specification, the contact capacity gets deteriorated. Apply for further detail.

Accessories (for Breaker unit 2/2)

Option

Push button cover

The cover is to prevent careless manual operation (ON, OFF) of the push buttons.
BC-L can be locked by a padlock (The padlock being supplied by the customer.)
For the size of the a suitable padlock, refer to Page 24.



Push button cover

Option

Counter (CNT)

The open/close operations of the breaker are shown on a 5 digit counter.

Option

Cylinder lock (CYL)

The breaker is locked OFF with the cylinder lock.

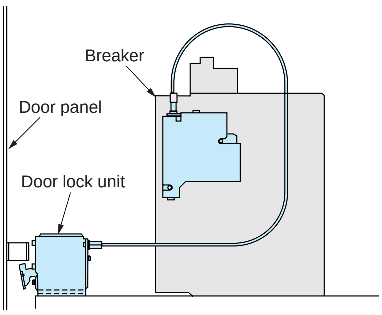
- Since it is an interlock which only allows the key to be removed when the breaker is locked off, it can be used for interlocking two or more breakers.

Option

Door interlock (DI)

The panel door cannot be opened unless the breaker is open.

- A wire type mechanical interlock is used to allow flexibility in positioning breakers in the switchboard.
- The parts of the Door panel should be supplied by customer.



Option

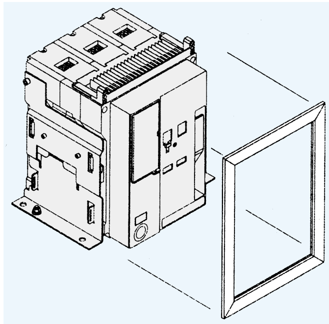
Terminal cover (TTC)

The transparent terminal cover prevents from careless touching to the live control terminals.
Protection degree IP20.

Option

Door frame (DF)

The door frame improves the appearance, after cutting out the panel door to install the breaker.



Option

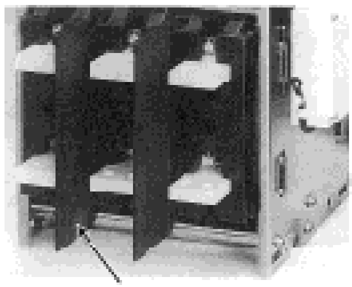
Dust cover

Dust cover prevents the dust or water entering into the panel board from the breaker panel cut.
Protection degree IP 54.

Option

Interphase Barrier (BA)

The interphase insulation of the circuit breaker has been intensified to prevent the shortcircuit due to conductive matters or dust. Easily detachable, in design, the barrier is applicable to fixed type, draw-out type, horizontal terminal or vertical terminal. (For further detail, see the “Table of Mountable Barriers” given below.



Interphase berrier (BA) 2 pcs (3-pole), 3pcs (4-pole)

●Table of Mountable Barriers

	Connecting method	AE630-SS~ AE1600-SS	AE2000-SS~ AE3200-SS	AE-SH Type
Fixed type	Horizontal terminal (standerd)	○	○	–
	Vertical terminal adapter	–	–	–
	Front terminal adapter	–	–	–
Draw-out type	Horizontal terminal (standerd)	○	○	○
	Vertical terminal	○	–	–
	Front terminal	–	–	–
	Vertical terminal adapter	–	–	–
	Front terminal adapter	–	–	–

Not available for AE4000-SSC, AE4000-SS~AE6300-SS

Option

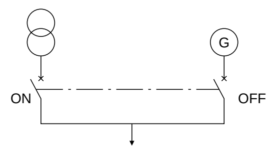
Mechanical interlock (MI)

The mechanical interlock is a secure interlock prohibiting the parallel closing of two or three breakers.

- Any combination between AE630-SS~AE3200-SH and AE4000-SSC is possible. Please apply for further details of AE4000~6300-SS.
- It can be simply installed on either fixed or drawout type breakers.
- With the drawout type, the interlock operates at the connecting point and can be released at other positions, providing secure maintenance and inspections of the breaker.
- There are restrictions on ordering MI and DI together, please apply for further details.
- It is impossible to secure interlock among 3 pcs of AE4000-SS~AE6300-SS.

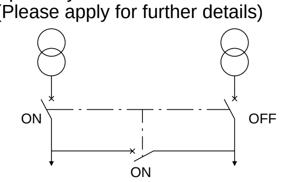
The following interlocks are available.

Change over of two power supplies

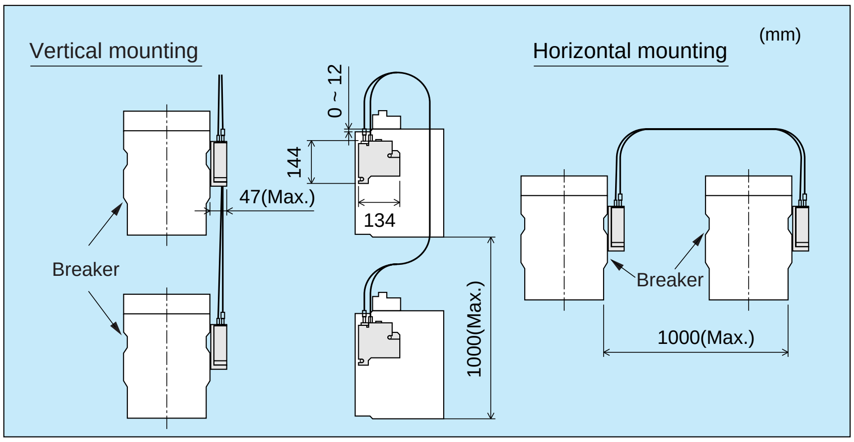


Change over of two supply systems

Up to any two breakers can be closed.
(Please apply for further details)



● Breaker arrangement (630AF ~ 3200AF)



Option

Condenser trip device (COT)

Even if the power supply fails, the breaker can be electrically opened by remote operation within a definite time. This device is combined with the shunt trip device (SHT).

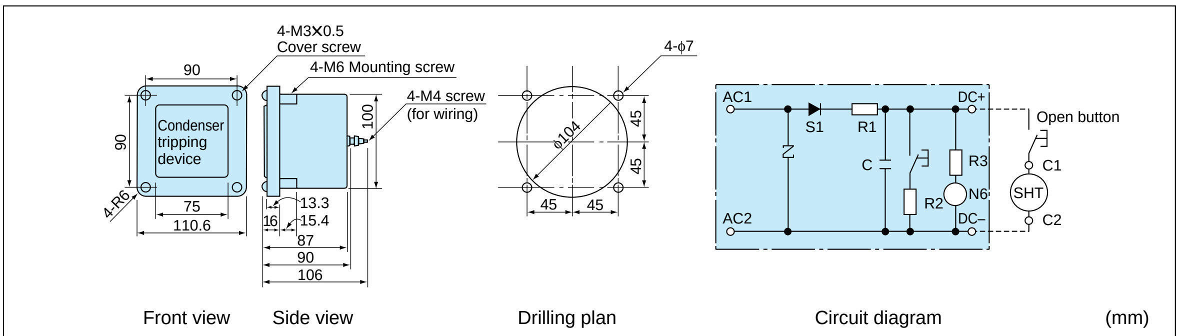
Note 1: The rated charging voltage is the voltage stored during capacitor saturation. It is continuously supplied by the rectified voltage of the rated AC input voltage.

Note 2: The charging time starts when the capacitor begins to supply power at 85% of the rated AC input voltage and continues until the capacitor charging voltage reaches 60% of rating.

Note 3: The time period in which the shunt trip device can perform its one operation starts from when the capacitor is charge to 100% the supply voltage is removed.

Type	KF-100	KF-200
Rated input voltage	100/110VAC	200/220VAC
Rated frequency	50 ~ 60Hz	50 ~ 60Hz
Rated charging voltage (Note1)	140/155V	280/310V
Condenser capacity	660μF	150μF
Voltage range	60 ~ 125%	60 ~ 125%
Power supply capacity	1VA	1VA
Charging time (Note 2)	0.5 sec max.	0.5 sec max.
Trip limit time (Note 3)	15 minutes min.	5 minutes min.
Paint colour	Black (N1.5)	Black (N1.5)
Withstand voltage (1 minute)	2000VAC	2000VAC
Applicable shunt trip voltage	100 ~ 250VAC•DC	100 ~ 250VAC•DC

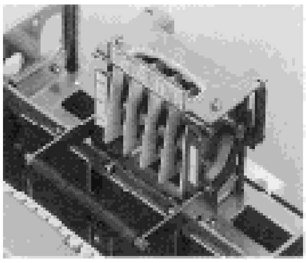
● Outline dimensions (mm)



Accessories (for Drawout frame)

Option Cell switch (CL)

The switch is used to indicate the drawout positions (CONNECTED, TEST, DISCONNECTED).



● Operating sequence and contact rating

Drawout position of breaker		Disconnected		Connected
Display position of drawout operation		DISCON	TEST	CONNECT
Switch function	CL-C (CONNECTED)	OFF		ON
Change-over sequence (a-contact)	CL-T (TEST)	OFF	ON	
	CL-D (DISCONNECTED)	ON		OFF

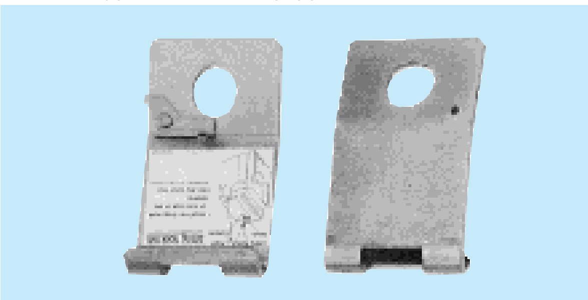
Contact capacity (A)	Voltage (V)		Resistive load	Inductive load
	AC	460	5	2.5
		250	10	10
		125		
	DC	250	3	1.5
		125	10	6
		30	10	10
Number that may be installed			Total 4c max.	

Option Shorting b-contact (SBC)

When moving the breaker from the connected to the test positions, use this contact to short circuit auxiliary switch (Axb) thus maintaining the correct sequence of operation of the external control circuit.
When ordered, the same number of shorting b-contacts as auxiliary switches (Axb) will be provided.

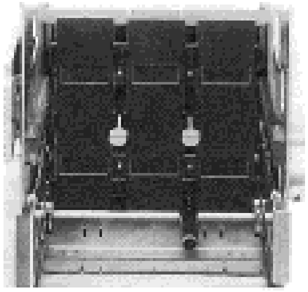
Option Lifting hooks (HP)

This is used to remove the drawout type breaker from the cradle.
The option is not necessary when the special lifter (bucket type) for AE-SS·SH is used.
The fixed type breaker is equipped with HP as standard.



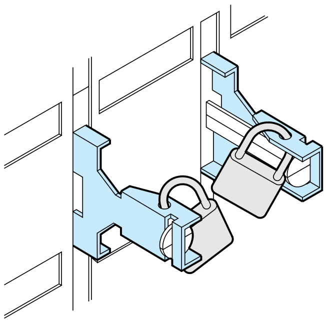
Option Safety shutters (SST)

The safety shutters cover the conductors (cradle side) and prevent contact with them when the breaker is drawn out.
● When checking the main circuit, supply and load sides of the shutters can be kept OPEN independently. (they are released automatically when the breaker is pushed in.)



Option Safety shutter lock (SST-LOCK)

This kit is used to lock the safety shutters using 2 padlocks (the padlocks to be customer's supply). The safety shutters close when the breakers drawn out to prevent accidental contact with the main contacts.



Option

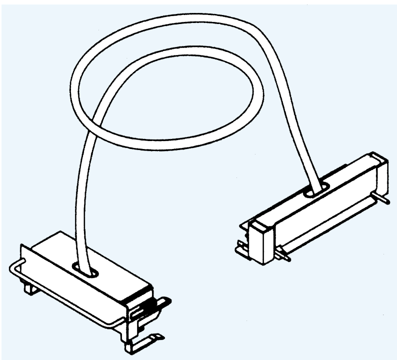
Mis-insertion preventor (MIP)

This option prevents any other circuit breakers except those specified from being inserted into the cradle, 5 settings are available.
(Note) It is not available for AE4000-SS~AE6300-SS.

Option

Test jumper (TJ)

With the breaker taken out of its cradle, this device will enable the breaker to be electrically opened and closed, and the operating sequence to be checked.
Note 1: Remove the breaker out of its cradle before using this device.



Option

Lifting truck

Lifting truck for transferring AE-SS, AE-SH breakers. Apply for further details.

Standard equipment

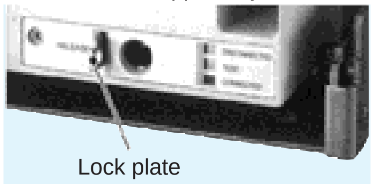
Drawout interlock

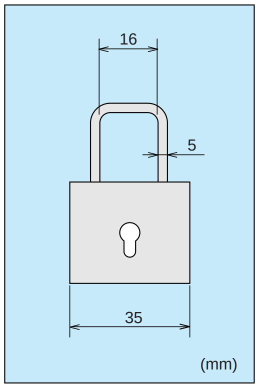
A safety device prohibits push-in and drawout when the breaker is ON. The drawout handle cannot be inserted unless the OFF button is pressed.

Position lock

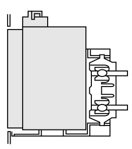
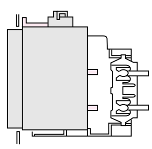
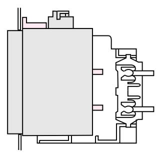
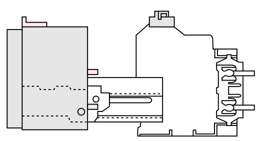
This device is for locking the drawout mechanism at the TEST position this then indicates the “TEST position”. The lock can be used during either the drawing out or pushing in operation.
The lock is released when the lock plate is pushed in, and the next operation becomes possible.
Padlocking is possible at the CONNECTED, TEST, and DISCONNECTED positions. Use this lock to prevent unauthorized changing of positions.

The padlock should be supplied by customer.





Operating position of drawout type

CONNECTED position	TEST position	DISCONNECTED position	DRAWOUT position
			
● Both main and control circuits are connected. ● Normal in use condition.	● Main circuit is disconnected, but the control circuit is connected. ● The breaker operation can be tested with the door closed.	● Both main and control circuits are disconnected. ● The door can be closed.	● This is the position for removing the breaker. ● The breaker is drawn out of the cradle on the extension rails.

● The earthling points are located on both sides of the cradle, and they make contact between the breaker and the cradle at CONNECTED, TEST, and DISCONNECTED positions.

Electronic trip relay specifications table

Type	Operating characteristics			Accessory (possible combinations)			Referred page
	Standard LTD STD INST	With MCR C (Note1) LTD STD INST/MCR	With NP N (Note2) LTD STD INST	OCR alarm (AL) A	Load current measurement (LM) C	Temperature alarm (TAL) T	
General use C type (Note 6)	C	—	—	○	—	—	29,30
General use S type	S	S— C	—	○	—	—	31,32
	ST TI	ST— C TI	ST— N TI	○	—	—	
	SPT TI PAL	SPT— C TI PAL	—	○	○	○	
	SPGT TI PAL GFR	SPGT— C TI PAL GFR	—	○	○	○	
	SPET TI PAL ER	SPET— C TI PAL ER	—	○	○	○	
General use special LTD SL type	SL	SL— C	—	○	—	—	31,32
	SLT TI	SLT— C TI	—	○	○	○	
	SLPT TI PAL	SLPT— C TI PAL	—	○	○	○	
	SLPGT TI PAL GFR	SLPGT— C TI PAL GFR	—	○	○	○	
	SLPET TI PAL ER	SLPET— C TI PAL ER	—	○	○	○	
Generater protection use M type	M	—	—	○	—	—	33,34
	MT TI	—	—	○	—	—	
	MPT TI PAL	—	—	○	—	○	
	MPGT TI PAL GFR	—	—	○	—	○	

Special use B type	B-C(Note 5) (Only INST/MCR characteristic)	○ (Standard)	—	—	
Non	BARE: without electronic trip relay (Not available for AE-SH)				

"○" Available
"—" Not available

LTD	Long-time delay
STD	Short-time delay
INST	Instantaneous
INST/MCR	Selectable Inst. or Making current release
TI	Trip indicator (LED and contact)
PAL	Pre-alarm (LED and contact)
GFR	Ground fault (Note 3)
ER	Earth leakage(Note 4) (External ZCT and SHT are required)

Super AE

Classification of types

Relay type and characteristic	Voltage code	Accessory
SPT— C	2	AT

◆**Control supply**

color : control supply is required

Code	Control voltage
0	Not required
1	AC100–120/200–240V
2	DC 100–110V
3	DC 125V
4	DC 24V
5	DC 48V

A OCR alarm (AL)
C Load current measurment (LM)
T Temperature alarm (TAL)

Standard function

1) Load current indicator.........The load state is indicated by the color of the LED
2) Test terminal.......................For characteristics check. M type relay can be checked each pole.
3) STD lock button ....Convenient checking of the INST. operation

(Note1) C MCR function is not available for AE-SH.
(Note2) N Neutral protection for 4 pole breaker
(Note3) GFR Not available for AE-SS series with maximum rated current ($I_{N\,MAX}$) coming to 315A or 500A, nor AE630-SH
(Note4) ER The earth leakage alarm facility is provided by using a electronic trip relay with earth leakage protection (E characteristics) and a external ZCT (see page 37 and 38.)
Should the breaker be required to trip on earth leakage, the above should be used with a SHT.
(Note5) B-CO relay is not available for AE-SH.
(Note6) C type relay is not available for AE4000-SSC and AE4000-SS～AE6300-SS.

Electronic trip relay(Characteristics setting table)

		General use		
		C type	S type	SL type
Rated current Max. ($I_{N\,MAX}$)		Refer to table 1 ($I_{N\,MAX}$=CT rating)		
Rated current(I_N)		0.5-0.6-0.7-0.8-0.9-1.0×$I_{N\,MAX}$ 0.8-0.9-1.0×$I_{N\,MAX}$ (AE4000-SSC) steps		
Uninterrupted current(I_U)		———	0.8~1.0×I_N continuously	
LTD	**Current**	1.15×I_N±10% (Note 1) FIX	1.15×I_U±10% (Note 1) FIX	
	Time (T_L)	150 sec. ±20% (at I_N×2) FIX	50-100-150 sec. ±20% (at I_U×2) steps	10-15-20-25-30 sec. (at I_U×5) steps
STD	**Current (I_S)**	2-3-4-6-8-10×I_N ±15% steps		
	Time (T_S)	0-0.1-0.2-0.3-0.4-0.5 sec. ±20% (at 1.5×I_S) (note) Operating time is less than 0.05 sec when "0" setting. steps		
INST	**Current (I_I)**	4-6-8-10-12-16×I_N steps	4-6-8-10-12-16 ×I_N±15% 4-6-8-10-12 ×I_N±15% (AE5000-SS) 4-6-8-10 ×I_N±15% (AE6300-SS) steps	
PAL (self-hold type)	**Current (I_P)**	———	0.7-0.8-0.9-1.0-OVER×I_U ±0% steps	
	Time (T_P)	———	0.5×T_L ±20%	
GFR	**Current (I_G)**	———	0.1-0.2-0.3-0.5×$I_{N\,MAX}$ ±20% 0.2-0.3-0.5×$I_{N\,MAX}$ ±20% (AE4000-SSC, AE4000-SS~AE6300-SS) steps	
	Time (T_G)	———	0.3-0.8-1.5-3 sec. ±20% (at I_G×1.5) steps	
ER	**Current (I_E)**	———	1-2-3-5A ±20% steps	
	Time (T_E)	———	0.3-0.8-1.5-3 sec. ±20% (at I_E×1.5) steps	

●Unless specified when ordering the electronic relay will be set to in blue.

Note 1 : 105% Non trip, 125% Pick up

C type setting dial operation schematic

Rated current MAX.
($I_{N\,MAX}$) — Rated current (I_N) —
- Instantaneous current (I_I)
- Short-time-delay current (I_S)
- Long-time-delay current (I_L)
- Load current indicator

S, SL type setting dial operation schematic

Rated current MAX.
($I_{N\,MAX}$)
- Rated current(I_N)
  - Instantaneous current (I_I)
  - Short-time-delay current (I_S)
  - Uninterrupted current (I_U)
    - Pre-alarm current (I_P)
    - Load current indicator
- Ground fault current(I_G)

"Long-time-delay" time (T_L)—Pre-alarm-timeT_P = $\frac{T_L}{2}$

		Generator protection use M type	
Rated current Max. ($I_{N\,MAX}$)		Refer to table 1 ($I_{N\,MAX}$ = CT rating)	
Rated current (I_N)		0.5 ~ 1.0×$I_{N\,MAX}$ 0.8 ~ 1.0×$I_{N\,MAX}$ (AE4000-SSC) (Adjusted to the required current when shipped from the factory)	FIX
LTD	Current (I_L)	1-1.05-1.1-1.15-1.2×I_N ± 5%	Steps
	Time (T_L)	15-20-25-30-40-60sec. ± 20% (at 1.2×I_L)	Steps
STD	Current (I_S)	2-2.5-3-3.5-4-4.5×I_N ± 15%	Steps
	Time (T_S)	0-0.1-0.2-0.3-0.4-0.5 sec. ± 20% (at 1.5×I_S)	Steps
INST	Current (I_I)	4-6-8-10-12-16×I_N ± 15% 4-6-8-10-12 ×I_N ± 15% (AE5000-SS) 4-6-8-10 ×I_N ± 15% (AE6300-SS)	Steps
PAL (auto reset type)	Current (I_P)	0.84-0.88-0.92-0.96-1.0×I_L ± 5%	Steps
	Time (T_P)	0.5×T_L ± 20%	
GFR	Current (I_G)	0.1-0.2-0.3-0.5×$I_{N\,MAX}$ ± 20% 0.2-0.3-0.5×$I_{N\,MAX}$ ± 20% (AE4000-SSC, AE4000-SS ~ AE6300-SS)	Steps
	Time (T_G)	0.3-0.8-1.5-3 sec. ± 20%	Steps

M type setting dial operation schematic

(Factory set)

Rated current MAX. ($I_{N\,MAX}$) — Rated current (I_N) — Instantaneous current (I_I) / Short-time-delay current (I_S) / Long-time-delay current (I_L) — Pre-alarm current (I_P) / Load current indicator

Rated current MAX. ($I_{N\,MAX}$) — Ground fault current (I_G)

"Long-time-delay" time — "Long-time-delay" time fine adjustment (T_L)×(0.8 to 1.2)

Pre-alarm-time $T_P = \frac{T_L}{2}$

Table 1 CT ratings (Rated current MAX.)

(A)

AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
630 500 } Low 315 } rating	1000	1250	1600	2000 1600 } Low 1250 } rating	2500	3200	4000	4000	5000	6300 6000 (JIS)

AE630-SH	AE1000-SH	AE1250-SH	AE1600-SH	AE2000-SH	AE2500-SH	AE3200-SH
630	1000	1250	1600	2000	2500	3200

Electronic trip relay (General use C type)

Note: AE4000-SSC, AE4000-SS to AE6300-SS are not available

B Load Current

Indicates the percentage of rated current (IN)
60-70-80-90-100-OVER
Display method:
LED colour
☐ 60 to 80%=Green
☐ 90 to 100%=Yellow
☐ OVER=Red
The LEDs goes out when the breaker trips.

Overload Protection

I Rated Current (IN) Setting Dial

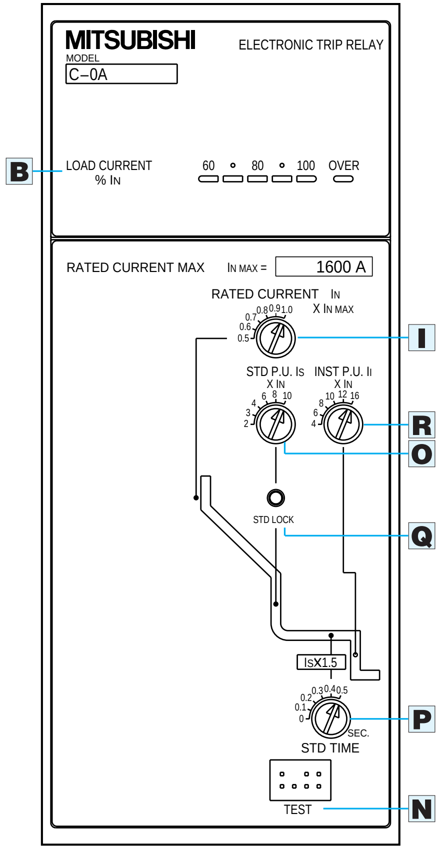
Rated current MAX. (IN MAX.) × Setting (A)
0.5-0.6-0.7-0.8-0.9-**1.0** Changing this setting changes the following values proportionally:
☐ Short-time-delay current (Is)
☐ Instantaneous current (Ii)

1. The actual tripping range is IN × 1.05-1.25
2. The load current is displayed as a percentage of the rated current.

Long-Time-Delay (TL)

150 sec. fixed
This value specifies the operating time when the current flowing is the rated current set value × 2.

This overview lists the maximum possible functionality of the units.
The following functions are included as standard equipment:
1. Displays
☐ Load current indicator
2. Protective functions
☐ Overload protection (long-time-delay)
☐ Short-circuit protection (short-time-delay)
☐ Short-circuit protection (instantaneous)
3. Peripherals
☐ Short-time-delay operation inhibit button
☐ Test terminal



N TEST Terminal Test functions

1. Tripping characteristics
☐ Long-time-delay (L)
☐ Shot-time-delay (S)
☐ Instantaneous (I)
A field test device is required (see p.39)

OCR Alarm Contact (AL)

1. An alarm signal is output to the contact when the breaker is tripped by one of the following causes:
☐ Long-time-delay (L)
☐ Short-time-delay (S)
☐ Instan. trip (I)
2. An external self-hold circuit is required, as the alarm signal pulse has a duration of only 0.03 sec.

Short-Circuit Protection

Short-Time-Delay

O STD P.U. Current (Is) Setting Dial

Rated current (IN) × Setting (A)
2-3-4-6-8-**10**
Current threshold value setting for short-time-delay tripping.

P STD Time(Ts) Setting Dial

Time-delay setting (sec.)
0-0.1-0.2-0.3-0.4-**0.5**
1. The setting value is the operating time when the current flowing is the short-time-delay current setting (Is) × 1.5.
2. If the dial is set to 0 second the breaker will trip in 0.05 seconds.

Q STD Lock Button

When measuring the instantaneous tripping current, press the short-time-delay operation inhibit button (STD LOCK) in order to disable the short-time-delay tripping function.

Instantaneous

R INST. P.U. Current (Ii) Setting Dial

Rated current (IN) × Setting (A)
4-6-8-10-12-**16**
Sets the threshold current value for instantaneous tripping.

Unless otherwise specified in your order the electronic trip relays will be delivered set to the values shown in blue letter.

Electronic trip relay (General use S, SL types)

Super AE

A Trip Indicator (TI)

Displays:

- ☐ Long-time-delay (L)
- ☐ Short-time-delay (S)/Instantaneous (I)
- ☐ Ground fault (G) or Earth leakage (E)

Display method:
Both an LED display (red) and a relay output are provided. Contact rating (A)*

1. A control power supply is required. **
2. The LED will go out when the control power supply is switched off or when the reset button is pressed.

B Load Current

Indicates the percentage of uninterrupted current (I_U)
60-70-80-90-100-OVER
Display method:
LED colour

- ☐ 60 to 80%=Green
- ☐ 90 to 100%=Yellow
- ☐ OVER=Red

The LEDs goes out when the breaker trips.

D Reset

1. Pressing this button resets the displays.
2. The button resets both the LEDs and the relay output of signals:
   - ☐ Trip indicator
   - ☐ Temperature alarm
   - ☐ Pre-alarm

C Pre-Alarm Display (PAL)

Display method: Both an LED display (yellow) and a relay output is provided.
Contact rating (A)*

1. The "PAL" LED lights up when the preset value is exceeded (the relay is not activated when this happens).
2. The relay output is activated when the "PAL OUT" LED lights up.
3. A control power supply is required.**
4. The LED goes out when the control power supply is turned off or when the reset buttons pressed.
5. Even if the load current decreases to less than the pre-alarm current, the "PAL-OUT" LED will not go out.

E Temperature Alarm (TAL)

Display methods: Both an LED indicator (red) and a relay output are provided.
Contact rating (A)*

1. A signal is generated when the unusual temperature of the main contacts rises above the threshold level.
2. A control power supply is required.**
3. The LED will go out when the control power supply is interrupted or when the reset button is pushed.

OCR Alarm Contact (AL)

Contact rating (A)*

1. An alarm signal is output to the contact when the breaker is tripped by one of the following causes:
   - ☐ Long-time-delay (L)
   - ☐ Short-time-delay (S)/Inst. trip (I) or MCR
   - ☐ Ground fault (G)
2. An external self-hold circuit is required, as the alarm signal pulse has a duration of only 0.03 sec.

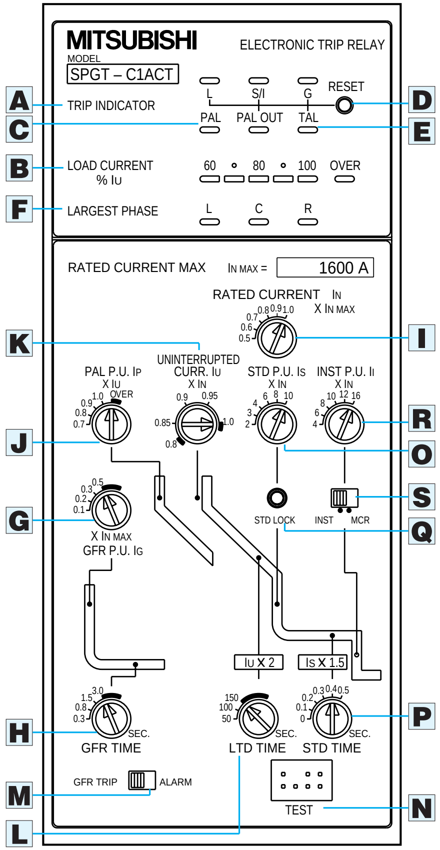
F Largest Phase

Display method: LED (green)

1. LED indicators are provided for the left, central and right poles. One LED is always on when current is flowing through the breaker.
2. The LED goes out when the breaker trips.
3. This function is included in the Load current measurement (LM) option.

Load Current Measurement (LM)

1. The load current can be measured at terminal LM. At twice the max. current ($I_{N\ MAX.}$) a signal of 10 V DC is output (see p.36 for further details).
2. A control power supply is required.**



Ground Fult Protection (GFR)

G GFR P.U. Current (I_G) Setting Dial

Rated current MAX. ($I_{N\ MAX.}$) ✕ Setting (A)
0.1-0.2-0.3-**0.5**

1. This function is not available for rated current MAX. values ($I_{N\ MAX.}$) 315A, 500A and AE630-SH.

H GFR Time (T_G) Setting Dial

GFR time setting (sec.) 0.3-0.8-1.5-**3**
The setting specifies the operating time when the current flowing is the ground fault current value setting ✕ 1.5
(see p.42 for further details)

Earth Leakage Protection (ER)

ER P.U. Current (I_E) Setting Dial

Current setting (A) 1-2-3-**5**

1. A control power supply is required.
2. Both external ZCT and SHT are required (see p.41 for further details)

ER Time (T_E) Setting Dial

ER time setting (sec.) 0.3-0.8-1.5-**3**
The setting represents the operating time when the current flowing is the earth leakage current value setting ✕ 1.5. The earth leakage protection facility is not illustrated because it is only possible to have either earth leakage or ground fault protection.

I Rated Current (I_N) Setting Dial

Rated current MAX. ($I_{N\ MAX.}$) ✕ Setting (A)
0.5-0.6-0.7-0.8-0.9-**1.0** Changing this setting changes the following values proportionally:

- ☐ Uninterrupted current (I_U)
- ☐ Short-time-delay current (I_S)
- ☐ Instantaneous current (I_I)
- ☐ Pre-alarm (I_P)

J Pre-Alarm Current (I_P) Setting Dial

Rated current (I_N) X setting (A)
0.7-0.8-0.9-1.0-**OVER**
Current setting for pre-alarm activation.
If the setting value is exceeded the "PAL" LED will light up.

Overload Protection

K Uninterrupted Current (I_U) Setting Dial

Rated current (I_N) ✕ Setting (A) 0.8~**1.0**

1. Used for setting the continuous uninterrupted current value.
2. The actual tripping range is I_U ✕ 1.05-1.25.
3. The load current is displayed as a percentage of the uninterrupted current and thus changes proportionally when the uninterrupted current setting is changed.
4. The pre-alarm also changes proportionally.
5. Neutral pole protection (NP) is possible to either ST-N relay.
(see p.42 for further details).

L LTD Time (T_L) Setting Dial

Long-time-delay time setting (sec.)
S type 50-100-**150**
SL type 10-15-20-25-**30**

1. This value specifies the operating time when the current flowing is the uninterrupted current set value ✕2 (S type) and ✕5 (SL type).
2. The pre-alarm operating time is half of the long-time-delay time setting.

This overview lists the maximum possible functionality of the units.
The following functions are included as standard equipment:

1. Displays
   - ☐ Trip indicator (TI)
   - ☐ Load current indicator
   - ☐ Display reset button
2. Protective functions
   - ☐ Overload protection (long-time-delay)
   - ☐ Short-circuit protection (short-time-delay)
   - ☐ Short-circuit protection (instantaneous)
3. Peripherals
   - ☐ Short-time-delay operation inhibit button
   - ☐ Test terminal

*Contact rating (A)

Voltage (V)		Resistive load	Inductive load
AC	120	2	2
	250		
DC	30		
	125	0.2	0.1

**Control supply (V)

AC 100-120/200-240 (50-60Hz)
DC 100-110
DC 125
DC 24
DC 48

Control supply capacity : more than 5VA

Unless otherwise specified in your order the electronic trip relays will be delivered set to the values shown in blue letter.

M Ground Fault TRIP/ALARM Switch

1. The breaker will trip when the switch is set to the "TRIP" position.
2. When the switch is set to the "ALARM" position a red trip indicator LED will light up and the relay output will be activated when a ground fault occurs; the breaker will not trip, however.
3. The switch must be set to the "TRIP" position when the overcurrent tripping characteristic is activated.

N TEST Terminal Test functions

1. Tripping characteristics
   - ☐ Long-time-delay (L)
   - ☐ Shot-time-delay (S)
   - ☐ Instantaneous (I)
   - ☐ Pre-alarm (P)
   - ☐ Ground fault (G)

   A field test device is required (see p.39)

Short-Circuit Protection

Short-Time-Delay

O STD P.U. Current (I_s) Setting Dial

Rated current (I_N) x Setting (A)
2-3-4-6-8-**10**
Current threshold value setting for short-time-delay tripping.

P STD Time(T_S) Setting Dial

Time-delay setting (sec.)
0-0.1-0.2-0.3-0.4-**0.5**

1. The setting value is the operating time when the current flowing is the short-time-delay current setting (I_S) ✕ 1.5.
2. If the dial is set to 0 second the breaker will trip in 0.05 seconds.

Q STD Lock Button

When measuring the instantaneous tripping current, press the short-time-delay operation inhibit button (STD LOCK) in order to disable the short-time-delay tripping function.

Instantaneous

R INST. P.U. Current (I_I) Setting Dial

Rated current (I_N) x Setting (A)
4-6-8-10-12-**16**
Sets the threshold current value for instantaneous tripping.

S INST/MCR Switch

1. Setting this switch to "INST" selects the instantaneous operation characteristic.
2. The "MCR" setting selects the MCR characteristic.
   The MCR characteristics the abbreviation for Making Current Release. With this characteristic, instantaneous tripping is only possible if a short circuit occurs during switch-ON. After the initial switch-ON, the time delay tripping characteristic is active but the instantaneous tripping is not possible.

Electronic trip relay (Generator protection use M type)

SuperAE

A Trip Indicator (TI)
Displays:
- Long-time-delay (L)
- Short-time-delay (S)/Instantaneous (I)
- Ground fault (G)

Display method:
Both an LED display (red) and a relay output are provided. Contact rating (A)*
1. A control power supply is required. **
2. The LED will go out when the control power supply is switched off or when the reset button is pressed.

B Load Current
Indicates the percentage of long time delay current (I_L) 50-60-70-80-90-100
Display method:
LED colour
- 50 to 70%=Green
- 80 to 90%=Yellow
- 100%=Red

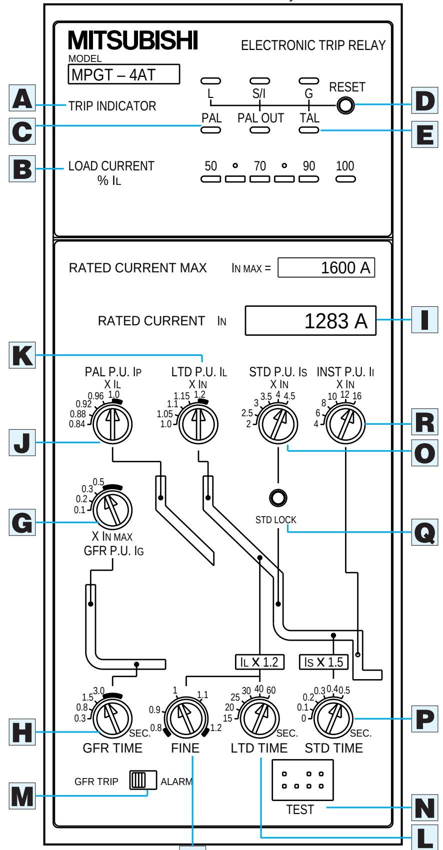
The LEDs go out when the breaker trips.

D RESET
1. Pressing this button resets the displays.
2. The button resets both the LEDs and the relay outputs of the following signals:
- Trip indicator
- Temperature alarm
- Pre-alarm

C Pre-Alarm Display (PAL)
Display method: Both an LED display (yellow) and a relay output is provided.
Contact rating (A)*
1. The "PAL" LED lights up when the preset value is exceeded ; the relay is not activated when this happens, however.
2. The relay output is activated when the "PAL OUT" LED lights up.
3. A control power supply is required.**
4. The LED will go out when the control supply is interrupted or when the reset buttons pressed.
5. Even if the load current, decreases to less than the pre-alarm current, the "PAL-OUT" LED will go out.

E Temperature Alarm (TAL)
Display methods: Both an LED indicator (red) and a relay output are provided.
Contact rating (A)*
1. A signal is generated when the unusual temperature of the main contacts rises above the threshold level.
2. A control power supply is required.**
3. The LED will go out when the control power supply is interrupted or when the reset button is pushed.

OCR Alarm Contact (AL)
Contact rating (A)*
1. An alarm signal is output to the contact when the breaker is tripped by one of the following causes:
- Long-time-delay (L)
- Short-time-delay (S)
- Instantaneous trip (I)
- Ground fault (G)
2. An external self-hold circuit is required, as the alarm signal pulse has a duration of only 0.03 sec.



Ground Fault Protection (GFR)

G GFR P.U. Current (I_G) Setting Dial
Rated current MAX. ($I_{N\,MAX}$.) × Setting (A)
0.1-0.2-0.3-**0.5**
1. This function is not available for max. rated current values ($I_{N\,MAX}$.) 315A, 500A and AE630-SH.

H GFR Time (T_G) Setting Dial
GFR time setting (sec.)
0.3-0.8-1.5-**3**
The setting specifies the operating time when the current flowing is the ground fault current value setting (I_G) × **1.5**
(see p.42 for further details)

I Rated Current (I_N) Setting Dial
The rated current must be preset to a fixed value (select a value between 0.5 and 1 × the Rated current MAX($I_{N\,MAX}$).).
The value is stamped on the front of the unit.

J Pre-Alarm Current (I_P) Setting Dial
Long-time-delay current value.
(I_L) × Setting (A)
0.84-0.88-0.92-0.96-**1.0**
Threshold value for pre-alarm operation.
If the setting value is exceeded the "PAL" LED will light.

Overload Protection

K Long-Time-Delay Current (I_L) Setting Dial
Rated current (I_N) × Setting (A)
1-1.05-1.1-**1.15**-1.2
1. The breaker trips within a range from (I_L) × 0.95 to 1.05.
2. The load current is displayed as a percentage of the long-time-delay current (I_L).
3. The pre-alarm set value varies proportionally to the long-time-delay current setting.

L LTD Time (T_L) Setting Dial
Long-time-delay setting (sec.)
15-**20**-25-30-40-60
1. This value specifies the operating time when the current flowing is the long-time-delay current set value (I_L) × 1.2.
2. The pre-alarm operating time is half of the long-time-delay setting.

Short-Circuit Protection

Short-Time-Delay

O STD P.U. Current (I_S) Setting Dial
Rated current (I_N) × Setting (A)
2-2.5-3-3.5-4-**4.5**
Current threshold value setting for short-time-delay tripping.

P STD Time(T_S) Setting Dial
Time-delay setting (sec.)
0-0.1-0.2-0.3-0.4-**0.5**
1. The setting value is the operating time when the current flowing is the Short-time-delay current setting (I_S) × 1.5.
2. If the dial is set to 0 second the breaker will trip in 0.05 seconds.

Q STD Lock Button
When measuring the instantaneous tripping current, press the short-time-delay operation inhibit button (STD LOCK) in order to disable the Short-time-delay tripping function.

Instantaneous

R INST. P.U. Current (I_I) Setting Dial
Rated current (I_N) × Setting (A)
4-6-8-10-12-**16**
Sets the threshold current value for instantaneous tripping.

T LTD (T_L) Fine Adjustment Dial
1. Fine adjustment is available from 0.8-**1.0**-1.2 of the Long-time-delay setting value (T_L).
2. This setting has no influence on the pre-alarm time.
3. Continuous adjustable.

M Ground Fault TRIP/ALARM Switch
1. The breaker will trip when the switch is set to the "TRIP" position.
2. When the switch is set to the "ALARM" position a red trip indicator LED will light up and the relay output will be activated when a ground fault occurs; the breaker will not trip, however.
3. The switch must be set to the "TRIP" position when the overcurrent tripping characteristic is activated.

N TEST Terminal Test functions
1. Tripping characteristics
- Long-time-delay (L)
- Shot-time-delay (S)
- Instantaneous (I)
- Pre-alarm (P)
- Ground fault (G)

A field test device is required
(see p.39)

This overview lists the maximum possible functionality of the units.
The following functions are included as standard equipment:
1. Displays
- Trip indicator (TI)
- Load current indicator (LCI)
- Display reset button
2. Protective functions
- Overload protection (long-time-delay)
- Short-circuit protection (short-time-delay)
- Short-circuit protection (instantaneous)
3. Peripherals
- Short-time-delay operation inhibit button
- Test terminal

*Contact rating (A)			
Voltage (V)		Resistive load	Inductive load
AC	120	2	2
	250		
DC	30		
	125	0.2	0.1

**Control supply (V)
AC 100-120/200-240 (50-60Hz)
DC 100-110
DC 125
DC 24
DC 48

Control supply capacity : more than 5VA

Unless otherwise specified in your order the electronic trip relays will be delivered set to the values shown in blue letter.

The numbers coloured blue from O to T will be set in factory side, without any indication.

Electronic trip relay accessories

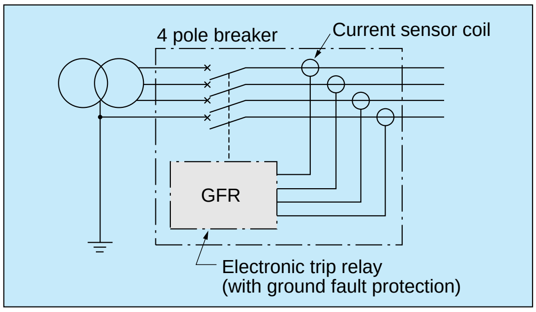
Option

Ground fault protection (GFR)

Sometimes the Long-time-delay or Short-time-delay functions will not protect a circuit even if there is a ground fault of several hundred amps. In which case, the ground fault protection function (GFR) is used. The sensitivity is selectable in the range of 0.1-0.2-0.3-0.5 times the Rated current MAX. ($I_{N\ MAX}$), and the operating time is selectable from the range of 0.3-0.8-1.5-3 seconds. A control supply is not required for the operation of the ground fault protection.

Note 1: In a 3-phase, 4-wire circuit, ground fault protection is also possible with a 3 pole breaker and a Neutral-pole CT (NCT) see page 37.

Note 2: The ground fault protection (G) is not available for AE-SS series with the Rated current MAX. ($I_{N\ MAX}$) coming to 315 A or 500 A, or for AE630-SH.



Option

Earth leakage protection (ER)

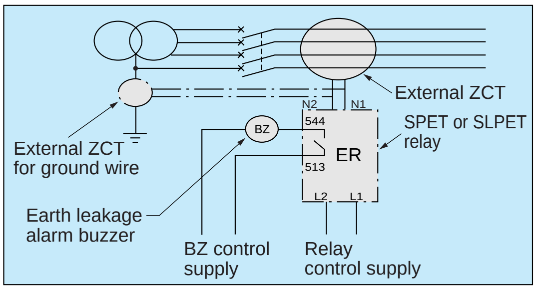
The earth leakage alarm facility is provided by using a electronic trip relay with earth leakage protection (E characteristics) and a external ZCT (see page 37.)

Even if several amperes of earth leakage current flow, the alarm alone operates but the breaker does not trip. This is therefore suitable when a continuous power supply is required. Should the breaker be required to trip on earth leakage, the above should be used with a SHT.

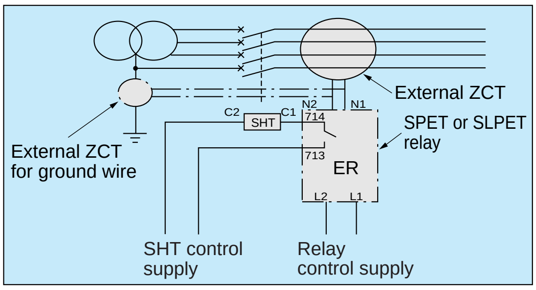
Note 1: The shunt tripping device (SHT) is suitable for 100-250V AC/DC or less.

Note 2: Output contact is self-hold type.
The output contact is turned off when the reset button is pressed or control supply is turned off.

● **Connection diagram (Earth leakage alarm system)**



● **Connection diagram (Earth leakage tripping system)**



Option

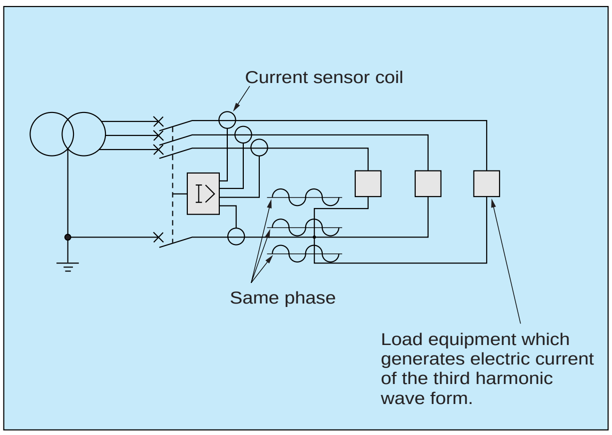
Neutral pole overcurrent protection (NP)

This function protects the neutral pole (4 pole) of the circuit breaker from overcurrent. Neutral overcurrent protection can be set to operate at 50% or 100% of the rated current (not changeable). Load equipment (for example: computer equipment, DC power supplies, etc) which is liable to generate third harmonic wave forms that may cause more load current to flow in the neutral pole, which may cause damage, the neutral pole overcurrent protection will prevent damage from occuring.

Note 1: The ST type electronic trip relay can be selected when the 4 pole breaker is used.
When order NP, indentify "50% protection" or "100% protection"

Note 2: Not available for AE4000-SS~6300-SS

● **Connection diagram**

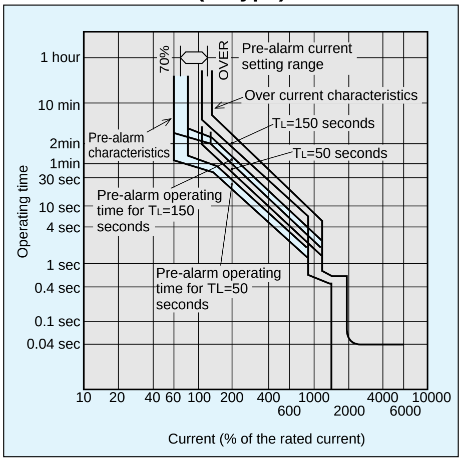


Option

Pre-alarm (PAL)

If the load current of the breaker exceeds the set value, A “PAL” LED lights and a relay output is energized. This is useful in securing a continuous power supply to a important circuit. The operating characteristic shown on the curve is proportional to half of the Long-time-delay tripping characteristic. It is designed to prevent unnecessary alarms from the inrush currents to the load. Moreover, the relay output is of a self-hold type for the general use relay and an auto reset type for the generator protection use relay. (The control supply and reset button are used in common with the trip indicator.)

● Characteristics (S Type)



Note: “TL” represents the Long-time-delay time

Option

OCR alarm (AL)

The OCR alarm (AL) is a short-time operating switch (1a) for the electrical indication of when the breaker trips due to overcurrent. The AL is an integral part of the electronic trip relay. Though it operates when the breaker trips due to the Long-time-delay, Short-time-delay, Instantaneous/MCR, Ground fault protection (GFR), It does not operate when the breaker trips due to the Earth leakage protection (ER).

Note: Though a control supply is not required for the operation of the OCR alarm (AL), a self-hold circuit is required since the relay output only operates for 0.03 seconds.

Note: When a continuous output signal from the OCR alarm (AL) is required please use the output signal from the trip indicator (TI) which is operated by the same causes as the OCR alarm (AL).

Option

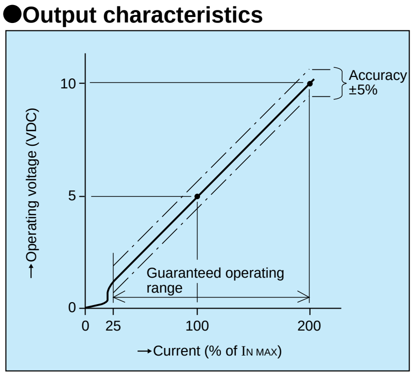
Load current measurement (LM)

A direct current voltage, converted from the effective value current in the overcurrent tripping device, is taken out by using an insulation amplifier. Use the receiving indicator that can be operated by an input of 0-10 V DC since the voltage signal proportional to the largest phase current is transmitted. Moreover, the maximum current flowing phase is displayed on the front of the relay as the subordinate option, the “largest phase” indicating LED, is lighting.

Note 1: See to it that the wiring is within 3 m of the breaker control circuit terminal by using the twist pair wire (over 40 turns/m).

Note 2: The required control power supply is common to the trip indicator.

●Output characteristics



Option

Temperature alarm (TAL)

If the temperature of the main contact rises above a pre-determined level, a LED will light and a relay contact (1a) will energize. This will prevent trouble and increase contact life, a useful preventive maintenance feature. (The control supply and the reset button are used in common with the trip indicator.)

Accessories (External accessories 1/2)

Option

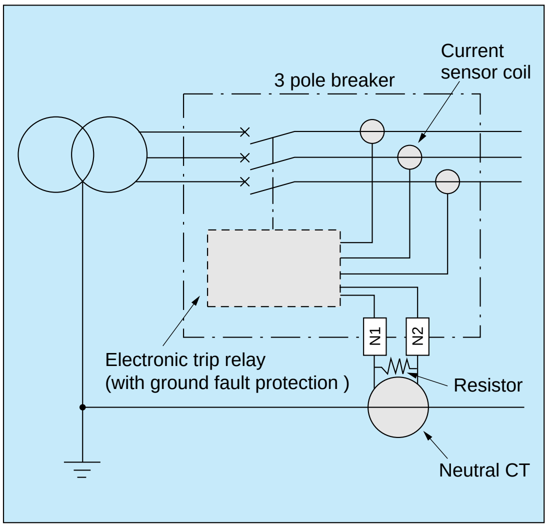
Neutral CT (NCT)

The neutral CT is used for ground fault protection when a 3 pole breader is used on a 3 phase 4 wires system.
It should be used together with the electronic trip relay that has the ground fault protection (G) option.

Type	Applicable CT type
AE 630-SS/SH	CW-40LM 630A
AE 1000-SS/SH	CW-40LM 1000A
AE 1250-SS/SH	CW-40LM 1250A
AE 1600-SS/SH	CW-40LM 1600A
AE 2000-SS/SH	CW-40LM 2000A
AE 2500-SS/SH	CW-40LM 2500A
AE 3200-SS/SH	CW-40LM 3200A
AE 4000-SS, SSC	CW-40LM 4000A
AE 5000-SS	CW-40LM 5000A
AE 6300-SS	CW-40LM 6300A CW-40LM 6000A (JIS)

Note: A suitable resistor (0.1Ω 10W) and screened wire (2m) is attached on the product.

● **Wiring diagram**



Option

External ZCT

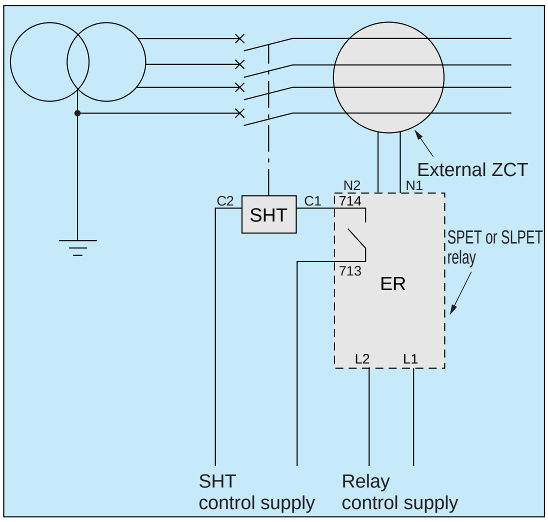
This option is used to detect several amperes of earth leakage when use in combination with a electronic trip relay that has the earth leakage tripping (ER) option.
Two methods are available: The first is where the three load conductors (and neutral in 4 wires system) pass through the ZCT. The other method uses a smaller ZCT through which the supply transformer's ground wire passes through to earth.

● **Type**

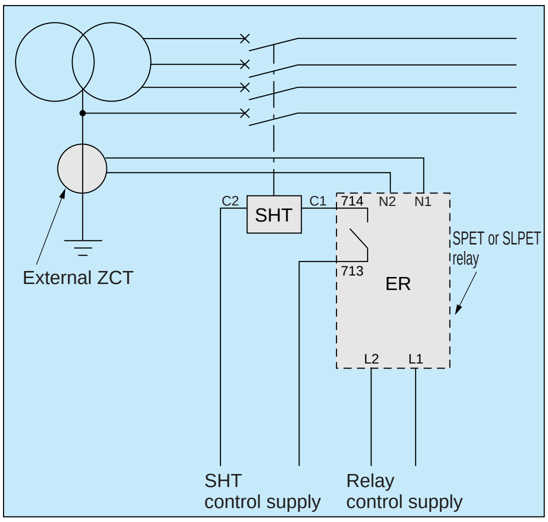
Application	External ZCT for load circuits			External ZCT for transformer ground wire					
Type	ZCT163	ZCT323	ZCT324	ZT15A	ZT30A	ZT40A	ZT60A	ZT80A	ZT100A

Note: A screened wire (2m) is attached on the product.

1. Wiring diagram (load circuit method)



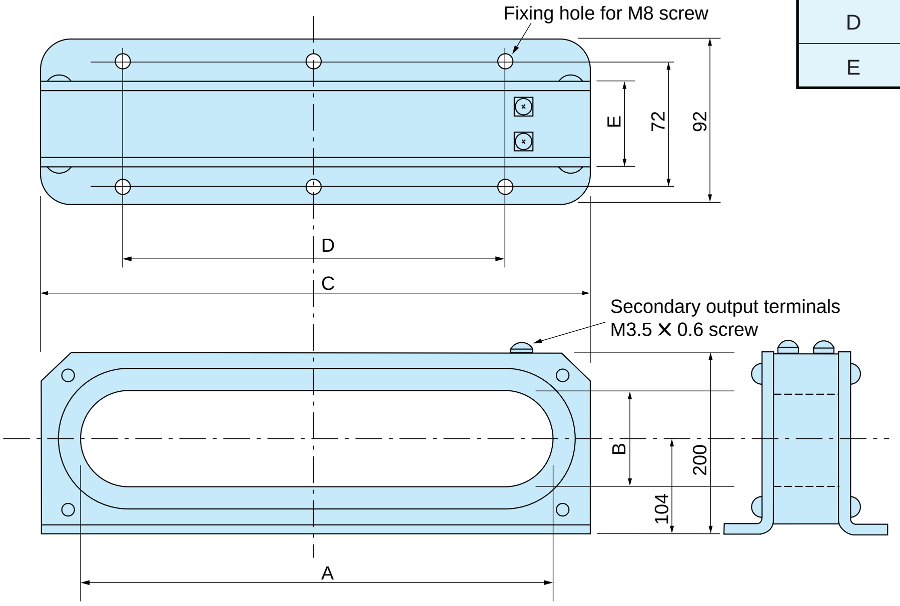
2. Wiring diagram (transformer ground wire method)



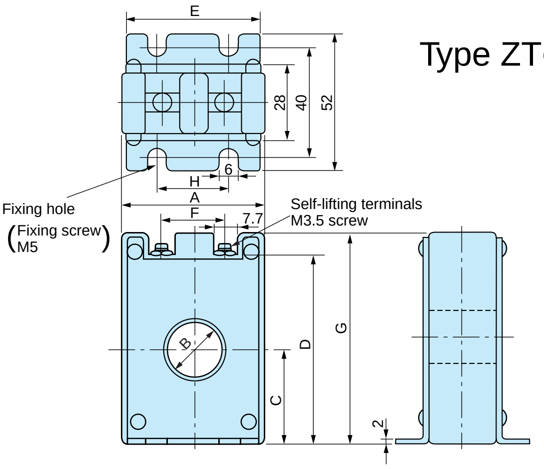
1. External ZCT for load circuits

● **Dimension table** (mm)

Type / Dimension	ZCT163	ZCT323	ZCT324
A	230	370	500
B	60	108	108
C	323	460	600
D	250	400	550
E	47	47	48

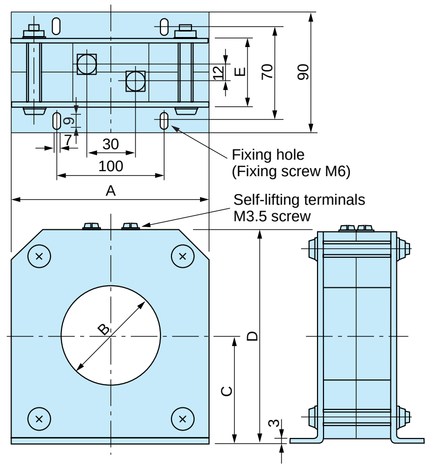


2. External ZCT for transformer ground wire



Type ZT○○A

Hole diameter



(1) Dimension table of ZT15A, 30A, 40A

Type / Dimension	ZT15A	ZT30A	ZT40A
A	48	68	85
B	15	30	40
C	29	37	43
D	62	82	92
E	46	66	81
F	15	30	40
G	70	90	100
H	25	50	50

(mm)

(2) Dimension table of ZT60A, 80A, 100A

Type / Dimension	ZT60A	ZT80A	ZT100A
A	140	160	185
B	60	80	100
C	73	82	93
D	150	169	190
E	46	48	50

(mm)

Accessories (External accessories 2/2)

Option

Field test device

The electronic trip relay can be checked without the breaker being connected to the main supply. The breaker will trip when tested.
Y-160 test device is not available for M type relay.

Type	Y-2000	Y-160
Test function	LTD, STD, INST, GFR Pre-alarm	LTD, STD, INST, GFR
Power supply	AC100-240V 50-60Hz	Battery use •AC100-120V •AC200-240V
Test current signal setting	10%~2000% (continuously variable)	6-point setting possible (20%, 50%, 125%, 200%, 500%, 2000%)
Ammeter	Yes	–
Time counter	Yes	Yes

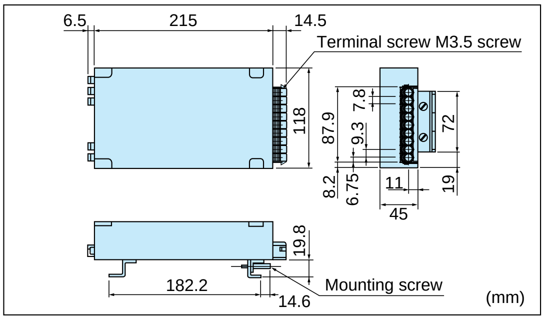
Option

External power supply unit (PS)

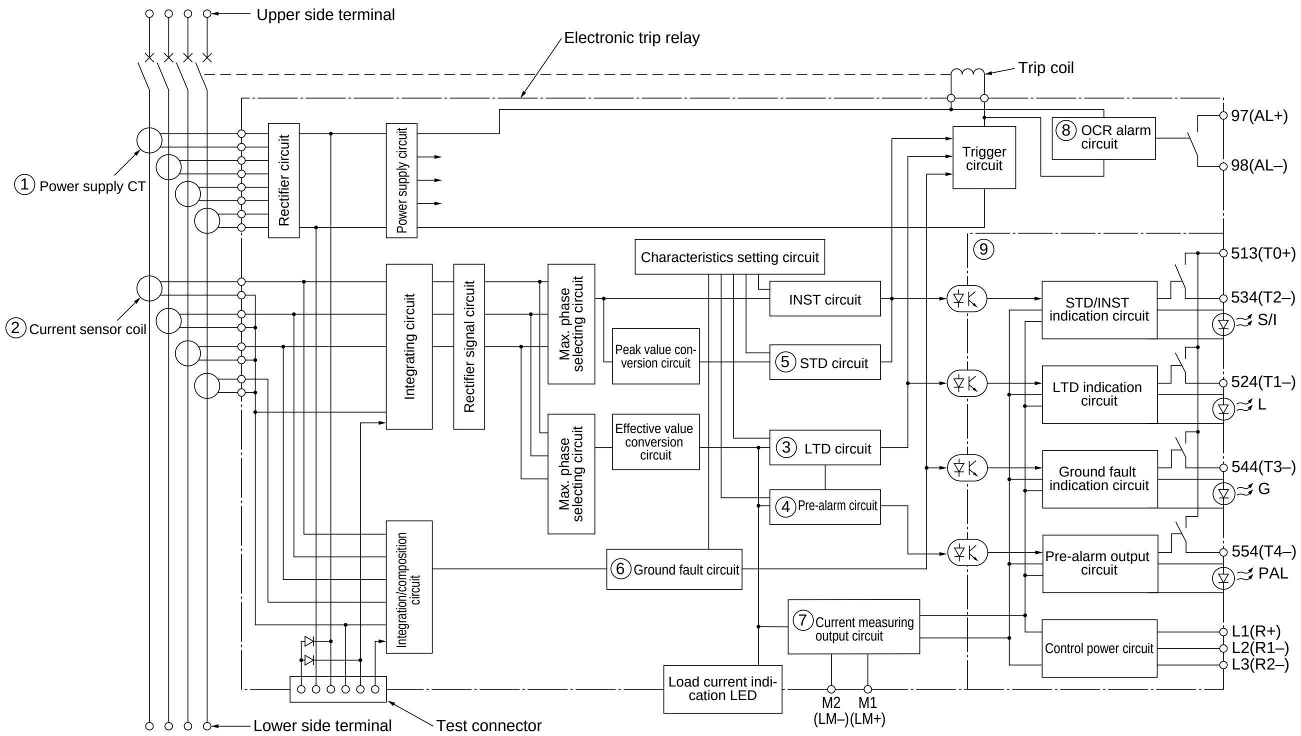
This unit is used when a 24 VDC control supply is needed for the trip indicator on the electronic trip relay.
The unit can be installed from the front to the left side of the breaker.

Item \ Type	PS-A200	PS-D200	PS-A400
Input voltage	100-110/ 200-24VAC (50-60HZ)	200VDC	380-415VAC (50-60HZ)
Input voltage range	$^{+10}_{-15}$ %	$^{+10}_{-15}$ %	$^{+10}_{-15}$ %
Input VA	30 VA MAX.	30 W MAX.	30 VA MAX.
Output voltage	24VDC±10% 0.42A MAX		24VDC±10% 0.3A MAX

● **Outline dimensions**



Circuit diagram of the electronic trip relay(SPGT)



Operating function of each device

① Power supply CT
Energy is supplied for the operation of the overcurrent tripping and ground fault tripping (GFR) function of the electronic trip relay.

② Current sensor coil
The current in each phase flowing through in the breaker is detected. A coreless coil which has good linearity is employed. The integrating circuit integrates the output voltage and provides a signal voltage waveform which is in proportion with the load current.

③ LTD circuit
This is an effective value detection type which is strong against the distored wave. It has a memory effect for the overcurrent state. If the electronic trip relay is tripped, the overcurrent memory is reset.

④ Pre-alarm circuit
This is an effective value detection system. As it does not have a memory effect for the overcurrent state, once the load current becomes less than the value of the pre-alarm setting current, it is reset.

⑤ STD/INST circuit
This is a peak value detection system, and is influenced by the distortion of the waveform.

⑥ Ground fault circuit
The signals in each phase are summed in the vector mode in order to gain the ground fault value.

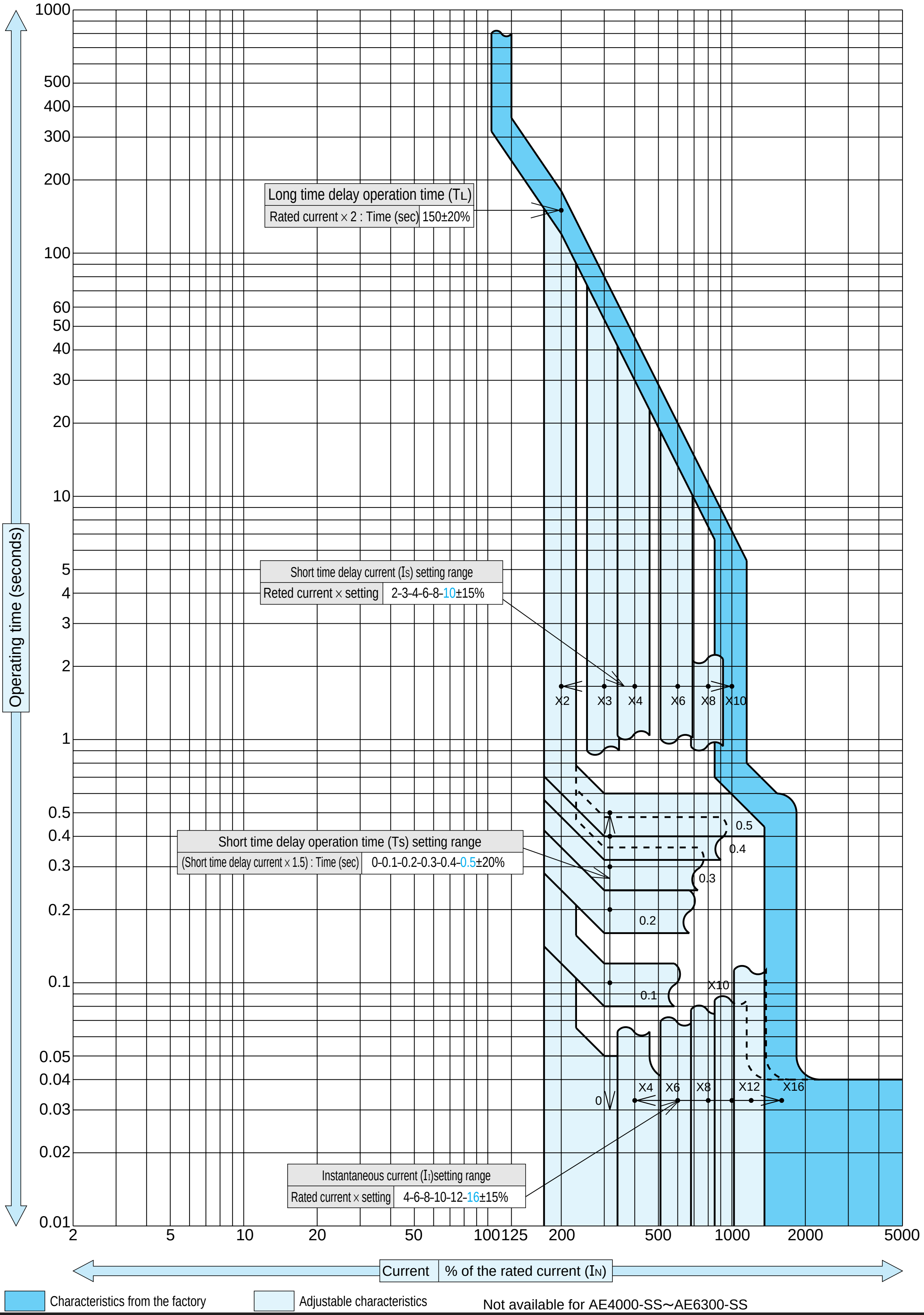
⑦ Current measuring output circuit
This is an effective value detection system, since insulation amplifieris are used, it is insulated between the input and output.

⑧ OCR alarm circuit
An alarm signal is output to the contact when the breaker is tripped. Signal pulse has a duration of only 0.03 seconds.

⑨ Trip indication circuit
The trip indicator is operated simultaneously with the OCR alarm, when the breaker tripped because of Long time delay, short time delay/instantaneous and Ground fault or Earth leakage.
A control power supply is required.

Operating characteristics (General use)

C type: AE630-SS/SH～AE3200-SS/SH

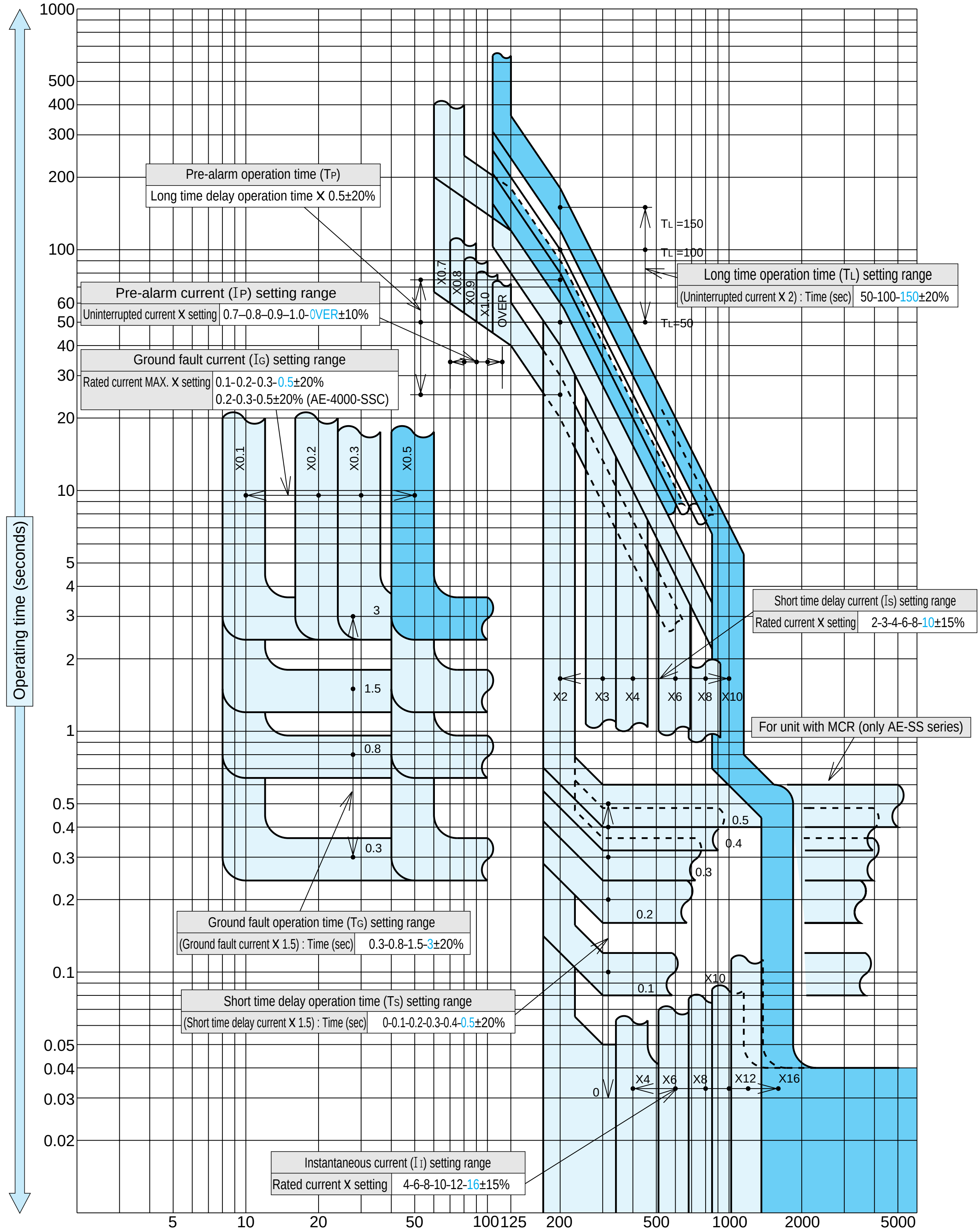


Not available for AE4000-SS～AE6300-SS

Operating characteristics (General use)

SuperAE

S type : AE630-SS/SH~AE3200-SS/SH, AE4000-SSC



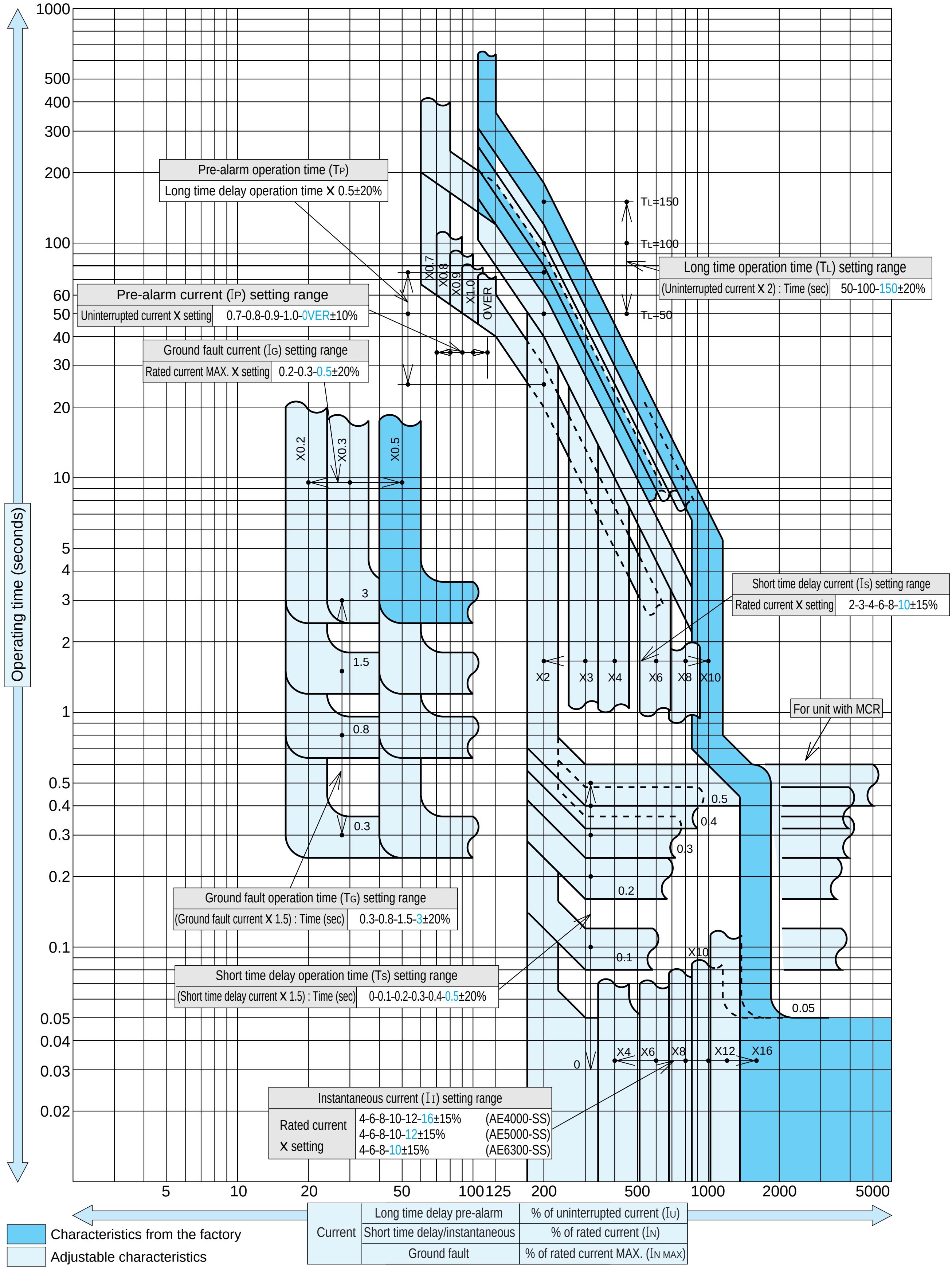
Current	Long time delay pre-alarm	% of uninterrupted current (IU)
	Short time delay/instantaneous	% of rated current (IN)
	Ground fault	% of rated current MAX. (IN MAX)

Characteristics from the factory

Adjustable characteristics

Operating characteristics (General use)

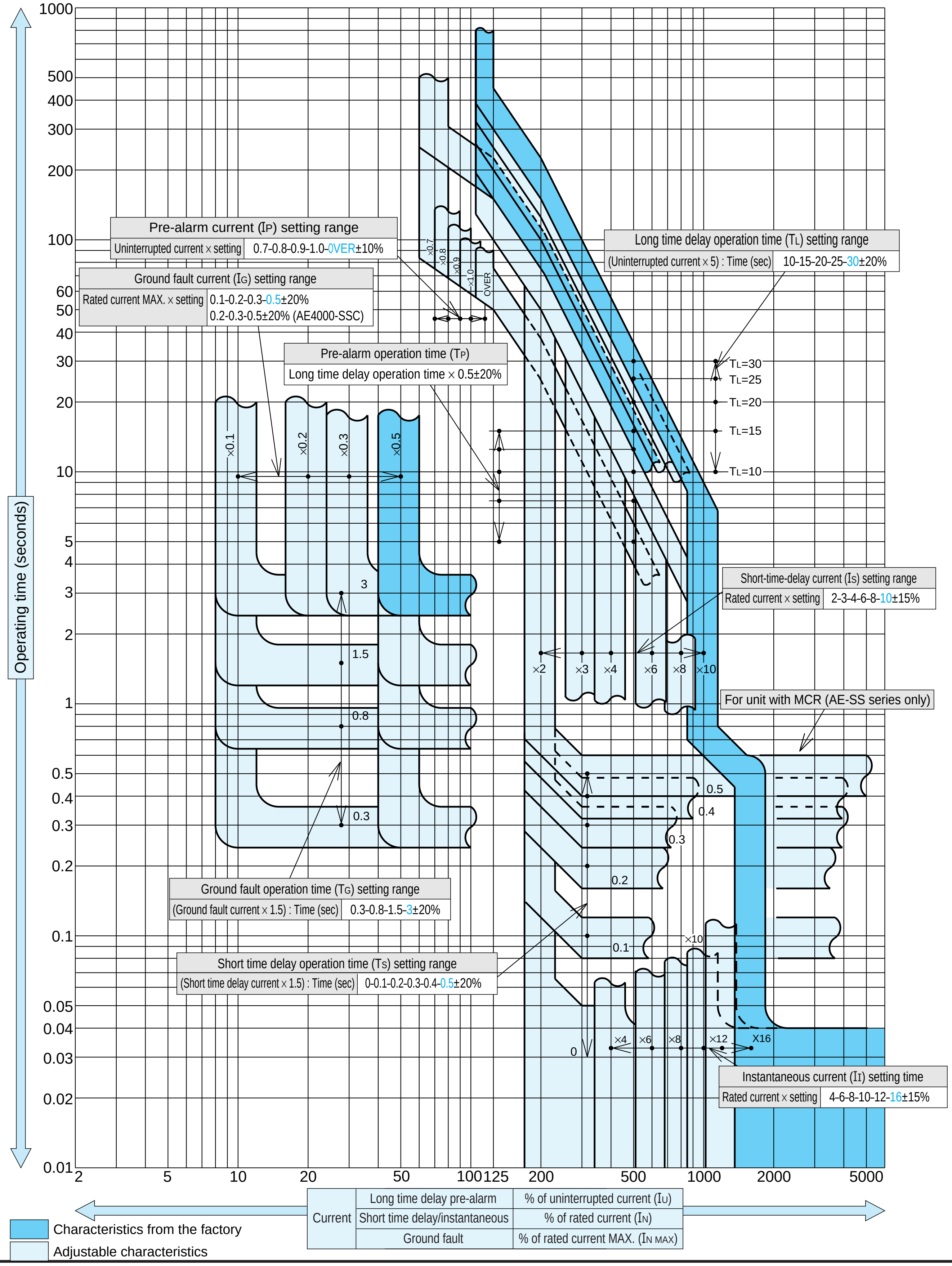
S type : AE4000-SS~AE6300-SS



Operating characteristics (General use)

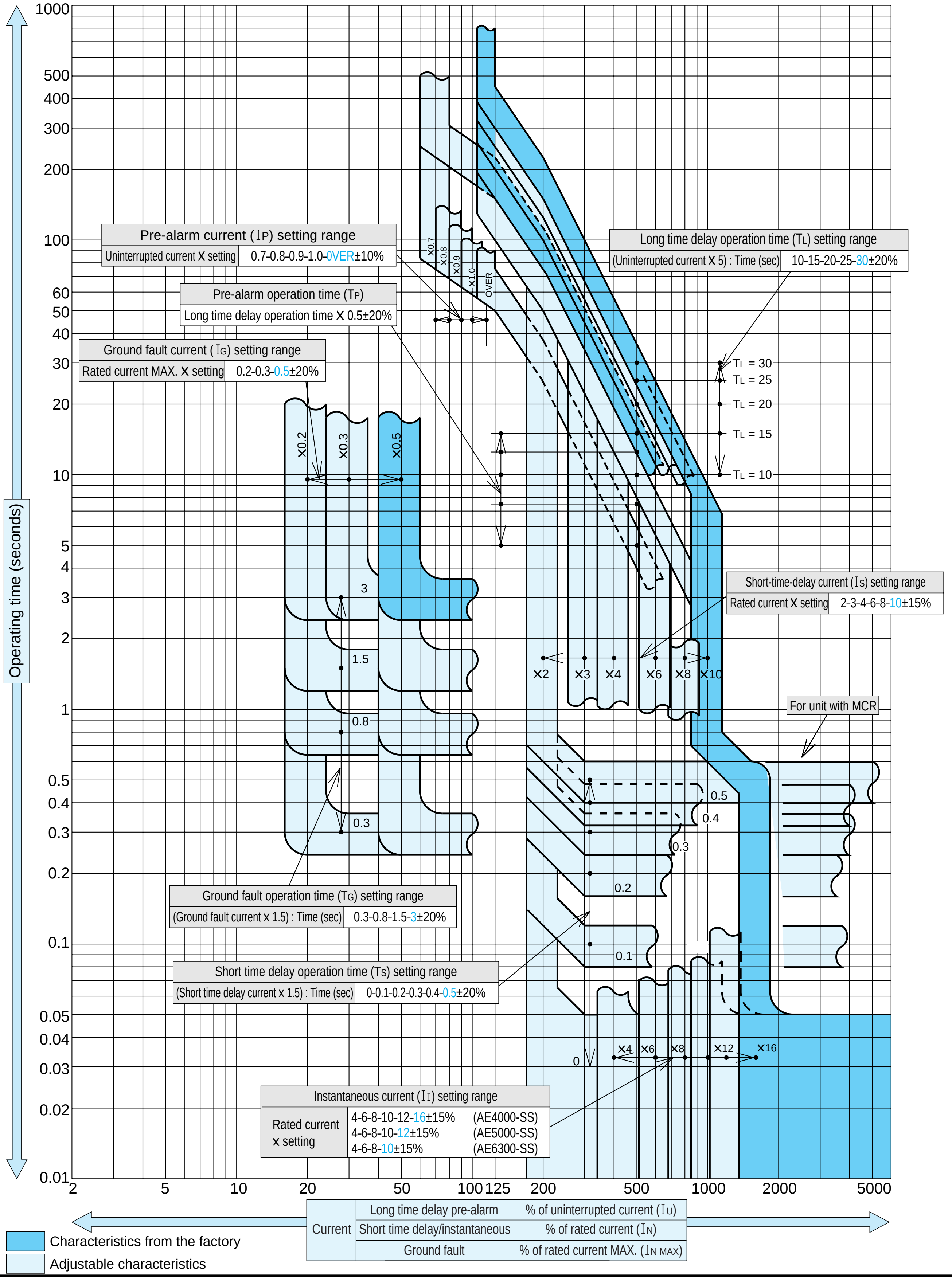
Super AE

SL type : AE630-SS/SH~AE3200-SS/SH, AE4000-SSC



Operating characteristics (General use)

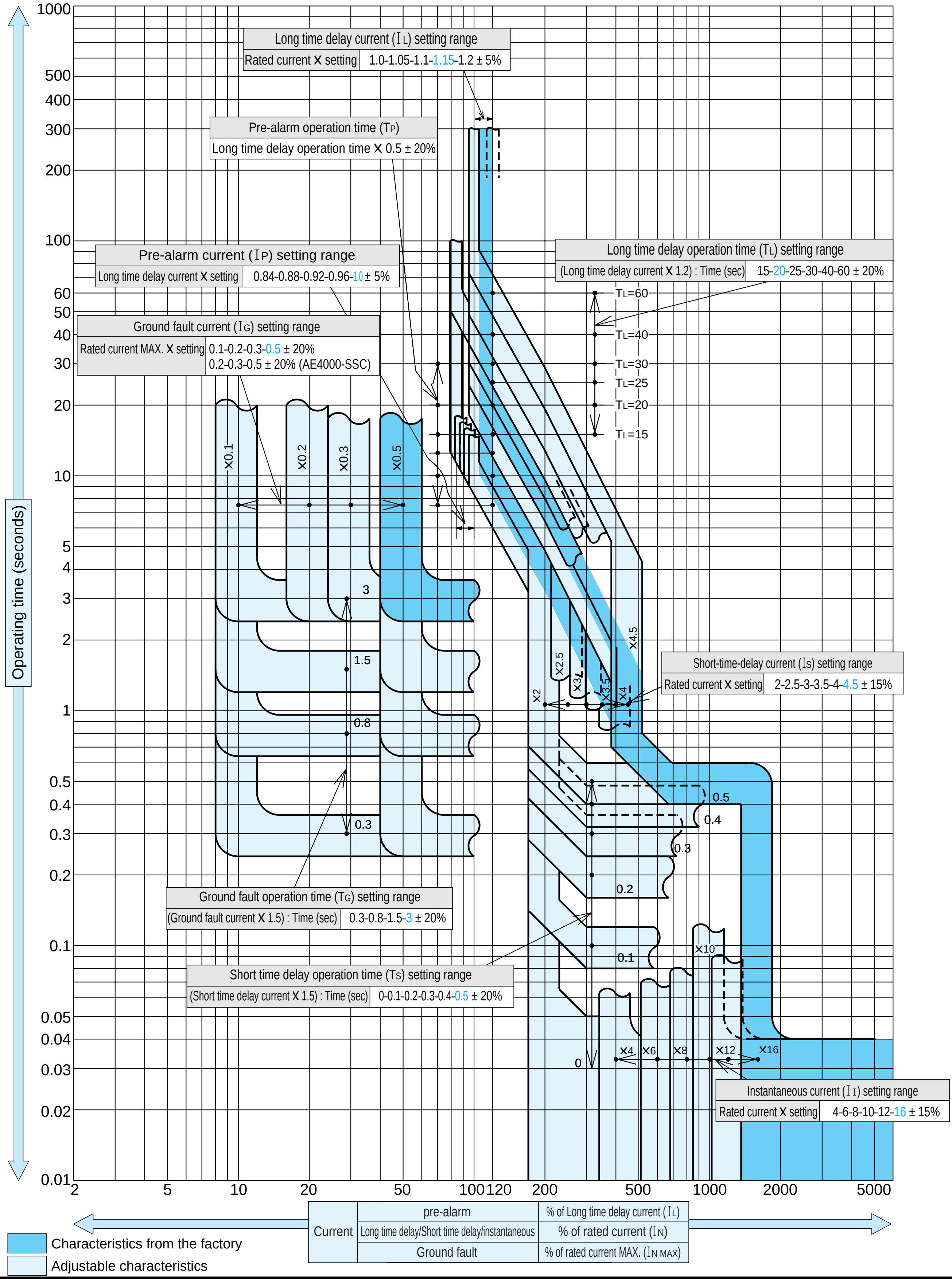
SL type : AE4000-SS~AE6300-SS



Operating characteristics (Generator protection use)

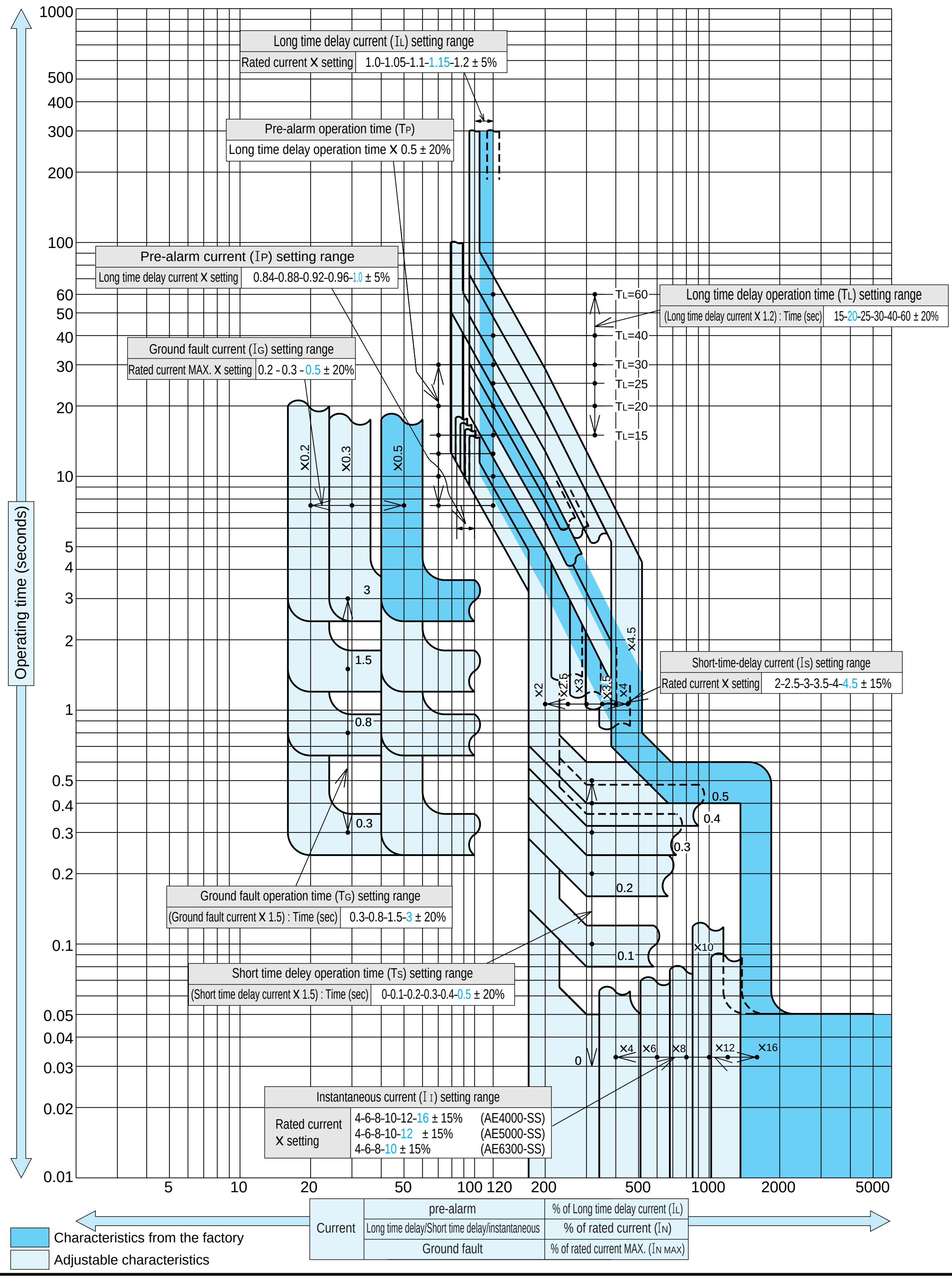
SuperAE

M type : AE630-SS/SH~AE3200-SS/SH, AE4000-SSC



Operating characteristics (Generator protection use)

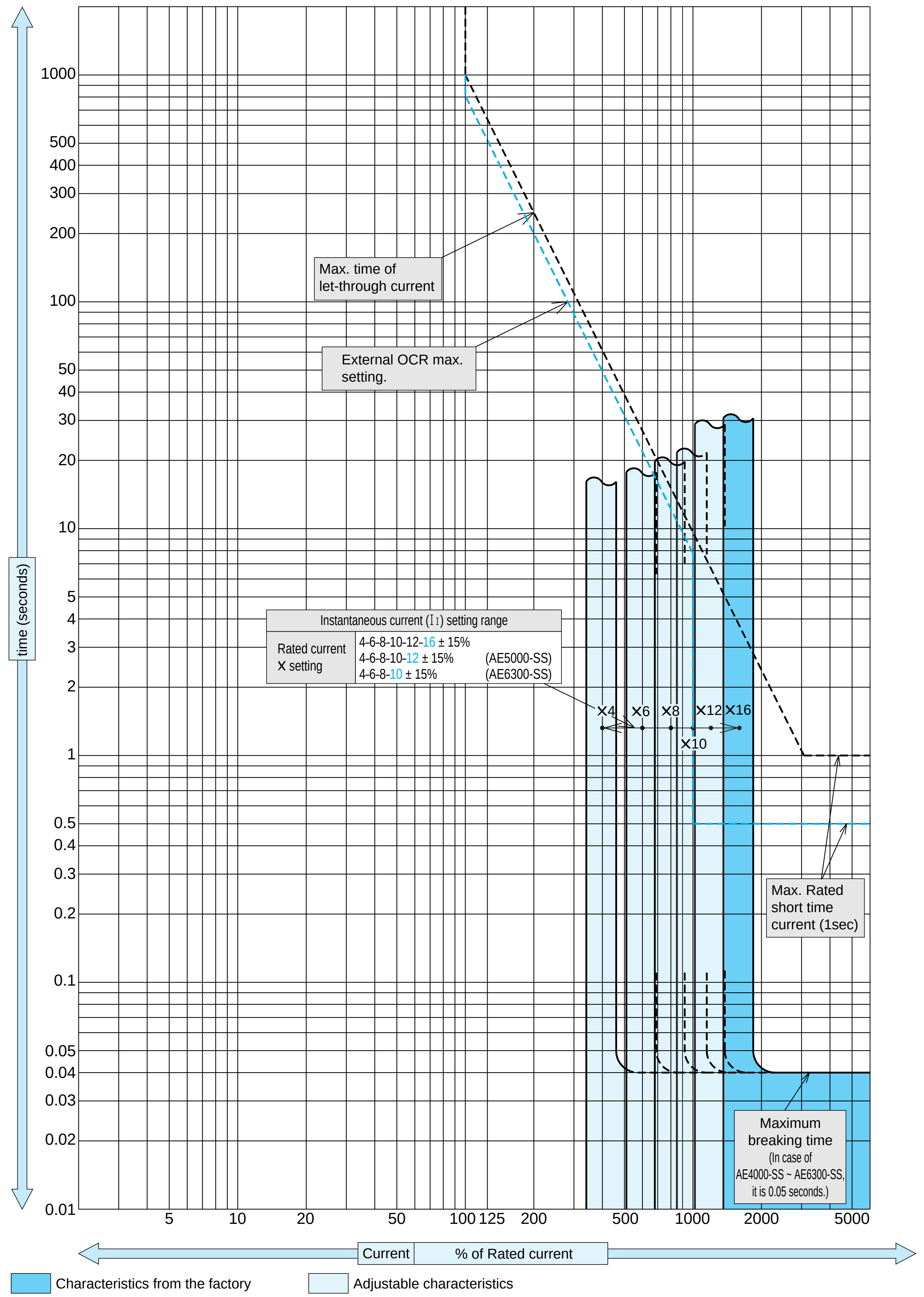
M type : AE4000-SS~AE6300-SS



MAX. time of let-through current and B type relay characteristics

B-COA

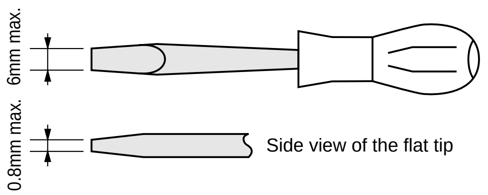
(Not available for AE-SH)



■ Tripping characteristics setting

Setting procedure

1. A small flat-tipped screwdriver is prepared.



2. Insert the flat-tipped screwdriver into the opening of the electronic trip relay cover. Then, lightly press the screwdriver leftward, and the cover will open.

3. There are 4 types of switches for setting up the required tripping characteristics and they should be used as follows:-

①Step adjustable type
A rotary switch is used. Do not stop the switch between steps as it would be the same setting value as that associated with the nearest step line. (Operate the switch with a torque of 0.1N•m or less.)

②Continuously adjustable type
Since a variable resistor is used, it is adjustable to any desired position on the scale. (Operate the switch with a torque of 0.1N•m or less.)

③Slide switch type
Slide the switch to the left or right. (operate the switch with a force of 1kg or less.)

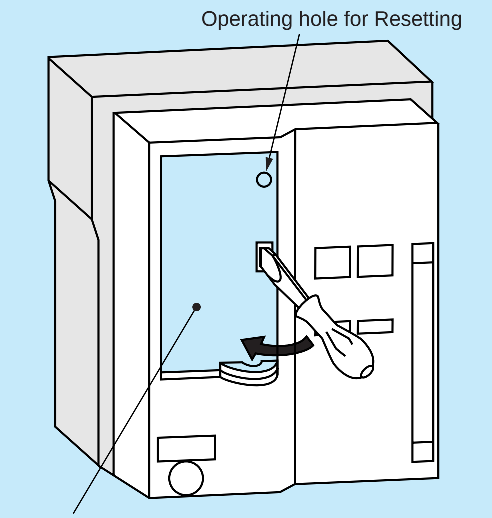
④Pushbutton type
A pushbutton is provided for termporary operation. Press it with a force of 1kg or less. Before operating make sure that the push-button is in its initial state.

4. When the characterisitics have been set, they should be checked using a field tester etc.

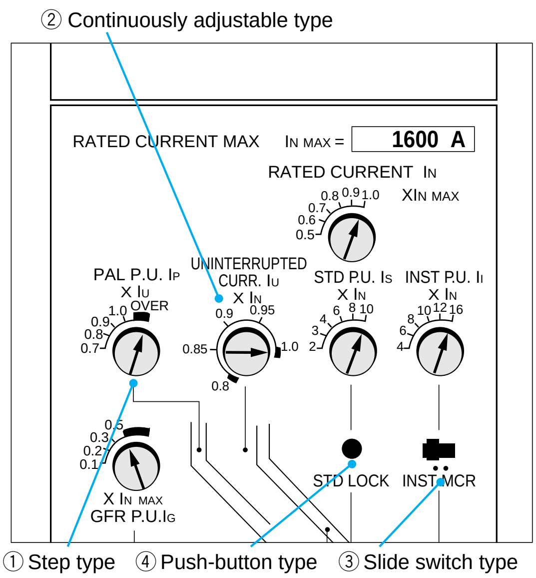
5. Two methods for sealing the cover are provided, select either from the following:-.

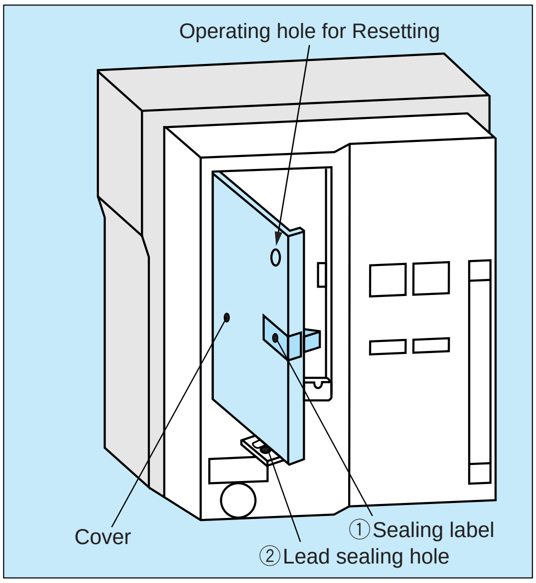
①Stick the sealing label on the opening of the electronic trip relay cover, and close the cover. The cover can not be opened unless the sealing label is removed.
Note: The sealing label is supplied with the relay.

②Seal the electronic trip relay cover by using the lead sealing hole at the bottom of the cover.



● Press the screwdriver in the direction of the arrow to open the cover.



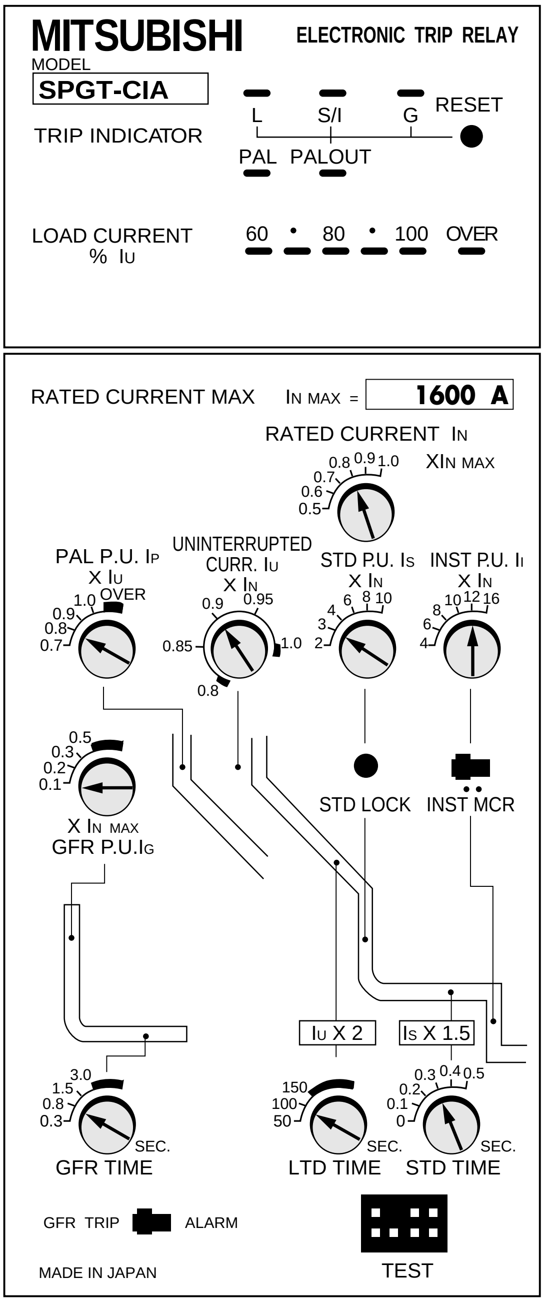


How to adjust the trip relay of AE-SS

AE-SS has very intelligent relay with multi functions.
But sometime, it seemed to be difficult to adjust it.
This report can help you to solve such questions.

<Front view of the relay>

The relay is set as follows.



Here

I_{NMAX} = Maximum rated current
I_N = Rated current
I_U = Uninterrupted current
LTD TIME = Long time delay tripping time
I_S = Short time delay pick-up current
STD TIME = Short time delay tripping time
I_I = Instantaneous pick-up current
I_P = Pre-alarm (PAL) operating current
I_G = Ground fault pick-up current
GFR TIME = Ground fault operating time

Tripping characteristics setting (2/3)

How to get the current settings and operating times

<Actual setting>
Current settings and operating times are calculated.

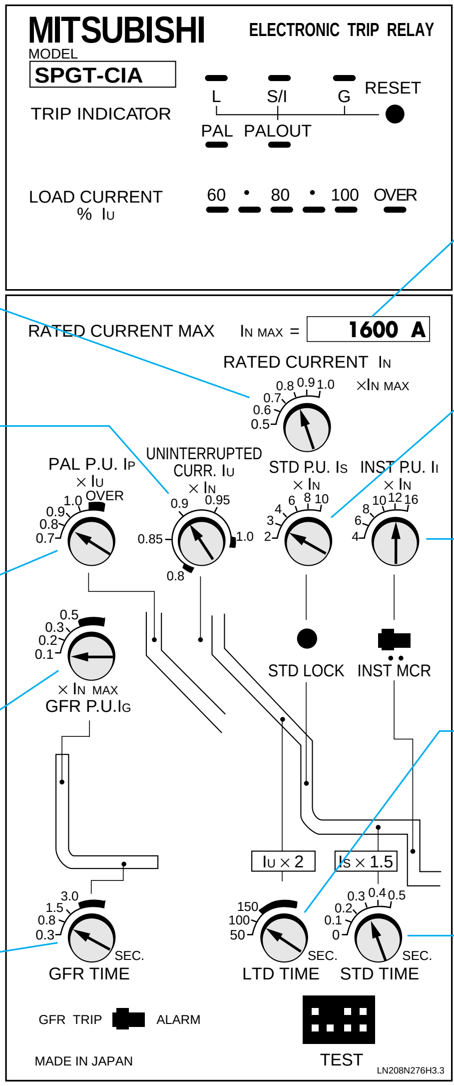
I_N=0.8× I_{NMAX}
=0.8×1600
=1280A

I_U=0.9× I_N
=0.9×1280A
=1152A

I_P=0.8× I_U
=0.8×1152
=921.6A

I_G=0.1× I_{NMAX}
=0.1×1600
=160A

GFR TIME=0.8sec
(at I_G×1.5=160×1.5 = 240A)



I_{NMAX}=1600A

I_S =3× I_N
=3×1280
=3840A

I_I =12× I_N
=12×1280
=15360A

LTD TIME=100sec
(at I_U×2=1152×2 = 2304A)

STD TIME=0.3sec
(at I_S×1.5=3840×1.5 = 5760A)

PAL pick-up time
=50% of LTD time=50sec
(at I_U×2=1152×2 = 2304A)

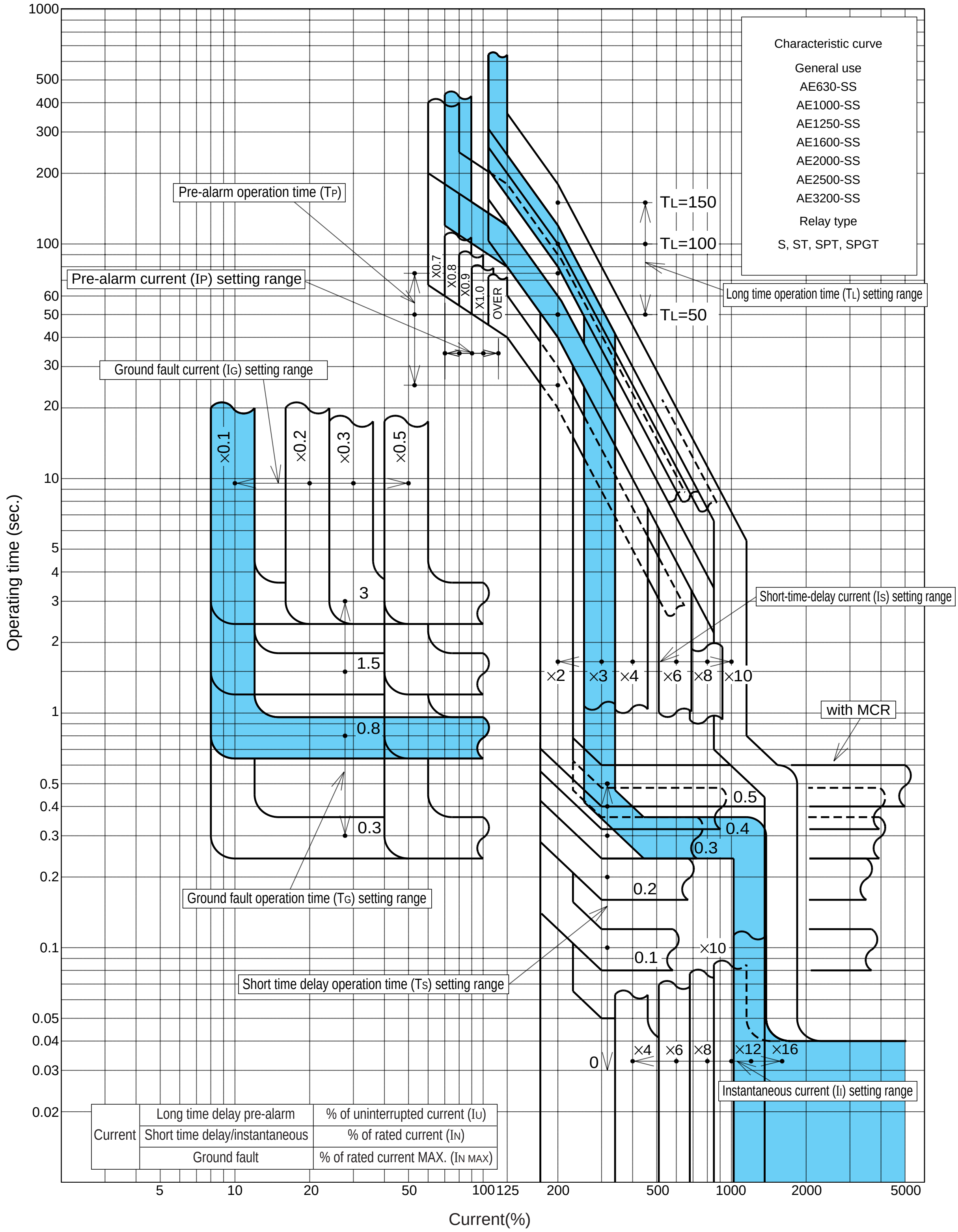
Actual settings are as following table.

I_{NMAX}	=1600A	I_I	=15360A±15%
I_N	=1280A	I_P	=921.6A±10%
I_U	=1152A	PAL pick-up time	=50sec±20% (at 2304A)
LTD TIME	=100sec±20% (at 2304A)	I_G	=160A±20%
I_S	=3840A±15%	GFR TIME	=0.8sec±20% (at 240A)
STD TIME	=0.3sec±20% (at 5760A)		–

<Characteristic curve> (1)

In above settings, operating characteristics are set as follows.

●Characteristic curve

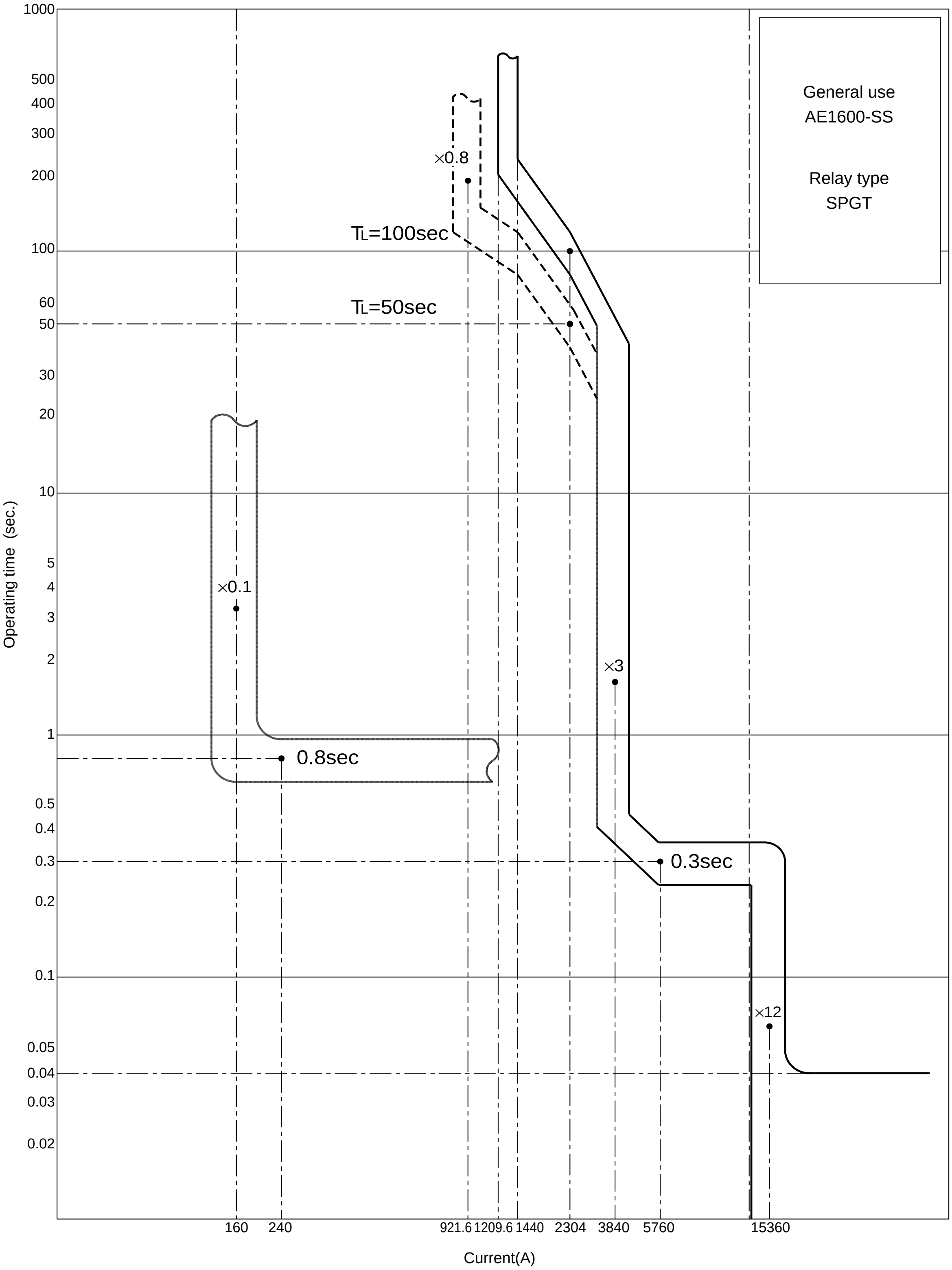


Current	Long time delay pre-alarm	% of uninterrupted current (IU)
	Short time delay/instantaneous	% of rated current (IN)
	Ground fault	% of rated current MAX. (IN MAX)

Tripping characteristics setting (3/3)

<Characteristic curve> (2)
Actual operating characteristics are shown is following curve by %-A figure.

●Characteristic curve



Tripping characteristics check

Super AE

Test terminals are provided at the right hand lower area on the front panel of super AE Series electronic trip relay. These terminals are for checking the tripping characteristics. by using a special field tester or by using a DC power supply.

Functions of the test terminals

1. Trip check (TC) terminal
   The breaker will trip when a power supply of 30VDC±10% is applied across terminals (TC) and (VT-) shown in the figure on the right.

2. Test power supply terminals ((VT+) and (VT–))
   The power supply input terminals are used to test the tripping characteristics of the Long-time-delay. Short-time-delay and Instantaneous tripping. A power supply capacity of 5W at 30VDC±10% is required.

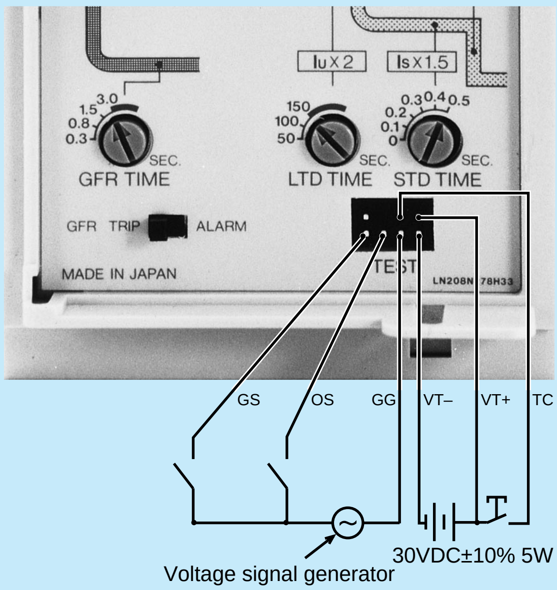
3. Overcurrent signal (OS) terminal
   When measuring the overcurrent tripping characteristics, input the AC voltage signal between terminals (OS) and (GG). The standard signal sizes are as follows.
   Note: In case of M relay R, S, T can be independently checked. Please apply for further details.

AC voltage signal

Frequency	Signal level	Test voltage
50Hz	141mV AC	$141\text{mV} \times \frac{\text{Test current}}{I_{N\ MAX}}$
60Hz	170mV AC	$170\text{mV} \times \frac{\text{Test current}}{I_{N\ MAX}}$

● The signal is equivalent to the Rated current MAX. ($I_{N\ MAX}$.).

4. Ground fault signal terminal (GS)
   When measuring the ground fault tripping characteristics (G characteristics), input the AC voltage signal between terminals (GS) and (GG). The standard signal levels are the same as for the overcurrent signal (OS).



Test connector (JST brand)
(Housing RF-08
Contact RF-SC2290)

Checking procedure using a field tester (Y-160 and Y-2000)

If the test power supply or a similar signal is applied to the test terminals of the electronic trip relay, the overcurrent tripping characteristics or ground fault tripping characteristics can easily be measured. Two models are available: Model Y-160 a small battery type and Model Y-2000 which can measue all the characteristics.
(Refer to page 39)

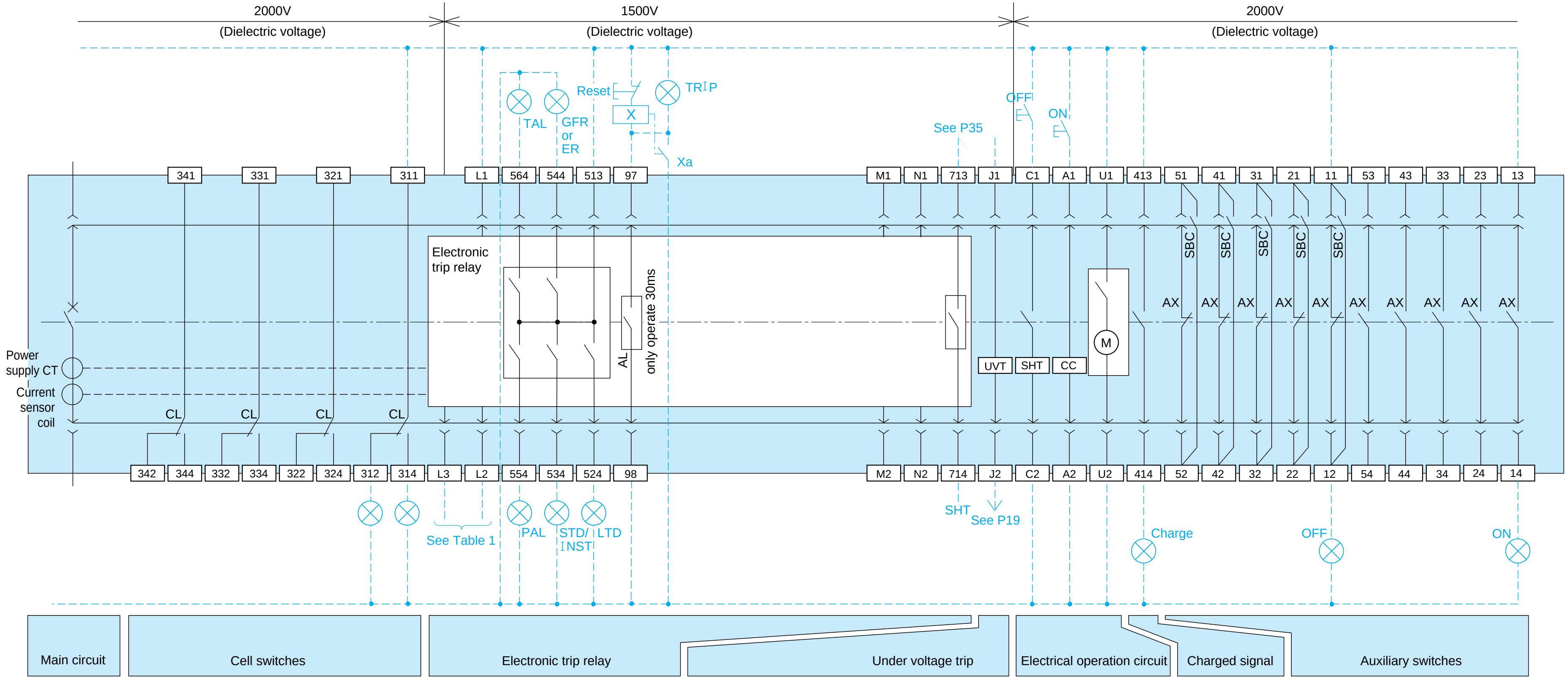
● Points to remember during testing
① If any current flows in the main circuit of the breaker, the correct characteristics will not be measured since the current will distort the test signal. Therefore, ensure that the test is conducted when the load current does not exist in the main circuit.
② Before measuring the Long-time-delay. time, remove any influence which may result from energization, before the test, by tripping the breaker once with the trip check.
③ The Instantaneous tripping current is the value measured when the breaker is gradually tripped, by increasing the overcurrent signal (OS) and continuously pressing the “STD LOCK” button (When using the Model Y-2000)

Wiring diagram (According to EN50005)

Internal wiring diagram

- The following wiring diagram shown accessories fully equipped.

- The Fig. below is the wiring diagram at fully equipped state.
- CL and SBC are accessories for draw-out type.
- On the draw-out type, the control circuit terminal block should be moved to the left or right by 5mm, after cables connecting.
- When usin coil loads such as DC magnetic switch, etc. as operating voltage in the peripheral circuits, install diodes, surge absorbers, etc. as a countermeasure against the surge (counter electromotive force) at the time of switching.
- Because of pumping prevention is not performed, do not use AXb contact for a cut-off of closing coil.



● Terminal Symbols

13 ~ 54	Auxiliary switch contact a	N1 N2	For N-pole CT or external ZCT connection
11 ~ 52	Auxiliary switch contact b	M1 M2	Load ammeter
413 414	Charged signal a	97 98	OCR alarm contact
U1 U2	Motor charging	524 ~ 544	Trip indication contact
A1 A2	Closing coil	554	Pre-alarm indication contact
C1 C2	Shunt trip	564	Temperature alarm contact
J1 J2	Under voltage trip	L1 L2 L3	Electronic relay unit control power supply
713 714	Earth leakage trip output (for SHT trip)	311 ~ 344	Cell switch

(Table-1)

Applicable power supply			
Voltage(V)			Input terminal
AC	Common	100–120	L1, L2
		200–240	L1, L3
DC		100–110	L1, L2
		125	
		24	
		48	

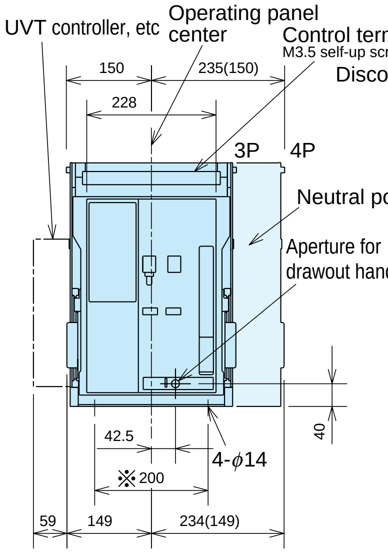
● Accessory Symbols

M	Motor	GFR or ER	Ground fault trip or earth leakage indication LAMP
CC	Closing coil	PAL	Pre-alarm indication LAMP
SHT	Shunt trip device	TAL	Temperature alarm indication LAMP
UVT	Under voltage trip coil	X	Self-hold relay
AL	OCR alarm (30ms)	——	Wiring completed by the factory
LTD	Long-time-delay trip indication LAMP	– – –	Wiring by the user
STD/INST	Short-time-delay or instantaneous trip indication LAMP		

Outline dimensions (1/4)

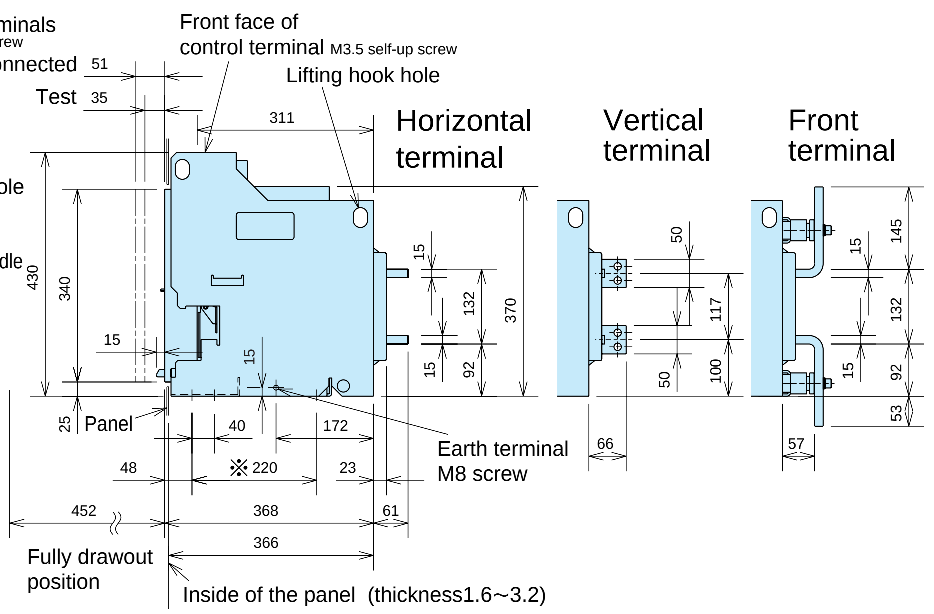
Drawout type AE630-SS~AE1600-SS

Front view



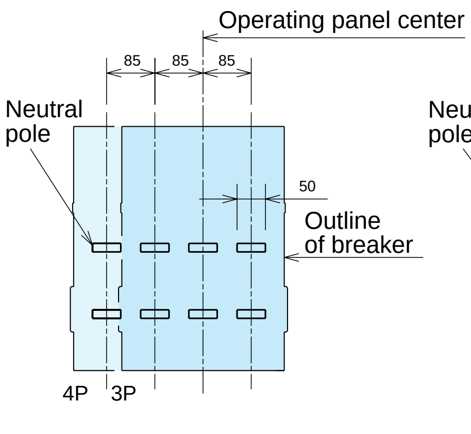
※: Mounting pitch
The numerals shown in parentheses are for 3 poles.

Side view

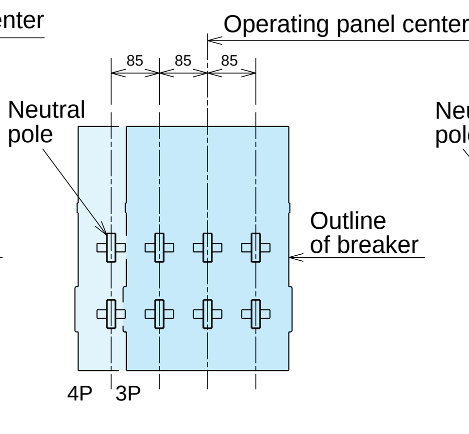


Rear view

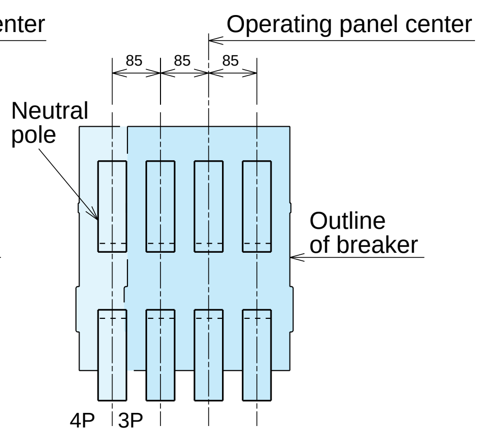
Horizontal terminal



Vertical terminal

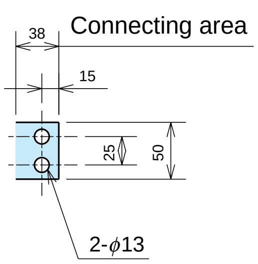


Front terminal

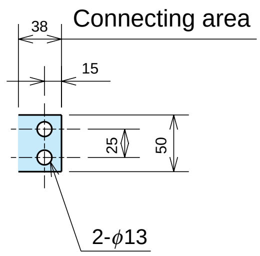


Main circuit terminal dimensions

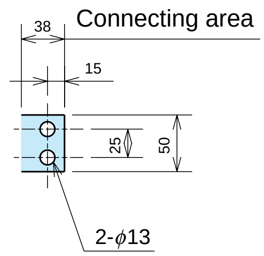
Horizontal terminal



Vertical terminal

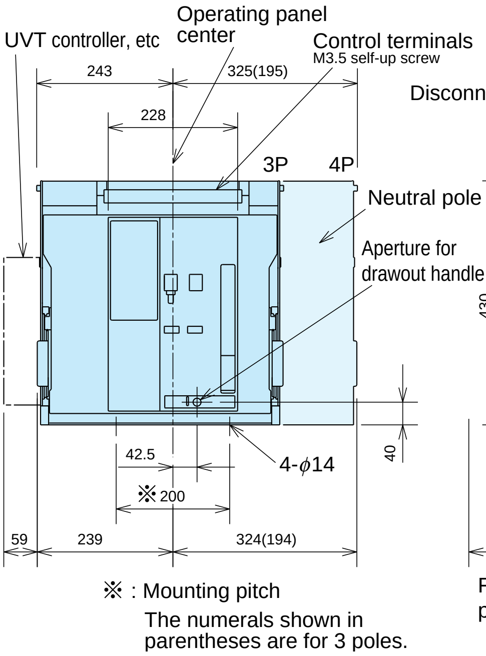


Front terminal

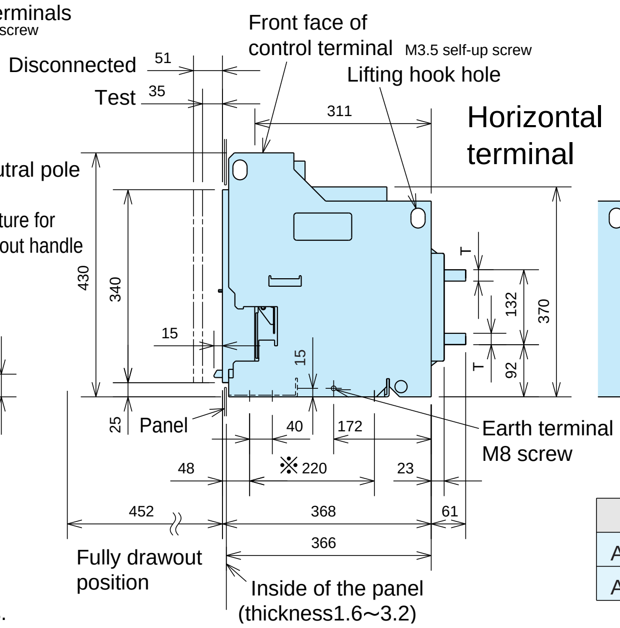


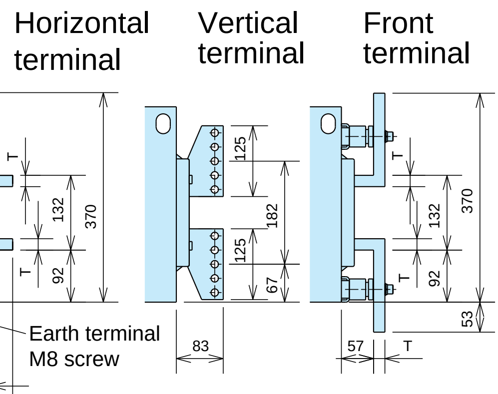
Drawout type AE2000-SS~AE3200-SS

Front view



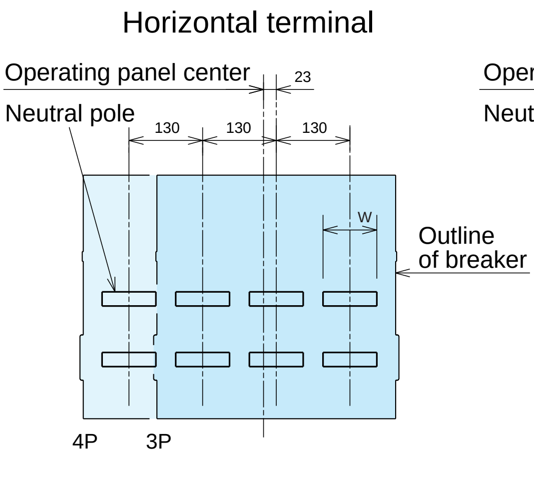
Side view

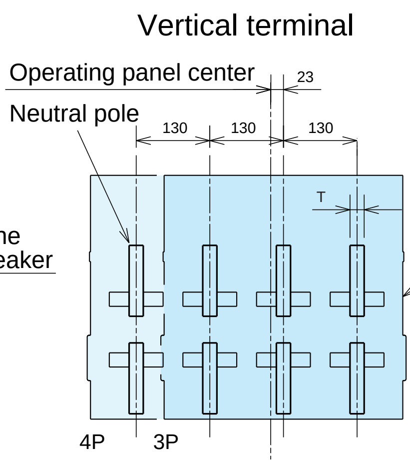


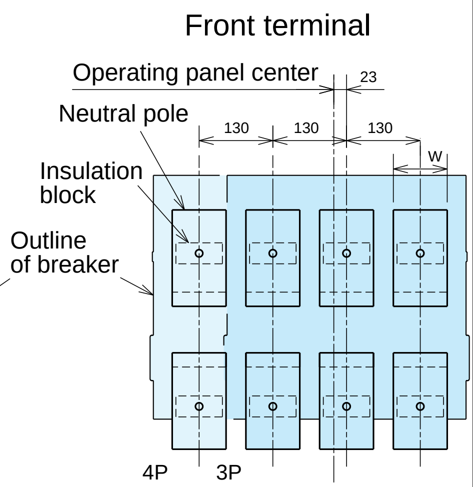


Type	Dimension of T
AE2000,2500-SS	20
AE3200-SS	25

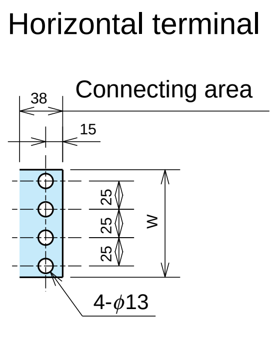
Rear view

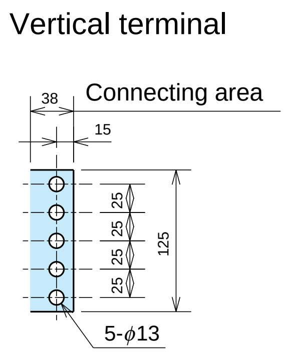


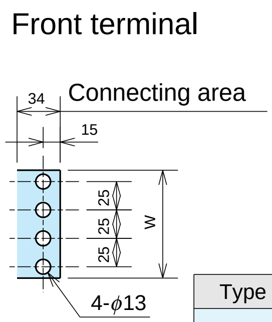




Main circuit terminal dimensions





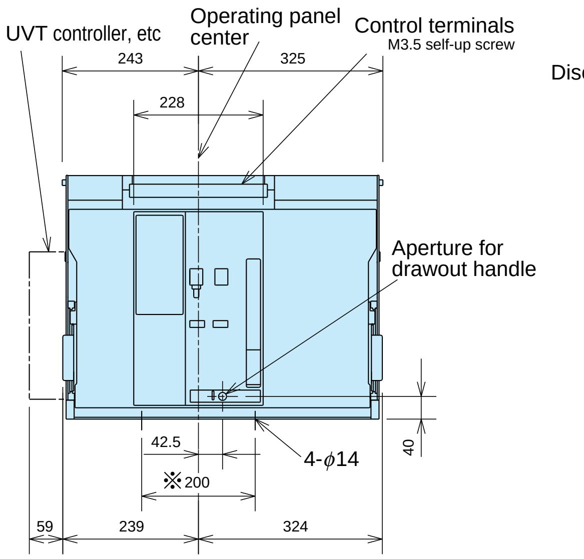


Type	Dimension of W
AE2000,2500-SS	95
AE3200-SS	103

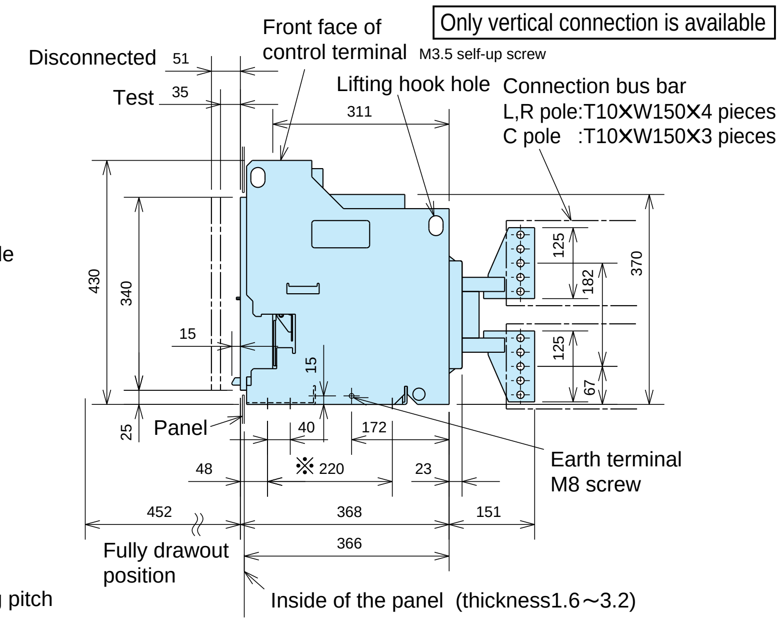
Outline dimensions (2/4)

Drawout type AE4000-SSC (3P)

Front view

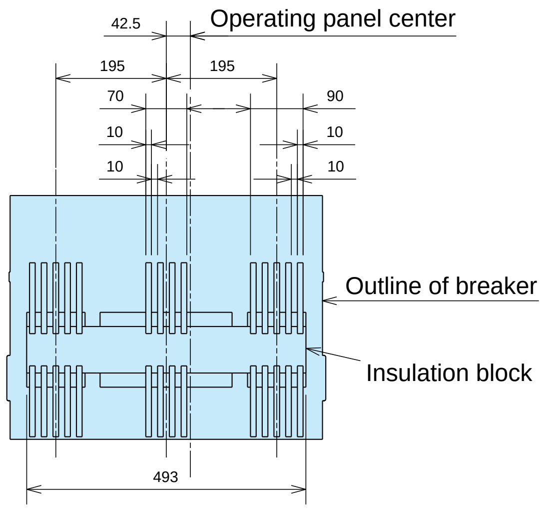


Side view

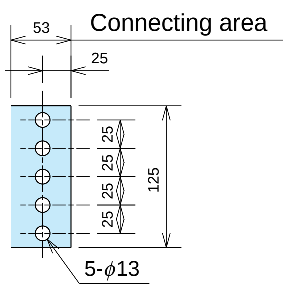


※ : Mounting pitch

Rear view

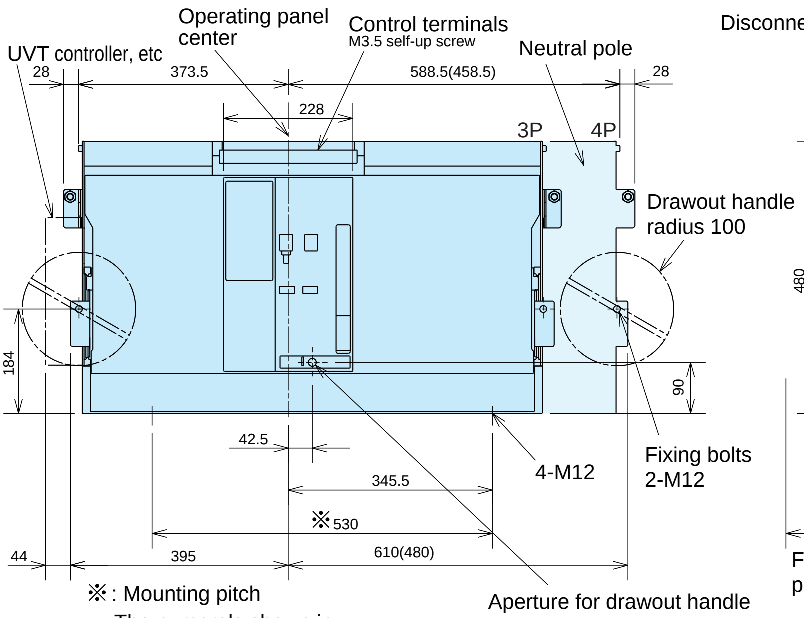


Main circuit terminal dimensions



Drawout type AE4000-SS~AE6300-SS

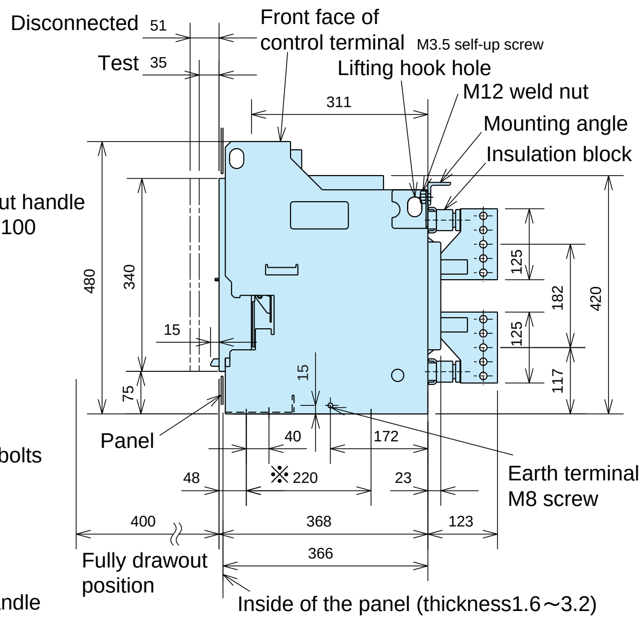
Front view



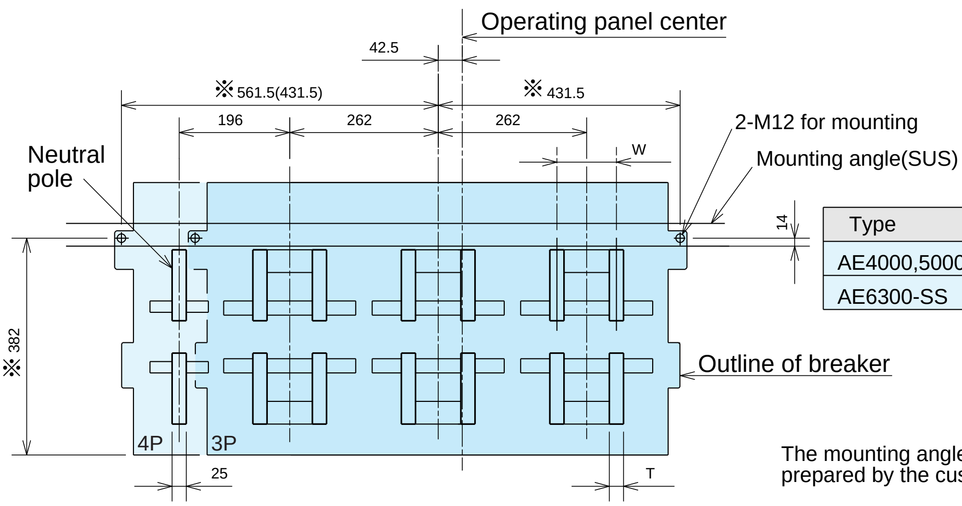
※: Mounting pitch

The numerals shown in parentheses are for 3 poles.

Side view



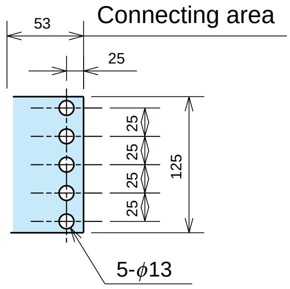
Rear view



Type	Dimension of W	Dimension of T
AE4000,5000-SS	100	20
AE6300-SS	105	25

The mounting angle should be prepared by the customer.

Main circuit terminal dimensions

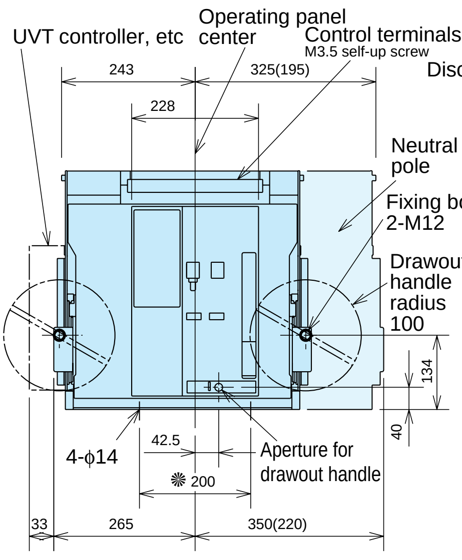


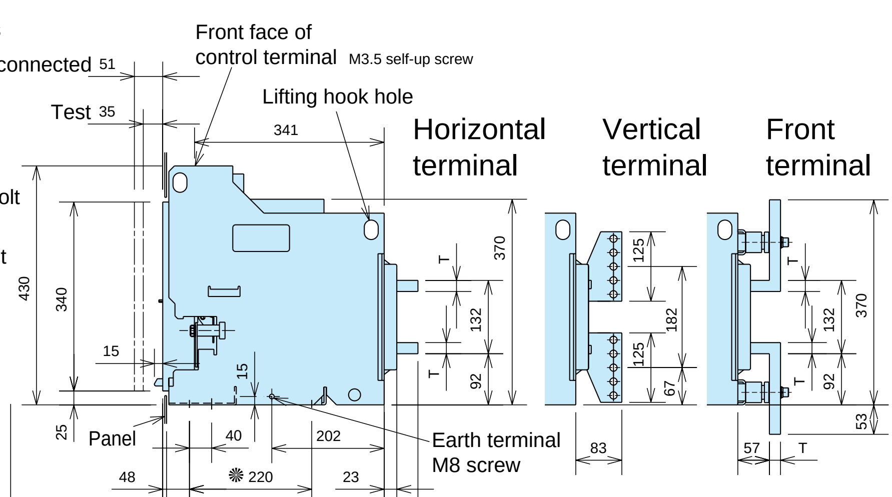
Outline dimensions (3/4)

Drawout type AE630-SH~AE3200-SH

Front view

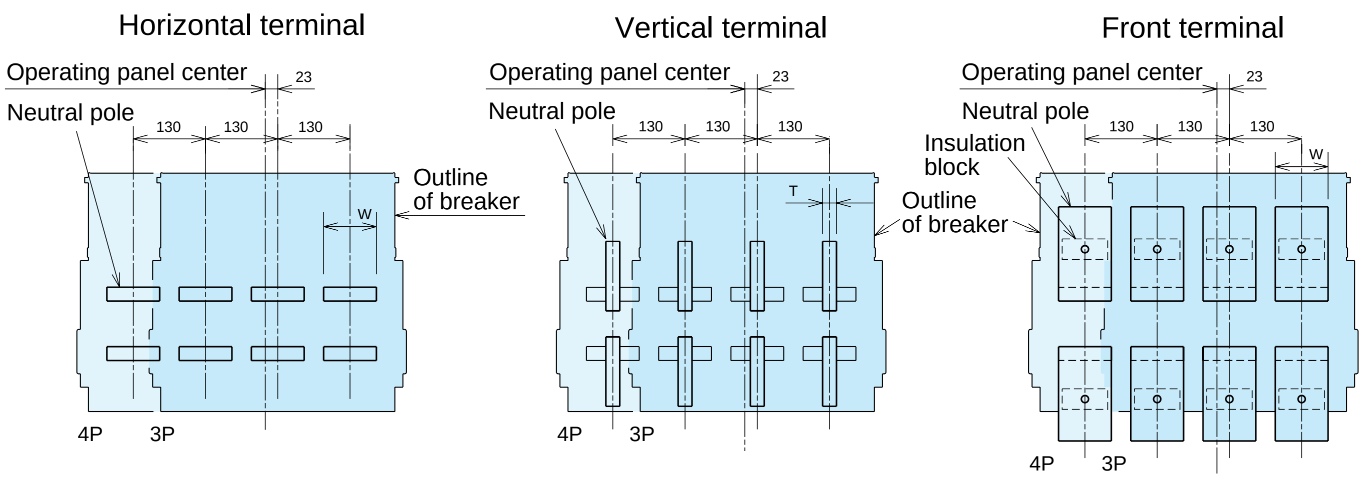
Side view



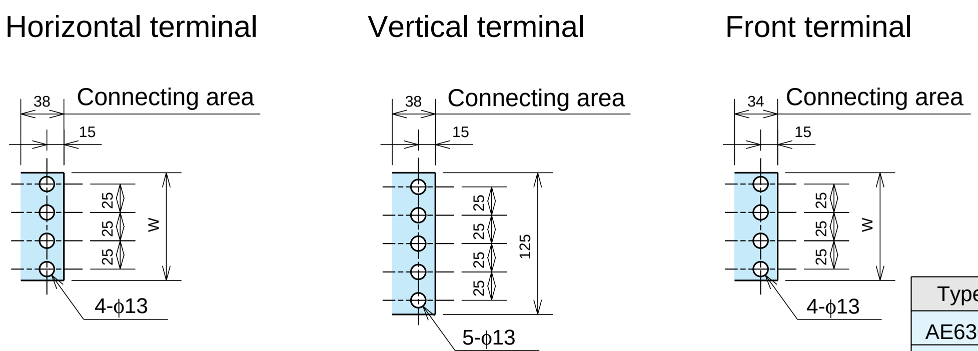


Type	Dimension of T
AE630 ~ 2500-SH	20
AE3200-SH	25

Rear view



Main circuit terminal dimensions



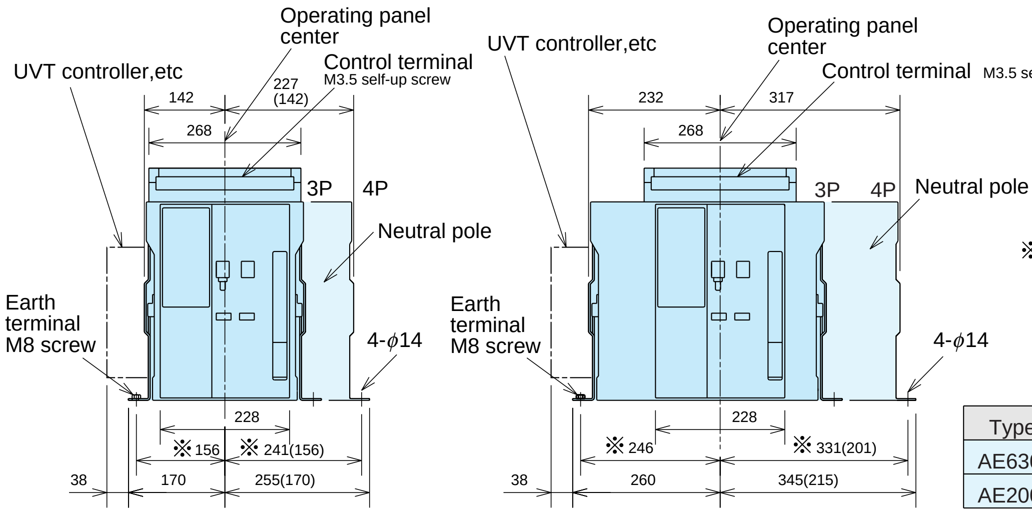
Type	Dimension of W
AE630 ~ 2500-SH	95
AE3200-SH	103

Fixed type AE630-SS/SH~AE3200-SS/SH

Front view

AE630~1600-SS

AE2000~3200-SS
AE630~3200-SH



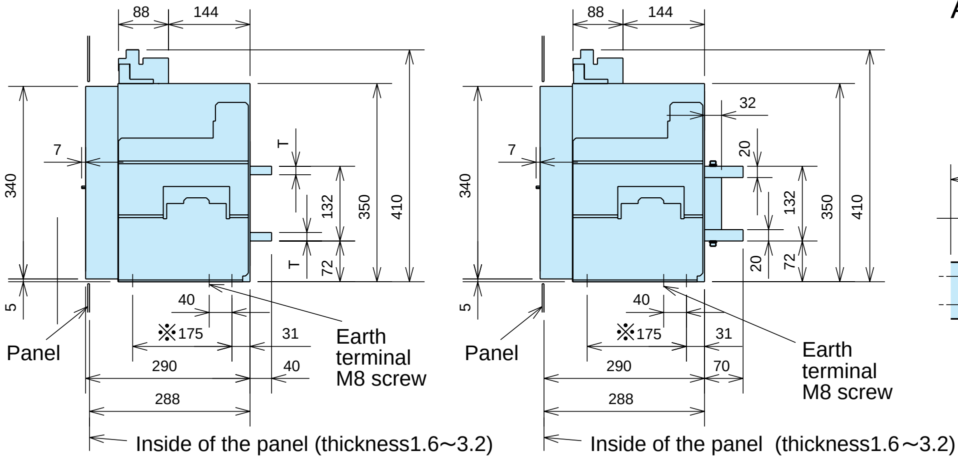
※ : Mounting pitch
The numerals shown in parentheses are for 3 poles.

Type	Dimension of T
AE630~1600-SS	15
AE2000~3200-SS	20

Side view

AE630~3200-SS

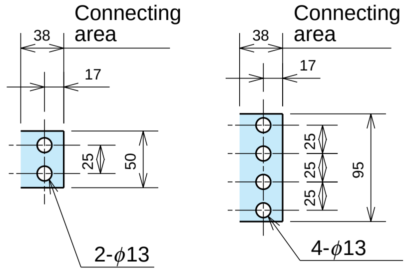
AE630~3200-SH



Main circuit terminal dimensions

AE630~1600-SS

AE2000~3200-SS
AE630~3200-SH

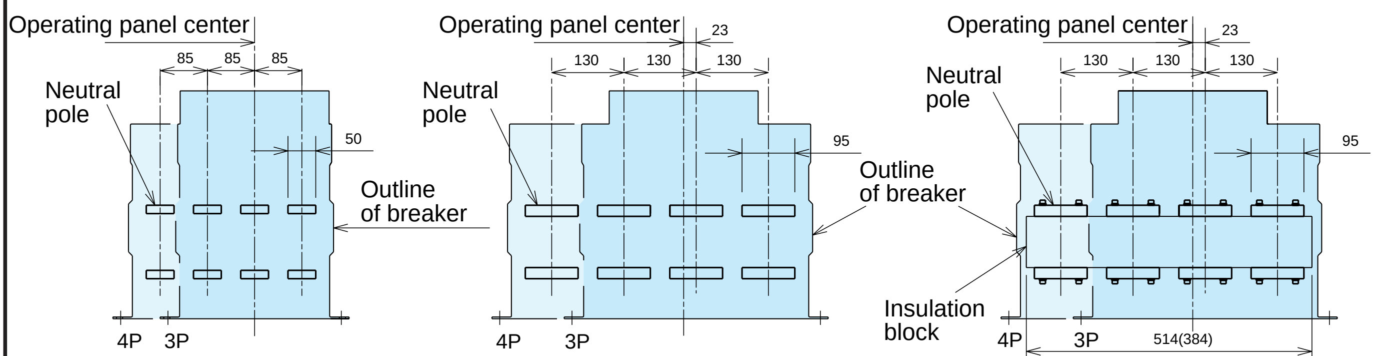


Rear view

AE630~1600-SS

AE2000~3200-SS

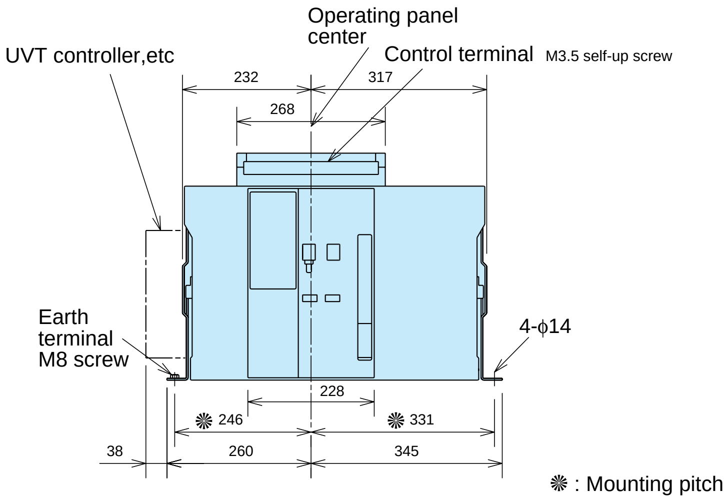
AE630~3200-SH



■ Outline dimensions (4/4)

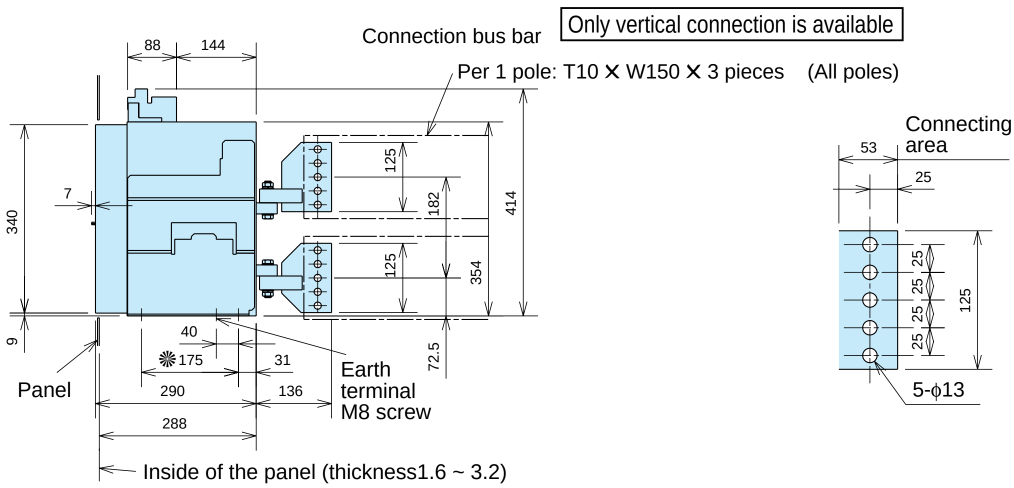
Fixed type AE4000-SSC (3P)

Front view

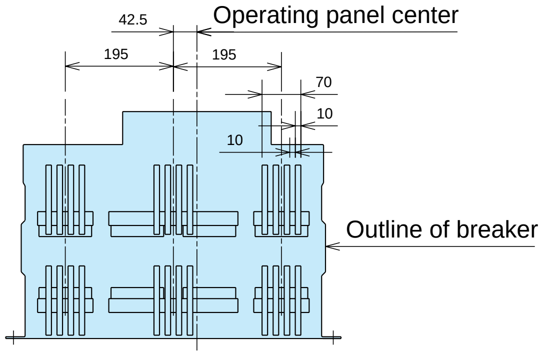


Side view

Main circuit terminal dimensions

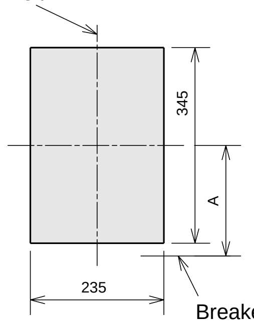


Rear view



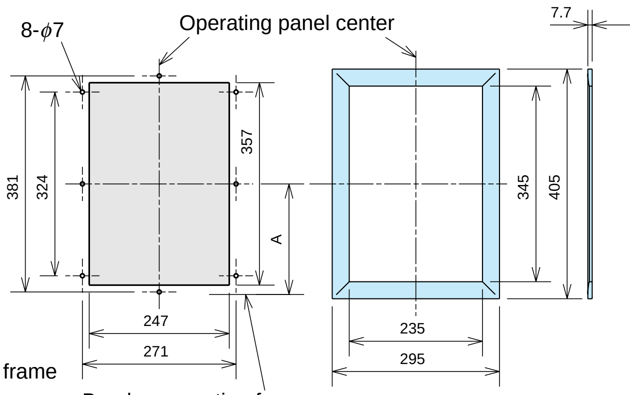
Panel-cut, Drawout handle, Terminal adapter

Panel-cut dimensions

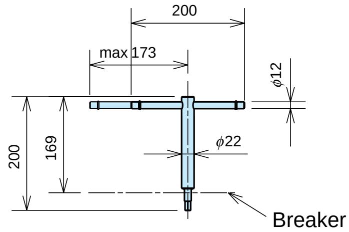


Door frame panel-cut dimensions

Panel-cut dimensions Outline



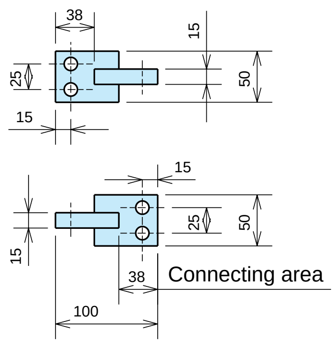
Drawout handle dimensions



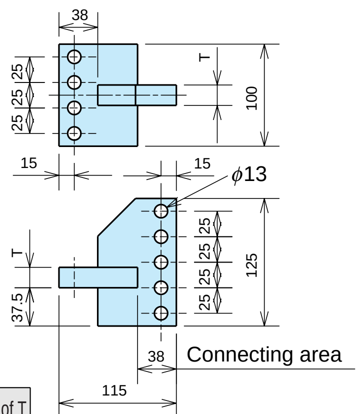
Type	Dimension of A
Fixed Type	175
Drawout Type	195
AE4000-SSC (FIX)	179
AE4000~6300-SS	245

Vertical terminal adapter

AE630~1600-SS



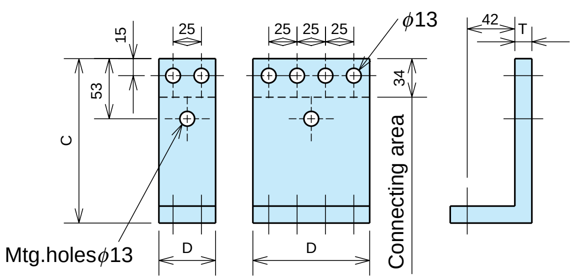
AE2000~3200-SS
AE630~3200-SH



Type	Dimension of T
AE2000,2500-SS AE630~2500-SH	20
AE3200-SS AE3200-SH	25

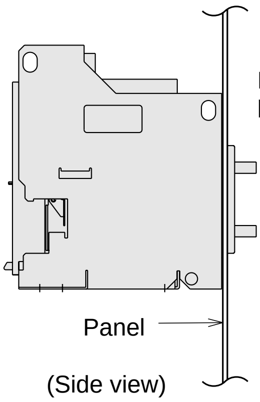
Front terminal adapter

AE630~1600-SS | AE2000~3200-SS AE630~3200-SH

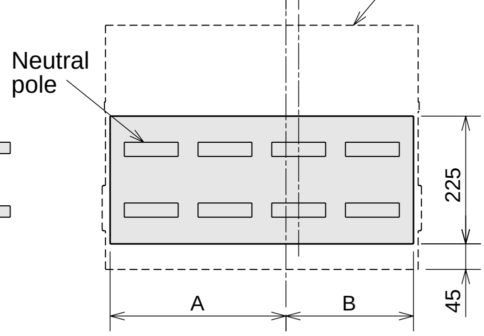


Type			Dimension of C	Dimension of D	Dimension of T
AE630~1600-SS	Fixed type	Up side	258.5	50	15
		Down side	145	50	15
	Drawout type		145	50	15
AE2000,2500-SS AE630~2500-SH	Fixed type	Up side	258.5	95	20
		Down side	145	95	20
	Drawout type		145	95	20
AE3200-SS AE3200-SH	Fixed type	Up side	258.5	95	25
		Down side	145	95	25
	Drawout type		145	103	25

Panel-cut dimensions (Breaker rear side)



(Side view)



(Rear view)

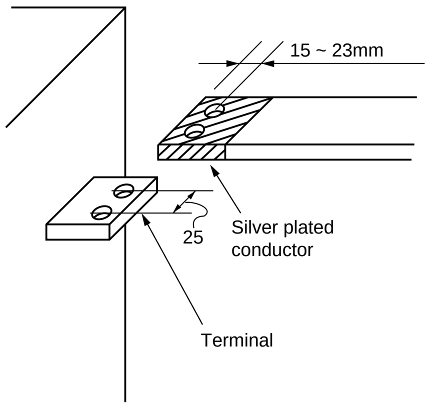
Dimensions

Type	Number of poles	Dimensions A	Dimensions B	Dimensions C
AE630~1600-SS	3	135	135	0
	4	220	135	0
AE2000~3200-SS AE630~3200-SH	3	180	225	23
	4	310	225	23

Technical information (1/3)

Pre-cautions when making connections

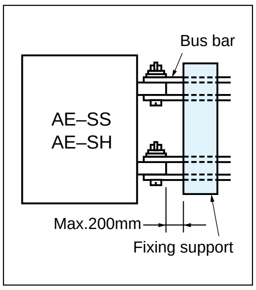
For the terminal connections, use M12 bolts, washers and spring washers.
In order to prevent increased contact resistance due to humidity, silver plating of the contact surface of the conductor which is connected to the terminal of the breaker, is recommended. Also clean the contact surface, and securely connect them at a suitable torque.



Standard Tightening Torque

Screw size	Tightening torque (N • m)
M12	40 ~ 50

Since fault current flowing through the conductors cause large electromagnetic forces, the conductors should be secured firmly, using the values in Table on the right as a reference. Max busbar supporting distance nearest to ACB is less than 200mm.



Electromagnetic force in kg·f per 1m conductor (in the case of three phase short circuit)

kg·f

Type (A)	AE630-SS ~ AE1600-SS	AE2000-SS ~ AE3200-SS AE – SH	AE4000-SSC	AE4000-SS ~ AE6300-SS
Conductor distance (mm) / Prospective fault current kA (pf)	85	130	195	262
30 (0.2)	750	450	340	230
42 (0.2)	1460	890	670	450
50 (0.2)	2080	1250	940	630
65 (0.2)	3510	2120	1590	1060
85 (0.2)	6020	3620	2720	1810
100 (0.2)	—	5010	—	2510
130 (0.2)	—	8470	—	4240

When selecting conductors for connection to a Series AE breaker, ensure that they have a sufficient current capacity, refer to Table on the right.

Conductor Size (IEC-60947-1 ; 40°C Ambient Temp., Open air)

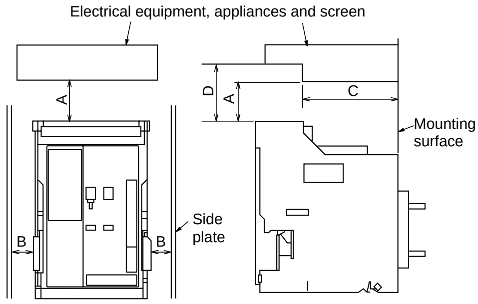
Rated current Max. (A)	Connecting conductors (copper bus bar) Arrangement	Quantity	Conductor size (mm)
630	With long surface vertical	2	40X5
1000	With long surface vertical	2	60X5
1250	With long surface vertical	2	80X5
1600	With long surface vertical	2	100X5
2000	With long surface vertical	3	100X5
2500	With long surface vertical	4	100X5
3150(3200)*1	With long surface vertical	3	100X10
4000*2	With long surface vertical	4	100X10
5000	With long surface vertical	4	150X10
6300	With long surface vertical	4	200X10

*1.The temperature rise of rated current 3200A conforms to the requirement of IEC 60947-1 for the connecting conductor size of a rated current of 3150A.
In case of more then 3200A, conductor sizes are not given in IEC 60947-1.
*2.In case of AE-4000-SSC, refer to P59, 63.

Line side insulation clearance

When a short-circuit current is interrupted, hot gas blows out discharged from the exhaust port of the arc extinguishing chamber, so provid a clearance as shown in the following table.

● On the fixed type, maintenance is possible with following clearance.



● **Dimensions** (mm)

Type		AE630-SS ~ AE3200-SS AE4000-SSC		AE4000-SS ~ AE6300-SS AE-SH
Applicable voltage		AC600V or less	AC660V,690V	AC690V or less
Fix type	A	(Note 1) 0	(Note 1) 100	(Note 1) 200
	B	(Note 3) 50	(Note 3) 50	(Note 3) 50
	C	162	162	—
	D	(Note 2) 50	(Note 2) 50	200
Drowout type	A	0	100	(Note 1) 200
	B	(Note 3) 50	(Note 3) 50	(Note 3) 50
	C	240	240	—
	D	(Note 2) 50	(Note 2) 50	200

Note 1 : 300mm or more clearance is necessary to inspect the arc-extinguishing chamber and contacts.

Note 2 : The wiring space reguired for the control terminal block.

Note 3 : In case dimension B becomes larger when the UVT controller, the mechanical interlock, door interlock, etc, are installed.

Service conditions

1 Normal service condition

If under ordinary conditions the following normal working conditions are all satisfied, the AE Series air circuit breaker may be used unless otherwise specified.

1. Ambient air temperature
   A range of max. +40˚C to min. –5˚C is recommended. However, the average over 24 hours must not exceed +35˚C.
2. Altitude
   2,000m (6,600 feet) or less
3. Environmental conditions
   The air must be clean, and the relative humidity 85% or less at a max. of +40˚C. Do not use and store in atmospheres with sulfide gas, ammonia gas etc.
   ($H_2S \leq 0.01$ppm $SO_2 \leq 0.1$ppm $NH_3 \leq$ a few ppm.)
4. Installation conditions
   When installing the AE Series air circuit breaker, refer to the installation instructions in the catalogue and instruction manual.
5. Strage temperature
   A range of max. +60˚C to min. –20˚C is recommended to store. However, the average over 24 hours must not exceed +35˚C.
6. Replacement
   Approx. 15 years.
   Please refer to the instruction manual.

2 Special service conditions

In the case of special service condition, modified air circuit breakers are available. Please specify when ordering. Service life may be shorter depend on service conditions.

1. Special environmental conditions
   If it is used at high temperature and/or high humidity, the insulation durability and other electrical/mechanical features may deteriorate. Therefore, the breaker should be specially treated. Moisture fungus treatment with increased corrosion-resistance is recommended. Since some parts may pose problems due to corrosion in the environments where corrosive gas results from the corrosion, the increased Extra-corrosion proof specifications is recommended.
2. Special ambient temperature
   If the ambient temperature exceeds +40˚C, the uninterrupted current rating will be reduced. Since the reduction value is different depending on the applicable standard, refer to P68.
3. Special altitude
   If it is used at the 2,000m or higher the heat radiation rate is reduced decreasing the operating voltage rating, continuous current capacity and breaking capacity. Moreover the durability of the insulation is also decreased owing to the atmospheric pressure. Apply for further detail.

■ Technical information (2/3)

Internal resistance, reactance and power consumption (per pole)

Type	Connection	Internal resistance (mΩ)	Reactance (mΩ)	Power consumption (W)
AE630-SS	Fixed type	0.028	0.059	11
	Drawout type	0.042	0.089	17
AE630-SH	Fixed type	0.020	0.047	8
	Drawout type	0.030	0.071	12
AE1000-SS	Fixed type	0.026	0.060	26
	Drawout type	0.040	0.091	40
AE1000-SH	Fixed type	0.018	0.047	18
	Drawout type	0.028	0.071	28
AE1250-SS	Fixed type	0.024	0.060	38
	Drawout type	0.038	0.091	60
AE1250-SH	Fixed type	0.016	0.047	25
	Drawout type	0.026	0.071	41
AE1600-SS	Fixed type	0.016	0.063	41
	Drawout type	0.030	0.095	77
AE1600-SH	Fixed type	0.014	0.047	36
	Drawout type	0.024	0.071	61
AE2000-SS	Fixed type	0.010	0.047	40
	Drawout type	0.020	0.071	80
AE2000-SH	Fixed type	0.012	0.047	48
	Drawout type	0.022	0.071	88
AE2500-SS	Fixed type	0.008	0.047	50
	Drawout type	0.018	0.071	113
AE2500-SH	Fixed type	0.010	0.047	63
	Drawout type	0.020	0.071	125
AE3200-SS	Fixed type	0.008	0.048	72
	Drawout type	0.014	0.072	143
AE3200-SH	Fixed type	0.009	0.048	92
	Drawout type	0.016	0.072	164
AE4000-SSC	Fixed type	0.008	0.048	128
	Drawout type	0.014	0.072	224
AE4000-SS	Drawout type	0.013	0.062	210
AE5000-SS	Drawout type	0.011	0.062	275
AE6300-SS	Drawout type	0.0085	0.062	340

● The above values are applicable for one pole.

Deratings by ambient temperature

(A)

Standard	Ambient temperature	AE630-SS AE630-SH	AE1000-SS AE1000-SH	AE1250-SS AE1250-SH	AE1600-SS AE1600-SH	AE2000-SS AE2000-SH	AE2500-SS AE2500-SH	AE3200-SS AE3200-SH	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
IEC60947-2 BS (Standard : 40°C)	40°C	630	1000	1250	1600	2000	2500	3200	4000	4000	5000	6300
	45°C	630	1000	1250	1600	2000	2500	3200	3800	4000	5000	6000
	50°C	630	1000	1250	1600	2000	2500	3200	3650	4000	5000	5750
	55°C	630	1000	1250	1550 (1600)	2000	2450	3000	3500	3900	5000	5500
	60°C	630	1000	1200 (1250)	1500 (1600)	2000	2350	2900	3300	3750	4750	5200
JISC8372 JISC8370 (Standard : 40°C)	40°C	630	1000	1250	1600	2000	2500	3200	3600	4000	5000	6000
	45°C	630	1000	1250	1600	2000	2500	3200	3500	4000	5000	5800
	50°C	630	1000	1250	1500 (1600)	2000	2500	3000	3350	4000	5000	5600
	55°C	630	1000	1200 (1250)	1450 (1600)	2000	2350	2900	3200	4000	4900	5450
	60°C	630	1000	1150 (1250)	1400 (1600)	2000	2250	2800	3050	4000	4700	5250
LR,AB,GL DNV,BV (Standard : 45°C)	45°C	630	1000	1250	1600	2000	2500	3200	—	4000	5000	6000
	50°C	630	1000	1250	1600	2000	2500	3200	—	4000	5000	5750
	55°C	630	1000	1250	1550 (1600)	2000	2450	3050	—	3900	5000	5500
	60°C	630	1000	1200	1500 (1600)	2000	2350	2900	—	3750	4750	5200
NK (Standard : 45°C)	45°C	630	1000	1250	1600	2000	2500	3200	3500	4000	5000	5700
	50°C	630	1000	1250	1500 (1600)	2000	2500	3000	3350	4000	5000	5500
	55°C	630	1000	1200 (1250)	1450 (1600)	2000	2350	2900	3200	4000	4800	5300
	60°C	630	1000	1150 (1250)	1400 (1600)	2000	2250	2800	3050	4000	4600	5100

Note : The figures in ( ) in the above Table indicate reduced current values exclusive to AE-SH series.

Technical information (3/3)

Selective interrupting combinations table

AE-SS Series air circuit breakers provide easy selective co-ordination with branch circuit breakers.
For selective co-ordinations, refer to the following table.

AC220V sym kA

Branch circuit breaker		Main circuit breaker / Unit breaking capacity	AE-SS										
			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
			65	65	65	65	85	85	85	85	130	130	130
NF-S • MB	NF30-SP MB30-SP MB50-CP	5	5	5	5	5	5	5	5	5	5	5	5
	NF50-SP NF60-SP MB50-SP	10	9(10)	10	10	10	10	10	10	10	10	10	10
	NF50-HP NF60-HP	25	9(25)	25	25	25	25	25	25	25	25	25	25
	NF50-HRP	85	9(65)	50(65)	65	65	85	85	85	85	85	85	85
	NF100-SP NF100-SEP MB100-SP	50	9(50)	45(50)	50	50	50	50	50	50	50	50	50
	NF100-HP	100	9(65)	50(65)	65	65	85	85	85	85	100	100	100
	NF250-SP NF250-SEP MB250-SP	50	9(50)	20(50)	22(50)	42(50)	50	50	50	50	50	50	50
	NF250-HP	100	9(65)	25(65)	40(65)	65	85	85	85	85	100	100	100
	NF400-SP	85	–	–	20(65)	27(65)	42(65)	70	85	85	85	85	85
	NF400-SEP	85	9(65)	15(65)	20(65)	27(65)	42(65)	70	85	85	85	85	85
	NF400-HEP	100	9(65)	15(65)	20(65)	27(65)	42(65)	70	85	85	100	100	100
	NF400-REP	125	9(65)	15(65)	20(65)	27(65)	42(65)	70	85	85	125	125	125
	NF630-SP	85	–	–	–	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF630-SEP	85	–	15(65)	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF630-HEP	100	–	15(65)	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF630-REP	125	–	15(65)	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF800-SEP	85	–	–	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF800-HEP	100	–	–	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF800-REP	125	–	–	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
NF-C	NF50-CP NF60-CP	5	5	5	5	5	5	5	5	5	5	5	5
	NF100-CP	25	9(25)	15(25)	18(25)	24(25)	25	25	25	25	25	25	25
	NF250-CP	30	9(30)	15(30)	18(30)	24(30)	30	30	30	30	30	30	30
	NF400-CP	50	–	15(50)	20(50)	27(50)	42(50)	50	50	50	50	50	50
	NF630-CP	50	–	–	–	24(50)	30(50)	40(50)	50	50	50	50	50
	NF800-CEP	50	–	–	18(50)	24(50)	30(50)	40(50)	50	50	50	50	50
NF-U	NF100-RP	125	65	65	65	65	85	85	85	85	125	125	125
	NF100-UP	200	65	65	65	65	85	85	85	85	130	130	130
	NF250-RP	125	9(65)	65	65	65	85	85	85	85	125	125	125
	NF250-UP	200	9(65)	65	65	65	85	85	85	85	130	130	130
	NF400-UEP	200	9(65)	15(65)	18(65)	29(65)	48(65)	85	85	85	130	130	130
	NF630-UEP	200	–	15(65)	18(65)	24(65)	30(65)	37(65)	68	85	120	120	120
	NF800-UEP	200	–	–	18(65)	24(65)	30(65)	37(65)	68	85	120	120	120

- The values in the table represent the max. rated current for both Series AE-SS air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SS series air circuit breakers instantaneous pick up is set to maximum.
- The numerals shown in parentheses are for AE-SS with MCR. (When set MCR).
- Please apply in case of AE-SH.

AC460V sym kA

Branch circuit breaker		Main circuit breaker / Unit breaking capacity	AE-SS										
			AE630-SS	AE1000-SS	AE1250-SS	AE1600-SS	AE2000-SS	AE2500-SS	AE3200-SS	AE4000-SSC	AE4000-SS	AE5000-SS	AE6300-SS
			65	65	65	65	85	85	85	85	130	130	130
NF-S • MB	NF30-SP MB30-SP MB50-CP	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	NF50-SP NF60-SP MB50-SP	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	NF50-HP NF60-HP	10	9(10)	10	10	10	10	10	10	10	10	10	10
	NF50-HRP	30	9(30)	30	30	30	30	30	30	30	30	30	30
	NF100-SP NF100-SEP MB100-SP	25	7(25)	20(25)	25	25	25	25	25	25	25	25	25
	NF100-HP	50	9(50)	30(50)	50	50	50	50	50	50	50	50	50
	NF250-SP NF250-SEP MB250-SP	25	7(25)	14(25)	19(25)	25	25	25	25	25	25	25	25
	NF250-HP	50	7(50)	15(50)	25(50)	42(50)	50	50	50	50	50	50	50
	NF400-SP	50	—	—	18(50)	24(50)	33(50)	45(50)	50	50	50	50	50
	NF400-SEP	50	9(50)	15(50)	18(50)	24(50)	33(50)	45(50)	50	50	50	50	50
	NF400-HEP	65	9(65)	15(65)	18(65)	24(65)	33(65)	45(65)	65	65	65	65	65
	NF400-REP	125	9(65)	15(65)	18(65)	24(65)	33(65)	45(65)	80	85	110	110	110
	NF630-SP	50	—	—	—	24(50)	33(50)	45(50)	50	50	50	50	50
	NF630-SEP	50	—	15(50)	18(50)	24(50)	30(50)	40(50)	50	50	50	50	50
	NF630-HEP	65	—	15(65)	18(65)	24(65)	30(65)	40(65)	60(65)	65	65	65	65
	NF630-REP	125	—	15(65)	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
	NF800-SEP	50	—	—	18(50)	24(50)	30(50)	40(50)	60(50)	50	50	50	50
	NF800-HEP	65	—	—	18(65)	24(65)	30(65)	40(65)	60(65)	65	65	65	65
	NF800-REP	125	—	—	18(65)	24(65)	30(65)	40(65)	60(65)	85	85	85	85
NF-C	NF50-CP NF60-CP	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	NF100-CP	10	9(10)	10	10	10	10	10	10	10	10	10	10
	NF250-CP	15	9(15)	15	15	15	15	15	15	15	15	15	15
	NF400-CP	25	—	15(25)	18(25)	24(25)	25	25	25	25	25	25	25
	NF630-CP	35	—	—	—	24(35)	30(35)	35	35	35	35	35	35
	NF800-CEP	35	—	—	18(35)	24(35)	30(35)	35	35	35	35	35	35
NF-U	NF100-RP	125	35(65)	65	65	65	85	85	85	85	125	125	125
	NF100-UP	200	50(65)	65	65	65	85	85	85	85	130	130	130
	NF250-RP	125	9(65)	50(65)	65	65	85	85	85	85	125	125	125
	NF250-UP	200	9(65)	65	65	65	85	85	85	85	130	130	130
	NF400-UEP	200	9(65)	15(65)	18(65)	29(65)	48(65)	85	85	85	130	130	130
	NF630-UEP	200	—	15(65)	18(65)	24(65)	30(65)	37(65)	68	85	120	120	120
	NF800-UEP	200	—	—	18(65)	24(65)	30(65)	37(65)	68	85	120	120	120

- The values in the table represent the max. rated current for both Series AE-SS air circuit breakers and branch breakers, and the selective co-ordination applies when the AE-SS series air circuit breakers instantaneous pick up is set to maximum.
- The numerals shown in parentheses are for AE-SS with MCR. (When set MCR).
- Please apply in case of AE-SH.

Ordering information for Mitsubishi AE-SS series air circuit breaker (General use ······S.SL Types)

Customer(name) ______ Order No. ______ Number of units 2 units

Type P13~16 AE 1600 -SS ___ AE ______ -SH

Number of poles ☑3P ☐4P Note1

Rated current 1600 A

Applicable standard ☑IEC 60947-2 ☐JIS C8372 ☐Others ______

Ambient temperature ☑40°C ☐Others ______ °C Note2

Connection P17 ☐Fixed type(FIX) Note3 ☑Drawout type(DR) Note4

Main circuit terminal — Only for Horizontal terminals: ☑Horizontal terminals(standard) ☐Vertical terminals(DR-VT) ☐Front terminals(DR-FT)

Example

Drawout type accessories P23~24

- ☑Cell switch CL- 2 C / T / D (Maximum: 4 pcs.)
- ☐Shorting-B contact(SBC)
- ☐Lifting hooks(HP)
- ☑Safety shutter(SST)
  - ☑Shutter lock(SST-LOCK)
- ☐Mis-insertion preventer(MIP) Note3
- ☐Test jumper(TJ) ______ units

☐Vertical terminal adapter(VTA) ☐Front terminal adapter(FTA) — Can be connected to the Horizontal terminals

Electronic trip relay P25~40: SPGT — ☐ 2 ; A T

Electronic trip relay type		
S	SL	S…Standard SL… Longtime delay
ST	SLT	T…Trip indication special
SPT	SLPT	P…Pre-alarm
SPGT	SLPGT	G…Ground fault protection Note5
SPET	SLPET	E…Earth leakage protection Note6
BARE		Relay not require Note7

Tripping characteristics Note5	
Blank	LTD+STD+INST
C Note7	LTD+STD+INST/MCR
N Note3,8	Neutral pole protection ☐50% ☐100%

Electronic trip relay accessories	
Blank	Not required
A	OCR alarm(30msec.1 pulse)
C	Load current measurement(voltage output)
T	Temperature alarm(LED&1a contact)

Control supply	
0	Not required(Only for S,SL type)
1	AC100–120/200–240V
2	DC100–110V
3	DC125V
4	DC24V
5	DC48V

☐Neutral CT(NCT)
☐External ZCT(ZCT) Type ______ Refer P37

☑Y-2000 field test device — AC100–240V
☐Y-160 field test device — ☐AC100–120V ☐AC200–240V

Electrical accessories P18~20

- ☑Auxiliary switch 5 A 5 B Max.5A5B
  - ☑Standard(AX)
  - ☐High capacity(HAX) "A"and"B"should be same.
- ☑Motor charging(MD) — ☑AC・DC100–125V ☐AC・DC200–250V ☐DC24V ☐DC48V
  Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☑Closing coil(CC) — ☑AC・DC100–250V ☐DC24–48V
- ☑Shunt trip device (SHT) — ☑AC・DC100–250V ☐AC380–500V ☐DC24–48V
- ☐Under voltage trip device — ☐AC100–120 /200–240 /380–460V ☐DC24V ☐DC48V ☐DC100–110V ☐DC120–125V
  - ☐Instantaneous(UVT-SSB)
  - ☐0.5sec Time-delay type (UVT-05SSB)
  - ☐3sec Time-delay type (UVT-30SSB)

P22 ☑ Condenser trip device (COT) — ☑AC100–110V ☐AC200–220V

Note1. Not available for AE4000-SSC.
Note2. There is case to derate by ambient temperature.
Note3. Not available for AE4000~6300-SS.
Note4. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note5. Not available for AE-SS series with maximum rated current (IN Max) coming to 315A or 500A, nor AE630-SH. Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note6. In case of Earth leakage alarm, It need external ZCT. In case of Earth leakage tripping, It also need SHT.
Note7. Not available for AE-SH.
Note8. Available for ST type relay.
Note9. If install together with MI, Please ask us.

Machine accessories P21~22

- ☑Push button cover(BC-L)
- ☑Counter(CNT)
- ☐Cylinder lock(CYL)
- ☐Door interlock(DI) Note9
- ☐Terminal cover(TTC)
- ☐Door frame(DF)
- ☐Dust cover(DUC)
- ☑Interphase barrier(BA) Note1,3
- ☐Mechanical interlock(MI) — ☐for 2units ☐for 3units

Remark

Special environments P66 ☐Moisture-fungus treatment ☐Extra-corrosion proof specification

Production date

Data ☑Specifications ☑Test report

Ordering information for Mitsubishi AE-SS series air circuit breaker (General use ……S.SL Types)

Customer(name) ______ Order No. ______ Number of units ______ units

Type P13~16 AE______-SS __ AE______-SH

Number of poles ☐ 3P ☐ 4P Note1

Rated current ______ A

Applicable standard ☐ IEC 60947-2 ☐ JIS C8372 ☐ Others______

Ambient temperature ☐ 40°C ☐ Others ______ °C Note2

Connection P17 ☐ Fixed type(FIX) Note3 ☐ Drawout type(DR) Note4

Main circuit terminal
- Only for Horizontal terminals (Fixed type)
- Drawout type: ☐ Horizontal terminals(standard) ☐ Vertical terminals(DR-VT) ☐ Front terminals(DR-FT)

Drawout type accessories P23~24
- ☐ Cell switch CL- __C __T __D (Maximum: 4 pcs.)
- ☐ Shorting-B contact(SBC)
- ☐ Lifting hooks(HP)
- ☐ Safety shutter(SST)
  - ☐ Shutter lock(SST-LOCK)
- ☐ Mis-insertion preventer(MIP) Note3
- ☐ Test jumper(TJ) ______ units

☐ Vertical terminal adapter(VTA) ☐ Front terminal adapter(FTA) — Can be connected to the Horizontal terminals

Electronic trip relay P25~40

[ ] — [ ] [ ] ; [| |]

Electronic trip relay type		
S	SL	S…Standard SL… Longtime delay special
ST	SLT	T…Trip indication
SPT	SLPT	P…Pre-alarm
SPGT	SLPGT	G…Ground fault protection Note5
SPET	SLPET	E…Earth leakage protection Note6

BARE	Relay not require Note7

Tripping characteristics Note5	
Blank	LTD+STD+INST
C Note7	LTD+STD+INST/MCR
N Note3,8	Neutral pole protection ☐ 50% ☐ 100%

Electronic trip relay accessories	
Blank	Not required
A	OCR alarm(30msec.1 pulse)
C	Load current measurement(voltage output)
T	Temperature alarm(LED&1a contact)

Control supply	
0	Not required(Only for S,SL type)
1	AC100–120/200–240V
2	DC100–110V
3	DC125V
4	DC24V
5	DC48V

☐ Neutral CT(NCT)
☐ External ZCT(ZCT) Type______Refer P37

☐ Y-2000 field test device — AC100–240V
☐ Y-160 field test device — ☐ AC100–120V ☐ AC200–240V

P22 ☐ Condenser trip device (COT) — ☐ AC100–110V ☐ AC200–220V

Electrical accessories P18~20
- ☐ Auxiliary switch — A __ B __ Max.5A5B
  - ☐ Standard(AX)
  - ☐ High capacity(HAX)
  - "A"and"B"should be same.
- ☐ Motor charging(MD) — ☐ AC・DC100–125V ☐ AC・DC200–250V ☐ DC24V ☐ DC48V
  - Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☐ Closing coil(CC) — ☐ AC・DC100–250V ☐ DC24–48V
- ☐ Shunt trip device (SHT) — ☐ AC・DC100–250V ☐ AC380–500V ☐ DC24–48V
- ☐ Under voltage trip device — ☐ AC100–120 /200–240 /380–460V ☐ DC24V ☐ DC48V ☐ DC100–110V ☐ DC120–125V
  - ☐ Instantaneous(UVT-SSB)
  - ☐ 0.5sec Time-delay type (UVT-05SSB)
  - ☐ 3sec Time-delay type (UVT-30SSB)

Machine accessories P21~22
- ☐ Push button cover(BC-L)
- ☐ Counter(CNT)
- ☐ Cylinder lock(CYL)
- ☐ Door interlock(DI) Note9
- ☐ Terminal cover(TTC)
- ☐ Door frame(DF)
- ☐ Dust cover(DUC)
- ☐ Interphase barrier(BA) Note1,3
- ☐ Mechanical interlock(MI) — ☐ for 2units ☐ for 3units

Special environments P66 ☐ Moisture-fungus treatment ☐ Extra-corrosion proof specification

Data ☐ Specifications ☐ Test report

Note1. Not available for AE4000-SSC.
Note2. There is case to derate by ambient temperature.
Note3. Not available for AE4000~6300-SS.
Note4. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note5. Not available for AE-SS series with maximum rated current (IN Max) coming to 315A or 500A, nor AE630-SH. Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note6. In case of Earth leakage alarm, It need external ZCT. In case of Earth leakage tripping, It also need SHT.
Note7. Not available for AE-SH.
Note8. Available for ST type relay.
Note9. If install together with MI, Please ask us.

Remark

Production date			

Ordering information for Mitsubishi AE-SS series air circuit breaker (General use ···C Type, Special use ···B-COA)

Customer(name) ______ Order No. ______ Number of units ______ units

Type P13~16 AE______-SS__ AE______-SH

Number of poles ☐ 3P ☐ 4P Note1

Rated current ______ A

Applicable standard ☐ IEC 60947-2 ☐ JIS C8372 ☐ Others______

Ambient temperature ☐ 40°C ☐ Others______°C Note2

Connection P17 ☐ Fixed type(FIX) Note3 ☐ Drawout type(DR) Note4

Main circuit terminal
- Only for Horizontal terminals
- ☐ Horizontal terminals(standard)
- ☐ Vertical terminals(DR-VT)
- ☐ Front terminals(DR-FT)

Drawout type accessories P23~24
- ☐ Cell switch CL- C T D (Maximum: 4 pcs.)
- ☐ Shorting-B contact(SBC)
- ☐ Lifting hooks(HP)
- ☐ Safety shutter(SST)
  - ☐ Shutter lock(SST-LOCK)
- ☐ Mis-insertion preventer(MIP) Note3
- ☐ Test jumper(TJ) ______ units

☐ Vertical terminal adapter(VTA)
☐ Front terminal adapter(FTA)
Can be connected to the Horizontal terminals

Electronic trip relay P25~40

[______] — [______] ; [___]

Electronic trip relay accessories	
Blank	Not required
A	OCR alarm(30msec.1 pulse)

Electronic trip relay type		
C-0	C type	Note1, Note3

BARE	Relay not require	Note5

If the special use relay (B-C0A) is required,
enter B - C0; A in the column. Note5

- ☐ Y-2000 field test device — AC100–240V
- ☐ Y-160 field test device — ☐ AC100–120V ☐ AC200–240V

Electrical accessories P18~20
- ☐ Auxiliary switch [A][B] Max.5A5B
  - ☐ Standard(AX)
  - ☐ High capacity(HAX) "A"and"B"should be same.
- ☐ Motor charging(MD) — ☐ AC・DC100–125V ☐ AC・DC200–250V ☐ DC24V ☐ DC48V

  Note:When specifying MD, be sure to order the closing coil(CC)and shunt trip device(SHT)for remote operation.
- ☐ Closing coil(CC) — ☐ AC・DC100–250V ☐ DC24–48V
- ☐ Shunt trip device (SHT) — ☐ AC・DC100–250V ☐ AC380–500V ☐ DC24–48V
- ☐ Under voltage trip device — ☐ AC100–120 /200–240 /380–460V ☐ DC24V ☐ DC48V ☐ DC100–110V ☐ DC120–125V
  - ☐ Instantaneous(UVT-SSB)
  - ☐ 0.5sec Time-delay type (UVT-05SSB)
  - ☐ 3sec Time-delay type (UVT-30SSB)

P22 ☐ Condenser trip device (COT) — ☐ AC100–110V ☐ AC200–220V

Note1. Not available for AE4000-SSC.
Note2. There is case to derate by ambient temperature.
Note3. Not available for AE4000~6300-SS.
Note4. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note5. Not available for AE-SH.
Note6. If install together with MI, Please ask us.

Machine accessories P21~22
- ☐ Push button cover(BC-L)
- ☐ Counter(CNT)
- ☐ Cylinder lock(CYL)
- ☐ Door interlock(DI) Note6
- ☐ Terminal cover(TTC)
- ☐ Door frame(DF)
- ☐ Dust cover(DUC)
- ☐ Interphase barrier(BA)
- ☐ Mechanical interlock(MI) — ☐ for 2units ☐ for 3units

Special environments P66 ☐ Moisture-fungus treatment ☐ Extra-corrosion proof specification

Data
- ☐ Specifications
- ☐ Test report

Remark

Production date

Ordering information for Mitsubishi AE-SS series air circuit breaker (Generator protection use ……M Types)

Customer(name) ______________ Order No. ______________ Number of units ____ units

Type P13 ~16 AE______-SS__ AE______-SH

Number of poles ☐ 3P ☐ 4P Note1, Note2

Rated current ______ A

Applicable standard ☐ LR ☐ AB ☐ GL ☐ DNV ☐ BV ☐ NK ☐ IEC 60947-2 ☐ Others ______

Ambient temperature ☐ 45°C ☐ Others ______ °C Note3

Connection P17 ☐ Fixed type(FIX) Note4 ☐ Drawout type(DR) Note5

Drawout type accessories P23 ~ 24
- ☐ Cell switch CL- [ ]C [ ]T [ ]D (Maximum: 4 pcs.)
- ☐ Shorting-B contact(SBC)
- ☐ Lifting hooks(HP)
- ☐ Safety shutter(SST)
  - ☐ Shutter lock(SST-LOCK)
- ☐ Mis-insertion preventer(MIP) Note4
- ☐ Test jumper(TJ) ______ units

Main circuit terminal
- Only for Horizontal terminals
  - ☐ Horizontal terminals(standard)
  - ☐ Vertical terminals(DR-VT)
  - ☐ Front terminals(DR-FT)

☐ Vertical terminal adapter(VTA)
☐ Front terminal adapter(FTA)
Can be connected to the Horizontal terminals

Electronic trip relay P25 ~ 40

[ ] — [ ] ; [| |]

Electronic trip relay accessories	
Blank	Not required
A	OCR alarm(30msec.1 pulse)
T	Temperature alarm(LED & 1a contact)

Electronic trip relay type	
M	M···Standard
MT	T···Trip indication
MPT	P···Pre-alarm
MPGT	G···Ground fault protection Note6

Control supply	
0	Not required(Only for M type)
1	AC100 – 120/200 – 240V
2	DC100 – 110V
3	DC125V
4	DC24V
5	DC48V

Specify the tripping characteristics
Refer to P28, 46, 47.

LTD Current	[ ]	% of Rated Current
LTD Time	[ ]	sec. at 120% of LTD Currrent
STD Current	[ ]	% of Rated Current
STD Time	[ ]	sec. at 150% of STD Currrent
INST Current	[ ]	% of Rated Current
PAL Current	[ ]	% of LTD Current
PAL Time	50	% of LTD Time
GFR Current	[ ]	% of Rated Current MAX.
GFR Time	[ ]	sec. at 150% of GFR Currrent

☐ Neutral CT(NCT)
☐ Y-2000 field test device —— AC100 – 240V

Electrical accessories P18 ~20
- ☐ Auxiliary switch
  - ☐ Standard(AX)
  - ☐ High capacity(HAX)
  - [A | B] Max.5A5B "A"and"B"should be same.
- ☐ Motor charging(MD)
  - ☐ AC • DC100 – 125V
  - ☐ AC • DC200 – 250V
  - ☐ DC24V
  - ☐ DC48V
  - Note:When specifying MD, be sure to order the closing coil (CC) and shunt trip device(SHT)for remote operation.
- ☐ Closing coil(CC)
  - ☐ AC • DC100 – 250V
  - ☐ DC24 /48V
- ☐ Shunt trip device (SHT)
  - ☐ AC • DC100 – 250V
  - ☐ AC380 – 500V
  - ☐ DC24 – 48V
- ☐ Under voltage trip device
  - ☐ Instantaneous(UVT-SSB)
  - ☐ 0.5sec Time-delay type (UVT-05SSB)
  - ☐ 3sec Time-delay type (UVT-30SSB)
  - ☐ AC100 – 120 /200 – 240 /380 – 460V
  - ☐ DC24V
  - ☐ DC48V
  - ☐ DC100 – 110V
  - ☐ DC120 – 125V

P22 ☐ Condenser trip device (COT)
- ☐ AC100 – 110V
- ☐ AC200 – 220V

Note1 . Not available for 4 pole breaker with LR, AB, GL, DNV, BV, NK standard.
Note2. Not available for AE4000-SSC.
Note3. There is case to derate by ambient temperature.
Note4. Not available for AE4000~6300-SS.
Note5. The terminal for AE4000-SSC, AE4000~6300-SS shall be vertical terminal.
Note6. Not available for AE-SS series with maximum rated current (In Max) coming to 315A or 500A, nor AE630-SH. Neutral CT is needed for Ground fault protection when a 3 pole breaker is used on a 3 phase 4 wires system.
Note7. If install together with MI, Please ask us.

Machine accessories P21 ~ 22
- ☐ Push button cover(BC-L)
- ☐ Counter(CNT)
- ☐ Cylinder lock(CYL)
- ☐ Door interlock(DI) Note7
- ☐ Terminal cover(TTC)
- ☐ Door frame(DF)
- ☐ Dust cover(DUC)
- ☐ Interphase barrier(BA)
- ☐ Mechanical interlock(MI)
  - ☐ for 2units
  - ☐ for 3units

Special environments P66 ☐ Moisture-fungus treatment ☐ Extra-corrosion proof specification

Data
- ☐ Specifications
- ☐ Test report

Remark

Production date

[MEMO]

Service network

Country/Region	Company	Address	Telephone
U.K.	Mitsubishi Electric Europe B.V. UK-Branch.	Travellers Lane, Hatfield, Herts, AL10 8 XB, England, U.K.	44-1707,276,100
Ireland	Irish Branch.	Westage Business Park, Ballymount, Dublin 22, Ireland.	353-1-4505007
Germany	German Branch.	Gother Strasse 8, 40880 Ratingen, Germany.	49-2102-4860
Italy	Carpaneto 10090 CASCINE VICA-RIVOLI (TO)	Via Ferrero, 10-Ang. Pavia 6 Italy.	39-11-9590111
Spain	Spanish Branch (Barcelona).	Polingono Industrial "Can Magi", Calle Joan Buscallà 2-4, Apartado de Correos 420,08190 Sant Cugat del Valles, Barcelona, Spain.	34-93-565-3131
Sweden	Euro Energy Components AB	Box 10161 S-43422 Kungsbacka	(0300)51800
Norway	SCANELEC	5074 Godvik Leirvikasen 43B. Norway.	47-55-506000
Denmark	ELPEFA A/S	Geminivej 32, DK-2670 Greve, Denmark.	45-43-694369
Greece	Antonios Drepanias.S.A.	ANTONIOS DREPANIAS 52, ARKADIAS STR.GR 121 32,PERISTERI ATHENS GREECE	30(1)5781599, 30(1)5781699
The Netherlands	R+H Technology BV.	3361 HJ Sliedrecht Industrieweg 30. Netherlands.	31-104871521
Switzerland	Trielec A G	8201 Schaffhausen Mühlentalstrasse 136. Switzerland	41-52-6258425
Belgium	Emac S.A.	1702 Groot-Bijgaarden Industrialaan 1, Belgium.	32-2-4810211
Poland	MPL Technology Sp zo.o.	30011 Krakow UI. Wroclawska 53 Poland.	48-12-322885
Israel	Gino Industries LTD.	3, Ophir St. 32235 Haifa Israel.	972-4-8670656
Turkey	HEDEF	Balmumcu-Istanbul Barboros Bulv. iba Bloklari Gazi Umur P. So Turkey.	90-212-2754876
Slovania	INEA	61230 Domzale Ljubljanska 80 Slovenia.	386-61-718000
South Africa	M.S.A.MANUFACTURING(PTY)LTD.	BRAMLEY 2018 JOHANNESBURG SOUTH AFRICA.	27-011-444-8080
Lebanon	COMPTOIR D'ELECTRICITE GENERALE-LIBAN	CEBACO CENTER-BLOCK A AUTOSTRADE DORA P.O. BOX: 90-1314, BEIRUT-LEBANON.	961-1-240430
Saudi Arabia	CENTER OF ELECTRICAL GOODS	AL-NABHANIYA STREET-4Th CROSSING AL-HASSA ROAD P.O. BOX: 15955 RIYADH 11454, SAUDI ARABIA.	966-1-4770149
Egypt	CAIRO ELECTRICAL GROUP	9 ROSTOUM STREET GARDEN CITY, P.O. BOX: 165-11516, CAIRO EGYPT.	202-356-1337
Kuwait	SALEM M AL-NISF ELECTRICAL CO.W.L.L.	P.O. Box 4784. Safat.13048.Kuwait.	965-484-5660
China	SETSUYO AUSCHINA ELECTRIC CO. LTD.	Building of Innovation Center, Room No. 406A, Guiping Road Shanghai China	021-6485-6611
	RYODEN INTERNATIONAL LTD.	3F Block 5 Building, Automation Instrumentation Plaza, 103 Cao Bao Road, Shanghai 200233, China	86-21-6475-3228
Hong Kong	Ryoden international Ltd.	10/F Manulife Tower 169 Electric Road North Point. Hong Kong.	28878870
Taiwan	Setsuyo Enterprise Co., Ltd.	8th Fl. NO.88 SEC. 6, Chung-Shan N Rd. Taipei, Taiwan	02-2381-3015
Korea	STC Techno Seoul Co., Ltd.(Setsuyo)	2 Fl. Dong Seo Game Channel Bldg ., 660-11 Deungchon-Dong, Kangseo-Ku, Seoul, Korea	02-3664-8333
Singapore	MITSUBISHI ELECTRIC ASIA PTE LTD	307 ALEXANDRA ROAD #05-01/02 MITSUBISHI ELECTRIC BUILDING SINGAPORE 159943	65-473-2308
Indonesia	P.T.SAHABAT INDONESIA.	JL Muara Karang Selatan Blok A/Utara No.1 kav.11 NO.1 P.O. Box 5045/Jakarta/11050. Jakarta Indonesia.	021-6621780
Philippines	EDISON ELECTRIC INTEGRATED INC.	24th Fl. Galleria Corporate Center Edsa Cr, Ortigas Ave. Quezon City, Metro Manila. Philippines.	02-643-8691
Thailand	UNITED TRADING & IMPORT CO. LTD.	77/12 BAMRUNG MUANG ROAD, KLONG MAHANAK, POMPRAB, BANGKOK 10100. Thailand.	02-223-4200-3
Pakistan	Prince Electric Co.	16 Brandreth Road Lahore 54000. Pakistan.	042-7654342
Vietnam	Sa Giang Techno co., Ltd.(Setsuyo)	207/4 NGUYEN VAN THU ST., DA KAO WARD, DIST 1 HCMC, VIETNAM	848-821-5450
Lao PDR	SOCIETE LAO IMPORT-EXPORT	43-47 LANE XANG ROAD P.O. BOX 2789 VT VIENTIANE LAO PDR.	21-215043, 21-215110
Myanmer	PEACE MYANMAR ELECTRIC CO., LTD.	NO. 216, BO AUNG GYAW STREET, BOTATAUNG 11161, YANGON, MYANMAR.	951-295426
Nepal	Watt & Volt House Co., Ltd.	KHA 2-65, Volt House Dilli Bazar Post Box: 2108, kathmandu, Nepal	977-1-411330
Australia	348 VICTORIA ROAD.	P.O. BOX: 11, RYDALMERE NSW 2166.	612-9684, 7245
New Zealand	Melco Sales (N.Z.) Ltd.	1 Parliament Street Lower Hutt. New Zealand.	644-569-7350
Colombia	Proelectrico LTDA.	Carrera 43G No. 27-12 P.O. Box 4346 Medellin. COLOMBIA.	(4) 2623038
Chile	RHONA S.A.	Vte. Agua Santa 4211 Casilla (P.O. Box) 30-D Viña Del Mar. Chile	(32)-611294
Uruguay	Fierro Vignoli S.A.	Avda. 1274 Montevideo. Uruguay.	(2) 921230
Peru	I.T.E.	Ingenieros s.a. Paseo de la Republica 3573 Lima 27. Peru.	(1) 221-2710
Venezuela	ADESCO C.A.	Calle 7,EDF.LOS ROBLES,LOCALES CYD URBANIZACION LA URBINA -EDO,MIRANDA P.O. BOX 78034 CARACAS 1074A	(2) 241-7634

Safety Tips : Be sure to read the instruction manual fully before using this product.

Safety Tips : Be sure to read the instruction manual fully befofe using this product.

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: MITSUBISHI DENKI BLDG., MARUNOUCHI, TOKYO 100-8310. TELEX: J24532 CABLE: MELCO TOKYO

Catalogue NO. Y-0446-K 9903(ROD) Printed in Japan

This catalogue is made from recycled paper.

New publication, effective Mar 1999
Specifications subject to change without notice.