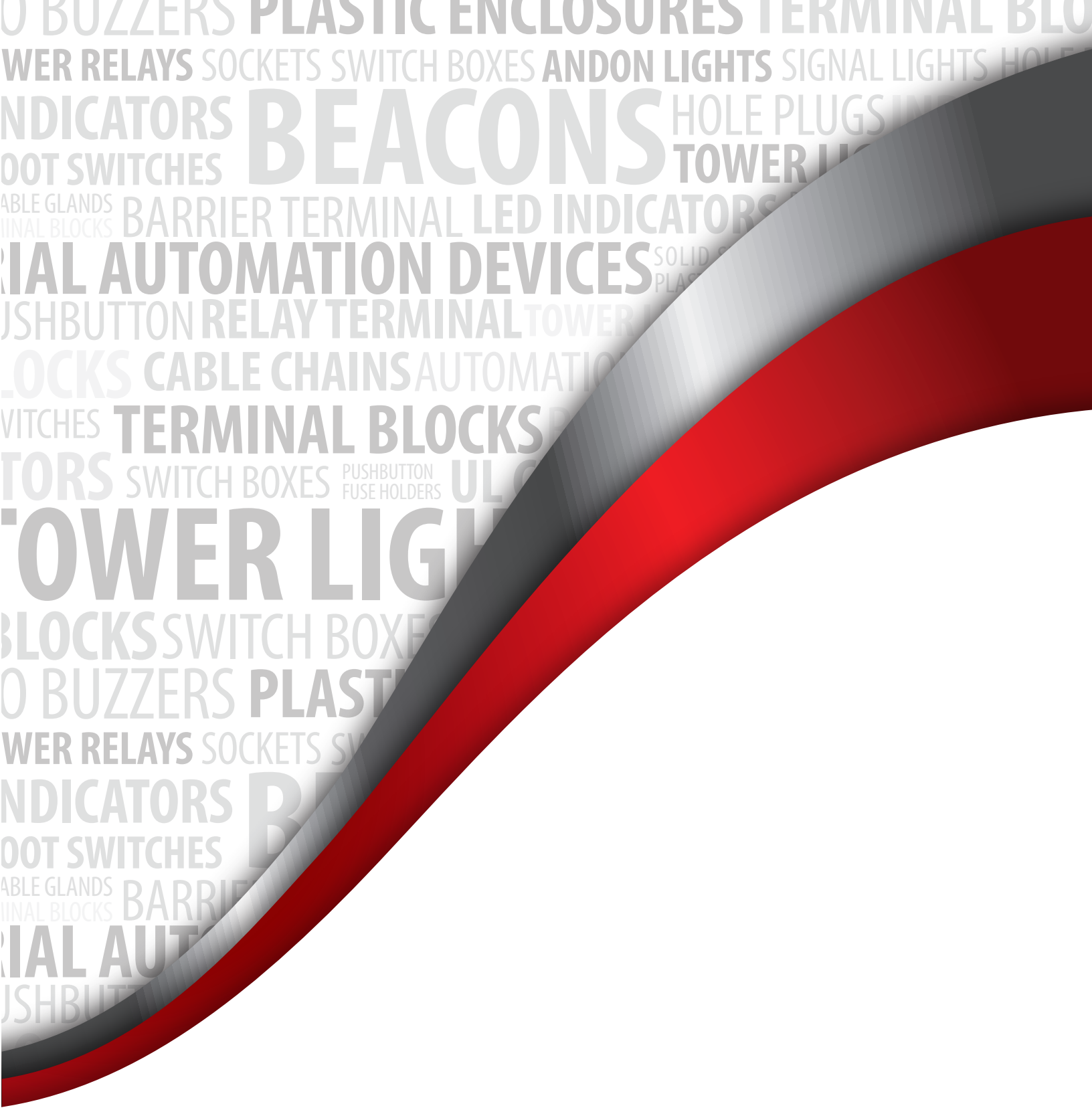


AmeriMation

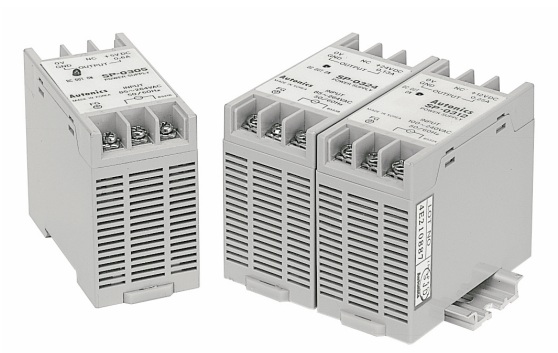
POWER CONTROL DEVICES

POWER CONTROL DEVICES

DIN Rail Mount Type Switching Mode Power Supply

■ Features

- Compact size, high quality, cost-effective
- Universal input power
- Enables to drive various controllers
- Built-in output short over current protection circuit
- DIN rail mounting and mountable without the rail



Please read "Safety Considerations" in the instruction manual before using.

■ Ordering Information

SP — **03** **24**

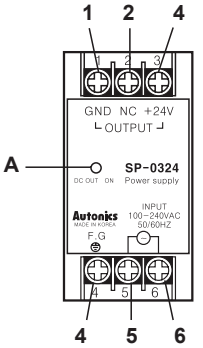
Output voltage	05	5VDC
	12	12VDC
	24	24VDC
Output power	03	3W
Item	SP	Switching Mode Power Supply

■ Specifications

Model		SP-0305	SP-0312	SP-0324
Output power		3W		
Input condition	Voltage	100-240VAC∼ (permissible voltage: 85-264VAC)		
	Frequency	50/60Hz		
	Efficiency	67 to 74%		
	Current consumption	Max. 0.15A		
Output characteristics	Voltage	5VDC⎓	12VDC⎓	24VDC⎓
	Current	0.6A	0.25A	0.13A
	Allowable voltage range	Max. ±5%		
	Ripple	Max. 5%		
	Voltage fluctuation ratio	Max. 0.5% (at 85-264VAC 100% load)		
Over-current protection		Min. 110%		
Series / Parallel operation		Not available		
Indicator		Output indicator: Red LED		
Insulation resistance		Over 100MΩ (at 500VDC megger)		
Dielectric strength		2,000VAC 50/60Hz for 1 minute		
Vibration		0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours		
Shock		300m/s² (approx. 30G) in each X, Y, Z direction for 3 times		
Environment	Ambient temperature	-10 to 50℃, storage: -20 to 70℃		
	Ambient humidity	35 to 85%RH		
Unit weight		Approx. 100g		

※Environment resistance is rated at no freezing of condensation.

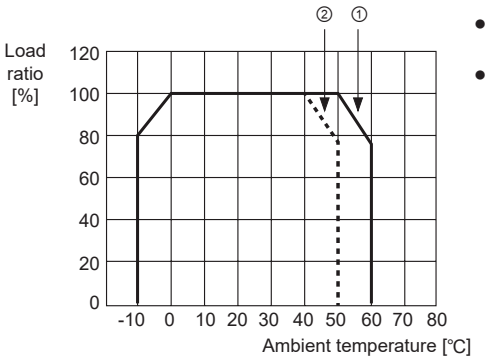
▣ Wiring Diagram/Unit Description



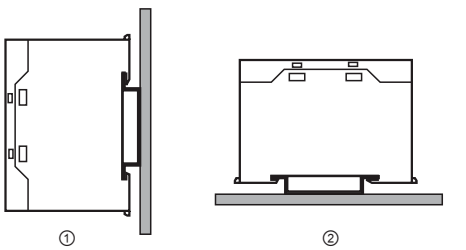
● **Wiring Diagram**
1. GND terminal – **2. NC terminal** **3. Output power [+24V] terminal** + **4. Frame ground [F.G.] terminal**
5. ~ **Input power terminal** **6.**

● **Unit Description**
A. Output indicator (green)

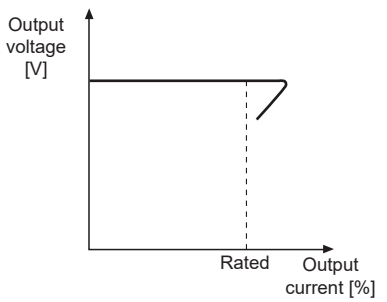
▣ Output Derating Curve by Ambient Temperature



- Be sure when installing as the efficiency is decreased by ambient temperature.
- Refer to output feature beside when installing as the efficiency is affected by mounting status.

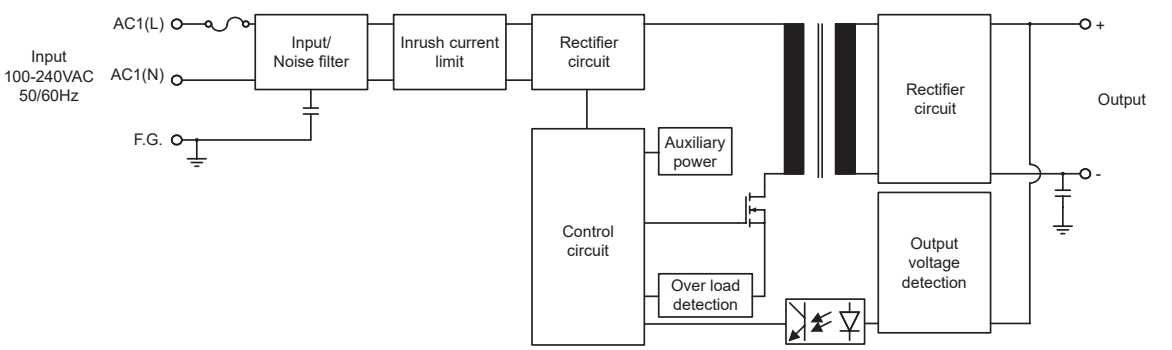


▣ Feature Data of Over-Current Protection



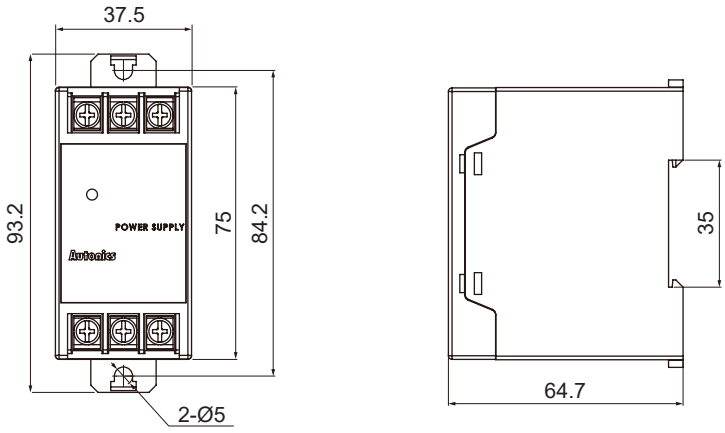
- It is able to protect overcurrent by load with built in over-current protection circuit. When the over rated current is flowed, the circuit is operated (output voltage is fallen) and it is released when the load current is under the rated current (it is returned to the rated output voltage).

▣ Block Diagram



▣ Dimensions

(unit: mm)

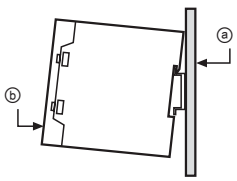


▣ Installation

◎ DIN rail mounting

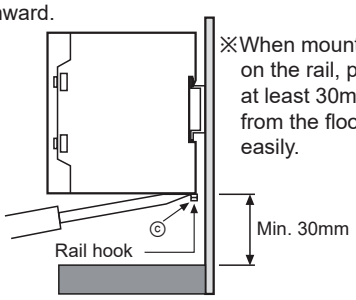
● Mounting to DIN rail

Put the unit on the part ⓐ of the rail before press it to the direction ⓑ.



● Removing from DIN rail

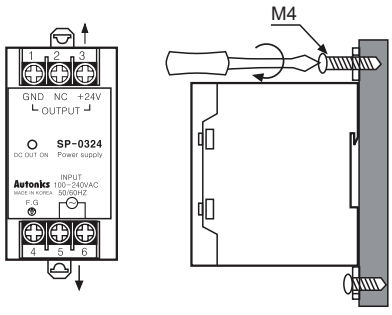
Put a screw driver into the part ⓒ before push it downward.



◎ Panel mounting

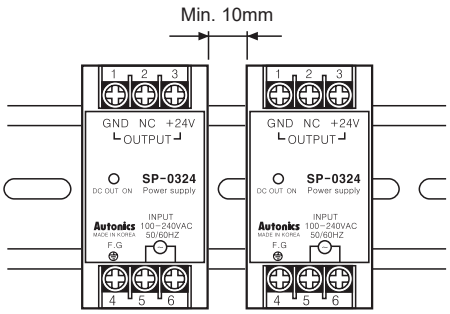
● When there is no DIN rail

If there is no rail, it is able to mount by screwing a bolt at the hook on the body as following figure.



◎ Spacing

When installing multiple SMPSs, please keep space at least 10mm between SMPSs for heat radiation.



▣ Proper Usage

⚠ Cautions during use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. Do not connect the output voltage neither in serial nor in parallel.
3. Since there is no harmonic suppression or power factor correction circuit, install the circuit separately if necessary.
4. Since using the condenser input method, power factor is in the range of 0.4 to 0.6. When using distribution board or transformer, check the capacity of the input voltage.

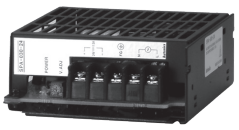
$$\text{Input apparent power[VA]} = \frac{\text{Output active power[W]}}{\text{Powerfactor} \times \text{Efficiency}}$$

5. Even though a noise filter is installed inside the product, the product can be affected by noise depending on the installation location or wiring.
6. If the internal fuse is damaged, please contact our A/S center.
7. To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
8. Install the unit in the well ventilated place.
9. Do not use near the equipment which generates strong magnetic force or high frequency noise.
10. This unit may be used in the following environments.
    ① Indoors (in the environment condition rated in 'Specifications')
    ② Altitude max. 2,000m
    ③ Pollution degree 2
    ④ Installation category II

Switching Mode Power Supply with Minimized Noise and Ripple

■ Features

- Built-in output short over current protection circuit, output short-circuit protection, overheating and over-voltage protection circuits (SPA-075/100/400)
- Standard on safety EN60950, EN50178
- EMS (electromagnetic susceptibility) EN61000-6-2
- EMI (electromagnetic interference) EN61000-6-4
- Output voltage: 5VDC, 12VDC, 24VDC
- Output power: 30W, 50W, 75W, 100W, 400W



SPA-030/050/075/100 Series

SPA-400-24

Please read "Safety Considerations" in the instruction manual before using.

■ Ordering Information

SPA — **030** — **24**

Output voltage	05	5VDC		
	12	12VDC		
	24	24VDC		
Output power	030	30W	100	100W
	050	50W	400	400W
	075	75W		
Item	SPA	Switching Mode Power Supply		

■ Specifications

◎ SPA-030/050/075/100 Series

Model		SPA-030-05	SPA-050-05	SPA-030-12	SPA-050-12	SPA-030-24	SPA-050-24	SPA-075-05	SPA-100-05	SPA-075-12	SPA-100-12	SPA-075-24	SPA-100-24
Output power		30W	50W	30W	50W	30W	50W	75W	100W	75W	100W	75W	100W
Input condition	Voltage※1, 2	100-240VAC～ (permissible voltage: 85-264VAC～)						100-120/200-240VAC～ (permissible voltage: 85-132/170-264VAC～) switching type					
	Frequency	50/60Hz											
	Efficiency※3	Min. 60%	Min. 67%	Min. 74%		Min. 80%		Min. 70%		Min. 78%	Min. 72%	Min. 78%	Min. 80%
	Current consumption※3	Max. 1.2A	Max. 1.6A	Max. 1.0A	Max. 1.4A	Max. 0.8A	Max. 1.1A	Max. 3.0A		Max. 2.0A	Max. 3.0A	Max. 2.0A	Max. 2.5A
Output characteristics	Voltage	5VDC⎓		12VDC⎓		24VDC⎓		5VDC⎓		12VDC⎓		24VDC⎓	
	Current	6A	10A	2.5A	4.2A	1.5A	2.1A	15A	20A	6.3A	8.5A	3.2A	4.2A
	Voltage adjustment range※4	±5%											
	Input variation※5	Max. ±0.5%											
	Load variation※3	Max. ±2%		Max. ±1%				Max. ±2%		Max. ±1%			
	Ripple※3	Max. ±1%											
	Start-up time※3	Max. 200ms		Max. 150ms				Max. 250ms					
	Hold time※3	Min. 10ms						Min. 5ms		Min. 10ms	Min. 5ms	Min. 10ms	
Protection	Inrush current protection	Max. 30A (100VAC～) /Max. 40A (200VAC～)		Max. 20A (100VAC～)				Max. 45A (100VAC～) /Max. 50A (240VAC～)		Max. 35A (100VAC～) /Max. 40A (240VAC～)	Max. 45A (100VAC～) /Max. 50A (240VAC～)	Max. 35A (100VAC～) /Max. 40A (240VAC～)	
	Over-current protection※6	Min. 110%							Min. 105%	Min. 110%			
	Over-voltage protection※4	—						6.5V ±10%		16V ±10%		30V ±10%	
	Output short-circuit protection	Max. 5ms						Max. 10ms		Max. 5ms	Min. 10ms	Max. 5ms	
Indicator		Output indicator: green LED											
Insulation resistance		Over 100MΩ (at 500VDC megger between all input terminals and F.G.)											
Dielectric strength		3000VAC 50/60Hz for 1min (between all input and output terminals)											
		1500VAC 50/60Hz for 1min (between all input terminals and F.G.)											
Vibration		0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours											
Shock		300m/s² (approx. 30G) in each X, Y, Z direction for 3 times											
EMS		Conforms to EN61000-6-2											
EMI		Conforms to EN61000-6-4											
Safety standards		EN60950, EN50178											
Environment	Ambient temp.	-10 to 50℃	-10 to 40℃			-10 to 50℃							
	Storage temp.	-25 to 65℃											
	Ambient humi.	25 to 85%RH, storage: 25 to 90%RH											
Tightening torque		0.7 to 0.9N·m											
Approval		CE						CE					
Unit weight		Approx. 350g						Approx. 400g					

※1: The rated input volatge of SPA-100-05 is 100-120/200-240VAC(100-132/190-264VAC).
※2: Since there is no separate input overvoltage protection for the voltage over the rated input voltage range, supplying overvoltage may result in product damage.
※3: 100% load for rated input voltage(100VAC).
※4: Use the output voltage adjusting volume within the voltage variable range. If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.
※5: Rated input voltage [• SPA-030/050 Series : 100-240VAC(85-264VAC) • SPA-075/100 Series : 100-120/200-240(85-132/170-264VAC)] is under 100% of load.
SPA-100-05 is under 100% of load for [100-120/200-240VAC(100-132/190-264VAC)].
※6: Rated input voltage(100VAC).
※Environment resistance is rated at no freezing or condensation.

■ Specifications

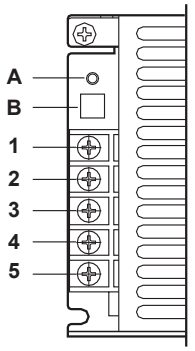
◎ SPA-400-24

Model			SPA-400-24
Output power			400.8W
Input condition	Voltage		200-240VAC～ (permissible voltage: 190-264VAC～)
	Frequency		50/60Hz
	Efficiency (typical)※1	220VAC～	85% (after 10 min of power ON)
	Current consumption (typical)	220VAC～	Max. 4.6A
	Leakage current (typical)	220VAC～	Max. 1mA
Output characteristics	Voltage		24VDC⎓
	Current		16.7A
	Voltage adjustment range※2		22.8-25.2VDC⎓
	Input variation		Max. ±0.5%
	Load variation		Max. ±1%
	Temperature drift		360mV
	Ripple&Ripple noise		Max. 290mV
	Start-up time (typical)※1	220VAC～	1800-2300ms
	Hold time (typical)※1	220VAC～	Max. 17ms
Protection	Inrush current protection (typical)※1	220VAC～	40A
	Over-current protection		110 to 160% (recovers automatically after the cause for over-current is removed)
	Over-voltage protection		27-33VDC
	Temp. rising limit		Yes
	Remote control		Yes (output voltage ON for shorting, output voltage OFF for open)
Indicator			Output indicator: green LED
Insulation resistance			Over 100MΩ (at 500VDC megger between all input terminals and F.G.)
Dielectric strength			3,000VAC 50/60Hz for 1 min (between all input and output terminals)
			2,000VAC 50/60Hz for 1 min (between all input terminals and F.G.)
Vibration			0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours
EMS			Conforms to EN61000-6-2
EMI			Conforms to EN61000-6-4
Safety standards			EN60950, EN50178
Environment	Ambient temperature		-10 to 50℃, storage: -20 to 75℃
	Ambient humidity		20 to 90%RH, storage: 20 to 90%RH
Fan life cycle			70,000 hours (based on 40℃ of ambient temperature)
Input cable			AWG18 to 16
Tightening torque			0.7 to 0.9N·m
Approval			CE
Weight※3			Approx. 975g (approx. 885g)

※1: Since there is no separate input overvoltage protection for the voltage over the rated input voltage range, supplying overvoltage may result in product damage.
※2: It is for 100% load.
※3: Use the output voltage adjusting volume within the voltage variable range. If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.
※4: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Wiring Diagram/Unit Description

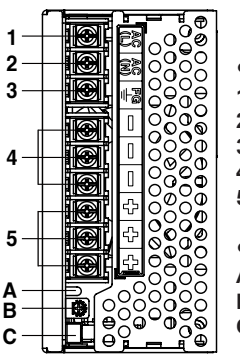
◎ SPA-030/050/075/100 Series



● Wiring Diagram
1. Output power [+] terminal
2. Output power [-] terminal
3. Frame ground [F.G.] terminal
4. Input power [N] terminal
5. Input power [L] terminal

● Unit Description
1. Output indicator (green)
2. Output voltage adjuster (V.ADJ)

◎ SPA-400-24

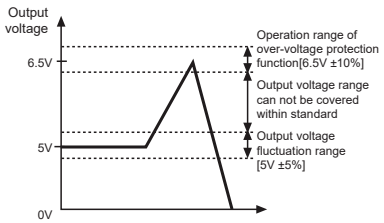


● Wiring Diagram
1. Input power [L] terminal
2. Input power [N] terminal
3. Frame Ground [F.G.] terminal
4. Output power [-] terminal
5. Output power [+] terminal

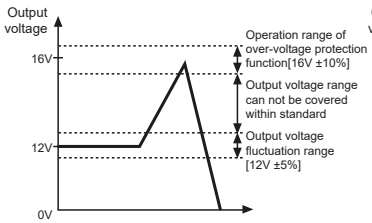
● Unit Description
A. Output indicator (green)
B. Output voltage adjuster (V.ADJ)
C. Remote control connector

■ Feature Data of Over-Voltage Protection

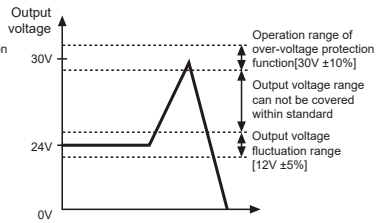
◎ **SPA-075-05/SPA-100-05**



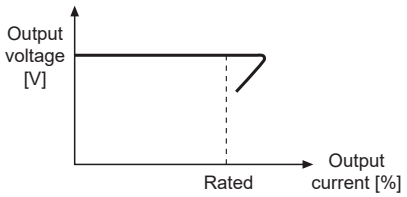
◎ **SPA-075-12/SPA-100-12**



◎ **SPA-075-24/SPA-100-24/ SPA-400-24**



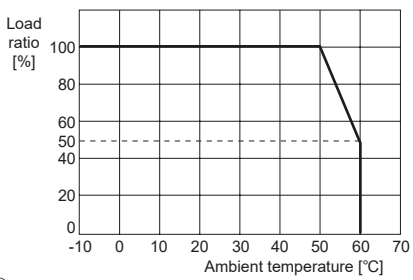
■ Feature Data of Over-Current Protection



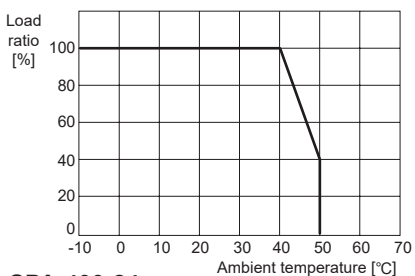
- It is when the rated input voltage is 100VAC, 100% load.
  In case of SPA-400-24, the rated input voltage is 220VAC, 100% load.
- It is able to protect over-current by load with built-in over-current protection circuit.
  When the over rated current is flowed, the circuit is operated (output voltage is fallen) and it is cancelled when the load current is under the rated current. (it is returned to the rated output voltage)

■ Output Derating Curve by Ambient Temperature

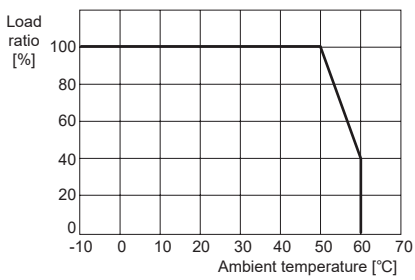
◎ **SPA-030-05/SPA-030-24/SPA- 050-24/ SPA-075-05/SPA-075-24/SPA-100-05/ SPA-100-12/SPA-100-24**



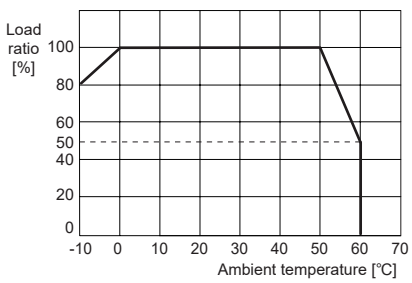
◎ **SPA-030-12/SPA-050-05/SPA-050-12**



◎ **SPA-075-12**

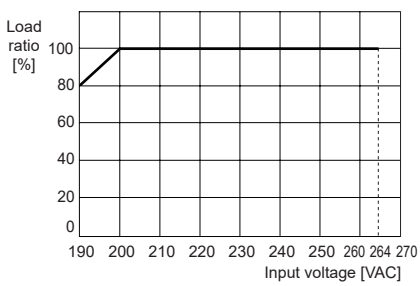


◎ **SPA-400-24**



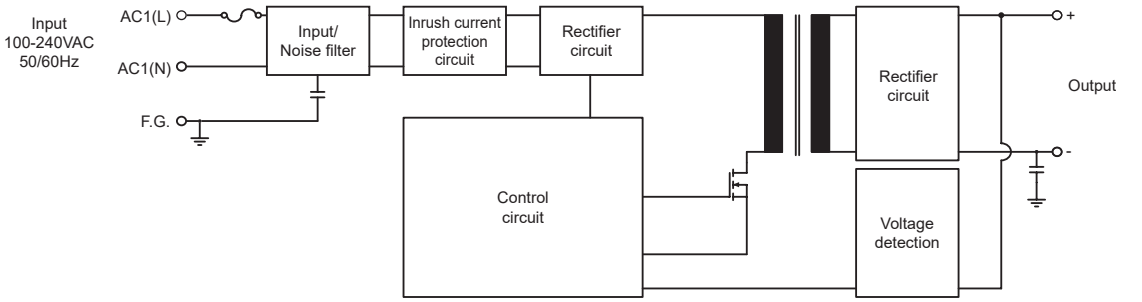
■ Output Static Characteristics by Input Voltage

◎ **SPA-400-24**

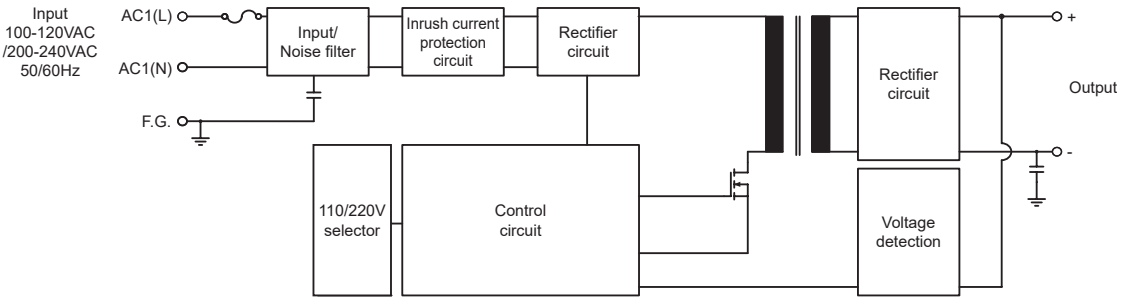


▣ Block Diagram

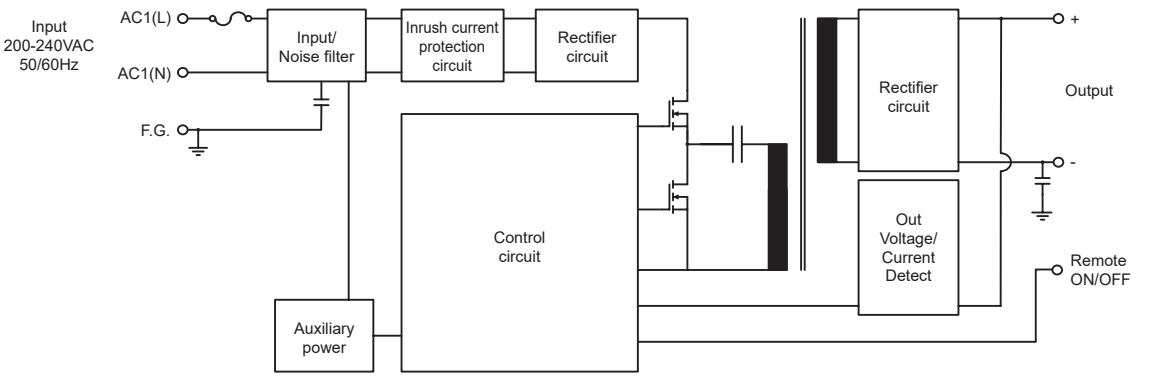
◎ SPA-030/050 Series



◎ SPA-075/100 Series



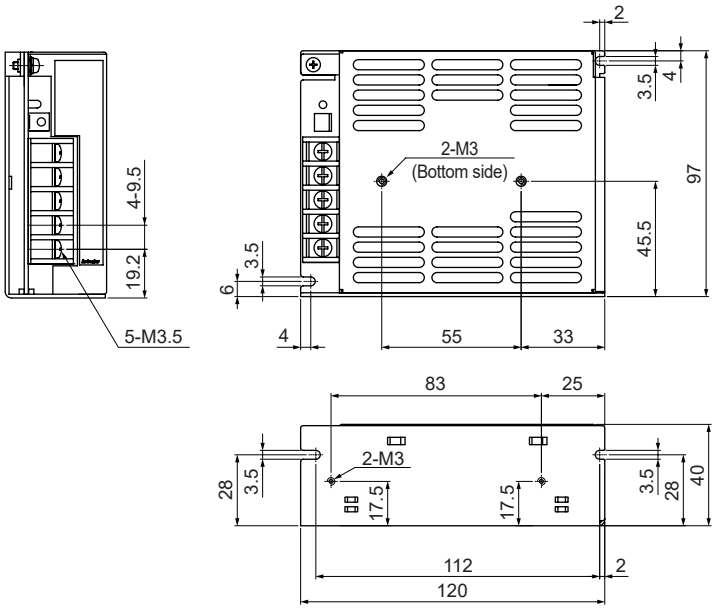
◎ SPA-400-24



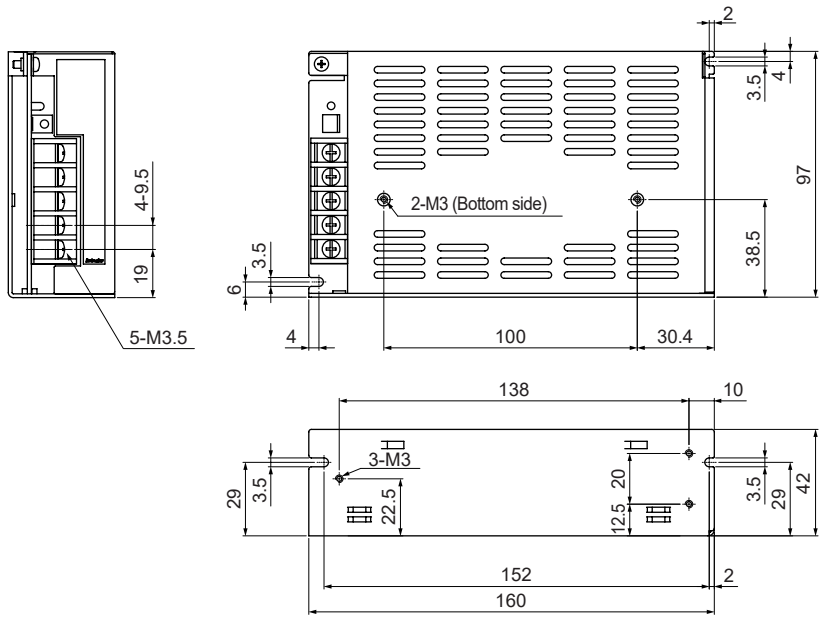
▣ Dimensions

(unit: mm)

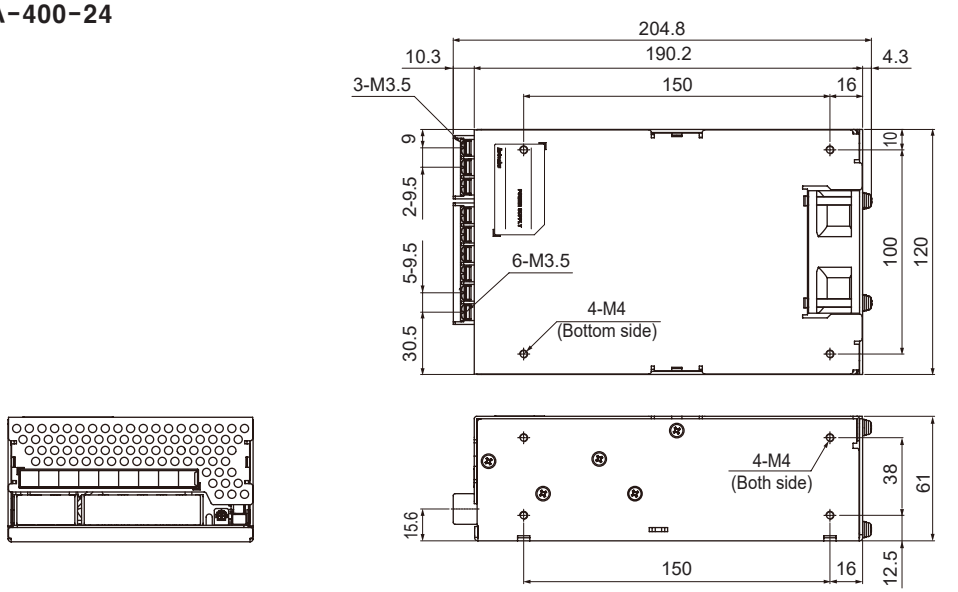
◎ SPA-030/050 Series



◎ SPA-075/100 Series



◎ **SPA-400-24**



▣ Specification of Input Cable

Specification of input cable	AWG21 to 19	AWG18 to 16
Model	SPA-030-05, SPA-030-12, SPA-030-24, SPA-050-12, SPA-050-24, SPA-075-12, SPA-075-24, SPA-100-24	SPA-050-05, SPA-075-05, SPA-100-05, SPA-100-12, SPA-400-24

▣ Over-Heating Protection

The overheat protection function cuts off the output voltage, when the temperature in an element increases due to overheating.
This product has the overheat protection function within itself.
When the overheat protection function is activated and the product does not work properly, please resupply power.
※Except SPA-400-24 model.

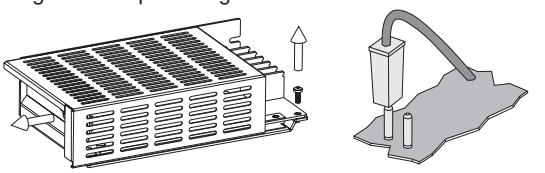
▣ Proper Usage

⚠ Cautions during use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. Do not connect the output voltage neither in serial nor in parallel.
3. Since there is no harmonic suppression or power factor correction circuit, install the circuit separately if necessary.
4. Since using the condenser input method, power factor is in the range of 0.4 to 0.6. When using distribution board or transformer, check the capacity of the input voltage.

$$\text{Input apparent power[VA]} = \frac{\text{Output active power[W]}}{\text{Powerfactor}\times\text{Efficiency}}$$

5. Even though a noise filter is installed inside the product, the product can be affected by noise depending on the installation location or wiring
6. If the internal fuse is damaged, please contact our A/S center.
7. In case of models using the user switching method for the input voltage selection, factory default is set to 220V. When switching over to 110V, remove the case of the product as below and select the voltage with the jumper switch within the range of the input voltage.



8. To ensure the reliability of the product, install the product on the panel or metal surface.
9. Install the unit in the well ventilated place.
10. Do not use near the equipment which generates strong magnetic force or high frequency noise.
11. This unit may be used in the following environments.
    ① Indoors (in the environment condition rated in 'Specifications')
    ② Altitude max. 2,000m ③ Pollution degree 2 ④ Installation category II

DIN Rail Mount Switching Mode Power Supply

▣ Features

- DIN rail type mount and screw mount methods
- Efficient power conversion
  : high conversion efficiency up to 92% with LLC circuit (SPB-240)
  : stable power supply with minimal noise and ripple
- Space efficient design
  : slim and compact size for maximum space efficiency
  : uniform depth size (except SPB-015/030) for neat and tidy installation
- Safety and user-friendly features
  : terminal protection cover (SPB-060/120/180/240)
  : easy wiring with rising clamp terminal (SPB-015/030)
  : inrush current prevention, output over-current prevention, output overvoltage prevention, output short-circuit protection, circuit overheating protection
  : low output voltage indicator (red LED), output indicator (green LED)
- Output power: 15W, 30W, 60W, 120W, 180W, 240W

SPB-015/030 Series | SPB-060 Series | SPB-120 Series | SPB-180 Series | SPB-240 Series

Please read "Safety Considerations" in the instruction manual before using.

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▣ Ordering Information

SPB — **120** — **24**

Output voltage	05	5VDC	24	24VDC
	12	12VDC	48	48VDC
Output power	015	15W	120	120W
	030	30W	180	180W
	060	60W	240	240W
Item	SPB	Switching Mode Power Supply		

▣ Specifications

Model		SPB-015-05	SPB-015-12	SPB-015-24	SPB-030-05	SPB-030-12	SPB-030-24	SPB-060-12	SPB-060-24	SPB-060-48	SPB-120-12	SPB-120-24	SPB-120-48	SPB-180-24	SPB-180-48	SPB-240-12	SPB-240-24	SPB-240-48
Output power		15W	15.6W		25W	30W	31.2W	60W		62.4W	96W	120W		180W	182.4W	240W		
Input condition	Voltage※1	100-240VAC~ (permissible voltage: 85-264VAC~/120-370VDC⎓)																
	Frequency	50/60Hz																
	Efficiency※2 (typical) 100VAC~	77%	80%	83%	77%	82%	84%	81%	84%	85%	82%	85%	85%	89%	89%	87%	89%	89%
	Efficiency※2 (typical) 240VAC~	76%	79%	82%	78%	83%	85%	83%	86%	87%	85%	88%	88%	92%	92%	90%	92%	92%
	Power factor※2	—			—			—			Min. 0.9			Min. 0.9		Min. 0.9		
	Max. current consumption※2	0.4A			0.8A			1.6A			1.9A			3.0 A		3.8A		
	Current consumption※2 (typical) 100VAC~	0.35A	0.35A	0.34A	0.56A	0.63A	0.63A	1.24A	1.21A	1.19A	1.19A	1.49A	1.43A	2.03A	2.04A	2.76A	2.71A	2.73A
	Current consumption※2 (typical) 240VAC~	0.19A	0.19A	0.19A	0.30A	0.35A	0.35A	0.66A	0.65A	0.64A	0.52A	0.61A	0.61A	0.83A	0.84A	1.14A	1.12A	1.13A
Power factor correction circuit		—			—			—			Built-in			Built-in		Built-in		
Output characteristics	Voltage	5VDC⎓	12VDC⎓	24VDC⎓	5VDC⎓	12VDC⎓	24VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓	24VDC⎓	48VDC⎓	12VDC⎓	24VDC⎓	48VDC⎓
	Current	3A	1.3A	0.65A	5A	2.5A	1.3A	5A	2.5A	1.3A	8A	5A	2.5A	7.5A	3.8A	20A	10A	5A
	Voltage adjustment range※3	Max. ±10%			Max. ±10%			Max. ±5%			Max. ±5%			Max. ±5%		Max. ±5%		
	Input variation※4	Max. ±0.5%			Max. ±0.5%			Max. ±0.5%			Max. ±0.5%			Max. ±0.5%		Max. ±0.5%		
	Load variation	Max. ±1%			Max. ±1%			Max. ±1%			Max. ±1%			Max. ±1%		Max. ±1%		
	Ripple& Ripple noise※2,※5	Max. ±1.5%	Max. ±1%		Max. ±1.5%	Max. ±1%		Max. ±1%			Max. ±1%			Max. ±1%		Max. ±1.5%	Max. ±1%	
	Start-up time※2 (typical) 100VAC~	500ms	550ms	650ms	600ms	550ms	550ms	520ms	550ms	1200ms	1200ms	1200ms	1200ms	87ms	75ms	75ms	87ms	75ms
	Start-up time※2 (typical) 240VAC~	550ms	550ms	650ms	600ms	550ms	550ms	530ms	550ms	400ms	400ms	400ms	400ms	56ms	45ms	45ms	56ms	45ms
	Hold time※2 (typical) 100VAC~	24ms	25ms	25ms	20ms	15ms	15ms	15ms	14ms	15ms	98ms	75ms	87ms	36ms	25ms	33ms	36ms	25ms
	Hold time※2 (typical) 240VAC~	190ms	190ms	190ms	130ms	110ms	110ms	100ms	110ms	108ms	97ms	43ms	86ms	36ms	25ms	33ms	36ms	25ms

※1: Since there is no separate input overvoltage protection for the voltage over the rated input voltage range, supplying overvoltage may result in product damage.
※2: It is for 100% load.
※3: Use the output voltage adjusting volume within the voltage variable range.
If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.
※4: It is for the rated input voltage 100-240VAC (85-264VAC) and 100% load.
※5: It is for the rated input voltage 100-240VAC.

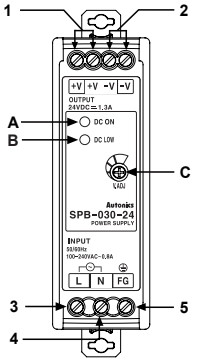
▣ Specifications

Model			SPB-015-05	SPB-015-12	SPB-015-24	SPB-030-05	SPB-030-12	SPB-030-24	SPB-060-12	SPB-060-24	SPB-060-48	SPB-120-12	SPB-120-24	SPB-120-48	SPB-180-24	SPB-180-48	SPB-240-12	SPB-240-24	SPB-240-48
Protection	Inrush current protection (typical)	100VAC~	7A	7A	7A	7A	7A	6A	13A	14A	10A	9A	11A	10A	8A	8A	8A	8A	8A
		240VAC~	32A	30A	31A	29A	31A	29A	19A	17A	37A	37A	36A	37A	25A	26A	22A	25A	26A
	Over-current protection※5		105 to 160%			105 to 160%			105 to 160%			105 to 160%			105 to 160%		105 to 160%		
	Over-voltage protection※3		—			—			—			16.0V ±10%	30.0V ±10%	58.0V ±10%	30.0V ±10%	58.0V ±10%	16.0V ±10%	30.0V ±10%	58.0V ±10%
	Output low-voltage indicate		4.2V ±10%	9.6V ±10%	20.0V ±10%	4.2V ±10%	9.6V ±10%	20.0V ±10%	9.6V ±10%	20.0V ±10%	43.0V ±10%	9.6V ±10%	20.0V ±10%	43.0V ±10%	20.0V ±10%	43.0V ±10%	10.0V ±10%	20.0V ±10%	43.0V ±10%
Indicator			Output indicator: green LED, output low-voltage indicator: red LED																
Insulation resistance			Over 100MΩ (at 500VDC megger between all input terminals and output terminals)																
Dielectric strength			3,000VAC 50/60Hz for 1 min (between all input terminals and output terminals)																
			1,500VAC 50/60Hz for 1 min (between all input terminals and F.G.)																
Vibration			0.75mm amplitude at frequency 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hour																
Shock			300m/s² (approx. 30G) in each X, Y, Z direction for 3 times																
EMS			Conforms to EN61000-6-2																
EMI			Conforms to EN61000-6-4																
Safety standards			EN60950, EN50178																
Environment	Ambient temp.※6		-10 to 50℃, storage: -25 to 65℃ (surrounding air temp.: max. 40℃)																
	Ambient humi.		25 to 85%RH, storage: 25 to 90%RH																
Input cable			AWG24 to 19 (material: Cu)			AWG24 to 19 (material: Cu)			AWG21 to 19 (material: Cu)			AWG21 to 19 (material: Cu)			AWG21 to 19 (material: Cu)		AWG18 to 16 (material: Cu)		
Terminal tightening torque			0.3 to 0.5N·m			0.3 to 0.5N·m			0.7 to 0.9N·m			0.7 to 0.9N·m			0.7 to 0.9N·m		0.7 to 0.9N·m		
Protection			IP20 (IEC standard)																
Approval			CE, cULus LISTED																
Weight※7			Approx. 202g (approx. 129g)			Approx. 249g (approx. 176g)			Approx. 347g (approx. 274g)			Approx. 570g (approx. 466g)			Approx. 609g (approx. 505g)		Approx. 866g (approx. 736g)		

※3: Use the output voltage adjusting volume within the voltage variable range.
If the voltage exceeds the output voltage range, overvoltage protection function is activated and the output is cut off.
※5: It is for the rated input voltage 100-240VAC. ※6: Refer to '▣ Output Derating Curve by Ambient Temperature'.
※7: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Wiring Diagram/Unit Description

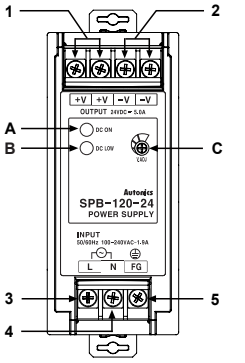
◎ SPB-015/030 Series



● **Wiring Diagram**
1. Output power [+V] terminal
2. Output power [-V] terminal
3. Input power [L] terminal
4. Input power [N] terminal
5. Frame ground [F.G.] terminal

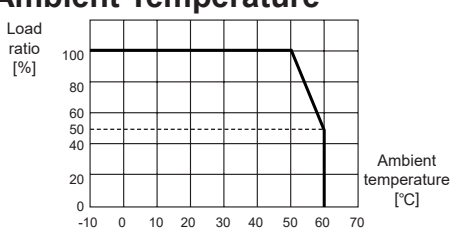
● **Unit Description**
A. Output (DC ON) indicator (green)
B. Output low voltage (DC LOW) indicator (red)
C. Output voltage adjuster (V.ADJ)

◎ SPB-060/120/180/240 Series



※SPB-015/060 Series has an output power [+V] terminal (1) and an output power [-V] terminal (2).

▣ Output Derating Curve by Ambient Temperature

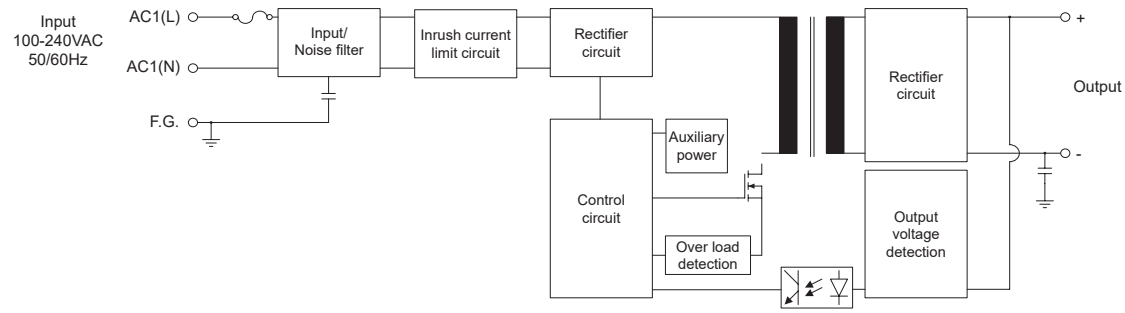


▣ Over-Heating Protection

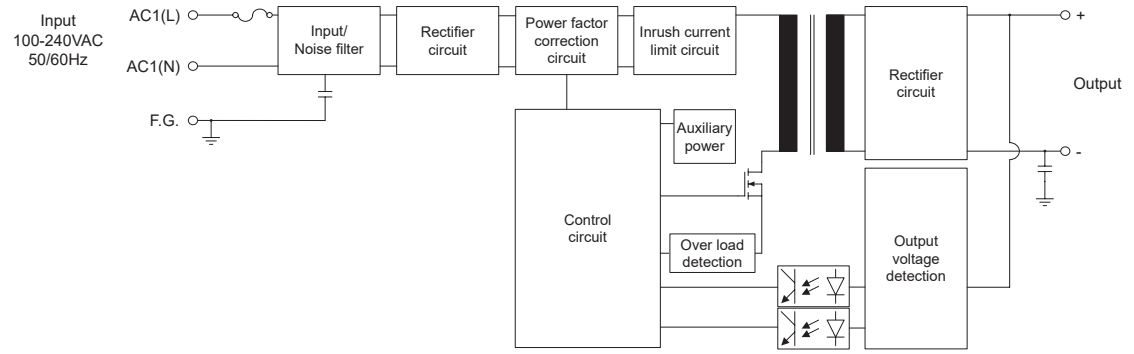
The overheat protection function cuts off the output voltage, when the temperature in an element increases due to overheating.
This product has the overheat protection function within itself.
When the overheat protection function is activated and the product does not work properly, please resupply power.

▣ Block Diagram

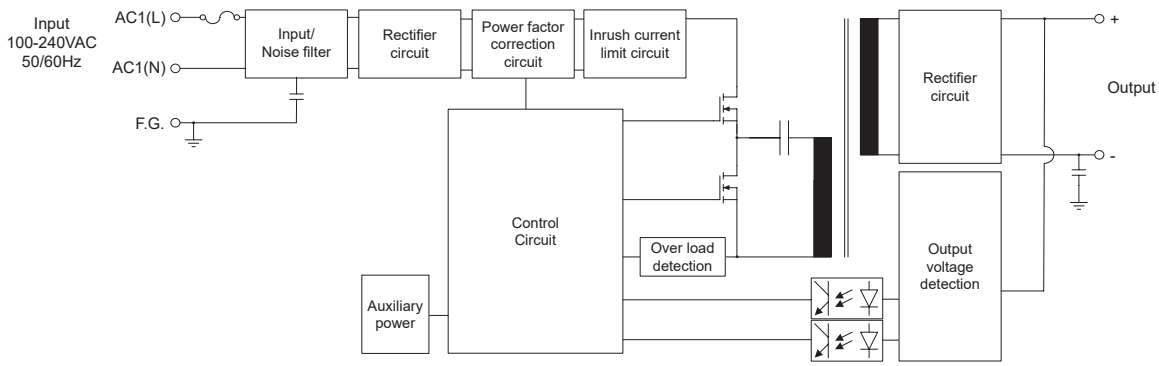
◎ SPB-015/030/060 Series



◎ SPB-120 Series



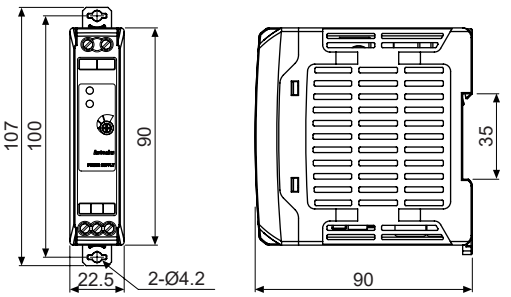
◎ SPB-180/240 Series



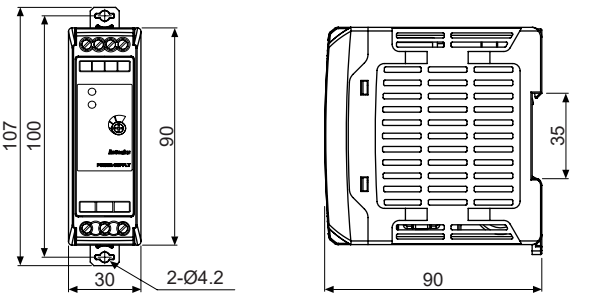
▣ Dimensions

(unit: mm)

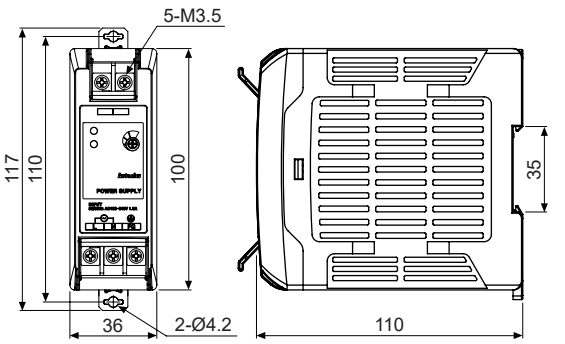
◎ SPB-015 Series



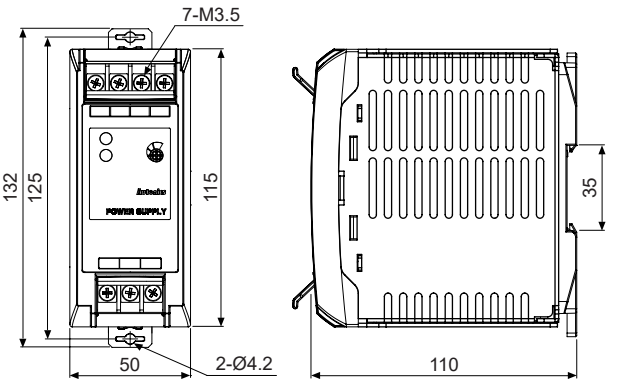
◎ SPB-030 Series



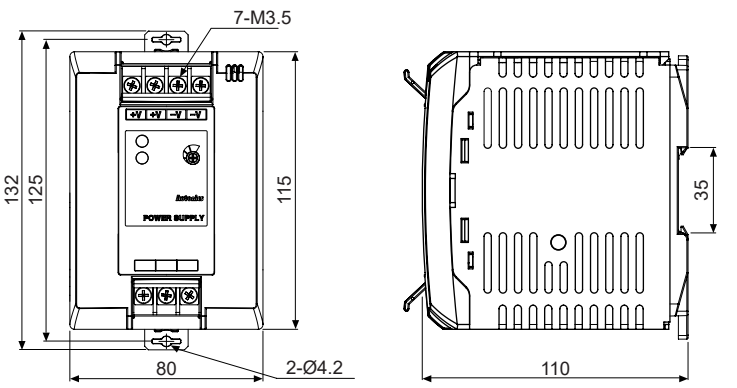
◎ SPB-060 Series



◎ SPB-120/180 Series



◎ SPB-240 Series

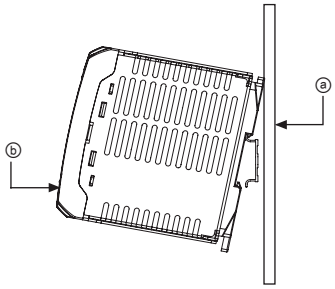


▣ Installation

◎ DIN rail mounting

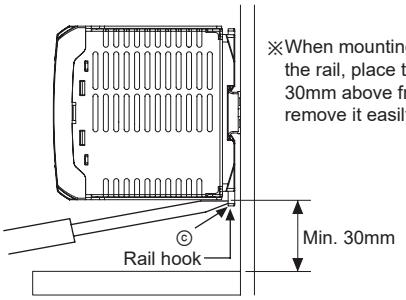
● Mounting to DIN rail

Put the unit on the part ⓐ of the rail before press it to the direction ⓑ.



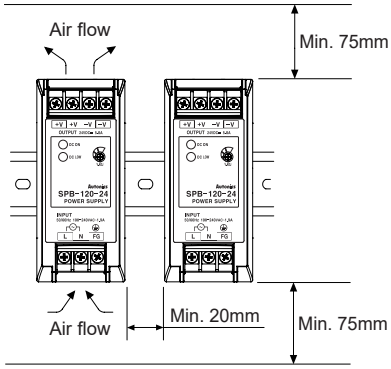
● Removing from DIN rail

Put a screw driver into the part ⓒ before push it downward.



◎ Spacing

When installing multiple SMPSs, please keep space at least 20mm between SMPSs for heat radiation.
In case of the top and bottom of the product, please keep space at least 75mm.



▣ Proper Usage

⚠ Cautions during use

1. Follow instructions in 'Proper Usage'. Otherwise, it may cause unexpected accidents.
2. Do not connect the output voltage neither in serial nor in parallel.
3. Since SPB-015/030/060 models have no harmonic suppression or power factor correction circuit, install the circuit separately if necessary.
4. Since SPB-015/030/060 models use the condenser input method, power factor is in the range of 0.4 to 0.6.
   When using distribution board or transformer, check the capacity of the input voltage.

$$\text{Input apparent power[VA]} = \frac{\text{Output active power[W]}}{\text{Powerfactor}\times\text{Efficiency}}$$

5. Even though a noise filter is installed inside the product, the product can be affected by noise depending on the installation location or wiring
6. If the internal fuse is damaged, please contact our A/S center.
7. To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
8. Install the unit in the well ventilated place.
9. Do not use near the equipment which generates strong magnetic force or high frequency noise.
10. This unit may be used in the following environments.
    ①Indoors (in the environment condition rated in 'Specifications')
    ②Altitude max. 2,000m
    ③Pollution degree 2
    ④Installation category II

Single-Phase, Power Controller

▣ Features

- **Various and simple input specification**
  - DC4-20mA, 1-5VDC, External 24VDC
  - External adjuster (1kΩ)
  - External contact (ON/OFF)
- **Various function**
  - OUT ADJ (output limit) function
  - SOFT START function (except for ON/OFF control method)
  - OUT display function
  - 50/60Hz automatic converting function
- **Various control method by switch**
  - Phase control method
  - Cycle control method (zero cross turn-on)
  - ON/OFF control method (zero cross turn-on)

⚠ **Please read "Safety Considerations" in the instruction manual before using.**

▣ Ordering Information

SPC | **1** | **-** | **35** | **-** | **E**

Marking language	E	English
Rated load current	35	35A
	50	50A
Control phase	1	Single-phase
Item	SPC	Solid state power controller

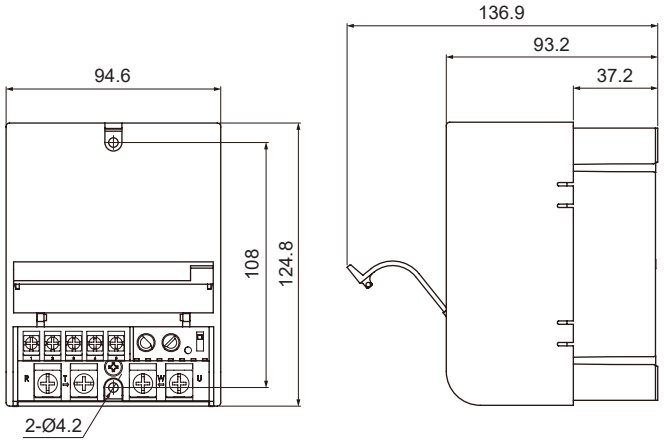
▣ Specifications

Model		**SPC1-35-E**	**SPC1-50-E**
Power supply		220VAC～ 50/60Hz	
Allowable voltage range		90 to 110% of rated voltage	
Operating frequency fluctuation		±1Hz	
Rated load current		35A (single-phase)	50A (single-phase)
Control power		220VAC～	
Control range		Phase control: 0 to 98%, Cycle control: 0 to 100%	
Applied load		Resistance load (min. load: over 5% of rated current)	
Cooling method		Natural cooling	
Control circuit		Micom control type	
Control input		• 1-5VDC⎓ • DC4-20mA (250Ω) • ON/OFF (external relay contact or 24VDC⎓) • External adjuster (1kΩ) • Output limit input (front OUT ADJ. adjuster)	
Control method	By selection switch	• Phase control※1 • Cycle control (zero cross turn-on) - Period 0.5 sec, 2.0 sec, 10 sec ※1 • ON/OFF control (zero cross turn-on)	
Starting type		SOFT START (0 to 50 sec variable)	
Indicator		Output indicator (OUT): red LED	
Insulation resistance		Over 100MΩ (at 500VDC megger)	
Dielectric strength		2000VAC 50/60Hz for 1 min	
Noise immunity		±2kV the square wave noise (pulse width: 1μs) by the noise simulator	
Vibration	Mechanical	0.75mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hour	
	Malfunction	0.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 10 min	
Shock	Mechanical	300m/s² (approx. 30G) in each X, Y, Z direction for 3 times	
	Malfunction	100m/s² (approx. 10G) in each X, Y, Z direction for 3 times	
Environment	Ambient temp.	0 to 50℃, storage: -25 to 65℃	
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH	
Wire specification		AWG16 to 8	AWG8 to 6
Unit weight		Approx. 1kg	

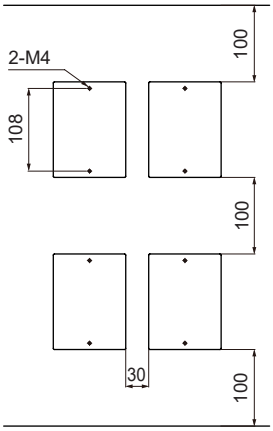
※1: Refer to '▣ **Operation and Function**'.
※Environment resistance is rated at no freezing or condensation.

▣ Dimensions

(unit: mm)



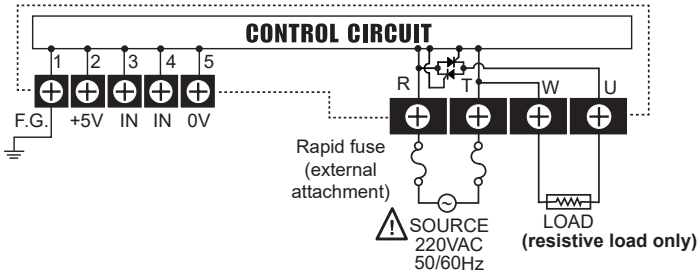
● **Spacing**



※When installing multiple power controllers, please keep space at least 30mm in horizontal and 100mm in vertical between power controllers for heat radiation.

▣ Connections

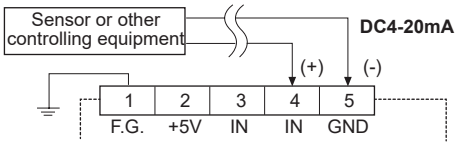
1. External connection



2. Connection of control input terminals

1) DC4-20mA control input

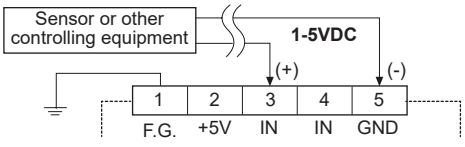
It controls 0 to 100% when you apply DC4-20mA on ④, ⑤ terminals when power is applied.



※**This function must not be used in ON/OFF control method.**

2) 1-5VDC control input

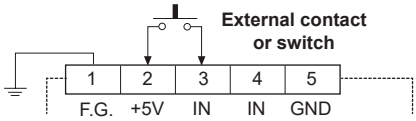
It controls 0 to 100% when you apply 1-5VDC on ③, ⑤ terminals when power is applied.



※**This function must not be used in ON/OFF control method.**

3) ON/OFF external contact control input

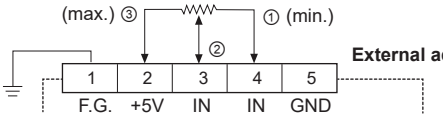
It controls 100% if you connect external contact or switch to ②, ③ terminal when it is ON, it controls 0% when it is OFF.



※**It is available for all control methods.**
OUT ADJ and SOFT START functions are not available in ON/OFF control method.

4) External adjuster control input

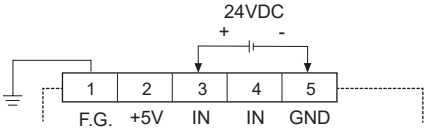
After power is applied, connecting the external adjuster 1kΩ to ②, ③, and ④ terminals and turning adjuster control from 0% to 100%. In another way, connecting to the ② and ③ terminals and turning OUT ADJ control from 0% to 100%.
It is available to control as the OUT ADJ, adjuster for the above 1), 2), 3) and set at 100% when it is not used.



※This function must not be used in ON/OFF control method.

5) External 24VDC control input

It can be used with external 24VDC voltage as below.
It is available to control of ON/OFF, outputs 100% for applying 24VDC and 0% for applying 0VDC.

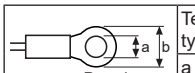


※It is available for all control methods.
OUT ADJ and SOFT START functions are not available in ON/OFF control method.

※Tighten the terminal screw with the below tightening torque.

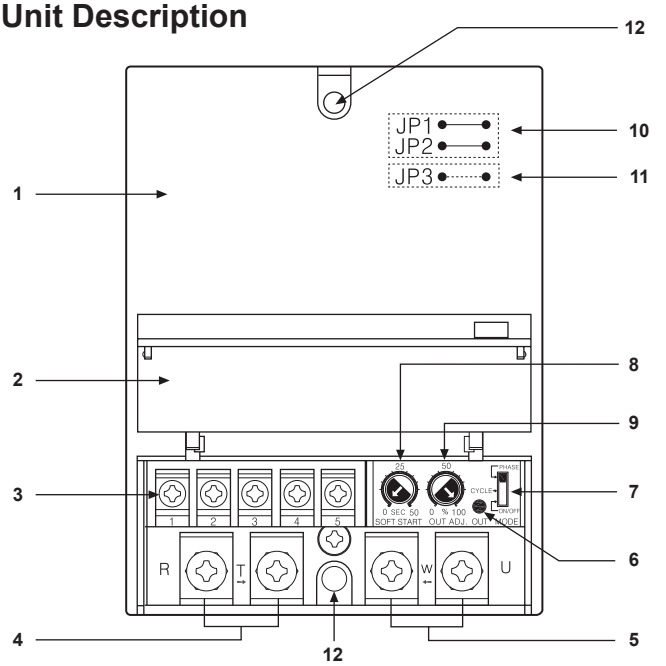
Terminal type	Signal input (control input)	Output and power
Screw	M3.5	M5
Tightening torque	0.6 to 1.2N·m	1.5 to 2.2N·m

※Use terminals of size specified below.



Terminal type	Signal input (control input)	Output and power
a	Min. 3.5mm	Min. 5mm
b	Max. 7.0mm	Max. 12mm

▣ Unit Description



1. Case
2. Terminal block cover
3. Terminal block for control input
4. Terminal block of the power
5. Terminal block for load connection
6. Output indicator (OUT)
7. Control method selection switch
8. SOFT START setting adjuster
9. Output limit setting adjuster
10. Selection jumper of control period
11. Selection jumper of control mode
12. Panel mounting hole
(bolt size: M4×50mm)

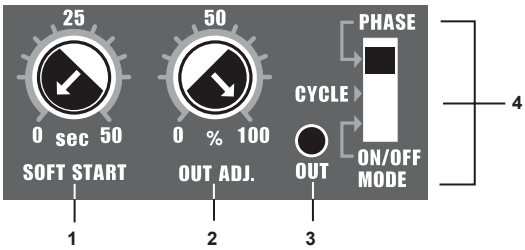
※10, 11 are placed on the inner PCB of the product.

▣ Factory Default

Control method	Phase control
Control mode	Phase equal division type according to control input
Control cycle period	0.5 sec (JP1, JP2 short)
SOFT START setting	0 sec
OUT ADJ. setting	100%

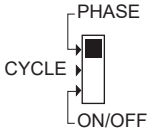
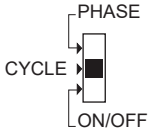
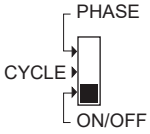
▣ Operation and Function

◎ Front



1. **SOFT START setting adjuster (0 to 50 sec)**
2. **Output limit setting adjuster (0 to 100%)**
3. **Output indicator**
4. **Control method selection switch**
   - PHASE: Phase control method
   - CYCLE: Cycle control method
   - ON/OFF: ON/OFF control method

◎ Control method selection

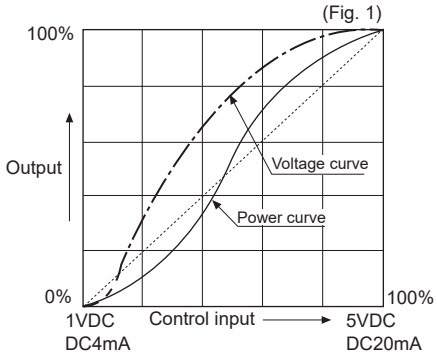
Control method	Phase control	Cycle control (zero cross turn-on)	ON/OFF control (zero cross turn-on)
Switch			

※When selecting cycle control method, the cycle has been set as 0.5 sec. It can be changed to 2 sec, 10 sec by selection.
※The control method setting cannot be changed while it is operating. **Turn OFF the power at first** then change the setting and supply the power again.

1) Phase control
It is output type to control phase of an alternating signal according to control input signal.

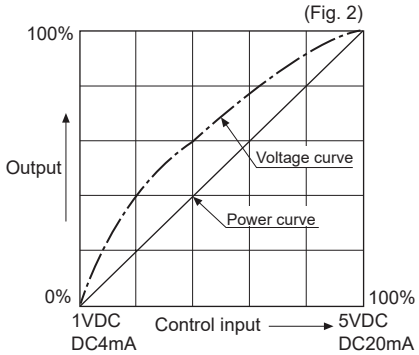
● Equal division type of phase according as control input
This is analog type to output control angle with dividing equally according as control input signal. It shows power characteristic as (Fig. 1) and it might occur over power and lack power at point middle of control input.

(Fig. 1)

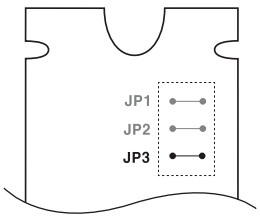


● Equal division type of power according as control input
It divides control angle non-equally according as control input signal then make power curve linearization, so it becomes possible to output the power, which is proportioned control input as outputting (Fig. 1).

(Fig. 2)



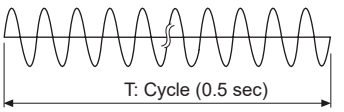
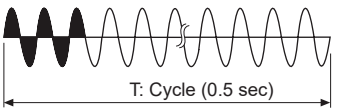
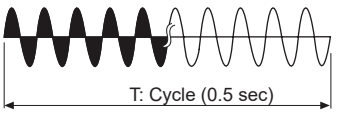
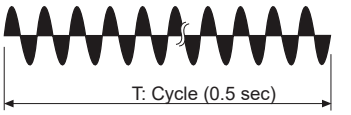
※To change the control mode, change TP3 of PCB as below.



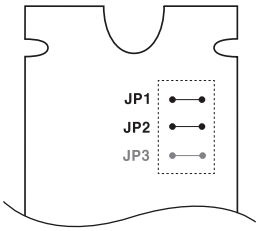
JP3	Division method (control mode)
SHORT	Equal division of phase according as control input
OPEN	Equal division of power according as control input

※ SHORT OPEN

2) Cycle control (fixed cycle) - Zero cross turn-on
It controls the power, which is applied into the load to repeat ON/OFF cycle like below picture with constant proportion according to control input signal. It is easy to control the load and there is no ON/OFF noise because it turns ON and OFF at the zero point of AC.
Usually it is used in a place or electric furnace which is not easily effected by external noise.

When control input signal is 0% (DC4mA, 1VDC)	When control input signal is 25% (DC8mA, 2VDC)
	
When control input signal is 50% (DC12mA, 3VDC)	**When control input signal is 100% (DC20mA, 5VDC)**
	

※To change control cycle, please change JP1 and JP2 of PCB as below.



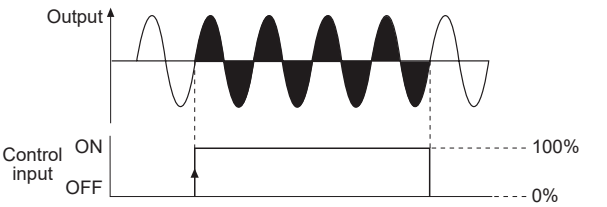
JP1	JP2	Cycle (sec)
SHORT	SHORT	0.5 sec
SHORT	OPEN	2.0 sec
OPEN	SHORT	10 sec
OPEN	OPEN	× (not used)

※ SHORT OPEN

3) ON/OFF control-Zero cross

This function is when control input is ON, output is 100%. When it is OFF, output is 0%.
It is the same function as SSR (Solid State Relay).
(It always turns ON/OFF at zero point of AC.)

※**OUT ADJ. and SOFT START function are not available in ON/OFF control method.**

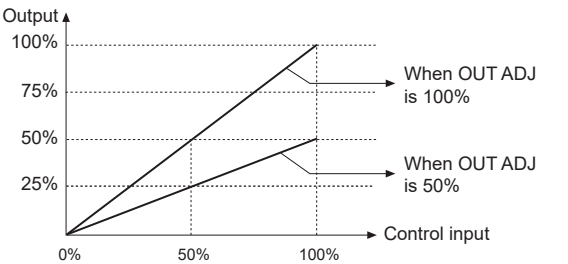


< Output wave form of ON/OFF control >

◎ OUT ADJ. (output limit) (0 to 100%)

This function will be [Control input (%) × OUT ADJ. (%) = Output] and it controls the power supplied into the load. Although control input is 100% (5V or 20mA), the output is the 50% which is proportioned with OUT ADJ. When not using OUT ADJ. function, please make set value 100%.

※**This function must not be used in ON/OFF control method.**

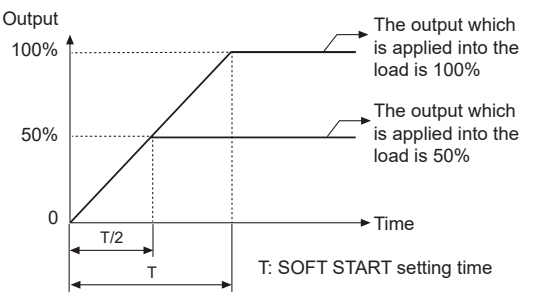


<The output characteristic of OUT ADJ. and control input>

◎ SOFT START (0 to 50 sec)

This function protects the load in cases that the set temperature is high, such as controlling the load (platinum. molybdenum, tungsten, infrared lamp, etc.) in which inrush current flows when power is supplied, or showing large width of temperature rise during initial operation.
SOFT START set time (T) is the required time that output reaches to 100%, and it is differentiated by OUT ADJ. set value. For example, SOFT START is set as 10 sec and OUT ADJ. is set as 70%, it takes 7 sec to reach goal output.
[Set time (T)×OUT ADJ. set value (%)=10 sec×0.7=7 sec]
If increasing the OUT ADJ. before output reaches to goal output, it delays as much as the value, multiply of increased value (%) and SOFT START set time. When not using SOFT START function, please make set value 0.

※**This function must not be used in ON/OFF control method.**



※T: Time to get the output which is applied into the load is 100%.
T/2: Time to get the output which is applied into the load is 50%.

◎ OUT display

This is LED lamp to display the status of output and will be getting brighter according as output.
(0%: min. LED light, 100%: max. LED light)

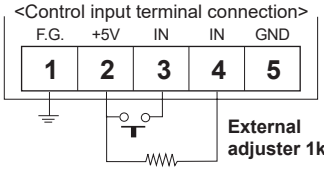
▣ Applications

E.g. 1) When controlling by limiting the power at ON/OFF in phase control and cycle control method.
For example, if it needs to control 80% output when it is ON, 24% output when it is OFF, please keep below.

Firstly set OUT ADJ. as 80% and connect external adjuster and external relay contact switch as the figure then set external adjuster as 30%.

- When the External contact signal is ON
  : 100% (contact input)×80% (OUT ADJ.)=80%
- When the External contact signal is OFF
  : 30% (adjuster input)×80% (OUT ADJ.)=24%

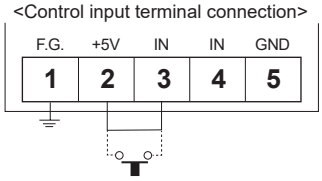
<Control input terminal connection>



E.g. 2) This is how to control 0 to 100% without external adjuster in phase control and cycle control method.

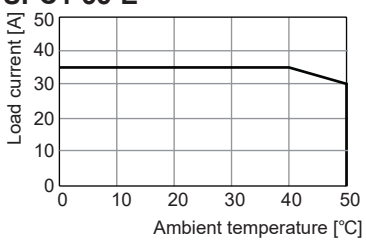
It is possible to control 0 to 100% by turning OUT ADJ. in state of connecting terminal 2 and terminal 3.

<Control input terminal connection>

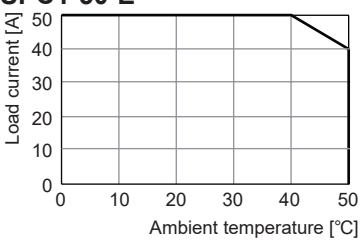


▣ Temperature Derating Curve

◎ SPC1-35-E



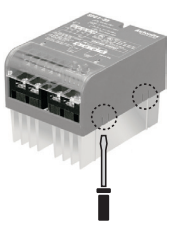
◎ SPC1-50-E



▣ Remove of Case

After disconnecting all power sources supplied to the product, remove the case.
Push the Joint part (4 points) on the right and left side of the case with the flat head screwdriver, and disassemble the case.

⚠ **When using the tool, be careful not to injure yourself.**



▣ Proper Usage

⚠ **Cautions during use**

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. Use the product, after 3 sec of supplying power.
3. Before use, set the mode and function according to the specification.
   Especially, be cautious that the product does not operate when OUT ADJ. is set to 0%.
   Since mode/parameter can not be changed during operation, set the mode and function after turning off the power.
4. To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
5. Install the unit in the well ventilated place.
6. While supplying power to the load or right after turning off the power of the load, do not touch the body and heat sink.
   Failure to follow this instruction may result in a burn due to the high temperature.
7. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
8. Do not wire to terminals which are not used.
9. The rapid fuse must be connected between R terminal and the power source.
10. Do not use near the equipment which generates strong magnetic force or high frequency noise.
11. This unit may be used in the following environments.
    ①Indoors (in the environment condition rated in 'Specifications')
    ②Altitude max. 2,000m
    ③Pollution degree 2
    ④Installation category III

Single-Phase/3-Phase, Slim Power Controller

▣ Features

- Refine and slim body design
- LED display for real time monitoring (control input, load voltage, load current, load power, load resistance and heatsink temperature) and checking parameter settings
- Stable control by feedback control (constantcurrent/constant voltage/constant power control)
- Communication output model available: RS485 (Modbus RTU method)
- Convenient parameter settings via PC (RS485 communication)
  : Free download the comprehensive device management program (DAQMaster)
- Various alarm functions (alarm output)
  : overcurrent, overvoltage, heatsink overheat, fuse break, SCR error
- Easy installation of the bracket
- Simple fuse replacement structure for easy maintenance
- Interphase insulating barrier included - SPR series
- Highly reliable SCR (IXYS) element

Please read "Safety Considerations" in the instruction manual before using.

▣ Manual

- For the detail information and instructions, please refer to user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, website). Visit our website (www.autonics.com) to download manuals.
- User manual for communication manual describes for RS485 communication (Modbus RTU protocol) and parameter address map data.

▣ Comprehensive Device Management Program (DAQMaster)

- DAQMaster is a comprehensive device management software for setting parameters and monitoring processes.
- Visit our website (www.autonics.com) to download user manual and comprehensive device management program.

< Computer specification for using software >

Item	Minimum specifications
System	IBM PC compatible computer with Pentium III or above
Operations	Windows 98/NT/XP/Vista/7/8/10
Memory	256MB+
Hard disk	1GB+ of available hard disk space
VGA	Resolution: 1024×768 or higher
Others	RS232C serial port (9-pin), USB port

< DAQMaster screen >

▣ Ordering Information

SPR **1** — **2** **70** **T** **F** **F**

Fuse	**N**	Non-fuse※1		
	F	Fuse		
Feedback control	**N**	Normal control		
	F	Normal/constant current/constant voltage/constant power control		
Option output	**N**	Alarm output		
	T	Alarm+RS485 comm. output		
Rated load current	**25**	25A	70	70A
	35	35A	100	100A
	50	50A	150	150A
Rated load voltage	**1**	110VAC		
	2	220VAC		
	3	380VAC		
	4	440VAC		
Control phase	**1**	Single-phase		
	3	3-phase		
Item	**SPR**	Solid State Power Regulator (slim type)		

※1: Product is not equipped with a rapid fuse inside. Install the suitable fuse for rated load current of the model separately. (The performance of the product is guaranteed only when using the fuse provided by us.)

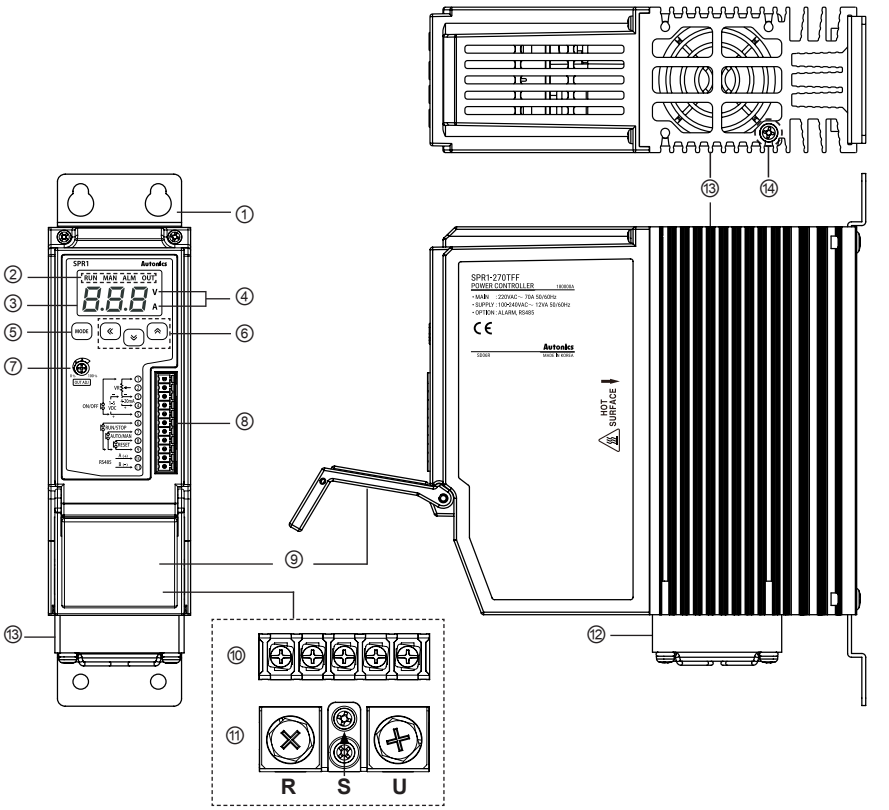
▣ Specifications

Model		SPR1 -1□□□□	SPR1- 2□□□□	SPR1 -3□□□□	SPR1 -4□□□□	SPR3 -1□□□□	SPR3- 2□□□□	SPR3 -3□□□□	SPR3 -4□□□□
Control phase		Single-phase				3-phase			
Rated load voltage (50/60Hz)		110VAC～	220VAC～	380VAC～	440VAC～	110VAC～	220VAC～	380VAC～	440VAC～
Power supply		100-240VAC～ 50/60Hz							
Min. load current		1A							
Permissible voltage range		90 to 110% of rated voltage							
Power consumption		• Rated load current 25A/35A/50A: max. 7VA • Rated load current 70A/100A/150A: max. 12VA				• Rated load current 25A/35A/50A: max. 14VA • Rated load current 70A: max. 22VA • Rated load current 100A/150A: max. 32VA			
Display method		3-digit 7-segment LED							
Indicator		• Operation indicator/Manual control indicator: green LED • Alarm indicator/output indicator/unit (V, A) indicator: red LED							
Control method		• Phase control: normal control mode, constant current/ constant voltage/constant power feedback control mode • Cycle control: fixed cycle control mode, variable cycle control mode • ON/OFF control				• Phase control: normal control mode, constant current/ constant voltage/constant power feedback control mode • Cycle control: fixed cycle control mode • ON/OFF control			
Applied load		• Phase control, ON/OFF control: resistance load, inductive load • Cycle control: resistance load							
Control input		• Auto control: DC4-20mA, 1-5VDC⎓, ON/OFF contact (no-voltage input), pulse voltage (5-12VDC⎓) • Manual control: outside adjuster (10kΩ), inside adjuster (output limit)							
Digital input (DI)		RUN/STOP switching, AUTO/MAN switching, RESET							
Output	Alarm	250VAC～ 3A, 30VDC⎓ 3A, 1c resistive load							
	Communication	RS485 communication output (Modbus RTU method), max. connection: 31 units							
Output range		• Phase control: 0 to 98% • Cycle control: 0 to 100% • ON/OFF control: 0%, 100%							
Output accuracy		• Normal control: within ±10% F.S. of rated load voltage • Constant current feedback control: within ±3% F.S. of rated load current • Constant voltage feedback control: within ±3% F.S. of rated load voltage • Constant power feedback control: within ±3% F.S. of rated load power							
Set method		By front keys, by communication							
Functions		Output limit (OUT ADJ), AUTO/MAN selection, control method selection, RESET, SOFT START, SOFT UP/DOWN, output high/low limit, input correction, input slope correction, monitoring (control input, load voltage/current/power/ resistance, power supply frequency, heatsink temperature)							
	Alarm	SCR error alarm, overcurrent alarm, heatsink overheat alarm, overvoltage alarm, fuse break alarm, frequency error alarm※1, heater break alarm							
Cooling method		• Rated load current 25A/35A/50A: natural cooling • Rated load current 70A/100A/150A: forced air cooling (with the cooling fan)							
Insulation resistance		Over 200MΩ (at 500VDC megger)							
Dielectric strength		2,000VAC 50/60Hz for 1 min (between input terminals and power terminals)							
Output leakage current		Max. 10mArms							
Noise immunity		±2kV the square wave noise (pulse width: 1μs) by the noise simulator							
Memory retention		Approx. 10 years (when using non-volatile semiconductor memory type)							
Vibration	Mechanical	0.75mm amplitude at frequency of 5 to 55Hz in each X, Y, Z direction for 2 hours							
	Malfunction	0.5mm amplitude at frequency of 5 to 55Hz in each X, Y, Z direction for 10 min							
Environment	Ambient temp.	-10 to 55℃, storage: -20 to 80℃							
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH							
Accessory		11-pin connector				11-pin connector, insulating barrier: 4			
Approval		CE				CE			
Weight※2		• Rated load current 25A/35A/50A : approx. 1.6kg (approx. 1.3kg) • Rated load current 70A : approx. 1.65kg (approx. 1.35kg) • Rated load current 100A/150A : approx. 3.2kg (approx. 2.8kg)				• Rated load current 25A/35A/50A : approx. 4.9kg (approx. 4.1kg) • Rated load current 70A : approx. 5kg (approx. 4.2kg) • Rated load current 100A/150A : approx. 9.7kg (approx. 8.7kg)			

※1: Only for normal control model of SPR1 Series.
※2: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Unit Description

◎ SPR1 Series



① Bracket
② Indicator

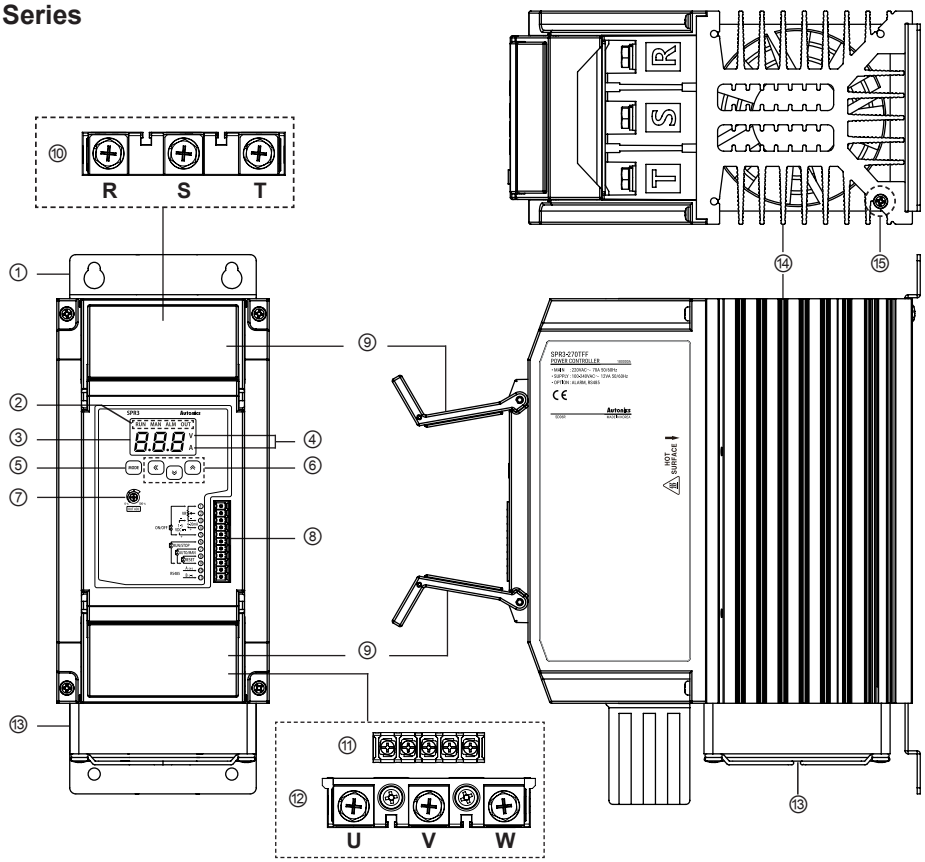
Indicator		Color	Function
RUN	Operation indicator	Green LED	Turns on in the RUN mode.
MAN	Manual control indicator	Green LED	Turns on when adjusting load output in the manual control mode.
ALM	Alarm indicator	Red LED	Flashes in alarming status.
OUT	Output indicator	Red LED	Turns on when load control outputs.

③ Display part: Displays settings of the front display [dI S] parameter in RUN mode, and displays parameter and setting value in setting mode.
④ Unit indicator (☼: Light ON/●: Light OFF)

Indicator		Display
V	A	
●	●	Resistance, load
☼	●	Voltage
●	☼	Current
☼	☼	Power

⑤ MODE key: Enters parameter group, returns to RUN mode, moves parameters, and saves the setting value.
⑥ Setting value adjustment key: Enters SV setting mode and move digits.
⑦ Output limit adjuster (OUT ADJ): Limits output from 0 to 100%.
⑧ 11-pin connector terminal
⑨ Terminal cover
⑩ Alarm output and power input terminals
⑪ R, S, U load output terminals
⑫ Cooling fan: For models with the rated load current of 70A/100A/150A, a cooling fan is attached.
⑬ Heatsink
⑭ Bolt for grounding (M4)

◎ SPR3 Series



① Bracket (except rated load current 100A/150A models)
② Indicator

Indicator		Color	Function
RUN	Operation indicator	Green LED	Turns on in the RUN mode.
MAN	Manual control indicator	Green LED	Turns on when adjusting load output in the manual control mode.
ALM	Alarm indicator	Red LED	Flashes in alarming status.
OUT	Output indicator	Red LED	Turns on when load control outputs.

③ Display part: Displays settings of the front display [dI 5] parameter in RUN mode, and displays parameter and setting value in setting mode.
④ Unit indicator (☼: Light ON/●: Light OFF)

Indicator		Display
V	A	
●	●	Resistance, load
☼	●	Voltage
●	☼	Current
☼	☼	Power

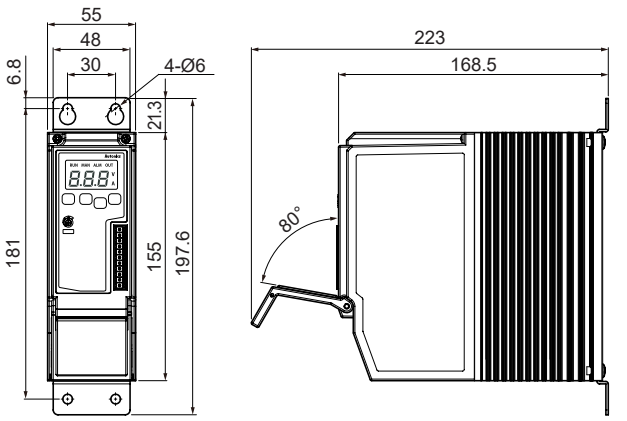
⑤ MODE key: Enters parameter group, returns to RUN mode, moves parameters, and saves the setting value.
⑥ Setting value adjustment key: Enters SV setting mode and move digits.
⑦ Output limit adjuster (OUT ADJ): Limits output from 0 to 100%.
⑧ 11-pin connector terminal
⑨ Terminal cover
⑩ R, S, T load input terminal
⑪ Alarm output and power input terminals
⑫ U, V, W Load output terminals
⑬ Cooling fan: For models with the rated load current of 70A/100A/150A, a cooling fan is attached.
⑭ Heatsink: In case of rated load current 100A/150A models, there are mounting holes on the right/left.
⑮ Bolt for grounding (M4)

▣ Dimensions

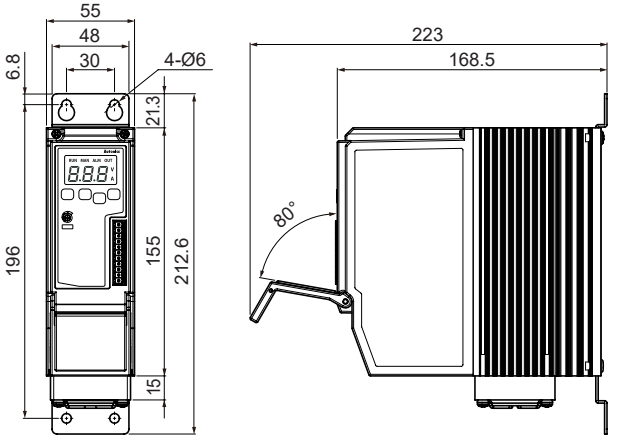
(unit: mm)

◎ SPR1 Series

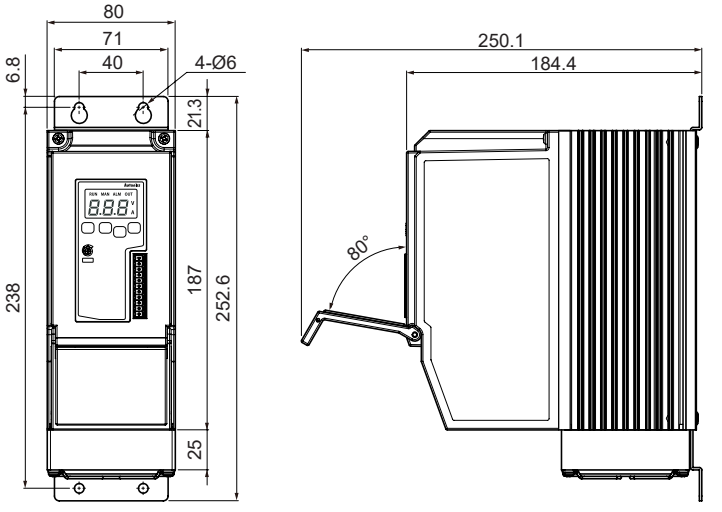
- **Rated load current 25A/35A/50A**



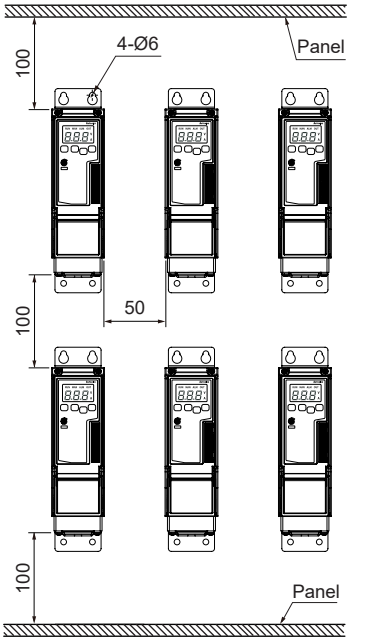
- **Rated load current 70A**



- **Rated load current 100A/150A**



◎ Spacing



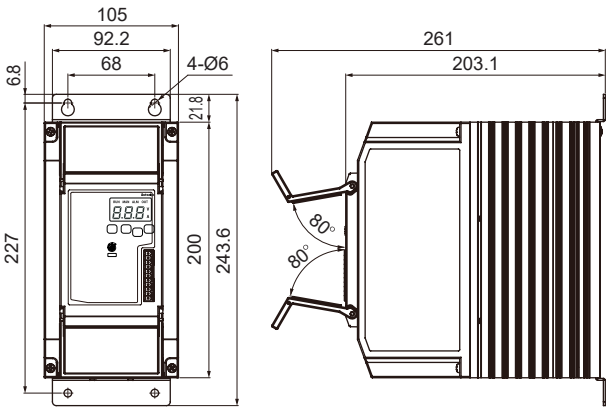
※When installing multiple power controllers, please keep space at least 50mm in horizontal and 100mm in vertical between power controllers for heat radiation.

High Temperature Caution

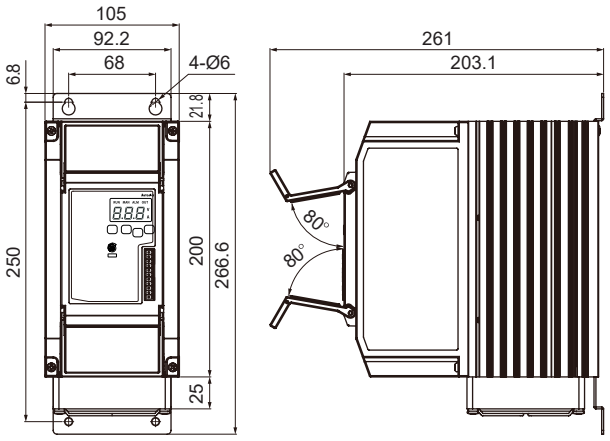
While supplying power to the load or right after turning off the power of the load, do not touch the body and heatsink.
Failure to follow this instruction may result in a burn due to the high temperature.

◎ SPR3 Series

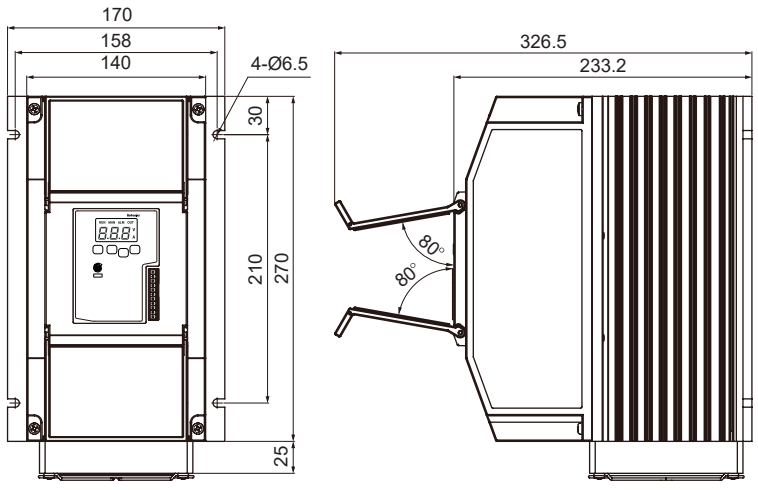
• Rated load current 25A/35A/50A



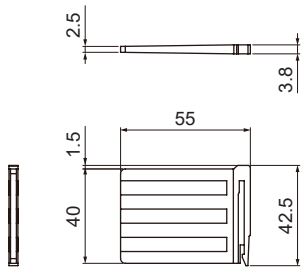
• Rated load current 70A



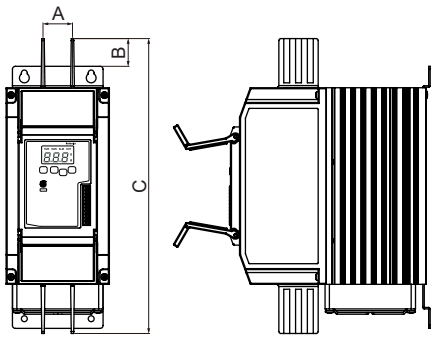
• Rated load current 100A/150A



• Insulating barrier



- With the insulating barrier



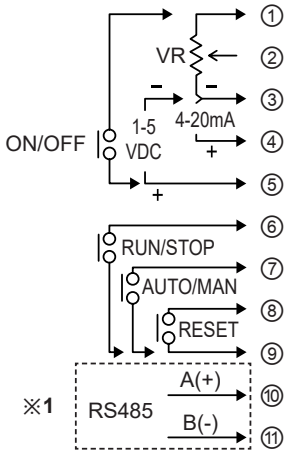
(unit: mm)

Rated load current	A	B	C
25A, 35A, 50A	30	28.2	300
70A	30	28.2	300
100A, 150A	40.5	50	370

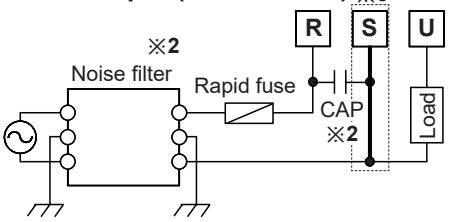
※It is recommended to use the included interphase barriers for insulation between phases and reduce influence from conductive material.

▣ Connections

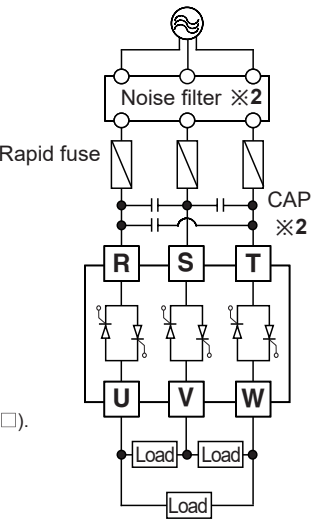
◎ Control input/Comm. output



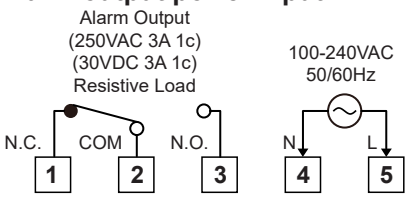
◎ Load output (SPR1 Series) ※3



◎ Load input/output (SPR3 Series)



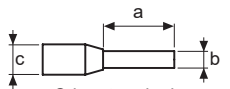
◎ Alarm output/power input



※1: This is only for models with RS485 communication output (SPR□-□□T□□).
※2: When connecting noise filter and capacitor, it is appropriate for EMC.
CAP : Rated load voltage 110VAC-220VAC → 1μF/250VAC
: Rated load voltage 380VAC-440VAC → 0.47μF/500VAC
※3: The normal control model does not connect S terminal and CAP for EMC.
※Tighten the terminal screw with the below tightening torque.

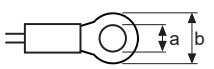
Rated load current	Specification	Alarm output/ power input	Load output (SPR1 Series)		Load input/output (SPR3 Series)
			S	R, U	
25A, 35A, 50A, 70A	Screw	M3	M3	M6	M6
	Tightening torque	0.5N·m	0.5N·m	5.5 to 6.0N·m	5.5 to 6.0N·m
100A, 150A	Screw	M3	M3	M8	M8
	Tightening torque	0.5N·m	0.5N·m	6.5 to 7.0N·m	6.5 to 7.0N·m

※Use crimp terminals or terminals of size specified below. (unit: mm)



<Crimp terminal>

Terminal type	Terminal number	a	b	c
Input (11-pin)	1 to 11	6 to 7	Max. 1.5	Max. 3.5



<Round>

Terminal type			a	b
Alarm output/power input			Min. 3.0	Max. 6.0
Load output (SPR1 Series)	S		Min. 3.0	Max. 8.0
	R, U	Rated load current 25A/35A/50A/70A	Min. 6.0	Max. 16.0
		Rated load current 100A/150A	Min. 8.0	Max. 26.0
Load input/output (SPR3 Series)	R, S, T, U, V, W	Rated load current 25A/35A/50A/70A	Min. 6.0	Max. 16.0
		Rated load current 100A/150A	Min. 8.0	Max. 26.0

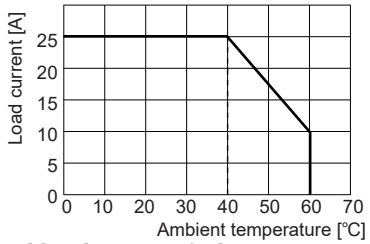
※Connect the specified wire as the rated load current.

Rated load current	Wire specification			
	Alarm output/ power input	Load output (SPR1 Series)		Load input/output (SPR3 Series)
		S	R, U	
25A/35A/50A/70A	AWG 18 to 14	AWG 18 to 14	AWG 13 to 4	AWG 13 to 4
100A/150A			AWG 4 to 2/0	AWG 4 to 2/0

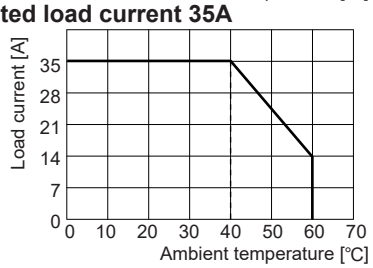
▣ Derating Curve

◎ SPR1 Series

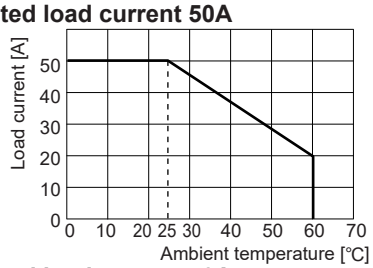
- **Rated load current 25A**



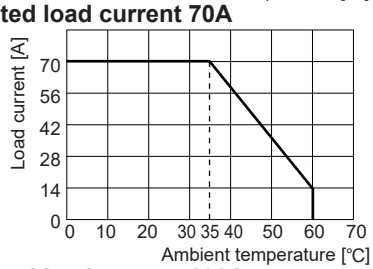
- **Rated load current 35A**



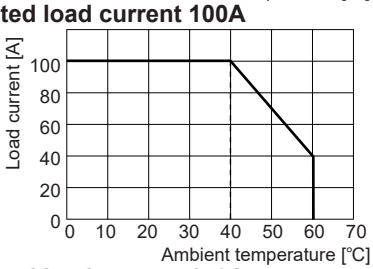
- **Rated load current 50A**



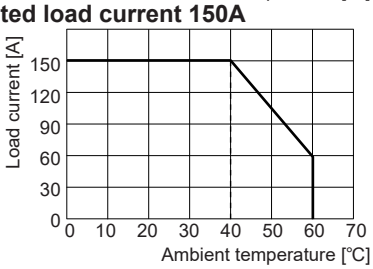
- **Rated load current 70A**



- **Rated load current 100A**

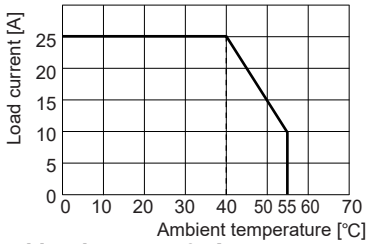


- **Rated load current 150A**

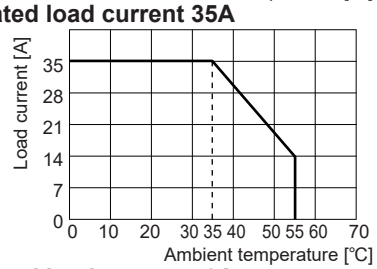


◎ SPR3 Series

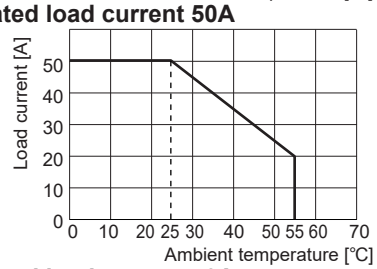
- **Rated load current 25A**



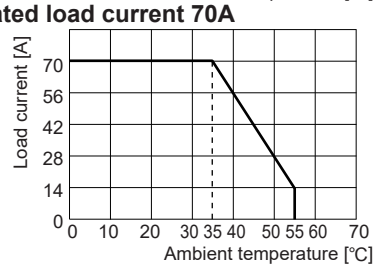
- **Rated load current 35A**



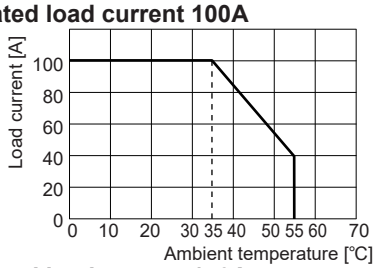
- **Rated load current 50A**



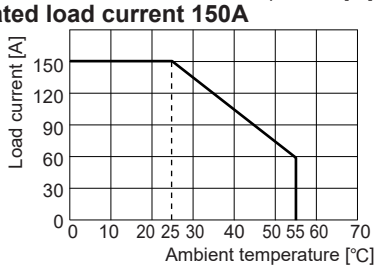
- **Rated load current 70A**



- **Rated load current 100A**

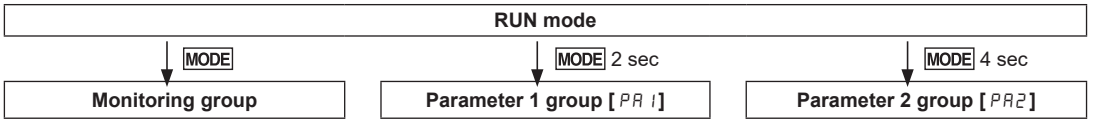


- **Rated load current 150A**



▣ Parameter Group

※Hold the MODE key in RUN mode to enter into parameter group.
※In parameter setting group, press the MODE key to move to other parameter in the group.
※Press the MODE key once after changing the setting value, to save the setting value and move to the next parameter.
※When entering to the parameter, press the ≪ key to move digit, ≫, ≪ keys to change the setting value.
※If there is no key input for 30 sec while setting SV or the parameters, the new settings are ignored, and the unit will return to RUN mode with previous settings.
※Hold the MODE key for 3 sec to save the setting value and return to RUN mode after changing the setting value.



◎ Monitoring group

Display		Measuring range	Description	Unit	Factory default
In		0 to 100	Displays the present control input as percentage.	%	—
SPR1	L-U ※1	0 to rated voltage range	Displays the present load voltage.	V	—
	L-A ※1	0 to rated current range	Displays the present load current.	A	—
SPR3	U-V ※1	0 to rated voltage range	Displays the present load voltage between U-V line.	V	—
	V-W ※1		Displays the present load voltage between V-W line.		
	W-U ※1		Displays the present load voltage between W-U line.		
	U-A ※1	0 to rated current range	Displays the present load current of U-phase.	A	—
	V-A ※1		Displays the present load current of V-phase.		
	W-A ※1		Displays the present load current of W-phase.		
L-W ※1		0 to rated power range	Displays the present load power.	kW	—
L-r ※1		0 to 100	Displays the present resistance as percentage compared to the set resistance of full load auto recognition.	%	—
tAP		0 to 100	Displays the present temperature of heatsink.	℃	—
Fr9		50, 60	Displays the present frequency of power supply.	Hz	—

◎ Parameter 1 group [PA1]

Display	Setting range	Description	Unit	Factory default
S-t	0 to 100	Set SOFT START time.	sec	3
U-t	0 to 100	Set SOFT UP time.	sec	3
d-t	0 to 100	Set SOFT DOWN time.	sec	3
L-L	0 ≤ L-L ≤ H-L ≤ 100	Set the output low-limit value.	%	0
H-L		Set the output high-limit value.	%	100
SLP ※2	0 to 100	In case of auto control (AUTO), set the output slop limit proportional to control input for limit load power.	%	100

◎ Parameter 2 group [PA1]

Display	Setting range		Description	Unit	Factory default
InT ※2	420	DC4-20mA	Set the control input specification.	—	420
	1-5	1-5VDC			
	5 12	5-12VDC			
	onF	ON/OFF contact			
	Con	RS485 comm.			
C-n	PA	Phase control- Normal	Set the control method. ※Cycle control-variable cycle [u-C] is displayed only for SPR1 series.	—	PA
	u-F ※1	Phase control - Constant voltage feedback			
	C-F ※1	Phase control - Constant current feedback			
	W-F ※1	Phase control - Constant power feedback			
	F-C	Cycle control - Fixed cycle			
	u-C	Cycle control - Variable cycle			
	onF	ON/OFF control			

Display	Setting range		Description	Unit	Factory default
MAn ※2	I_r	Inside adjuster	In case of manual control (MAN), set the output limit method.	—	I_r
	E_r	Outside adjuster			
	E_I	Inside/Outside adjuster			
Inb ※2	-99 to 99		Set the compensated input value for the offset between the actual input value and the measured input value.	%	0.0
SPn ※2	-99 to 99		Set the compensated input slope value between the actual input value 100% and the measured input value 100%.	%	0.0
dIS	In	Resistance and input	Set the desired value to be displayed at the front display part.	—	In
	SPR1 L-u ※1	Load voltage			
	SPR1 L-A ※1	Load current			
	SPR3 U-u ※1	Load voltage between U-V line			
	SPR3 u-v ※1	Load voltage between V-W line			
	SPR3 v-U ※1	Load voltage between W-U line			
	SPR3 U-A ※1	U-phase load current			
	SPR3 u-A ※1	V-phase load current			
	SPR3 v-A ※1	W-phase load current			
	L-v ※1	Load power			
oCu ※1	0 to 120		Set the overcurrent alarm value.	%	120
oCt ※1	0 to 100		Set the overcurrent alarm delay time.	sec	5
ouu ※1	0 to 120		Set the overvoltage alarm value.	%	120
out ※1	0 to 100		Set the overvoltage alarm delay time.	sec	5
F-L ※1	oFF / on		It executes 100% control output for 3 sec and the load resistance value recognized automatically as the initial set when the function is ON.	—	oFF
Hbu ※1	oFF / 10 to 100		Set the heater break alarm value.	%	10
Adr ※3	01 to 99		Assign the unique address when communicating.	—	01
bPS ※3	24, 48, 96, 192, 384		Set the speed of data transmission. Multiply by 100 to read the set value. (e.g.: 96=9600bps)	bps	96
Prt ※3	non / EuE / odd		A parity bit is a data communication method that adds an additional bit to each character in transmitted data as an indicator used to verify data loss and corruption.	—	non
StP ※3	1, 2		Set the number of bits to mark the end of a transmitted data string.	bit	2
rdt ※3	5 to 99		Set standby time to prevent communication errors when communicating with a slow master device (PC, PLC, etc.).	ms	20
CAv ※3	EnA	Enable	Enable or disable the setting of parameters stored in memory via communication from the master system (PC, PLC, etc.). Reading the set value in parameter is always possible.	—	EnA
	dSA	Disable			
LoC	oFF	Unlock	The parameter group settings can not be changed when the function is ON.	—	oFF
	LC1	PA1 lock			
	LC2	PA2 lock			
Ini	no / YES		If set the parameter to YES, reset all parameters to default. Hold the ◁, ▽, △ keys for 5 sec, to enter parameter reset parameter.	—	no

※1: Displayed only for feedback control models.
※2: Set the below parameters available depends on the control input.

Type	Input		Display		Input correction [Inb]	Input slope correction [SPn]	Output slope [SLP]	Monitoring value [In]
Auto control (AUTO)	Current	DC4-20mA	Int	420	○	○	○	The last control input value 0 to 100%
	Voltage	1-5VDC		1-5	○	○	○	
	pulse voltage	5-12VDC		5 12	×	×	○	
	No-voltage	ON/OFF contact		onF	×	×	○	
	RS485 communication			Com	×	×	×	
Manual control (MAN)	Output limit	Inside adjuster	MAn	I_r	×	×	×	
		Outside adjuster		E_r				
		Inside/outside adjuster		E_I				

※3: Displayed only for models with RS485 comm. output.

▣ Load Output Formula

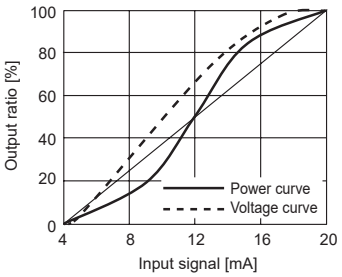
Type	Input		Display		Formula
Auto control (AUTO)	Current	DC4-20mA	int	420	Load output [%] = Control input [%] × Output slope (SLP) [%]
	Voltage	1-5VDC		1-5	
	RS485 communication			Con	Load output [%] = RS485 [%]
Manual control (MAN)	Output limit	Inside adjuster	man	I_r	Load output [%] = Inside adjuster [%]
		Outside adjuster		E_r	Load output [%] = Outside adjuster [%]
		Inside/outside adjuster		E_I	Load output [%] = Inside adjuster [%] × Outside adjuster [%]

▣ Control Method

◎ Phase control

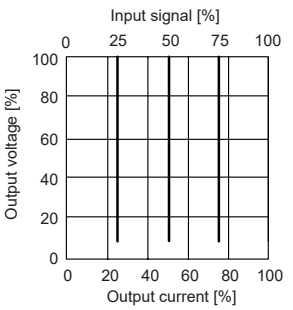
• Normal control mode

It is general output method to divide control angle proportionally according to control input signal and to output it.



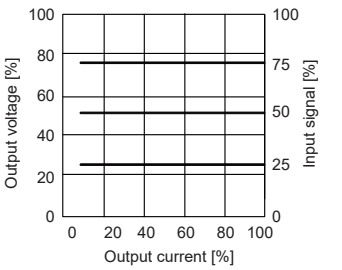
• Constant current feedback control mode

If temperature coefficient of load (platinum, molybdenum, tungsten, etc) changes 6 to 12 times based on room temperature, it outputs constant current which is proportion to control input not to change output voltage for power supply variation, load resistance variation.



• Constant voltage feedback control mode

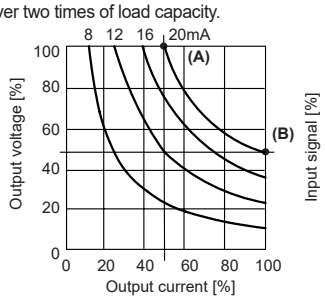
At low temperature coefficient load(iron, chrome, nichrome, etc) of electrical resistance, it outputs constant output which is proportion to control input not to change output voltage for power supply variation, load resistance variation.



• Constant power feedback control mode

It is proper control method for a heater which resistance value variation by silicon carbide (SiC) heating is big. It outputs constant power which is proportion to control input even though load variation and power supply variation.

Output characteristics is proper 50% of the curve which connects the point (A) [output voltage 100% × output current 50%] and the point (B) [output voltage 50% × output current 100%]. The current output capacity of this unit should be over two times of load capacity.

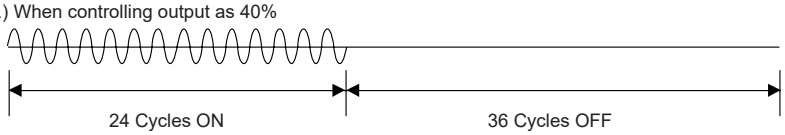


◎ Cycle control

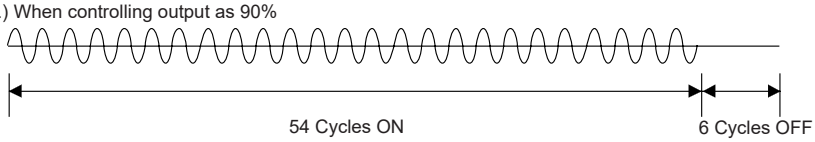
• Fixed cycle control mode

During fixed cycle (60 cycles) of load power, it repeats ON/OFF cycle as constant ratio according to control input signal and controls the power supplies on the load.

E.g.) When controlling output as 40%



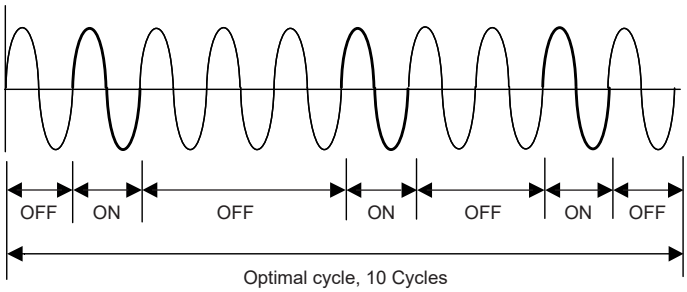
E.g.) When controlling output as 90%



• Variable cycle control mode

Variable cycle control controls required power using min. cycles of load power according to control input signal and optimize temperature changes of the subject.

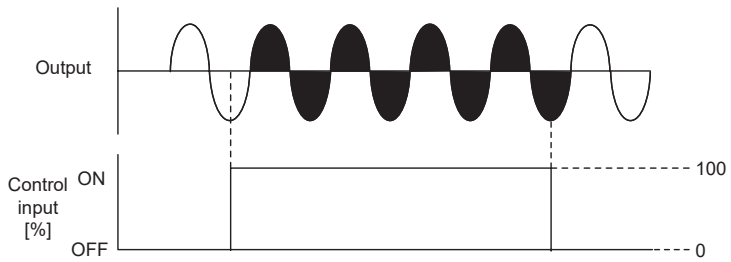
E.g.) When controlling output as 30%



◎ ON/OFF control

This is control method that output is 100% at control input ON (approx. 18mA, min. 4.5VDC), and 0% at control input OFF (approx. 18mA, max. 4.5VDC).

※When using ON/OFF control method, output limit, SOFT START, SOFT UP/DOWN, input correction, and input slope correction functions are not setable.

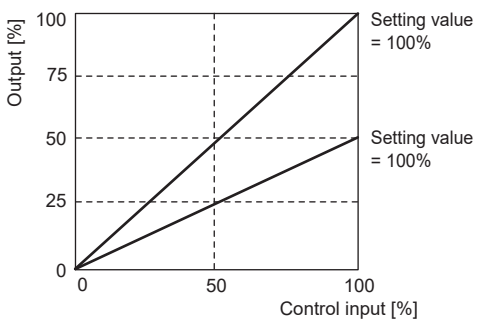


▣ Functions

◎ Output limit (OUT ADJ)

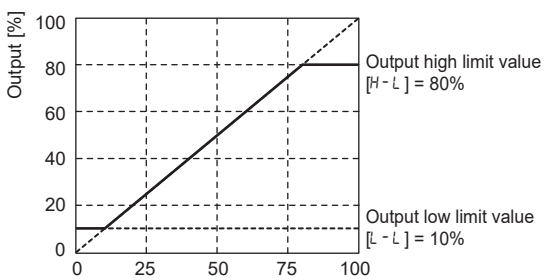
This function will be [Control input (%) × OUT ADJ (%) = Output] and it controls the power supplied into the load. Although control input is 100% (5V or 20mA), the output is the 50% which is proportioned with OUT ADJ.

※This function can not be used for ON/OFF control method.



◎ Output high limit/low limit value [H-L / L-L]

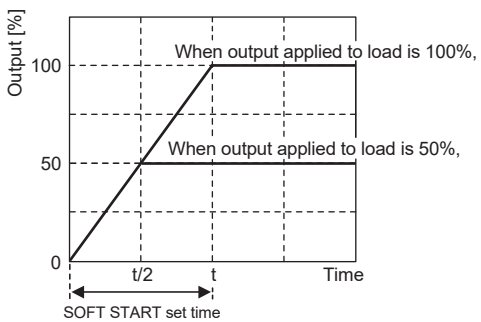
This function is to limit output range to protect load.



◎ SOFT START [S-T]

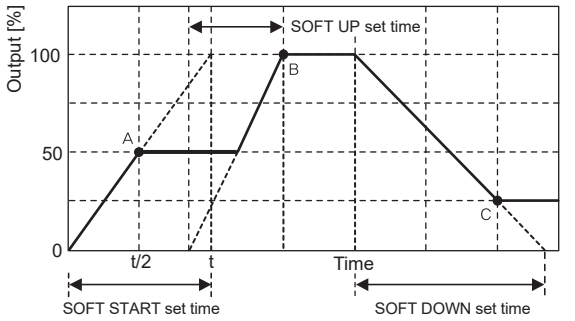
When the power is supplied, this function is able to protect the load when it controls load (molybdenum, white gold, infrared lamp) with inrush current or the width of rising temperature in big (SV is big). SOFT START set time (T) is the required time that output reaches to 100%, and it is differentiated by OUT ADJ set value.

※This function can not be used for ON/OFF control method.



◎ SOFT UP/DOWN [U-t/d-t]

Unlike SOFT START which operates only once at supplying power, this function protects load from the inrush current in the RUN mode. When reached to the target output value, operation stops.
※This function can not be used for ON/OFF control method.

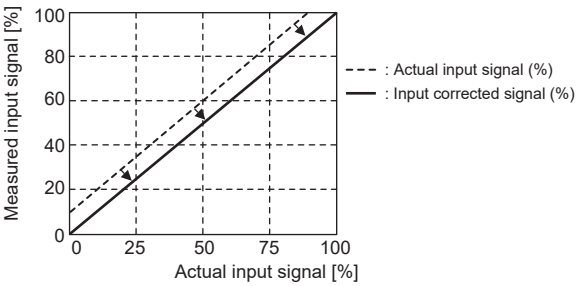


A: SOFT START function finished.
B: SOFT UP function finished.
C: SOFT DOWN function finished.

◎ Input correction [inb]

It compensates the offset between actual input value and measured input value.

E.g.) When the input monitoring value is 5% at 4mA in DC4-20mA control input, setting inb to -5 calibrates the input monitoring value to 0%.

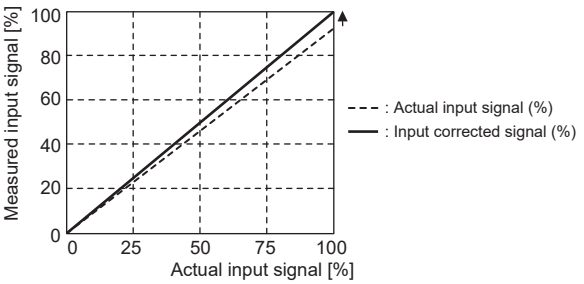


◎ Input slope correction [SPn]

It compensates the gain of the measured 100% input for actual 100% input value.

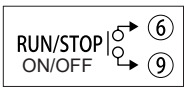
$$\text{Calibrated monitoring value} = \text{Monitoring value} + \frac{\text{Monitoring value}}{100 - SPn} \times SPn$$

E.g.) When the input monitoring value is 99% at 4mA in DC4-20mA control input, setting SPn to 1 calibrates the input monitoring value to 100%.



◎ RUN/STOP switching

RUN/STOP status of the power controller can be switched with the external RUN/STOP contact.
In the RUN mode, the operation indicator on the front turns on.



◎ AUTO/MANUAL selection

Operation mode (auto control/manual control) of the power controller can be selected with the external AUTO/MAN contact.
In the manual control mode, the manual control indicator on the front turns on.

◎ RESET

In the event of system anomalies and alarms, RESET input restarts the power controller.(Parameters are not initialized.)
Or, hold the ▼, ▲ keys for 2 sec, to operates RESET.

◎ Alarm

Type	Display		Operation		Clear alarm
	Error	Priority	Alarm	Output	
SCR error alarm※1	Scr	1	• Error messege flashes. • Alarm indicator (ALM) flashes. • Alarm output turns ON	• Output stops. (SCR OFF)	• Re-supply the power • RESET • Switch to STOP mode
Overcurrent alarm※1	o-C	2			
Heatsink overheat alarm	tEn	4			
Overvoltage alarm※1	o-u	5			• Automatically cleared when returning within the setting range
Fuse break alarm	FUS	3			
Frequency error alarm※2	Frq	6			
Heater break alarm※1	H-b	7		• Continues operation	

※1:This is only for feedback control models.
※2: This is only for normal control models of SPR1 Series.
※When multiple alarms occur at the same time, the highest priority error message will be displayed based on priority.

1) SCR error alarm
Even though output is 0%, if the current of 10% or more of the rated load current flows for over 3 sec continuously, SCR error alarm occurs.

2) Overcurrent alarm
This function protects the load from overcurrent.
If the current flows over the overcurrent alarm setting value [oCu] and setting delay time [oCt], overcurrent alarm occurs.

3) Heatsink overheat alarm
When the temperature of a heatsink is over 85℃, heatsink overheat alarm occurs.

4) Overvoltage alarm
This function protects the load from overvoltage.
If the current flows over the overvoltage alarm setting value [ouu] and setting delay time [out], overvoltage alarm occurs.

5) Fuse break alarm
When braking fuse, not suppling load power, breaking load (single load), fuse brake alarm occurs.

6) Frequency error alarm
When the load power frequency is out of the specification, frequency error alarm occurs.

7) Heater break alarm
Comparing the full load resistance value and the current load resistance value, if the current load resistivity is maintained under the setting value [Hbu] for over 3 sec continuously, heater break alarm occurs. This alarm operates when control output is over 10% and load current is over 10% of the rated current. Output does not stop and operates normally.

$$\text{Current load resistivity(\%)} = \frac{\text{Full load resistance value}}{\text{Current load resistance value}} \times 100$$

◎ Full load auto recognition [F-L]

This function recognizes the load resistance value automatically. Turning on this function operates the load with 100% of output for approx. 3 sec and sets the load resistance value in the product automatically.
※This is only for feedback control models.

◎ RMS display/control

SPR Series measures and displays RMS value for maintaining accuracy.
E.g.) At pure resistance load, when control input is 4-20mA, rating is 220V or 50A.

Control input	4mA	8mA	12mA	16mA	20mA	Unit
Amount of control input	0	25	50	75	100	%
Display voltage (normal control mode)	0	66	155	210	220	V
Display voltage (constantvoltage feedback control mode)	0	55	110	165	220	V
Display current (constantcurrent feedback control mode)	0	12	25	38	50	A

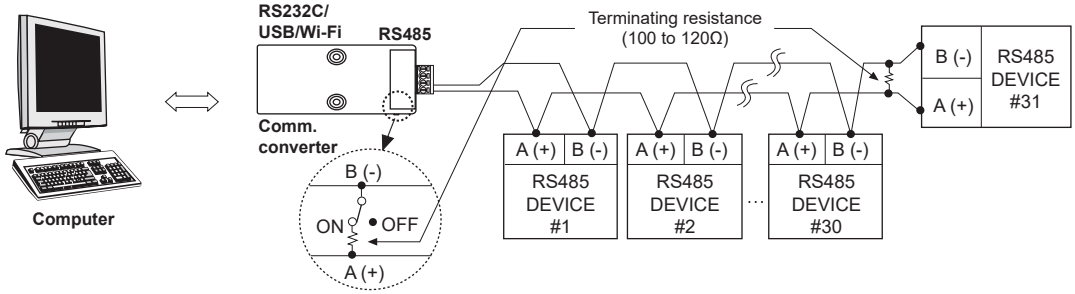
▣ RS485 Communication Output

※Applicable for models with RS485 communication output through option output (SPR□-□□T□□).
Please refer to '▣ Ordering Information'.

◎ Communication Specifications

Comm. protocol	Modbus RTU	Comm. speed	2400, 4800, 9600, 19200, 38400 bps
Connection method	RS485	Comm. response time	5 to 99ms (default: 20ms)
Application standard	Compliance with EIA RS485	Start bit	1-bit (fixed)
Max. connections	31 units (address: 1 to 99)	Data bit	8-bit (fixed)
Synchronization method	Asynchronous	Parity bit	None, Even, Odd
Comm. method	Two-wire half duplex	Stop bit	1-bit, 2-bit
Comm. distance	Max. 800m		

◎ Application of system organization



※It is recommended to use Autonics communication converter; SCM-WF48 (Wi-Fi to RS485·USB wireless communication converter, sold separately), SCM-US48I (USB to RS485 converter, sold separately), SCM-38I (RS232C to RS485 converter, sold separately). Please use twisted pair wire, which is suitable for RS485 communication, for SCM-WF48, SCM-US48I and SCM-38I.

▣ Sold Separately

◎ Communication converter

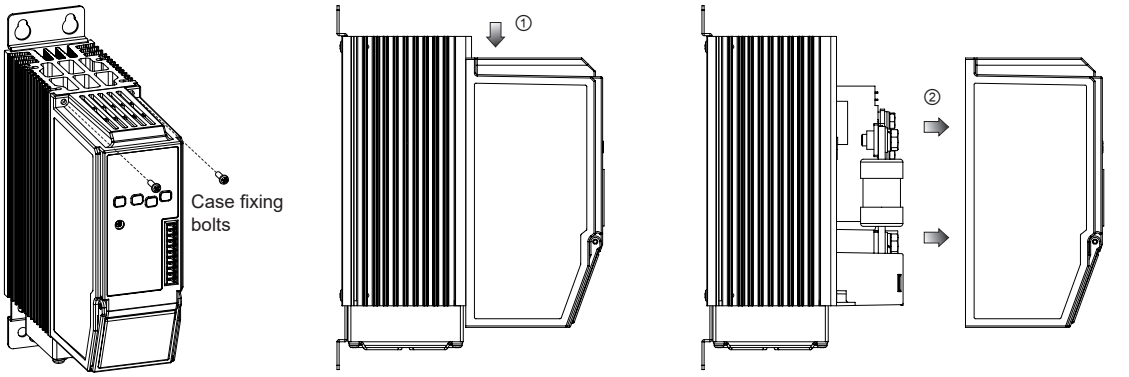
- **SCM-WF48**
  (Wi-Fi to RS485·USB wireless communication converter)

- **SCM-US48I**
  (USB to RS485 converter)

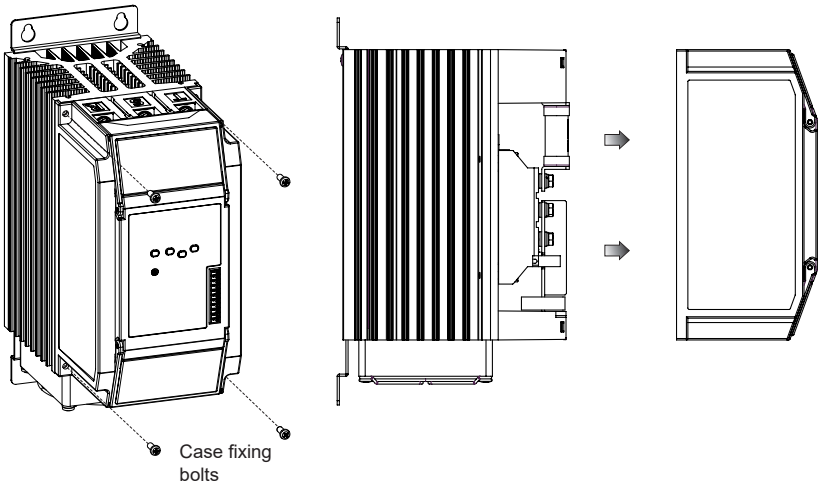
- **SCM-38I**
  (RS232C to RS485 converter)

▣ Removing the Case

◎ SPR1 Series



◎ SPR3 Series

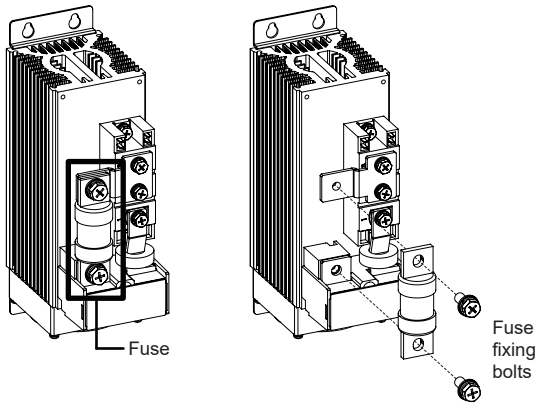


• Specification of case fixing bolts

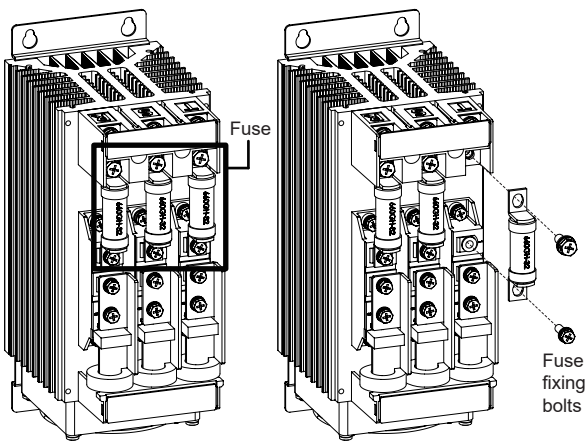
Rated load current	Spec. of bolts
25A, 35A, 50A, 70A	M3
100A, 150A	M4

▣ Replacement of Fuse

◎ SPR1 Series



◎ SPR3 Series



● Specification of fuse fixing bolts

Series / Rated load current	SPR1	SPR3
25A	M6	M6
35A		
50A		
70A		
100A	M8	Top: M8 Bottom: M6
150A		M8

● Recommended fuse specifications

For replacing the fuse, please use the recommended fuse which has the below specifications.
(manufacture: BUSSMANN, HINODE)

Series / Rated load current	SPR1	SPR3
25A	50FE	50FE
35A	63ET	63ET
50A	80ET	80ET
70A	100FE	100FE
100A	FWH-150B	660GH-160※1
150A	FWH-200B	660GH-200※1

※1: Fuse manufacture: HINODE
※The performance of the product is guaranteed only when using the fuse provided by us.

▣ Proper Usage

⚠ Cautions during use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. Use the product, after 3 sec of supplying power.
3. Before use, set the mode and function according to the specification.
   Especially, be cautious that the product does not operate when OUT ADJ. is set to 0%. Since changing the mode/ parameter during operation may result in malfunction, set the mode and function after disconnecting load output.
4. Re-supply the power to the unit after the unit is discharged completely.
   Failure to follow this instruction may result in malfunction.
5. To ensure the reliability of the product, install the product on the panel or metal surface vertically to the ground.
6. Install the unit in the well ventilated place.
7. While supplying power to the load or right after turning off the power of the load, do not touch the body and heat sink.
   Failure to follow this instruction may result in a burn due to the high temperature.
8. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
9. Do not wire to terminals which are not used.
10. Since inter element can be damaged when using with coil load, inductive load, etc., the inrush current must be under the rated load current.
11. Do not use near the equipment which generates strong magnetic force or high frequency noise.
12. This unit may be used in the following environments.
    ① Indoors (in the environment condition rated in 'Specifications')
    ② Altitude max. 2,000m
    ③ Pollution degree 2
    ④ Installation category III

Digital Power Controllers

▣ Features

- High speed and high accuracy by digital control using high speed CPU
- Various controls
  - Phase control, feedback control (constant voltage/constant current/constant power)
  - Zero crossing cycle control (fixed/variable cycles)
  - Zero crossing ON/OFF control
- Improved maintainability with built-in fast-acting fuse and easy fuse replacement
- Communication output model: RS485 (Modbus RTU)
- Various control inputs and DI inputs
  - control input: analog (current, voltage), ON/OFF (voltage pulse, no voltage), communication (RS485), potentiometer
  - DI input: AUTO/MAN switching, RUN/STOP switching, Reset, output holding, SP designation (6 setting points can be customized)
- Various alarm output
  - Overcurrent, overvoltage, fuse break, heat sink overheat, device fault, heater break alarm (partial heater break detection)
- Improved convenience by separating operation part
- Applicable load
  - Supercantal, platinum, molybdenum, carbon, halogen lamps, chrome, nickel, etc.

⚠ **Please read "Safety Considerations" in the instruction manual before using.**

CE

▣ Ordering Information

DPU | **1** | **2** | **A** | — | **025** | **R**

Option

R	RS485 communication
D	Remote Display Unit
A	Remote Display Unit + RS485 communication
N	No option

Rated load current

025	25A	180	180A
040	40A	200	200A
050	50A	250	250A
070	70A	350	350A
080	80A	400	400A
100	100A	500	500A
120	120A	600	600A
150	150A		

Size

	Single-phase	3-phase
A	0 to 70A	0 to 50A
B	80 to 200A	70 to 200A
C	250 to 350A	
D	400 to 600A	
E	Option	

Power supply

1	110VAC
2	220VAC
3	380VAC
4	440VAC

Control phase

1	Single-phase
3	3-phase

Item

DPU	Digital Power Controller

◎ Size type

• DPU1 Series (unit: mm)

Size	Current capacity	W	H	D	P1	P2	Allowable cable thickness
A	0 to 70 A	97	260	170	82	150	Min. AWG 4
B	80 to 200 A	140	280	174	127	150	Min. AWG 4/0
C	250 to 350 A	213	338	179	193	200	Min. AWG 300MCM
D	400 to 600 A	278	418	212	261	200	Min. AWG 500MCM

• DPU3 Series (unit: mm)

Size	Current capacity	W	H	D	P1	P2	Allowable cable thickness
A	0 to 50A	140	306	200	127	150	Min. AWG 4
B	70 to 200A	213	365	217	195	200	Min. AWG 4/0
C	250 to 350A	278	450	227.5	261	200	Min. AWG 300MCM
D	400 to 600A	427	528	275.5	405	330	Min. AWG 500MCM

■ Specifications

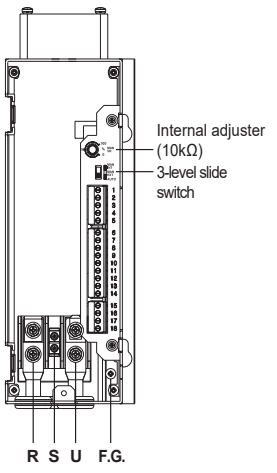
Series		DPU1		DPU3	
Control phase		Single-phase		3-phase	
Power supply		110VAC～ / 220VAC～ / 380VAC～ / 440VAC～ (FAN and control power 220VAC～ 50/60Hz separately)			
Allowable voltage range		90 to 110% of rated voltage		85 to 115% of rated voltage	
Rated frequency		50/60Hz (auto recognition), allowable frequency range: ±2Hz			
Min. load current		1A			
Output range		Phase control: 5 to 98%, Z.C. control: 0 to 100%			
Control method※1		• Phase control: Normal control (non-Feedback), constant voltage/constant current/constant power control (Feedback) • Cycle control (Z.C.): Fixed cycle control, Variable cycle control • ON/OFF control (Z.C.)			
Applied load		• Phase control: resistance load, inductive load • ON/OFF, Cycle control: resistance load			
Power consumption		Max. 7W (except FAN operation power)		Max. 10W (except FAN operation power)	
Display method		• Display value and SV display: 7-segment 4-digit • Status display: 4 LED • Display value percentage display: 11 LED Bar		• Display value and SV display: 7-segment 4-digit • Status display: 6 LED • Display value percentage display: 11 LED Bar	
Output accuracy		• Constant voltage feedback control: Within ±3% F.S. of rated voltage (within variable ±10% F.S. of rated voltage) • Constant current feedback control: Within ±3% F.S. of rated voltage (within variable 1 to 10 times of rated resistance) • Constant power feedback control: Within ±3% F.S. of rated voltage (within variable ±10% F.S. of rated voltage and within variable 1 to 10 times of rated resistance) • Normal control: within ±10% F.S. of rated voltage			
Set method		By front keys, By communication			
Control input		• Auto: 4-20mA / 0-20mA / 0-5VDC⎓ / 1-5VDC⎓ / 0-10VDC⎓ / voltage pulse (0/12VDC⎓ (24VDC⎓)) / no-voltage input (ON/OFF) / communication input (RS485) • Manual: inside 10kΩ adjuster, outside 3 to 10kΩ adjuster (min. 2W)			
Digital input (DI)		AUTO/MAN switching, RUN/STOP switching, RESET, Output holding, SP setting (SP1 to 6)			
Display content		Control input, load voltage, load current, load power, load resistance, power supply frequency			
Min. display output		Min. 2.5% of rated voltage/current			
Option output		RS485 communication output (Modbus RTU method), [max. 32 units]			
Dielectric strength		2,000VAC 50/60Hz for 1 min (between input terminal and power terminal)			
Vibration		0.75mm amplitude at frequency of 5 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours			
Insulation resistance		Over 200MΩ (at 500VDC megger)			
Noise immunity		±2kV the square wave noise (pulse width 1μs) by the noise simulator			
Environment	Ambient temp.	-10 to 50℃, storage: -20 to 80℃			
	Ambient humi.	5 to 90%RH, storage: 5 to 90%RH			
Approval		CE			
Weight※2		• A size : approx. 3.2kg (approx. 3.0kg) • C size : approx. 12.1kg (approx. 11.0kg)	• B size : approx. 5.6kg (approx. 3.0kg) • D size : approx. 19.3kg (approx. 11.0kg)	• A size : approx. 7.6kg (approx. 6.5kg) • C size : approx. 21.1kg (approx. 20.0kg)	• B size : approx. 13.0kg (approx. 11.5kg) • D size : approx. 35.7kg (approx. 30.8kg)

※1. Variable cycle control is only for single-phase model.
※2. The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

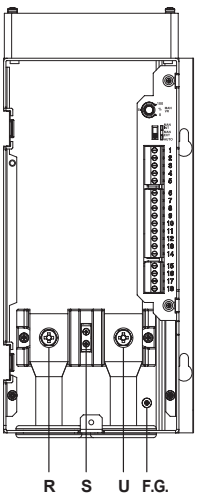
▣ Connections

◎ DPU1 Series

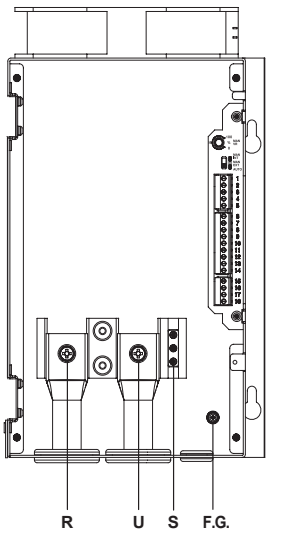
• A Size



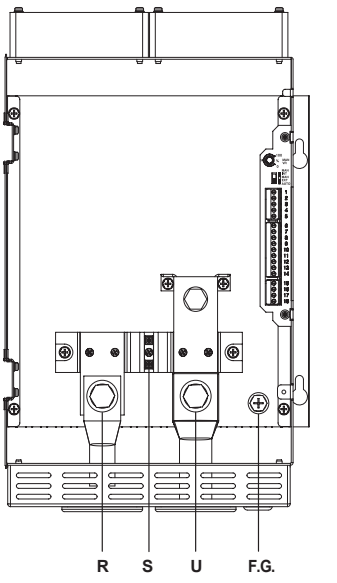
• B Size

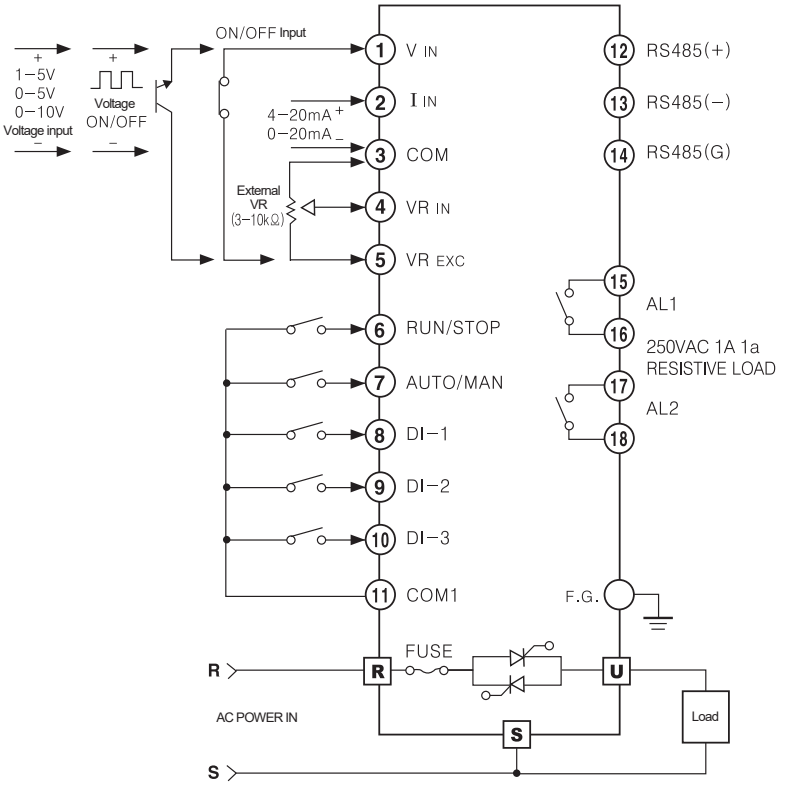


• C Size



• D Size

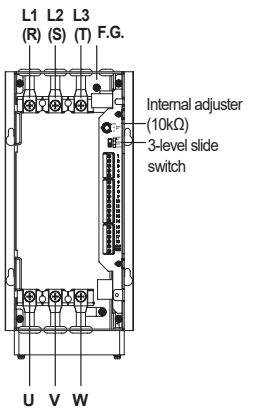




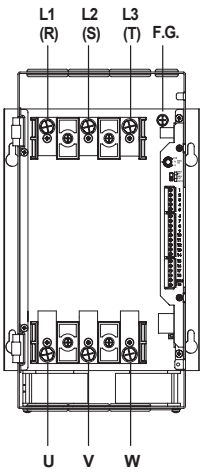
- Do not mix noise to input cable. It is recommended to use shield cable, twisted cable as input cable for effective noise.
- If there is possible to affect inductive noise, it is recommended to use shielded cable at high-frequency power for effective noise.
- DI input switch should be for low current and ON resistance should be max. 20Ω (including cable resistance).
- DI input terminals are COM, DI-1 to 3, RUN, AUTO.
- For remote display unit option model, use connection cable as our standard cable.
- When connecting ⑥, ⑪ , it operates as MANUAL. When connecting, ⑥, ⑦, ⑪, it operates AUTO.

◎ DPU3 Series

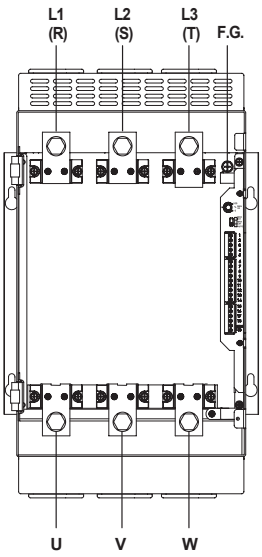
• A Size



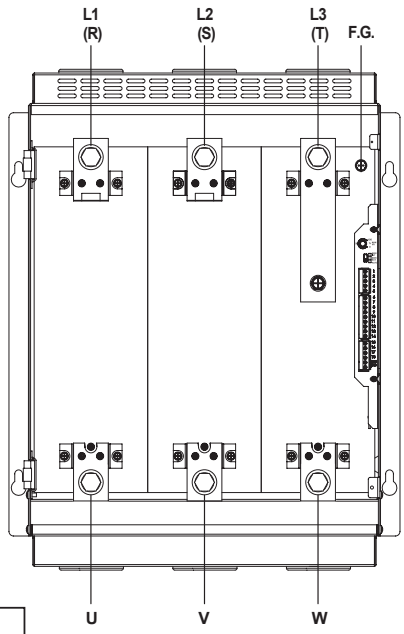
• B Size

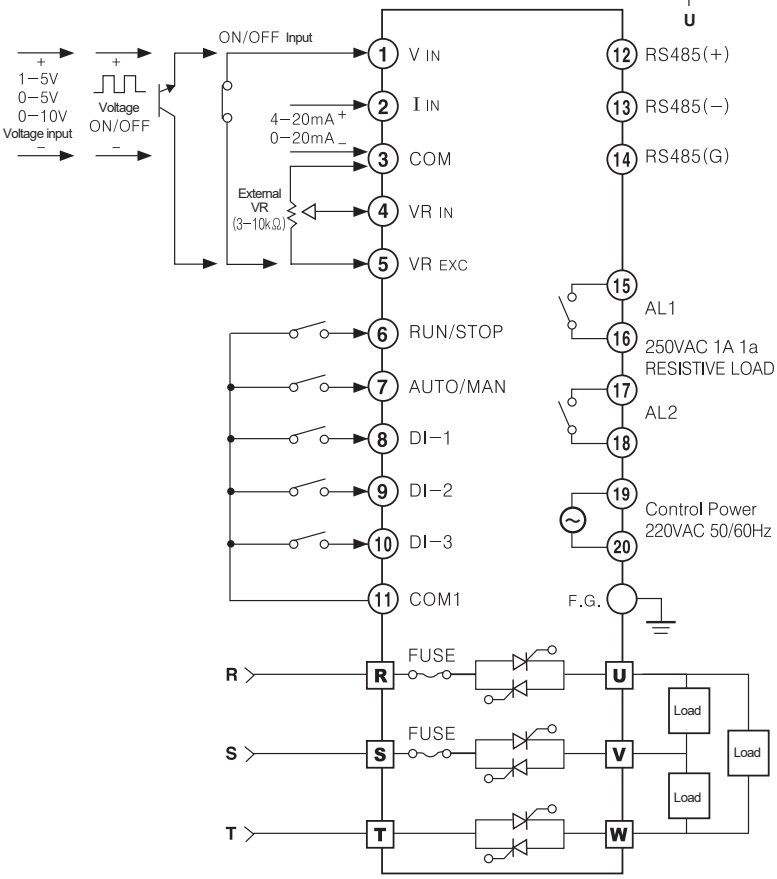


• C Size



• D Size





- Do not mix noise to input cable. It is recommended to use shield cable, twisted cable as input cable for effective noise.
- If there is possible to affect inductive noise, it is recommended to use shielded cable at high-frequency power for effective noise.
- DI input switch should be for low current and ON resistance should be max. 20Ω (including cable resistance).
- DI input terminals are COM, DI-1 to 3, RUN, AUTO.
- For remote display unit option model, use connection cable as our standard cable.
- When connecting ⑥, ⑪ , it operates as MANUAL. When connecting, ⑥, ⑦, ⑪, it operates AUTO.

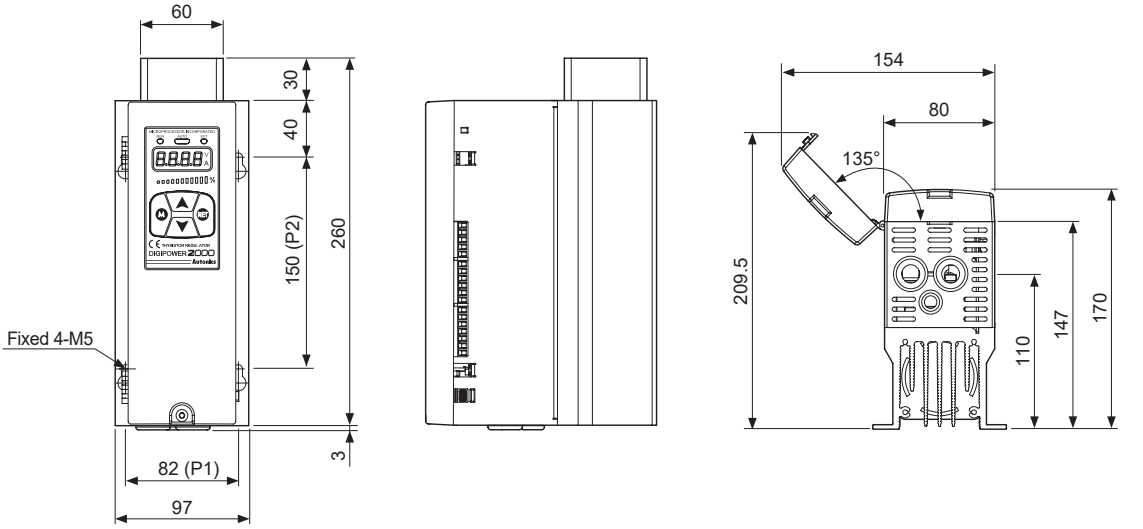
▣ Dimensions

(unit: mm)

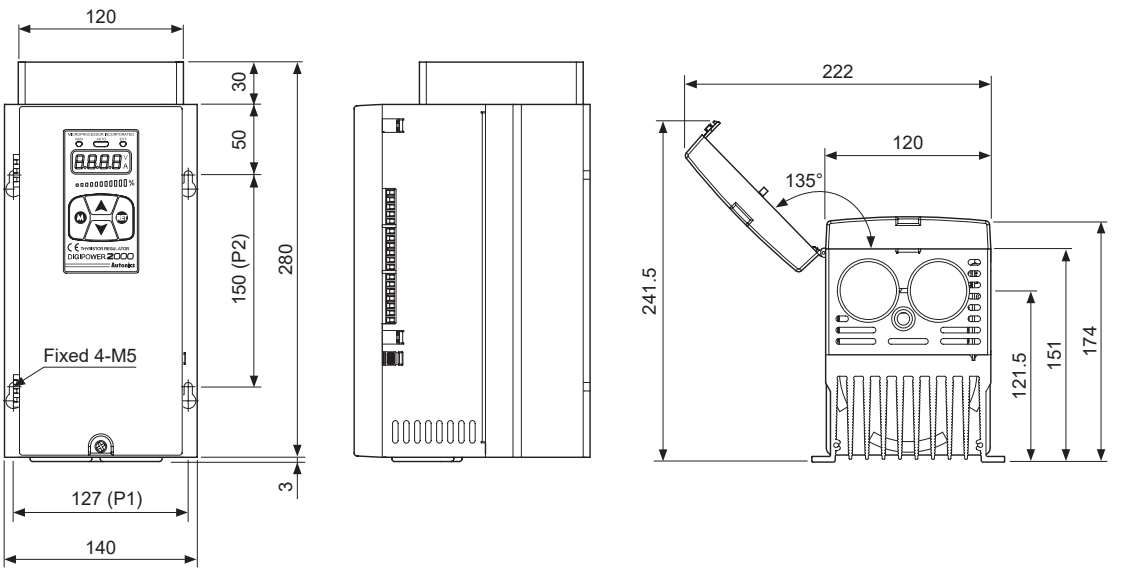
◎ DPU1 Series

● A Size: DPU1☐A-025/040/050/070

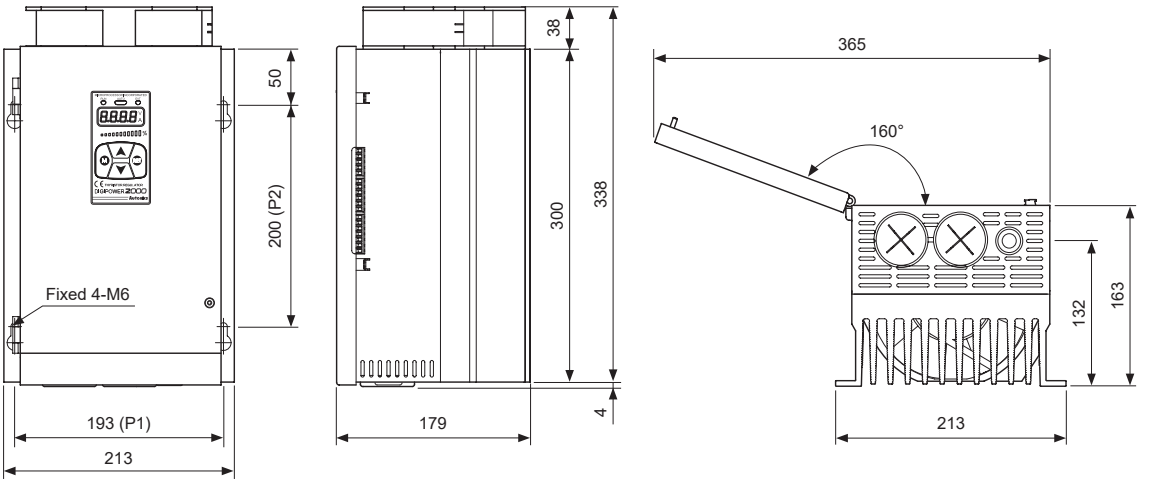
※25A, 40A, 50A are not attached a fan.



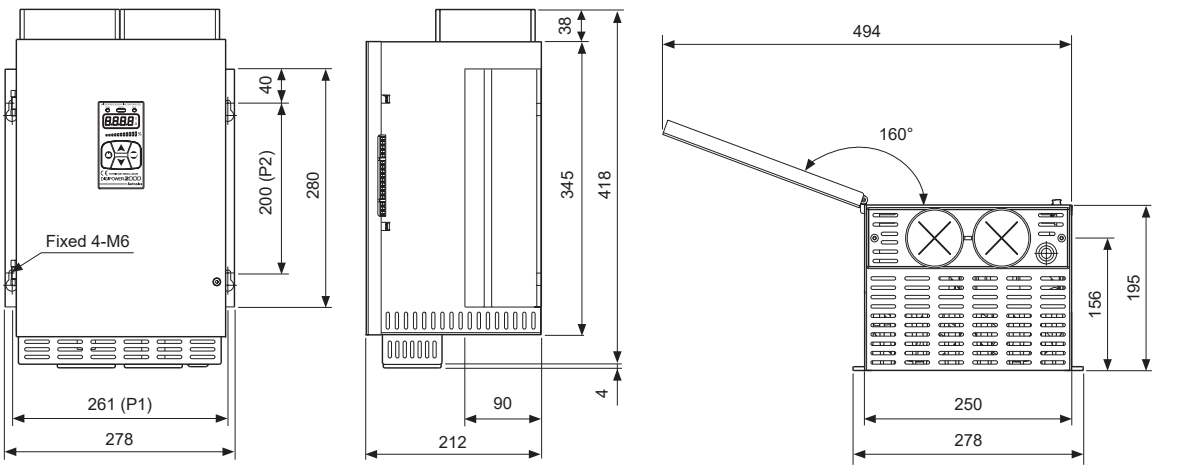
● B Size: DPU1☐B-080/100/120/150/180/200



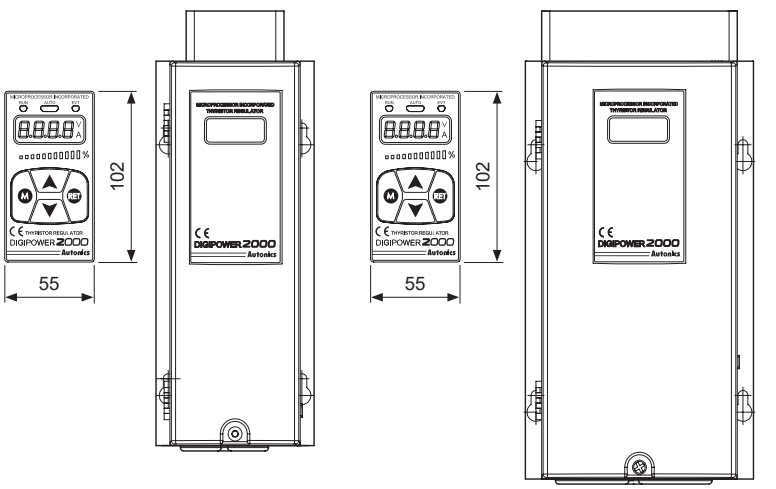
● **C Size: DPU1□C-250/350**



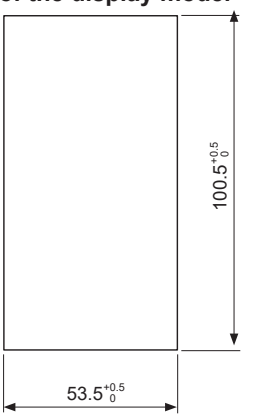
● **D Size: DPU1□D-400/500/600**



◎ **In case of remote display unit + RS485 communication option**



● **Panel cut-out of the display model**

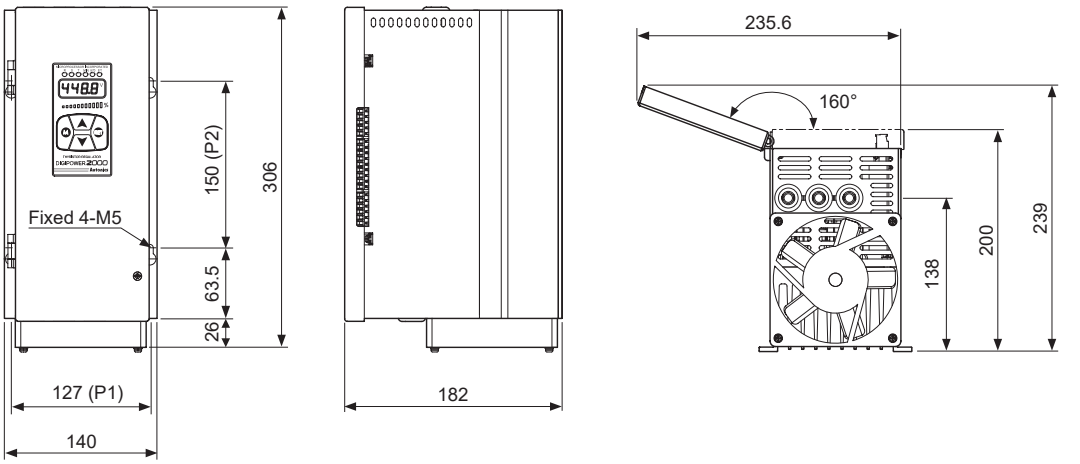


※It is recommended for remote panel cable to use max. 5 m to prevent noise. (Check the length when ordering it.)

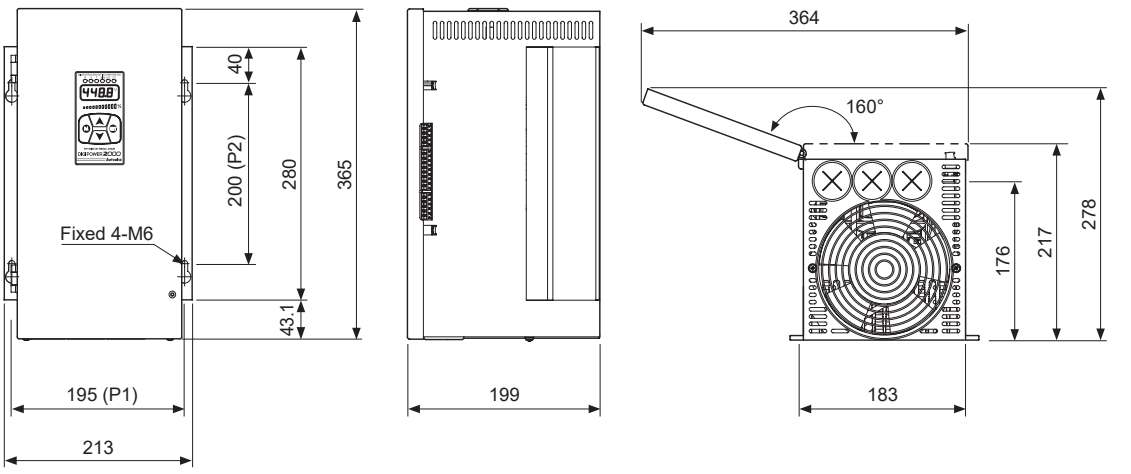
◎ DPU3 Series

(unit: mm)

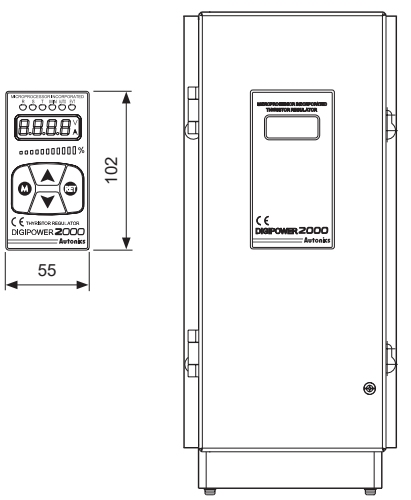
● A Size: DPU3□A-025/040/050



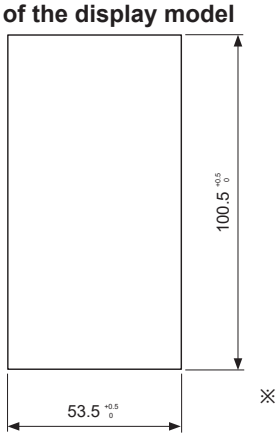
● B Size: DPU3□B-070/080/100/120/150/180/200



◎ In case of remote display unit + RS485 communication option

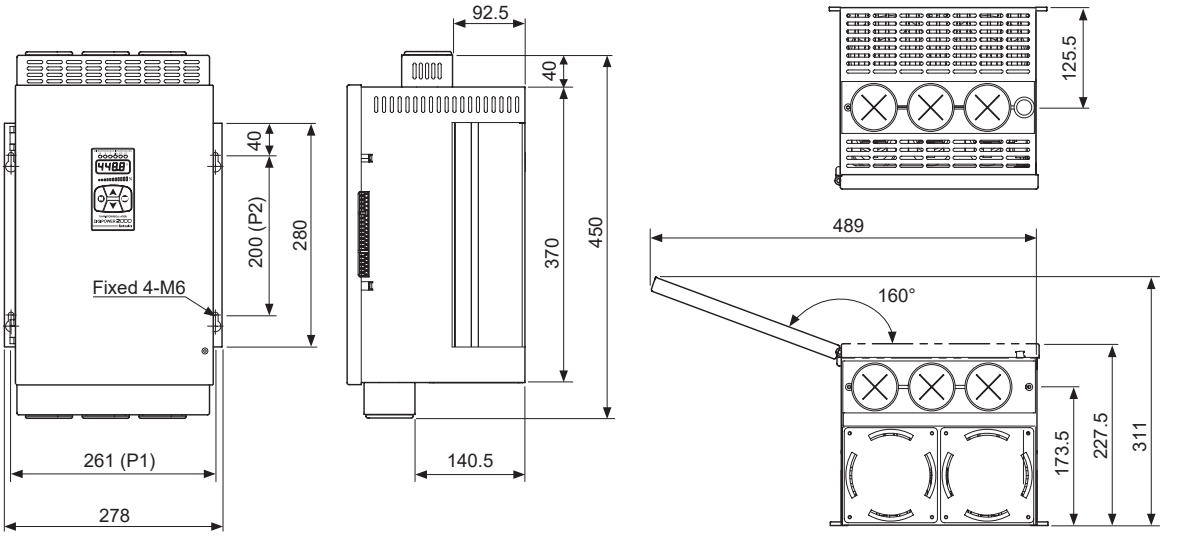


● Panel cut-out of the display model

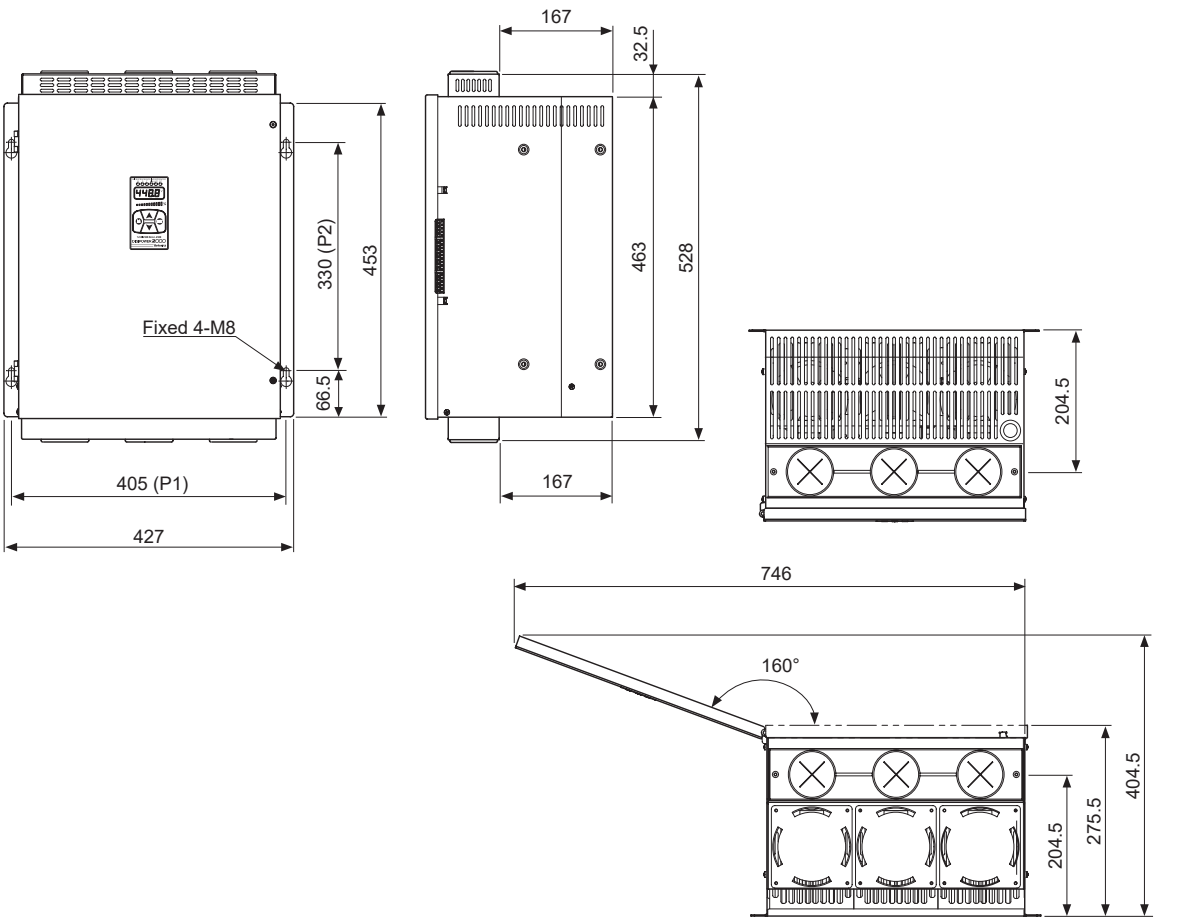


※ It is recommended for remote panel cable to use max. 5m to prevent noise. (Check the length when ordering it.)

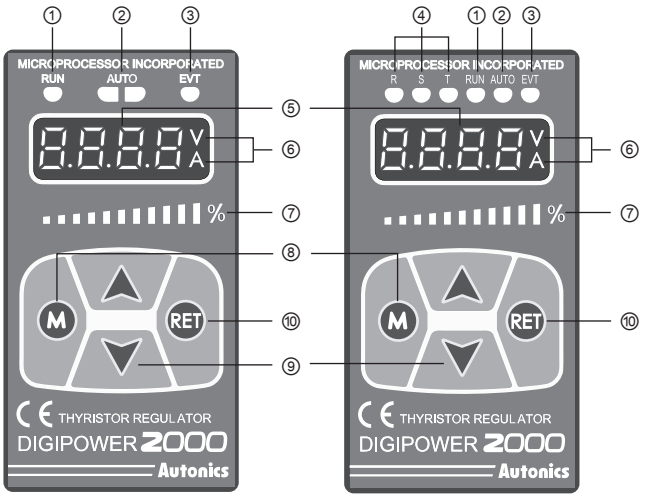
● **C Size: DPU3□C-250/350**



● **D Size: DPU3□D-400/500/600**



▣ Unit Description



<single-phase> <3-phase>

① RUN indicator: Turns ON in RUN, turns OFF in STOP
② AUTO indicator: Turns ON in AUTO, turns OFF in MANUAL
③ EVT indicator: Turns ON in Digital Input (DI-1 to 3) ON, flashes in alarm output
④ R, S, T indicators: Turns ON differently by displayed value in display part
E.g.) When R, S turn ON, it displays voltage between R-S line
⑤ Display part: Displays selected display value content in RUN mode, displays parameter and set value in SET mode
⑥ V, A indicators
: The V indicator turns ON when displaying voltage.
The A indicator turns ON when displaying current.
The V, A indicators turn ON when displaying power.
The V, A indicators turn OFF when displays resistance and input value.
⑦ Bar display: Turns ON as 0 to 100% ratio for selected display value
⑧ (M) key: Used to enter parameter mode, monitoring mode and to move between parameters
⑨ ▲,▼ key: Used to move setting modes and to set parameters.
⑩ (RET) key: Used to return to RUN mode from SET mode

▣ Control Input

◎ Input type

Type					Parameter
AUTO input	Analog input	Current	4-20mA	Input impedance 100Ω	4-20
			0-20mA		0-20
		Voltage	1-5VDC	Input impedance 25Ω	1-5
			0-5VDC		0-5
			0-10VDC		0-10
	ON/OFF input	Voltage pulse	0/12VDC		SSr
		No-voltage pulse	ON/OFF	—	
	Comm. input	RS485	—	—	Con
MANUAL input		Internal adjuster	10kΩ	—	—
		External adjuster	3 to 10kΩ	—	—

◎ Input selection

In AUTO input, select it at control input type[In-P] at setting mode1.
In MANUAL input, set output slope manual adjustment [A-GA] in operating mode as OFF and select the input by the inside 3-level slide switch.

● Output slope manual adjustment [A-GA] as oFF
: Select the input by the inside 3-level slide switch

Type		Description
MAN INT / MAN EXT / AUTO	MAN INT	Adjust output slope with the inside adjuster
	MAN EXT	Adjust output slope with an outside adjuster
	AUTO	No function

◎ AUTO/MANUAL selection by terminal input (DI) [terminal 7 and 11]

When the AUTO/MAN terminal input is ON (close), it is AUTO input operation. When it is OFF (open), it is MAN (manual) input operation.
When the AUTO/MAN terminal input is OFF (open) (MANUAL operation), only INT or EXT input selected by the 3-level slide switch is available.

▣ Functions

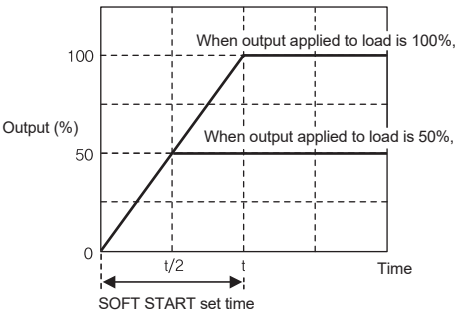
◎ SOFT START [St-t]

When controlling the load which has inrush current (platinum, molybdenum, tungsten, infrared lamp, etc) in power ON, or when control input changes rapidly, it prevents the load to increase output gradually within the set time. Set the time for soft start.
Regardless of control method setting (phase control or cycle control), it operates as phase control.
Set the time to reach output from 0 to 100%.
It operates when it is RUN mode from STOP status after supplying power or reset. When it reaches to the target output value, soft start function ends.
Soft start set time (t) is the time up to 100% increase of output applied to load. When the final target output value is 50%, taken time to reach is t/2.

Reaching time to the final target output value = Target output (%)× t

※ E.g.) SOFT START time: 25 sec, final target output: 80%
0.8×25 = 20 sec

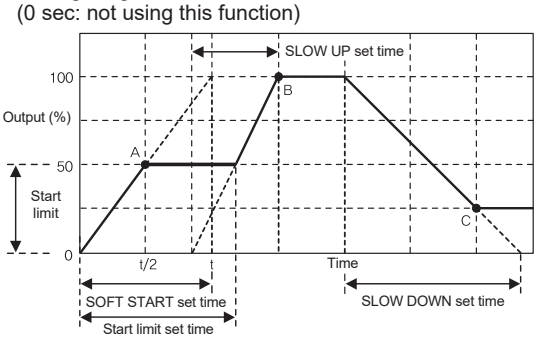
- Setting range: 0 to 100 sec (0 sec: not using this function)



◎ Start limit [S-Ln] and start limit time [S-Lt]

When power is ON, changing to RUN status from STOP status, or alarm reset, set limit output value and time to prevent the inrush current or error current.
Regardless of control method setting (phase control or cycle control), it operates as phase control.

- Setting range for start limit: 0 to 110% of output
- Setting range for start limit time: 0 to 100 sec
(0 sec: not using this function)

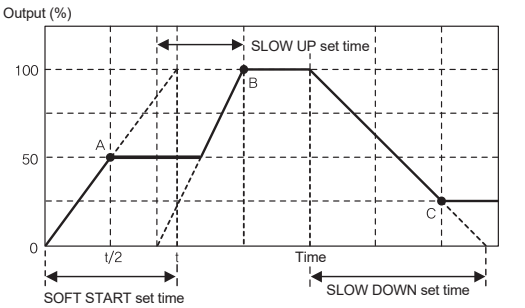


- A: SOFT START function ends
- B: SLOW UP function ends
- C: SLOW DOWN function ends

◎ SLOW UP / SLOW DOWN [UP-t / dn-t]

It is same purpose as soft start function. Soft start starts only one time at first but slow up/slow down function start during operation.
Regardless of control method setting (phase control or cycle control), it operates as phase control.
When it reaches to the target output value, slow up/slow down functions end.

- Setting range: 0 to 999 sec
(0 sec: not using this function)

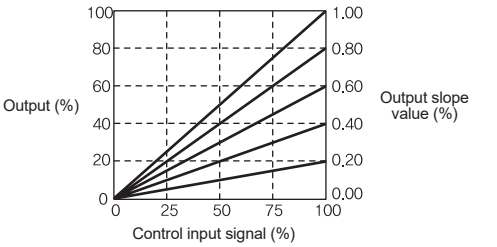


- A: SOFT START function ends
- B: SLOW UP function ends
- C: SLOW DOWN function ends

◎ Output slope setting [SLoP]

This function is to set output changed ratio by control input from 0.00 to 1.00 range.

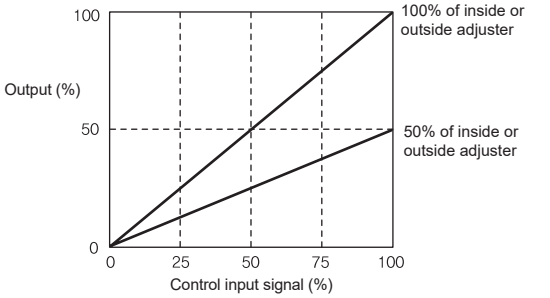
- Output value when setting slope: Input (%)×Slope value



▣ Functions

◎ Output slope manual adjustment [A-GA]

This function is to adjust manually (inside or outside adjuster) output value ratio for control input.
When AUTO operation and output slope manual adjustment [A-GA] is set as ON, [SLoP] is not able to set.
It displays slope value by the inside or outside adjuster input.



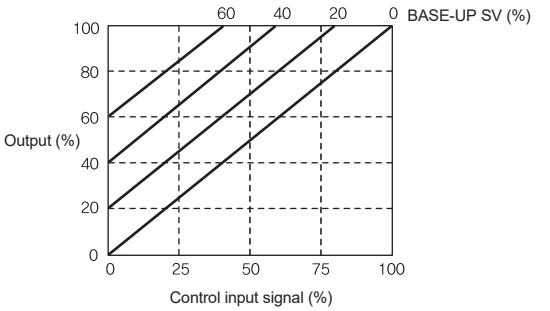
● Output slope manual adjustment [A-GA] as on
: Set output slope by the inside 3-level slide switch

Type		Description
MAN INT / MAN EXT / AUTO	MAN INT	Adjust output slope with the inside adjuster
	MAN EXT	Adjust output slope with an outside adjuster
	AUTO	No function

◎ BASE-UP [b-UP]

This function is to add base-up set value to input signal.
It is available only when output low-limit value is 0%.
It is limited by start limit value at initial start.

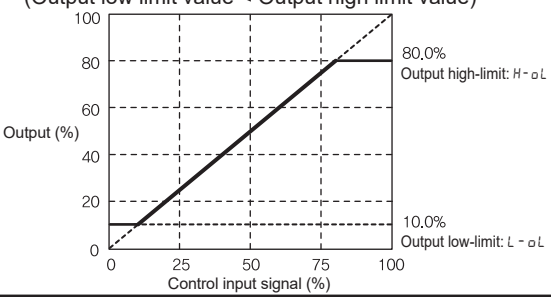
- Setting range: BASE-UP SV (%) < Output high-limit value
- Output value for BASE-UP setting
  : Input (%)×Slope value+ BASE-UP SV



◎ Output high limit value [H-oL], Output low limit value [L-oL]

This function is to limit output range to protect load.

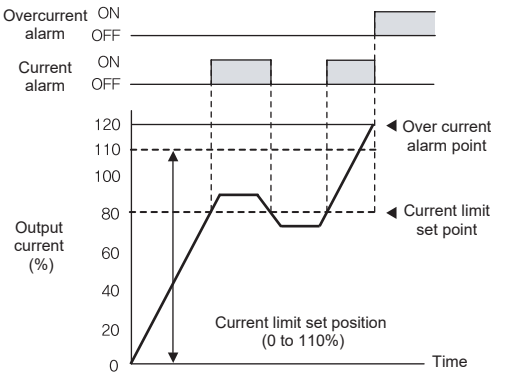
- Setting range: 0 to 110%
  (Output low limit value < Output high limit value)



◎ Current limit [C-LI]

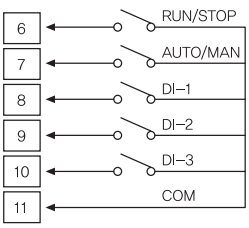
It operates when normal, constant voltage, constant current mode of phase control.
When using the load which has high inrush current, it restrains the current to protect thyristor.
Especially, in case of voltage feedback, only voltage current, it may over the rated current of thyristor because current flows by resistance value of the load. To prevent over the rated current, limit the current.

- Setting range: 0 to 110% of rated current



◎ Digital input (DI)

Below functions are available by terminal input.
Digital input has five terminals; AUTO/MANUAL terminal, RUN/STOP terminal, and DI-1 to 3 terminals.
Select the function for each input terminal of DI-1 to 3.



● AUTO/MANUAL selection [terminal 7 and 11]

Select AUTO (close)/MANUAL (open) input by terminal input.
AUTO mode controls output according to control input as analog input (voltage, current) or ON/OFF input (including SSR pulse input).
MANUAL mode controls according to control input as the inside adjuster adjustment or an outside adjuster adjustment.
When selecting AUTO (close), the front AUTO indicator turns ON or selecting MANUAL (open), the front AUTO indicator turns OFF.

● RUN/STOP switching [terminal 6 and 11]

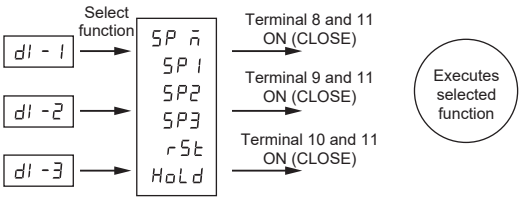
Select RUN (close)/STOP (open) operation status by terminal input.

RUN mode operates as the set contents by control input.
STOP mode is standby status.

When selecting RUN (close), the front RUN indicator turns ON or selecting STOP (open), the front RUN indicator turns OFF.

● Digital input (DI-1 to DI-3) setting [terminal 8, 9, 10 and 11 (COM)]

Select the each function for each digital input at parameters [dI - 1, dI - 2, dI - 3].
When setting ON (close) to DI input, the front EVT indicator turns ON or setting OFF (open), the front EVT indicator turns OFF.
As below, there are 6 functions to select.
※ SP n is available only in dI - 1.



● RESET [rSt]

After selecting RESET function, turn digital input ON (close) and open, this unit resets and re-starts.

● HOLD [HoLd]

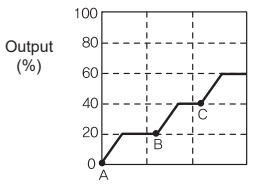
After selecting HOLD function and digital input is ON (close), output and display value of this unit is hold. (it operates hold when digital input maintains ON (close) status.)

● Single SP [SP1, SP2, SP3]

Set [SP1, SP2, SP3] to each digital input for output to reach to the relevant SP.
It is available to set individually at [dI - 1, dI - 2, dI - 3], and duplicated setting is allowed.
When setting SP1, SP1 is displayed in operating mode, same as SP2 and SP3.
When this function is not set, the parameters to set SP in operating mode are not displayed.

※E.g.)

dI - 1	dI - 2	dI - 3	Operating Mode SP value set parameter
SP1	SP2	SP3	SP1 (e.g.: 20%)
			SP2 (e.g.: 40%)
			SP3 (e.g.: 60%)



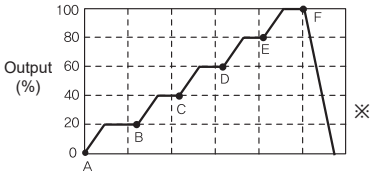
- A: When dI - 1 is ON
- B: When dI - 2 is ON
- C: When dI - 3 is ON

● Multi SP [SP n]

It is available to set total 6 SPs and to control output depending on 3 digital inputs' setting.
This function is selectable only in [dI - 1]. When selecting [SP n] at [dI - 1], [dI - 2, dI - 3] parameters are not displayed.
When selecting [SP n] at [dI - 1], 6 parameters to set SPs are displayed in operating mode.
(SP1, SP2, SP3, SP4, SP5, SP6)

※E.g.) ※ ○: Close, ×: Open

	dI - 1	dI - 2	dI - 3	Operating Mode SP value set parameter
A	○	×	×	SP1 (e.g.: 20%)
B	×	○	×	SP2 (e.g.: 40%)
C	○	○	×	SP3 (e.g.: 60%)
D	×	×	○	SP4 (e.g.: 80%)
E	○	×	○	SP5 (e.g.: 100%)
F	×	○	○	SP6 (e.g.: 0%)
G	○	○	○	—



※ A, B, C, D, E, F : Close/Open status of Digital Input

◎ Proportional and integral constant set of feedback control

Proportional Integral Control:
This is the combination of proportional control and integral control. Proportional control operates soft control without overshoot and hunting for the set value. Integral control modifies offset automatically to reach the set value stably. The optimal values of proportional constant and integral constant are set as factory defaults. When changing proportional constant and integral constant, it may cause response delay in feedback control or overshoot or hunting.

● Proportional constant set [P]

It compensates error from the target value proportionally. If proportional constant value is small, response is fast and it may cause overshoot or hunting. If proportional constant value is big, response is slow.

- Setting range: 1 (0%) to 2000 (100%)

● Integral constant set [I]

It compensates cumulative error from the target value. The set integral constant is the time when proportional value and integral value are equal.
If integral constant value is small, response is fast and it may cause overshoot or hunting. If integral constant value is big, response is slow.

- Setting range: 0.1 to 999.9 sec

※P, I parameters are displayed when control mode is constant voltage, constant current, constant power mode in phase control.

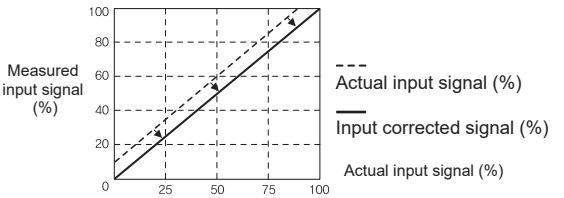
▣ Functions

◎ Input correction [I n-b]

It compensates the offset between actual input value and measured input value.

- Setting range: -99.9 to 99.9%

※E.g.) Input type is 4-20mA,
When 4mA is applied and the input monitor value displays, set [I n-b] as -0.5 and the input monitor value displays as 0.0%.

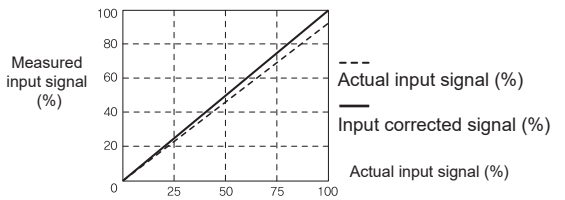


◎ Input slope correction [SPAn]

It compensates the gain of the measured 100% input for actual 100% input value.

- Setting range: -99.9 to 99.9%

※E.g.) Input type is 4-20mA,
When 20mA is applied and the input monitor value displays 99.5%, set [SPAn] as 0.5 and the input monitor value is 100.0%.



◎ Display value content selection [d ISP]

You can select display value content for the display part in RUN mode.

- Display range
  - Single-phase: [Ld-U], [AnP], [PU], [rEF]
  - 3-phase: [U-U], [U-V], [V-W], [LA-W], [LA-U], [LA-V], [PU], [rEF]

◎ Bar graph content selection [bAr]

You can select display value content for the bar graph.

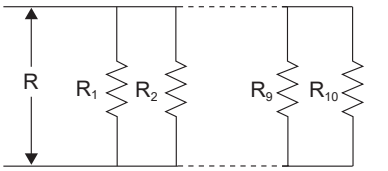
- Display range
  - Single-phase: [Ld-U], [AnP], [PU], [rEF]
  - 3-phase: [U-U], [U-V], [V-W], [LA-W], [LA-U], [LA-V], [PU], [rEF]

◎ Load resistance display method [drES]

This function is for display load resistance [rES] into a percentage in monitoring mode when disconnecting the parallel load. You can select this value as increase rate of load resistance [UP] or as decrease rate of number of loads [doUn].

※Decrease rate of number of loads [doUn] displays correct decrease rate only when the connected each load resistance is same.

E.g.)Each of R_1 to R_{10} is 10Ω and load resistance (R) is 1Ω,
When disconnecting R_1 to R_5,



① Increase rate of load resistance[UP]
It is based on 100% of load resistance (R), 1Ω. When disconnected R_1 to R_5, load resistance is 2 Ω and load resistance [rES] in monitoring mode displays 200%.

② Decrease rate of number of loads [doUn]
It is based on 100% of 10 loads (R_1 to R_{10}). When disconnected R_1 to R_5, the number of load are 5 (R_6 to R_{10}) and load resistance [rES] in monitoring mode displays 50%.

◎ Alarm

Alarm	Parameter	Operation	Clear alarm
Overcurrent alarm	o-C	Stops output (SCR OFF)	· Re-supply the power. · RESET (RET key) · Switch to STOP mode
Overvoltage alarm	o-U		
Fuse break alarm	FUSE	※1	
Heatsink overheat alarm	tEnP	Stops output (SCR OFF)	
Element error alarm	SCr		
Heater break alarm	HbE	Continues operation	Automatically cleared within the setting range

※1: For single-phase model, output stops.
For 3-phase model, when 1-phase break, it maintains output and when 2-phase break, it stops output.

◎ Lock [LoCE]

This function is to limit parameter set value check and change.
Set this parameter lock function to enter setting mode1.
When setting this parameter lock as LoC2 or LoC3, only parameter lock is displayed in setting mode 1.

Parameter	oFF	LoC1	LoC2	LoC3
Operating Mode set group	●	●	●	◐
Setting Mode 2 set group	●	●	◐	◐
Setting Mode 1 set group	●	◐	○	○

●:Enable to check and set, ◐:Enable to check/Disable to set,
○: Disable to check

◎ Heater disconnection alarm [Hb-A]

When load resistance display method is set as [UP], it is over the set value, this alarm occurs.
[H-bE] and display value flashes for 2 sec in turn in the display part and EVT lamp flashes for 0.5 sec.
Even though heater disconnection alarm occurs, control operation continues.
It is cleared automatically when the value is below the SV of heater disconnection alarm value.

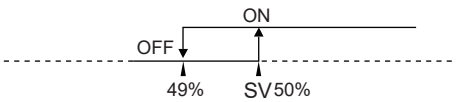
● Heater disconnection alarm value setting [Hb-u]

Regardless of control method (phase control, cycle control), it operates. For the accurate operation, over 10% of control output (phase control, cycle control) and over 30% of rated current are required.

- Setting range: 10 to 500%

Hysteresis of heater disconnection alarm is fixed as 1% for ON/OFF interval.

E.g.)When SV for heater disconnection alarm is 50%, alarm turns ON at 50%, alarm turns OFF at 49%.



◎ Full load auto recognition [F-Ld]

When operating load recognition function, it outputs 100% for 3 sec. Do not use this unit to the device which has problem 100% output of load.
Set [F-Ld] as on in setting mode 1 [St-1] group and press the M key, load auto recognition function operates.
According to secular changes of the load, execute this function regularly.

※Be sure that when auto recognition starts, it operates 100% output for 3 sec.

※Caution

Do not execute this function as on without profession's consultations. When executing this function, voltage, current outputs fully. Be sure that it may cause damage to the load.

When using special load using low voltage and high current such as (super)tantalum, SiC, molybdenum, tungsten, etc, it may cause heater break alarm [H-bE]. This alarm does not have problem in operation but it occurs when it does not detect the load when using as low voltage. Set the below notes to clear the alarm.

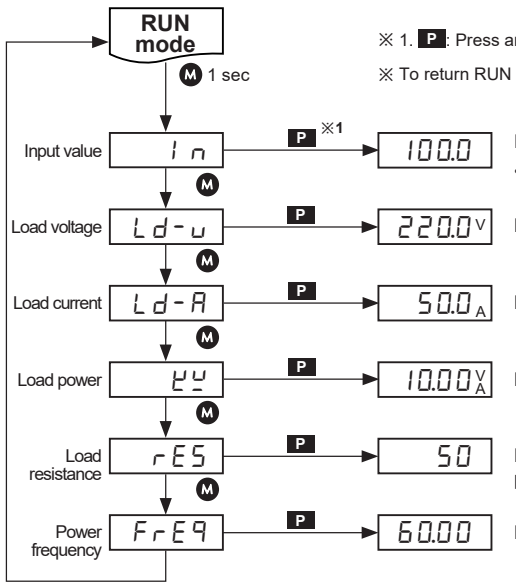
Note>When using special load such as (super) tantalum, SiC, molybdenum, tungsten, H-bE alarm clear method:

- Set load resistance display method [drES] as UP in setting mode 1 [St-1].
- Set heater break alarm value [Hb-u] as 500 in setting mode 2 [St-2].

▣ Monitoring Mode

Monitoring mode can monitor measured several physical quantities of this unit, not set parameters.

◎ DPU1 Series



※ 1. **P**: Press any key among ▲, ▼.

※ To return RUN mode, press the RET key at any parameter, or not to operate any keys in 30 sec.

For ON/OFF input, or SSR pulse input, it displays 0 or 100.
• Setting range: Within 0.0 to 100.0%

Monitors measured voltage at load within the rated voltage range.

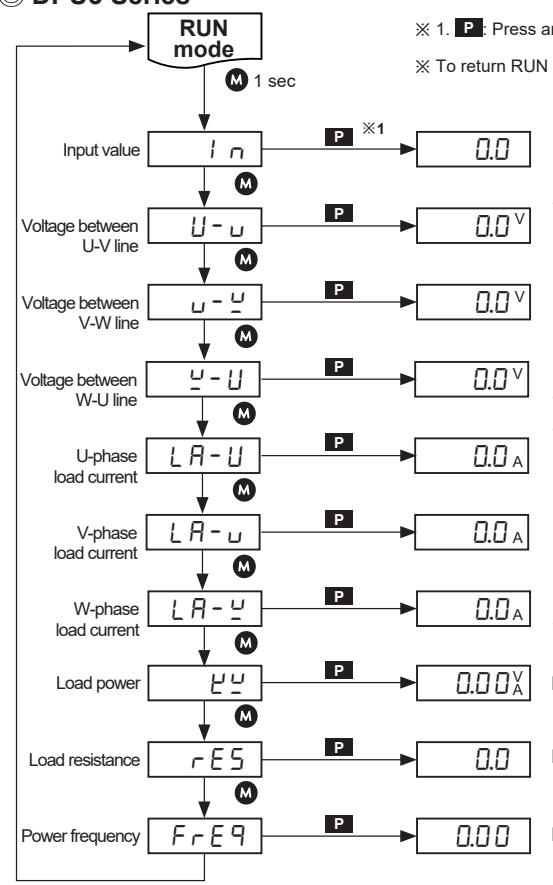
Monitors measured current at load within the rated current range.

Monitors measured power at load within the rated power range.

Displays measured resistance at load for initial set resistance as percentage

Displays frequency of power

◎ DPU3 Series



※ 1. **P**: Press any key among ▲, ▼.

※ To return RUN mode, press the RET key at any parameter, or not to operate any keys in 30 sec.

For ON/OFF input, or SSR pulse input, it displays 0 or 100.
• Setting range: Within 0.0 to 100.0%

Monitors measured voltage at load within the rated voltage range.

Monitors measured current at load within the rated current range.

Monitors load power output at 3-phase.

Displays LLLL, 10 to 500%, HHHH.

Displays frequency of power within 45.0 to 65.0Hz range

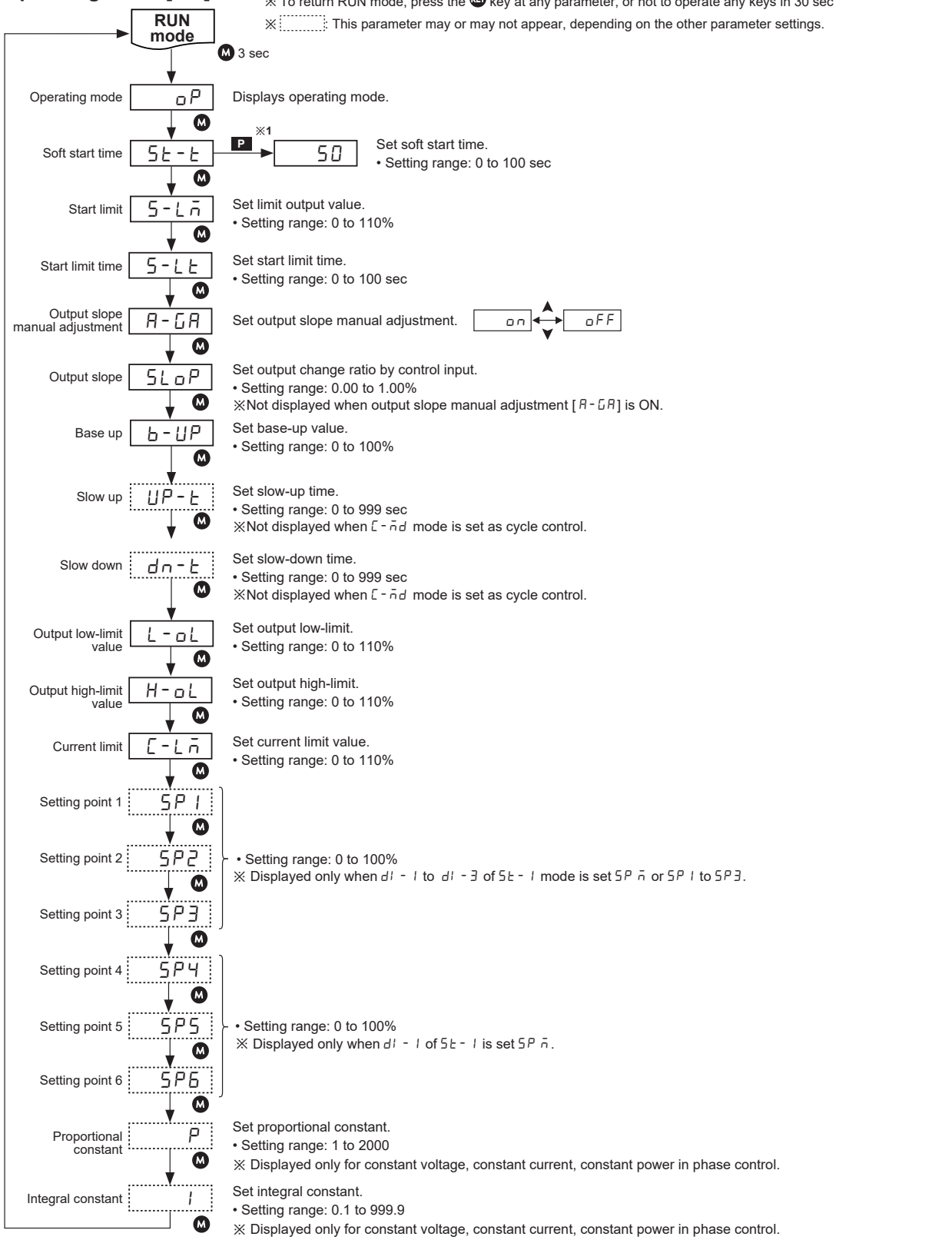
▣ Parameter Mode

◎ Operating Mode [oP]

※ 1. P : Press any key among ▲, ▼.

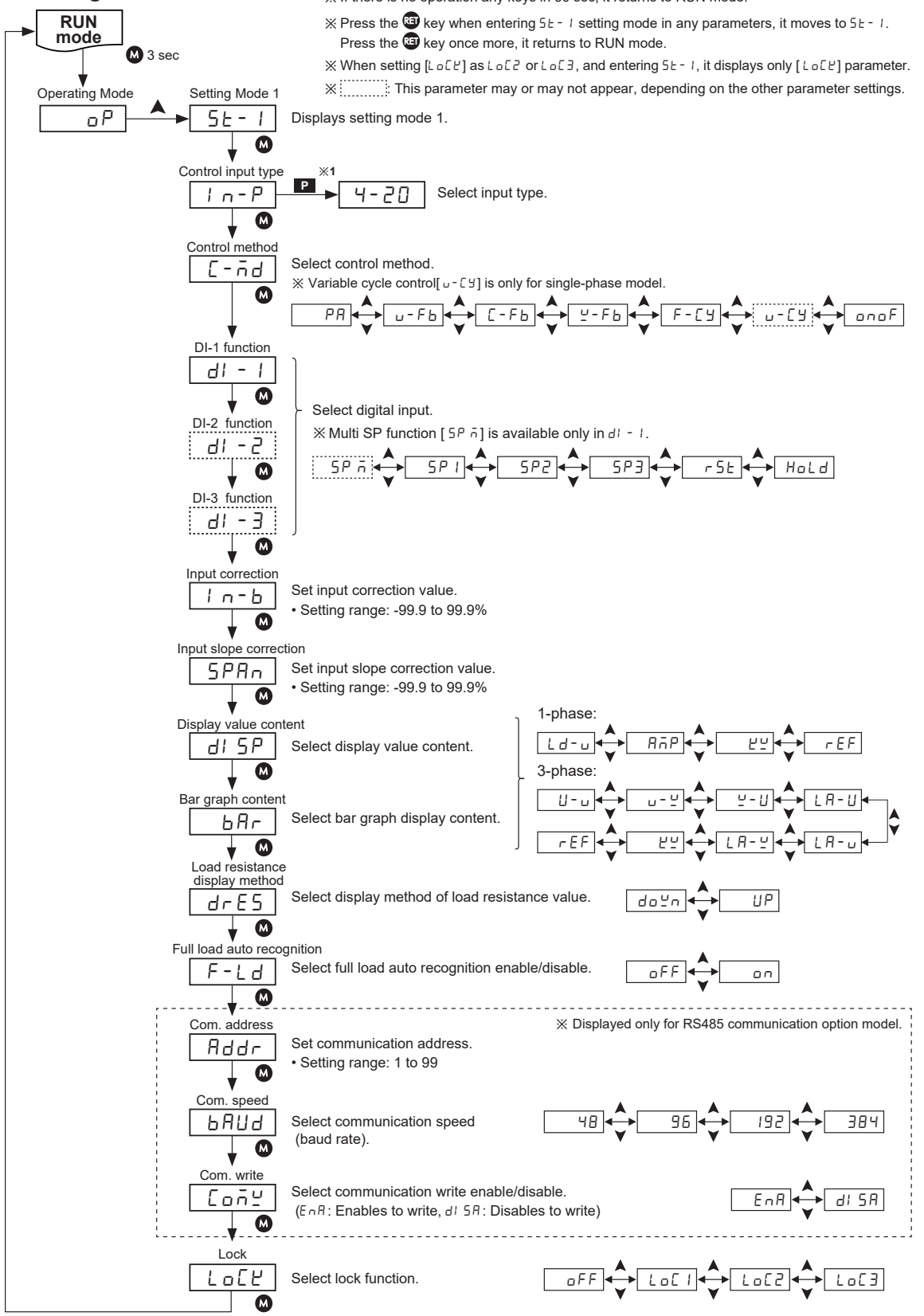
※ To return RUN mode, press the RET key at any parameter, or not to operate any keys in 30 sec

※ [ ] : This parameter may or may not appear, depending on the other parameter settings.



◎ Setting Mode 1

※ 1. P: Press any key among ▲, ▼.
※ If there is no operation any keys in 30 sec, it returns to RUN mode.
※ Press the SET key when entering St-1 setting mode in any parameters, it moves to St-1.
Press the SET key once more, it returns to RUN mode.
※ When setting [LoCK] as LoC2 or LoC3, and entering St-1, it displays only [LoCK] parameter.
※ ..... : This parameter may or may not appear, depending on the other parameter settings.



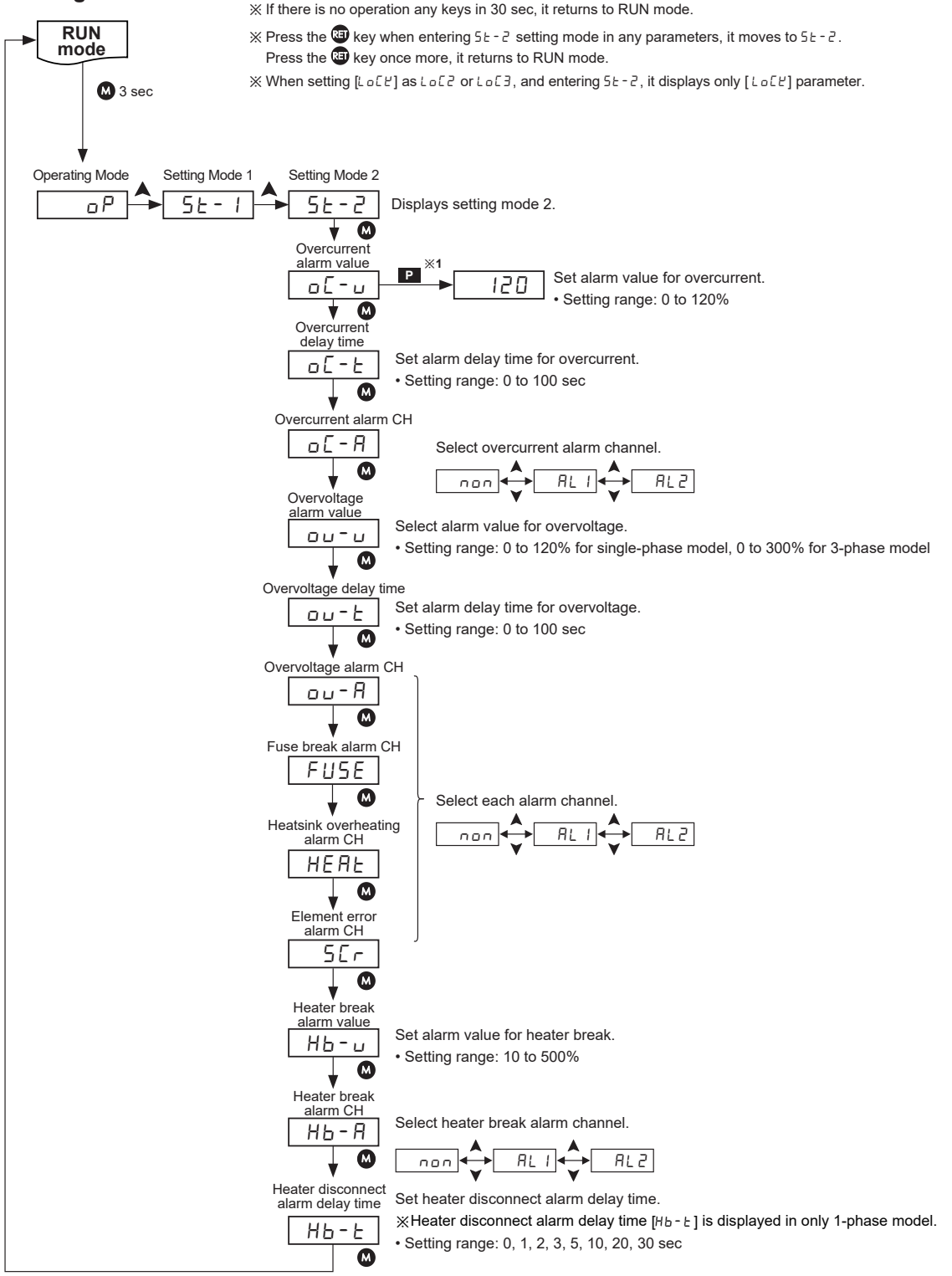
◎ Setting Mode 2

※ 1. P: Press any key among ▲, ▼.

※ If there is no operation any keys in 30 sec, it returns to RUN mode.

※ Press the RET key when entering St-2 setting mode in any parameters, it moves to St-2.
Press the RET key once more, it returns to RUN mode.

※ When setting [LoCK] as LoC2 or LoC3, and entering St-2, it displays only [LoCK] parameter.



▣ Factory Default

◎ Operating Mode

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
St-t	0000	b-UP	000.0	C-Ln	110.0	SP5	000.0
S-Ln	110.0	UP-t	0003	SP1	000.0	SP6	000.0
S-Lt	0000	dn-t	0003	SP2	000.0	P	0150
A-GA	oFF	L-oL	000.0	SP3	000.0	I	020.0
SLoP	1.000	H-oL	110.0	SP4	000.0		

◎ Setting Mode 1

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
In-P	4-20	In-b	000.0	bAr	Single-phase Ld-u	ConY	EnA
C-nd	PA	SPAn	000.0		3-phase U-u	LoCK	oFF
dI-1	SP n	dISP	Single-phase Ld-u	F-Ld	oFF		
dI-2	SP1		3-phase U-u	Addr	0001		
dI-3	SP1	drES	doYn	bAUd	384		

◎ Setting Mode 2

Parameter	Default	Parameter	Default	Parameter	Default	Parameter	Default
oC-u	110.0	ou-u	110.0	FUSE	AL1	Hb-u	010.0
oC-t	0005	ou-t	0005	HEAt	AL1	Hb-A	AL2
oC-A	AL1	ou-A	AL1	SCr	AL1	Hb-t	Single-phase 30

▣ Communications

◎ Communication specification

Protocol	Modbus RTU
Connection type	RS485
Application standard	Compliance with EIA RS485
Max. connection	32 units (address: 01 to 64)
Synchronization method	Asynchronous
Communication method	2-wire half duplex
Communication distance	Max. 800m
Communication speed	4800, 9600, 19200, 38400bps
Communication response wait time	5 to 99ms
Data bit	8-bit (fixed)
Parity bit	Even (fixed)
Stop bit	1-bit (fixed)

◎ Function code format

● Function code 3 (0×03) = Read holding registers

• Request (Master → Slave)

0×01	0×03	0×00	0×00	0×00	0×16	××	××
Add.	Com-mand	Start add.		Number of data		CRC 16	
		High	Low	High	Low	High	Low

• Response (Slave → Master)

0×01	0×03	0×10	0×03	0×E8	...	0×03	0×E8	××	××
Add.	Response command	Number of data	1st data		...	16th data		CRC 16	
			High	Low	...	High	Low	High	Low

• Error (Slave → Master)

0×01	0×83	××	××	××
Address	Response command	Exception code	CRC 16	

● Function code 4 (0×04) = Read input registers

• Request (Master → Slave)

0×01	0×04	0×00	0×00	0×00	0×10	××	××
Add.	Com-mand	Start add.		Number of data		CRC 16	
		High	Low	High	Low	High	Low

• Response (Slave → Master)

0×01	0×04	0×10	0×03	0×E8	...	0×03	0×E8	××	××
Add.	Response command	No. of data	1st data		...	16th data		CRC 16	
			High	Low	...	High	Low	High	Low

• Error (Slave → Master)

0×01	0×84	××	××	××
Address	Response command	Exception code	CRC 16	

● Function code 6 (0×06) = Write single registers

• Request (Master → Slave)

0×01	0×06	0×00	0×00	0×03	0×E8	××	××
Add.	Com-mand	Address		Number of data		CRC 16	
		High	Low	High	Low	High	Low

• Response (Slave → Master)

0×01	0×06	0×00	0×00	0×03	0×E8	××	××
Add.	Response Command	Address		Data		CRC 16	
		High	Low	High	Low	High	Low

• Error (Slave → Master)

0×01	0×86	××	××	××
Address	Response command	Exception code	CRC 16	

● Function code 16 (0×10) = Write multiple registers

● Request (Master → Slave)

0×01	0×10	0×00	0×00	0×00	0×10	0×20	××	××
Add.	Com-mand	Start add.		Number of data		Num-ber of byte	CRC 16	
		High	Low	High	Low		High	Low

● Response (Slave → Master)

0×01	0×10	0×00	0×00	0×03	0×E8	××	××
Add.	Response command	Start add.		Number of data		CRC 16	
		High	Low	High	Low	High	Low

● Error (Slave → Master)

0×01	0×90	××	××	××
Address	Response Command	Exception code	CRC 16	

※ Exception code
- 0×01: Not supported command code
- 0×02: Starting address of required data and transmittable address are different.
- 0×03: The number of required data is over than the number of transmittable data.
- 0×04: Transmittable data does not process properly.

◎ Address mapping table

● Input registers [DPU1 Series]

No. (address)	Item	Factor
300001 (0000)	Output voltage	*0.1
300002 (0001)	Load current	*0.1
300003 (0002)	Power	*0.1
300004 (0003)	Load resistance	*0.1
300005 (0004)	Power frequency	*0.01
300101 (0064)	Product No. H	00
300102 (0065)	Product No. L	00
300103 (0066)	Hardware version	10
300104 (0067)	Software version	10
300105 (0068)	Model name 1	"DP"
300106 (0069)	Model name 2	"2-"
300107 (006A)	Model name 3	"00"
300108 (006B)	Model name 4	" "
300109 (006C)	Model name 5	" "
300110 (006D)	Model name 6	" "
300111 (006E)	Model name 7	" "
300112 (006F)	Model name 8	" "
300113 (0070)	Model name 9	" "
300114 (0071)	Model name 10	" "
300115 (0072)	Reserved	Reserved
300116 (0073)	Reserved	Reserved
300117 (0074)	Reserved	Reserved
300118 (0075)	Coil start address	0
300119 (0076)	Coil quantity	0
300120 (0077)	Input start address	0
300121 (0078)	Input quantity	0
300122 (0079)	Holding reg start address	0
300123 (007A)	Holding reg quantity	32
300124 (007B)	Input reg start address	0
300125 (007C)	Input reg quantity	5

● Input registers [DPU3 Series]

No. (address)	Item	Factor
300001 (0000)	Load voltage between U-V line (Vrms)	*0.1
300002 (0001)	Load voltage between V-W line (Vrms)	*0.1
300003 (0002)	Load voltage between W-U line (Vrms)	*0.1
300004 (0003)	U-phase load current (Arms)	*0.1
300005 (0004)	V-phase load current (Arms)	*0.1
300006 (0005)	W-phase load current (Arms)	*0.1
300007 (0006)	Power	*0.01
300008 (0007)	Load resistance (% display for initial load)	*0.1
300009 (0008)	Power frequency	*0.01
300101 (0064)	Product No. H	00
300102 (0065)	Product No. L	00
300103 (0066)	Hardware version	10
300104 (0067)	Software version	10
300105 (0068)	Model name 1	"DP"
300106 (0069)	Model name 2	"2-"
300107 (006A)	Model name 3	"00"
300108 (006B)	Model name 4	" "
300109 (006C)	Model name 5	" "
300110 (006D)	Model name 6	" "
300111 (006E)	Model name 7	" "
300112 (006F)	Model name 8	" "
300113 (0070)	Model name 9	" "
300114 (0071)	Model name 10	" "
300115 (0072)	Reserved	Reserved
300116 (0073)	Reserved	Reserved
300117 (0074)	Reserved	Reserved
300118 (0075)	Coil start address	0
300119 (0076)	Coil quantity	0
300120 (0077)	Input start address	0
300121 (0078)	Input quantity	0
300122 (0079)	Holding reg start address	0
300123 (007A)	Holding reg quantity	32
300124 (007B)	Input reg start address	0
300125 (007C)	Input reg quantity	5

◎ Address mapping table

● Holding registers [DPU1 Series]

No. (address)	Item		Factor
400001 (0000)	Reference Value	—	*0.1 (0 to 1000)
400002 (0001)	Start Limit Time	S-Lt	0 to 100
400003 (0002)	Start Limit	S-Ln	*0.1 (0 to 1100)
400004 (0003)	Soft Start Time	St-t	0 to 100
400005 (0004)	Output High-Limit	H-oL	*0.1 (0 to 1100)
400006 (0005)	Output Low-Limit	L-oL	*0.1 (0 to 1100)
400007 (0006)	Remote SP1	SP1	*0.1 (0 to 1000)
400008 (0007)	Remote SP2	SP2	*0.1 (0 to 1000)
400009 (0008)	Remote SP3	SP3	*0.1 (0 to 1000)
400010 (0009)	Remote SP4	SP4	*0.1 (0 to 1000)
400011 (000A)	Remote SP5	SP5	*0.1 (0 to 1000)
400012 (000B)	Remote SP6	SP6	*0.1 (0 to 1000)
400013 (000C)	Slow Up Time	UP-t	0 to 999
400014 (000D)	Slow Down Time	dn-t	0 to 999
400015 (000E)	Current Limit	C-Ln	*0.1 (0 to 1100)
400016 (000F)	Over current value	oC-u	*0.1 (0 to 1200)
400017 (0010)	Over current time	oC-t	0 to 100
400018 (0011)	Over voltage value	ou-u	*0.1 (0 to 1200)
400019 (0012)	Over voltage time	ou-t	0 to 100
400020 (0013)	Load detector alarm value	Hb-u	*0.1 (100 to 5000)
400021 (0014)	Display selected contents	diSP	0 to 3 0: Ld-u, 1: AnP, 2: UY, 3: rEF
400022 (0015)	Bar graph's content	bAr	0 to 3 0: Ld-u, 1: AnP, 2: UY, 3: rEF
400023 (0016)	Control integer KP value	P	1 to 2000
400024 (0017)	Control integer KI value	I	*0.1 (1 to 9999)
400025 (0018)	Control Method	C-nd	0 to 6 0: F-CY, 1: u-CY, 2: onoF, 3: PA, 4: u-Fb, 5: C-Fb, 6: Y-Fb
400026 (0019)	Digital input 1	di-1	0 to 5 0: SPn, 1: SP1, 2: SP2, 3: SP3, 4: rSt, 5: HoLd
400027 (001A)	Digital input 2	di-2	
400028 (001B)	Digital input 3	di-3	
400029 (001C)	Auto ref input selector	In-P	0 to 6 0: 4-20, 1: 0-20, 2: 1-5, 3: 0-5, 4: 0-10, 5: SSr, 6: Con
400030 (001D)	Load resistance display method	drES	0 to 1 0: doYn, 1: UP
400031 (001E)	Operation	—	Bit0... Fault Bit1... I-OC Bit2... Over current Bit3... Over volt Bit4... Over temp Bit5... Fuse cut Bit6... Phase loss Bit7... Load open Bit8... SCR error Bit9... Freq error Bit10... Run/Stop Bit11... Auto/Manual Bit12... EMS Power
400032 (001F)	Output slope	SLoP	*0.001 (0 to 1000)
400033 (0020)	Base Up	b-UP	*0.1 (0 to 1000)
400034 (0021)	Input correction	In-b	*0.1 (-999 to 999)
400035 (0022)	Input slope correction	SPAn	*0.1 (-999 to 999)
400036 (0023)	Overcurrent alarm output	oC-A	0 to 2 0: non, 1: AL1, 2: AL2
400038 (0025)	Overvoltage alarm output	ou-A	
400039 (0026)	Fuse alarm	FUSE	
400041 (0028)	Alarm heat sink temperature alarm	HEAt	
400042 (0029)	SCR error alarm	SCr	
400043 (002A)	Heater break alarm	Hb-A	
400044 (002B)	Auto Gain	A-GA	0 to 1 0: oFF, 1: on
400045 (002C)	Heater Break Time	Hb-t	0 to 7 0: 0, 1: 1, 2: 2, 3: 3, 4: 5, 5: 10, 6: 20, 7: 30

● **Holding registers [DPU3 Series]**

No. (address)	Item		Factor
400001 (0000)	Reference Value	—	*0.1 (0 to 1000)
400002 (0001)	Start Limit Time	S-Lt	0 to 100
400003 (0002)	Start Limit	S-Ln	*0.1 (0 to 1100)
400004 (0003)	Soft Start Time	St-t	0 to 100
400005 (0004)	Output High-Limit	H-oL	*0.1 (0 to 1100)
400006 (0005)	Output Low-Limit	L-oL	*0.1 (0 to 1100)
400007 (0006)	Remote SP1	SP1	*0.1 (0 to 1000)
400008 (0007)	Remote SP2	SP2	*0.1 (0 to 1000)
400009 (0008)	Remote SP3	SP3	*0.1 (0 to 1000)
400010 (0009)	Remote SP4	SP4	*0.1 (0 to 1000)
400011 (000A)	Remote SP5	SP5	*0.1 (0 to 1000)
400012 (000B)	Remote SP6	SP6	*0.1 (0 to 1000)
400013 (000C)	Slow Up Time	UP-t	0 to 999
400014 (000D)	Slow Down Time	dn-t	0 to 999
400015 (000E)	Current Limit	C-Ln	*0.1 (0 to 1100)
400016 (000F)	Over current value	oC-u	*0.1 (0 to 1200)
400017 (0010)	Over current time	oC-t	0 to 100
400018 (0011)	Over voltage value	ou-u	*0.1 (0 to 1200)
400019 (0012)	Over voltage time	ou-t	0 to 100
400020 (0013)	Load detector alarm value	Hb-u	*0.1 (100 to 5000)
400021 (0014)	Display selected contents	dISP	0 to 3 0: U-u, 1: u-Y, 2: Y-U, 3: LA-U, 4: LA-u, 5: LA-Y, 6: YY, 7: rEF
400022 (0015)	Bar graph's content	bAr	0 to 3 0: U-u, 1: u-Y, 2: Y-U, 3: LA-U, 4: LA-u, 5: LA-Y, 6: YY, 7: rEF
400023 (0016)	Control integer KP value	P	1 to 2000
400024 (0017)	Control integer KI value	I	*0.1 (1 to 9999)
400025 (0018)	Control Method	C-nd	1 to 6 1: F-CY, 2: onoF, 3: PA, 4: u-Fb, 5: C-Fb, 6: Y-Fb
400026 (0019)	Digital input 1	dI-1	0 to 5 0: SPn, 1: SP1, 2: SP2, 3: SP3, 4: rSt, 5: HoLd
400027 (001A)	Digital input 2	dI-2	
400028 (001B)	Digital input 3	dI-3	
400029 (001C)	Auto ref input selector	In-P	0 to 6 0: 4-20, 1: 0-20, 2: 1-5, 3: 0-5, 4: 0-10, 5: SSr, 6: Con
400030 (001D)	Load resistance display method	drES	0 to 1 0: doYn, 1: UP
400031 (001E)	Operation	—	Bit0... Fault Bit1... I-OC Bit2... Over current Bit3... Over volt Bit4... Over temp Bit5... Fuse cut Bit6... Phase loss Bit7... Load open Bit8... SCR error Bit9... Freq error Bit10... Run/Stop Bit11... Auto/Manual Bit12... EMS Power
400032 (001F)	Output slope	SLoP	*0.001 (0 to 1000)
400033 (0020)	Base Up	b-UP	*0.1 (0 to 1000)
400034 (0021)	Input correction	In-b	*0.1 (-999 to 999)
400035 (0022)	Input slope correction	SPAn	*0.1 (-999 to 999)
400036 (0023)	Overcurrent alarm output	oC-A	0 to 2 0: non, 1: AL1, 2: AL2
400038 (0025)	Overvoltage alarm output	ou-A	
400039 (0026)	Fuse alarm	FUSE	
400041 (0028)	Alarm heat sink temperature alarm	HEAt	
400042 (0029)	SCR error alarm	SCr	
400043 (002A)	Heater break alarm	Hb-A	
400044 (002B)	Auto Gain	A-GA	0 to 1 0: oFF, 1: on

▣ Proper Usage

- Follow instructhions in 'Cautions during Use'.
  Otherwise, it may cause unexpected accidents.
- Keep away from high voltage lines or power lines to prevent inductive noise.
  Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
- Do not wire the unused terminals.
- Resuply the power after the product is completely discharged.
  Failure to follow this instruction may result in malfunction of the product.
- Wetted product may cause the electric leakage or fire, the inspection must be required.
  Use safety equipment for installation.
  Do not raise leg or sit on the product.
- Prevent the product cover from automatically opening for transporting.
- In case of temporary storage, fix the product with transporting screw.

Single-Phase, Slim, Power Controller

▣ Features

- Slim size (50mm width)
- Auto/Manual input control available
- Switch between RUN (close)/STOP (open) using terminal inputs
- Phase control for various load control and zero-cross cycle control (variable cycles)
- Built-in fast-acting fuse for internal circuit protection (optional)
- Various alarm outputs: overcurrent alarm, heatsink overheat alarm, load disconnection alarm, SCR error alarm

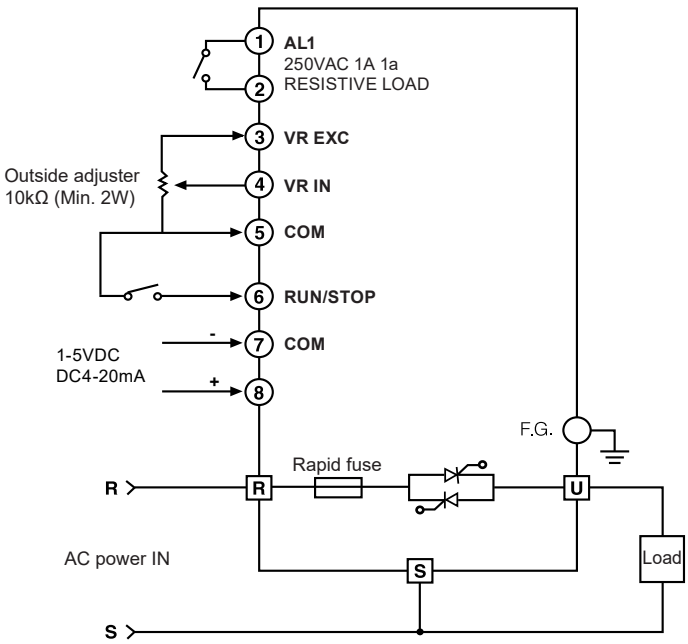
Please read "Safety Considerations" in the instruction manual before using.

▣ Ordering Information

DPUS | **2** | — | **025** | **N**

Option	N	Non-fuse
	F	Fuse
Rated load current	025	25A
Power supply	2	220VAC
	3	380VAC
	4	440VAC
Item	DPUS	Digital Thyristor Power Controller (slim)

▣ Connections



※R, S, U terminals are at the bottom of the unit. For wiring terminals, open the front cover.

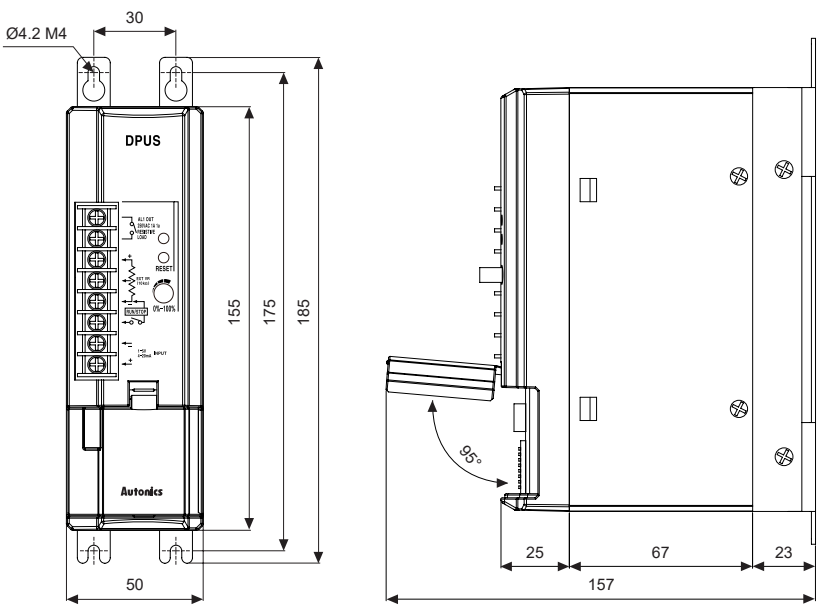
■ Specifications

Series		DPUS2-025□	DPUS3-025□	DPUS4-025□
Control phase		Single-phase		
Power supply		220VAC～	380VAC～	440VAC～
Allowable voltage range		90 to 110% of rated voltage		
Rated frequency		50/60Hz (auto recognition), allowable frequency range: ±2Hz (performance guarantee: ±1Hz)		
Rated current		25A		
Power consumption		Max. 5W		
Min. load current		3A		
Output range		• Phase control: 0 to 98% • Variable cycle control: 0 to 100%		
Output accuracy		Within ±10% F.S. of rated voltage		
Control method		Phase control, variable cycle control		
Load		Resistance load		
Indicator		Indicates LED status		
Setting method		Setting by front DIP switches and a rotary switch		
Control input		• Auto: DC4-20mA / 1-5VDC⎓ • Manual: inside adjuster 10kΩ, outside adjuster 10kΩ (min. 2W)		
DIP switch input		Phase control/variable cycle control, voltage/current input, AUTO/MANUAL, ramp operation, over current alarm/current limit, load recognition mode, inside/outside adjuster		
Rotary switch input		Output setting: 10 to 100% over current and load disconnection alarm setting		
Dielectric strength		2,000VAC 50/60Hz for 1 min (between input terminal and power terminal)		
Vibration		0.75mm amplitude at frequency of 5 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours		
Insulation resistance		Over 200MΩ (at 500VDC megger)		
Noise immunity		±2kV the square wave noise (pulse width 1μs) by the noise simulator		
Environment	Ambient temp.	-10 to 50℃, storage: -20 to 80℃		
	Ambient humi.	30 to 85%RH, storage: 30 to 85%RH		
Approval		CE		
Weight※1		Approx. 980g (approx. 880g)		

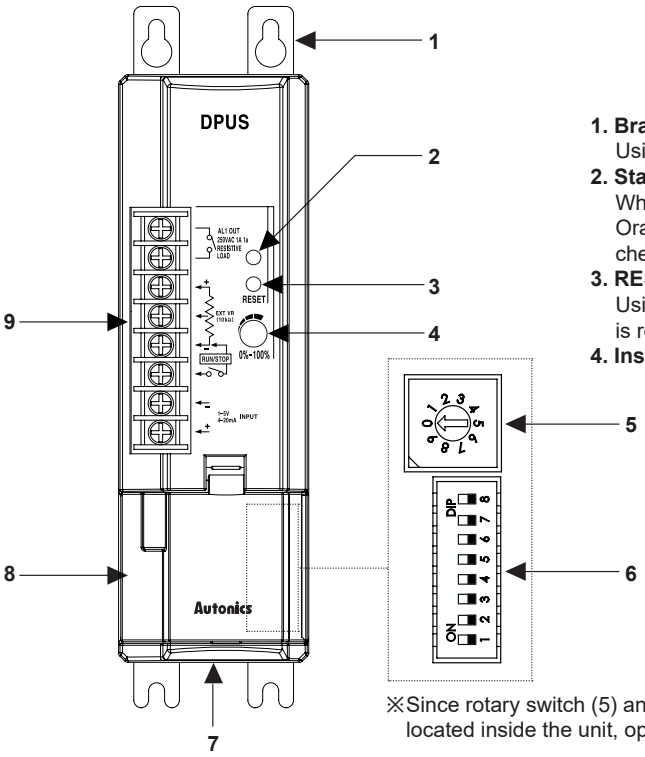
※1: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Dimensions

(unit: mm)



▣ Unit Description



1. Bracket
Using for mounting this unit on the panel.

2. Status indicator
When Power ON, it turns ON in Orange→Red→Orange→Turn OFF→Green. You can check the status indicator for alarm.

3. RESET button
Using for clear alarm. Press the RESET button and power is resupplied.

4. Inside adjuster (10kΩ)

※Since rotary switch (5) and DIP switch (6) are located inside the unit, open the front cover.

5. Rotary switch
Set current limit output (10 to 100%). Factory default: 0

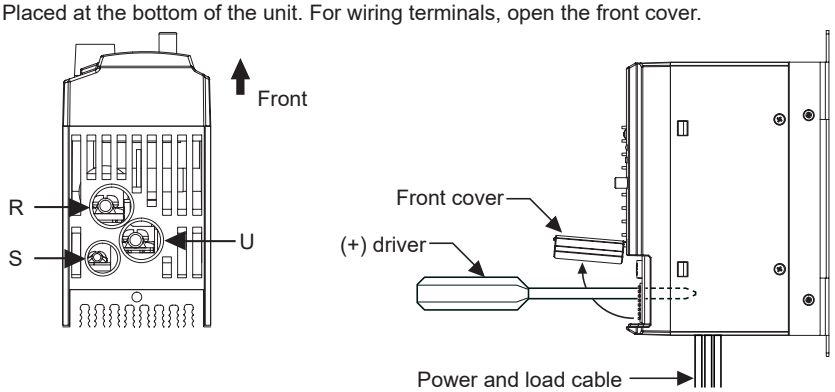
Position	1	2	3	4	5	6	7	8	9	0
SV	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

6. DIP switch

Position	1	2	3	4	5	6	7	8
ON	Current input (DC4-20mA)	Phase control	MANUAL	Ramp operation ON	Load recognition mode ON	Current limit	—	Inside adjuster
OFF	Voltage input (1-5VDC)	Variable cycle control	AUTO	Ramp operation OFF	Load recognition mode OFF	Overcurrent alarm	—	Outside adjuster

Factory default: All DIP switches OFF

7. Power input and load connection part
Placed at the bottom of the unit. For wiring terminals, open the front cover.



8. Front cover
Open the front cover, there are the rotary switch, DIP switch, power input part.

9. Terminal block

▣ Functions

◎ Ramp operation [DIP switch 4 ON]

When controlling the load which has inrush current (platinum, molybdenum, tungsten, infrared lamp, etc) in power ON, or when control input changes rapidly, it prevents the load to increase output gradually within the set time. Regardless of control method setting, Ramp operation increases/decreases input value.
The time for output to reach 0 to 100% (current limit output value) is fixed at 10 sec.

◎ RUN/STOP [5-6 terminals]

It switches RUN (close)/STOP (open) by terminal input.
RUN mode operates as the set value by control input.
STOP mode is standby status.

◎ AUTO/MANUAL selection [DIP switch 3 ON/OFF]

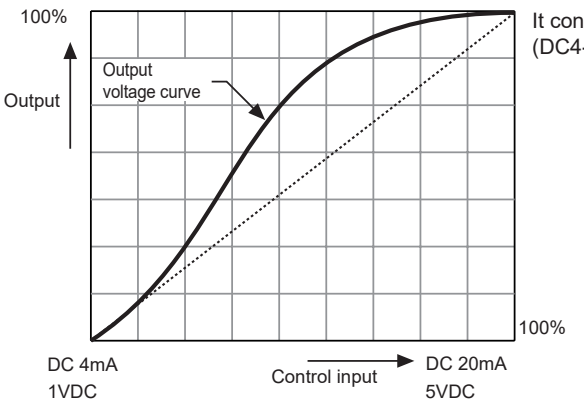
1) AUTO: Mode for controlling the output by analog input.
2) MANUAL: Mode for controlling the output by adjusting inside or outside adjuster as control input adjuster.

Selection	Type		Input impedance	DIP switch
AUTO input (DIP switch 3 OFF)	Current	DC4-20mA	100Ω	DIP switch 1 ON
	Voltage	1-5VDC	13kΩ	DIP switch 1 OFF
MANUAL input (DIP switch 3 ON)	Inside adjuster	10kΩ	—	DIP switch 8 ON
	Outside adjuster	10kΩ	—	DIP switch 8 OFF

※For setting by the inside adjuster, do not use the outside adjuster.

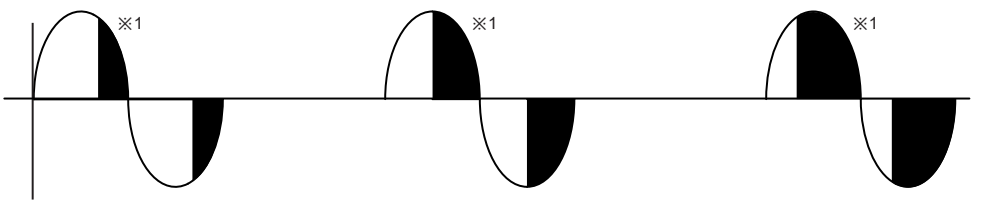
◎ Control method

1) Phase control [DIP switch 2 ON]
It controls proportionally a phase angle according to control input with half cycle.



It controls phase angle proportional to control input (DC4-20mA or 1-5VDC) level.

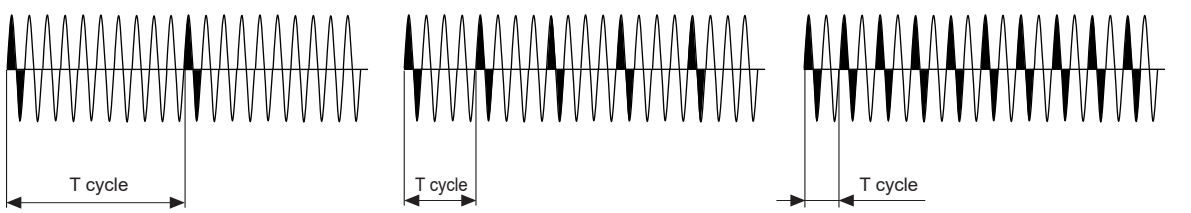
· 25% of control input signal · 50% of control input signal · 75% of control input signal



※1: Black parts of output waves are output value as applied to the load.

2) Variable cycle control [DIP switch 2 OFF]
It optimizes the number of AC voltage cycles supplied to the load by control input proportionally and controls the subject fast and correctly.

· 10% of control input signal · 25% of control input signal · 50% of control input signal



■ Alarm

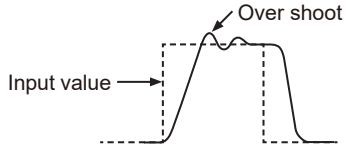
Type	Status indicator	Operation	Clear alarm
Overcurrent	Flashes red LED by 0.5 sec	Output stop (SCR OFF)	RESET switch or Power resupply
Heatsink overheat	Flashes red LED by 0.3 sec		
Thyristor error	Flashes green/red LED interval		
Current limit	Flashes orange LED by 0.5 sec	Current limit output	Automatically clear at alarm clear conditions
Load disconnection	Flashes green LED by 0.5 sec	Operation maintain	

◎ Current alarm

Current alarm is available only in phase control mode. Set alarm current value by the rotary switch.

1) Overcurrent alarm (DIP switch 6 OFF):
   When current reaches to the set current limit value, the set alarm occurs and output stops (flashes red LED by 0.5 sec).
   To clear this alarm, re-supply the power or press the RESET key.
2) Current limit (DIP switch 6 ON):
   Current limit function limits output to prevent not to flow over the rated current (flashes orange LED by 0.5 sec).

※When operating current limit, it may cause over shoot temporarily.



◎ Heatsink overheat alarm

When the temperature of a heatsink is over 90℃, heatsink overheat alarm occurs (flashes red LED by 0.3 sec).
To clear this alarm, re-supply the power or pres s the RESET key.

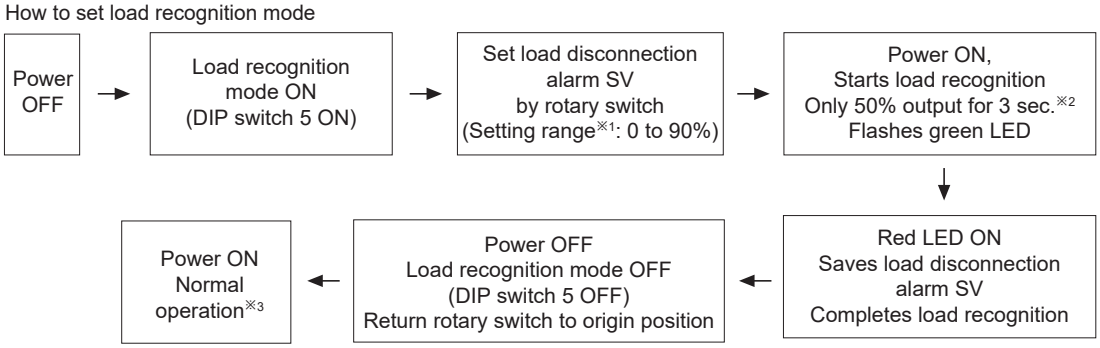
◎ Thyristor error alarm

If current flows over 3A even though output is 0%, element error alarm occurs. When element error alarm occurs, output stops (flashes green/red LED interval). To clear this alarm, re-supply the power or press the RESET key.

◎ Load disconnection alarm [Power OFF after DIP switch 5 ON]

Load disconnection alarm is available after measuring load resistance value by load recognition mode (DIP switch 5 ON).
When load resistance value is over than disconnection alarm SV, alarm occurs (load disconnection alarm occurs regardless of output value) and control operation is maintained (flashes green LED by 0.5 sec).
For output voltage is below 15V or output is 10%, load disconnection alarm does not operate.
When load resistance value is lower than the load disconnection alarm SV, this alarm cleared automatically.

・How to set load recognition mode



※1: When setting as 0, load disconnection alarm does not operate.
※2: Do not use the load which has the problem with 50% output.
※3: When output is lower than the load disconnection alarm SV set by the rotary switch, load disconnection alarm occurs.

■ Proper Usage

- In order to prevent electric shock, this unit should be grounded.
  Otherwise, mount the unit on the solid metal conductor which is grounded.
- Install the unit vertically at the well ventilated place.
- Install the unit at the access restriction area.
  ※Access restriction area: a electric expert with delegated authority or a well trained electric expert only accessible area.
- Be sure that if using this unit over the rated current, it may cause damage to the unit directly.
- Select the proper cable for connecting power and load to flow the rated current enough by the cable standard.
- In order to open the front cover, the power supply should be cut off.
  Before replacing, wiring it, be sure that turn OFF the power of input and load parts and check the safety.
- This product may be used in the following environments.
  ① Indoors
  ② Max. altitude: 2,000m
  ③ Pollution degree 2
  ④ Installation category II

Miniature Circuit Breakers

BK63HU / BK63H

LSIS

BK63HU UL489 MCB

- Pole : 1P, 2P, 3P
- Rated current : 1~63A
- Curve : B, C, D, K
- Rated short current : 10kA
- Accessory : AX, AL, SHT, UVT

BK63HU 1P

BK63HU 2P

BK63HU 3P

Ratings

Performance	UL489 MCB	
Standard	UL489, UL486E(Lug)	
Protection	Overload, Short circuit	
Rated current	1, 2, 3, 4, 5, 6, 8, 10 ,15, 16, 20 ,25, 30, 32, 40, 50, 63A	
Number of poles	1P, 2P, 3P	
Rated short circuit capacity	AC	DC
	1P : 10kA@120/240VAC, 10kA@277VAC (1~25A) 10kA@120/240VAC(30~63A) 2P, 3P : 10kA@240VAC, 480Y/277VAC(1~25A) 10kA@240VAC(30~63A)	1P : 10kA@60VDC 2P, 3P : 10kA@125VDC
Rated frequency	50/60 Hz	
Reference temperature	40℃	
Normal ambient temperature	-5 ~ 40℃	
Tripping curve	B, C, D, K curve	
Trip type	Thermal magnetic	
Type of terminals	Terminal with stirrup(indirect pressure)	
Terminal size acceptability - Min/Max	14 / 4AWG	
Tightening Torque	3.9 Nm (35 lbf-in)	
Installation	Mounting on 35mm din rail	
Dimension of specimen (W×H×D)	18×105×66 (1P)	
Protection degree	IP20	
Accessory	AX-HU, AL-HU, SHT-HU, UVT-HU	
Relative humidity	45~85%RH	
Electrical Endurance	6,000	
Maximum switching frequency (Time/h)	360/h	
Approvals	UL, CB, ABS	

BK63H UL1077 MCB

- Pole : 1P, 2P, 3P, 4P
- Rated current : 1~63A
- Curve : B, C, D
- Rated short current : 10kA
- Accessory : AX, AL, SHT, UVT

BK63H-UL 1P

BK63H-UL 2P

BK63H-UL 3P

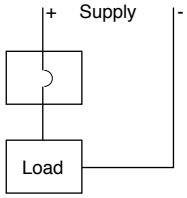
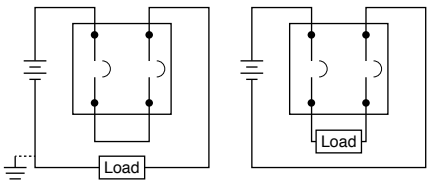
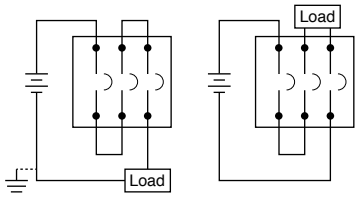
BK63H-UL 4P

Ratings

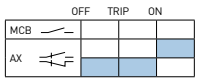
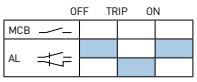
Performance	UL1077 MCB	
Standard	UL 1077	
Protection	Overload, Short circuit	
Rated current	1, 2, 3, 4, 5, 6, 8, 10 ,15, 16, 20 ,25, 30, 32, 40, 50, 63A	
Number of poles	1P, 2P, 3P, 4P	
Rated short circuit capacity	AC	DC
	1P : 10kA@120/240VAC 6kA@277VAC 2P~4P : 10kA@120/240VAC 6kA@480Y/277VAC	1P : 10kA@60VDC 2P~4P : 10kA@125VDC
Rated frequency	50/60 Hz	
Reference temperature	40℃	
Normal ambient temperature	-5 ~ 40℃	
Tripping curve	B, C, D Curve	
Trip type	Thermal Magnetic	
Type of terminals	Terminal with stirrup(Indirect pressure)	
Terminal size acceptability - Min/Max	14 / 4AWG	
Tightening torque	2Nm (17.5 lbf-in)	
Installation	Mounting on 35mm din rail	
Dimension of specimen (W×H×D)	18×81×66 (1P)	
Protection degree	IP20	
Accessory	AX-H, AL-H, SHT-H, UVT-H	
Relative humidity	45~85%RH	
Electrical endurance	6,000	
Maximum switching frequency (Time/h)	360/h	
Approvals	UL, CB, ABS	

Accessory / Circuit diagrams(BK63HU)

Exemplary DC circuit diagrams(BK63HU)

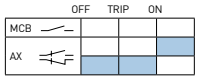
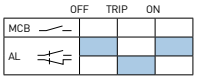
1 Pole	2 Pole	3 Pole
	 A. Ground system B. Unground system	 A. Ground system B. Unground system

UL489 accessory

Type		AX-H	AL-H
Appearance			
Rating	AC circuit	6A at 240VAC 3A at 415VAC	
	DC circuit	1A at 110VDC 2A at 48VDC	
Contact			
Dimension(W×H×D)		9 × 105 × 66	

Type	SHT-HU	UVT-HU
Appearance		
Control voltage [Ue]	AC 110~380V DC 60~220V	AC 110~120V AC 220~240V AC 380~415V
Operation voltage	80~110% Ue	-
Trip voltage	-	35~70% Ue
Dimension(W×H×D)	18 × 105 × 66	

UL1077 accessory

Type		AX-H	AL-H
Appearance			
Rating	AC circuit	6A at 240VAC 3A at 415VAC	
	DC circuit	1A at 110VDC	
Contact			
Dimension(W×H×D)		9 × 81 × 66	

Type	SHT-H	UVT-H
Appearance		
Control voltage [Ue]	AC 110~380V DC 60~220V	AC 110~120V AC 220~240V AC 380~415V
Operation voltage	80~110% Ue	-
Trip voltage	-	35~70% Ue
Dimension(W×H×D)	18 × 81 × 66	

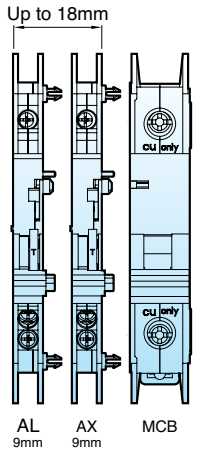
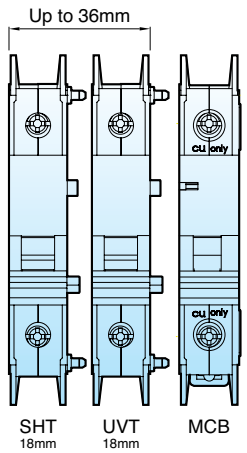
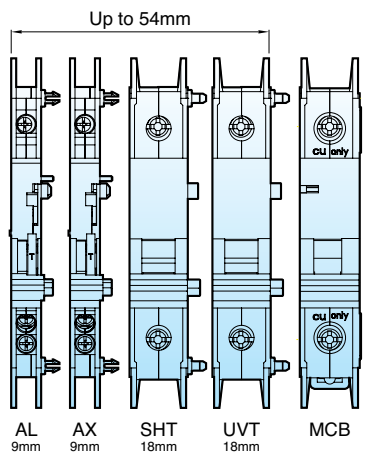
Numbering system / Accessory connecting

UL 489 / 1077 MCB

BK	63H	U	1P	B	63A	10kA	240VAC	UL489
Series	AF	Standard	Pole	Type	A	KA	Rated voltage	Standard
MCB	63	U UL489	1P	B-Type	1, 2, 3, 4, 5, 6, 8, 10, 15, 16, 20 ,25, 30, 32, 40, 50, 63	6	120/240VAC	UL489
		UL1077	2P	C-Type		10	240VAC	UL1077
			3P	D-Type			277VAC	
			4P	K-Type			480Y/277VAC	

AX	—	H	UL1077
Accessory		Applicable product	Applied standard
AX Auxiliary switch		H (UL1077) BK63H	UL1077 UL1077
AL Alarm switch		HU (UL489) BK63HU	UL489 UL489
SHUT shunt trip device			
UVT Under voltage trip device			

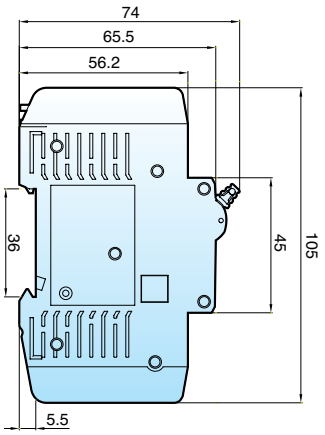
Accessory connecting

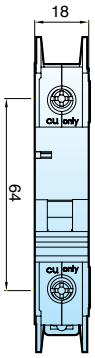
Aux. contacts	Tripping devices	Both Aux. contacts and tripping devices
		

Dimension / Operating curve

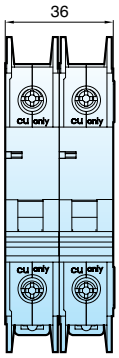
UL489 MCB

BK63HU

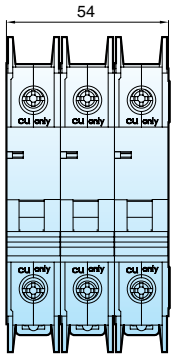




1P : 130g

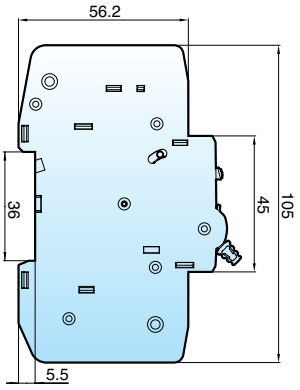


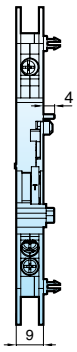
2P : 260g



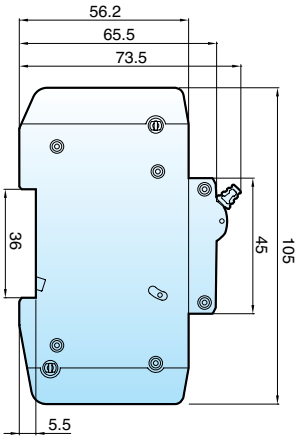
3P : 390g

AX-HU/AL-HU

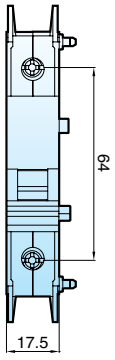




SHT-HU/UVT-HU

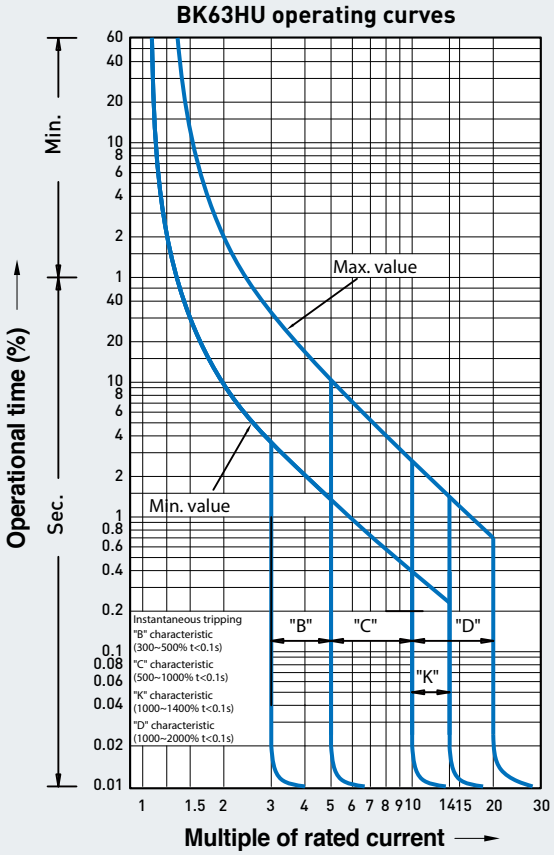


SHT : 100g / UVT : 110g



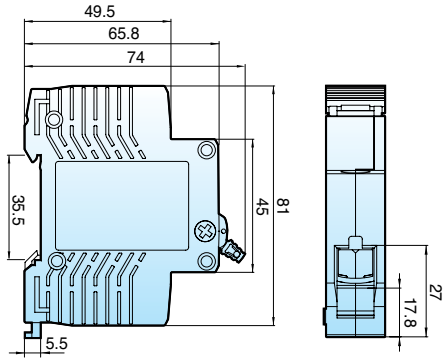
AX : 48g / AL : 48g

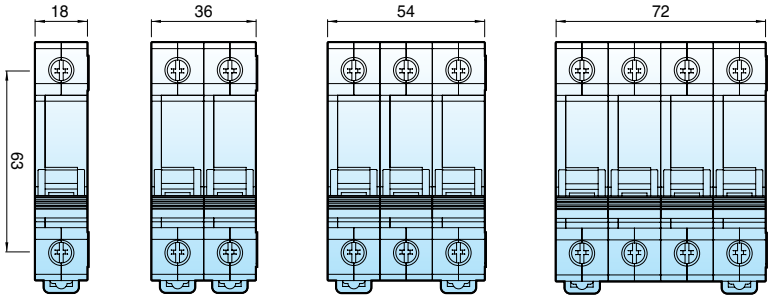
UL489 MCB operating curve



UL1077 MCB

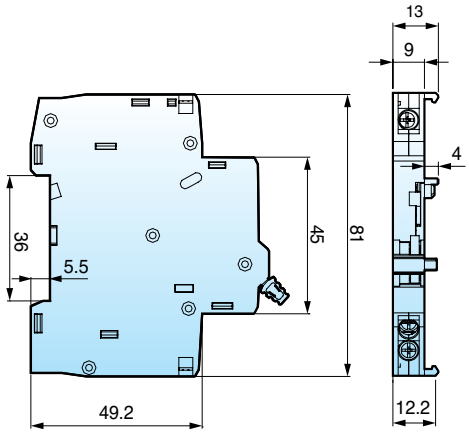
BK63H



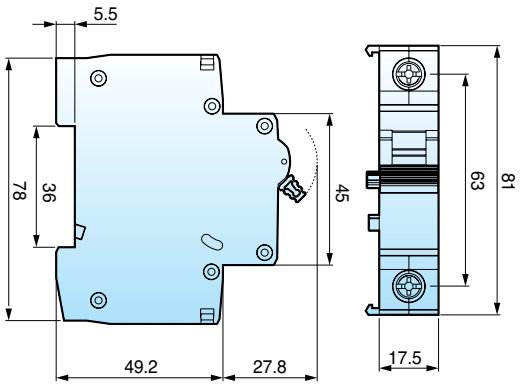


1P : 120g 2P : 240g 3P : 360g 4P : 480g

AX-H/AL-H

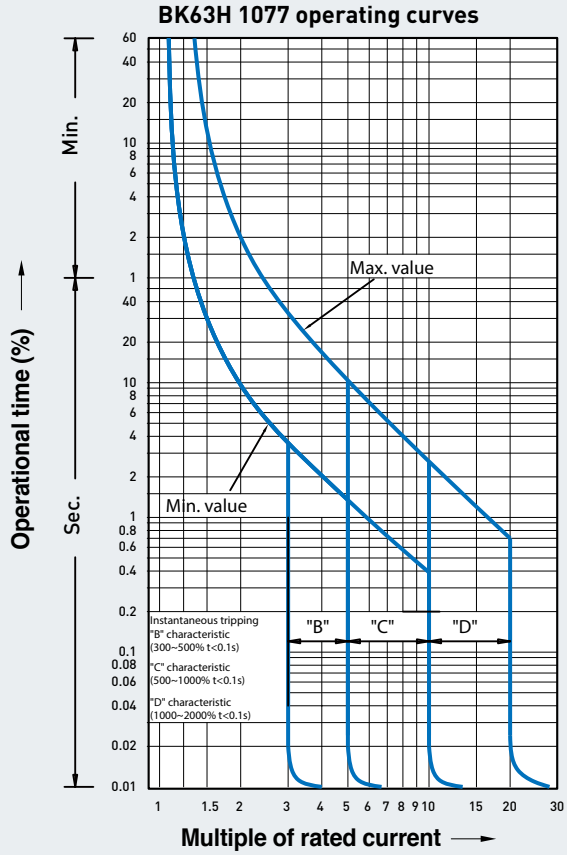


SHT-H/UVT-H



SHT : 100g / UVT : 110g AX : 48g / AL : 48g

UL1077 MCB operating curve



Accessory (Locking device)

Code	Name	ea
06410096	Locking device	1set (12ea)

Type	UVT-H
 * Press button and insert into the handle	 • Lock: Ø7.0 • Weight: Not less than 120g • Do not pull over by 10kg.f or more

Susol Super Solution

UL MCCB

UL Molded Case Circuit Breakers

LSIS


MCCB
UTS250L
Susol
Circuit Breaker
Interruptor Automatico
Disjoncteur
ON
OFF
ATU
250A
40°C
3P

Super Solution for Protection

The new series Susol with thermal-magnetic circuit breakers are designed to protect low voltage electrical systems from damage caused by overloads and short circuits.

FOR POWER DISTRIBUTION

High breaking capacity
Optimum coordination technique
Powerful engineering tools
Reverse feeding

FOR PROTECTION OF MOTORS AND THEIR CONTROL DEVICES

Optimal overload protection
Guaranteed Short Circuit Current Ratings

FOR CONTROLLING AND DISCONNECTING CIRCUITS

FOR EXTENSIVE APPLICATIONS

Wide range of optimized auxiliaries and accessories

SUSOL MCCBS AT A GLANCE.

1 FOR POWER DISTRIBUTION

- High breaking capacity
- Optimum coordination technique
- Powerful engineering tools
- Reverse feeding

2 FOR PROTECTION OF MOTORS AND THEIR CONTROL DEVICES

- Optimal overload protection
- Guaranteed Short Circuit Current Ratings

3 FOR EXTENSIVE APPLICATIONS

- Wide range of optimized auxiliaries and accessories

4 FOR CONTROLLING AND DISCONNECTING CIRCUITS

UTE100

UTS150

UTS250

UTS400

SIMPLIFIED PRODUCT RANGE

- **AF**: 100AF, 150AF, 250AF, 400AF, 600AF, 800AF, 1200AF
- **Ampere Range**: 15A ~ 1200A
- **Pole**: 2P, 3P

VARIABLE ACCESSORIES

- Electrical auxiliaries[AX, AL, UVT, SHT]
- Extended and direct mount rotary handle
- Flange handle with flexible cable and linkage
- Variable depth mechanism
- Locking devices
- LUG for CU/AL cable with UL486

HIGH PERFORMANCE

- Ultimate breaking capacity (kA rms)
- Max 100kA @480VAC and 50kA @600V

STANDARDS

- **World class with UL489**
  - UL489
  - CSA
- **IEC60947-2**
- **Class 1E for Nuclear power plant**
  - EQ : Environment Qualification
  - SQ : Seismic Qualification

VARIOUS TRIP UNITS

- **ATU**: Adjustable thermal & magnetic unit
- **FMU**: Adjustable thermal, fixed magnetic unit
- **FTU**: Fixed thermal & magnetic unit
- **ETS**: Electronic trip unit (LI, LSI)
- **ETM**: Electronic trip unit (LSIG, Muli-function unit)
- **OCR**: Electronic trip unit

MCP CHARACTERISTIC

- Simplified product range
  - **AF**: 150AF, 250AF, 400AF, 600AF, 800AF, 1200AF
  - **Ampere Range**: 1.6A ~ 1200A Only 3 Pole use
- **Standards**
  - Instantaneous circuit breaker with UL489
  - Motor protector with MC and Relay with UL508
- **IEC60947-2**

MCS CHARACTERISTIC

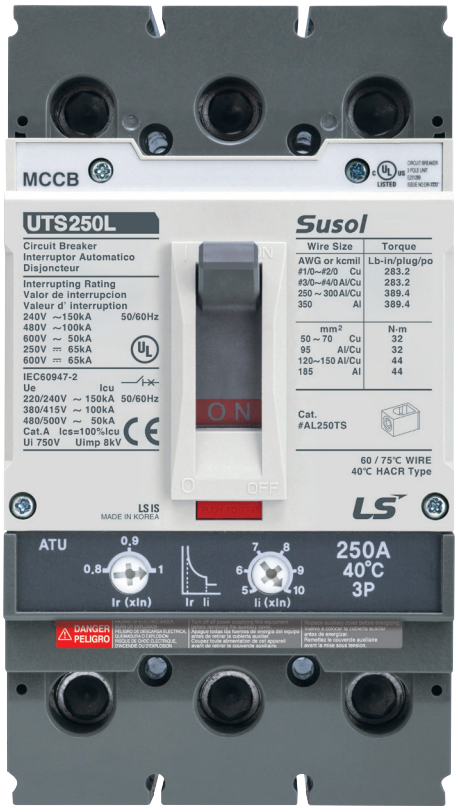
- Simplified product range
  - **AF**: 100AF, 150AF, 250AF, 400AF, 600AF, 800AF, 1200AF
  - **Ampere Range**: 100A ~ 1200A
  - **Pole**: 2P, 3P
- **Standards**
  - World class with UL489
- **IEC60947-2**

UTS600

UTS800

UTS1200

Engineered for Optimal Protection



SUSOL SERIES OFFER VARIOUS TRIP UNITS :

- **ATU** (Adjustable thermal & magnetic unit)
- **FMU** (Adjustable thermal, fixed magnetic unit)
- **FTU** (Fixed thermal & magnetic unit)
- **ETS** (Electronic trip unit for UTS150…UTS600)
- **ETM** (Electronic trip unit for UTS400, UTS600)
- **OCR** (Electronic trip unit for UTS800, UTS1200)

THERMAL MAGNETIC TRIP UNITS

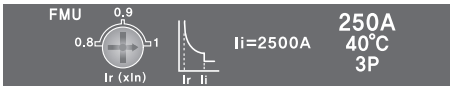
- UTE100...UTS600 frame
- 15-600 amperes
- Factory-installed
- Several versions by rated current and function

FTU

- Fixed Thermal. 15A~600A
- Fixed Magnetic. 400A~6000A

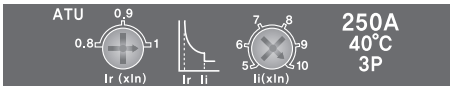
FMU

- Adjustable Thermal. 25A~600A(0.8~1 x In)
- Fixed Magnetic. 400A~6000A



ATU

- Adjustable Thermal. 100A~600A(0.8~1 x In)
- Adjustable Magnetic. 500A~6000A(5~10 x In)



MCP

- Adjustable Magnetic. 10A~6000A

MCS

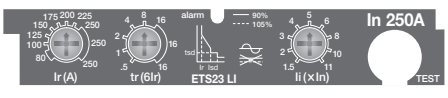
- Fixed Magnetic. 1000A~6000A

ELECTRONIC TRIP UNITS

- UTS150…UTS600 frame
- 15~600 amperes
- Factory-installed
- Several versions by rated current and function

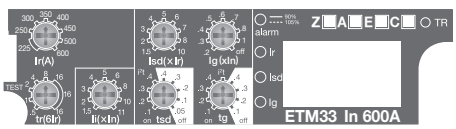
ETS

- Electronic trip unit for UTS150…UTS600



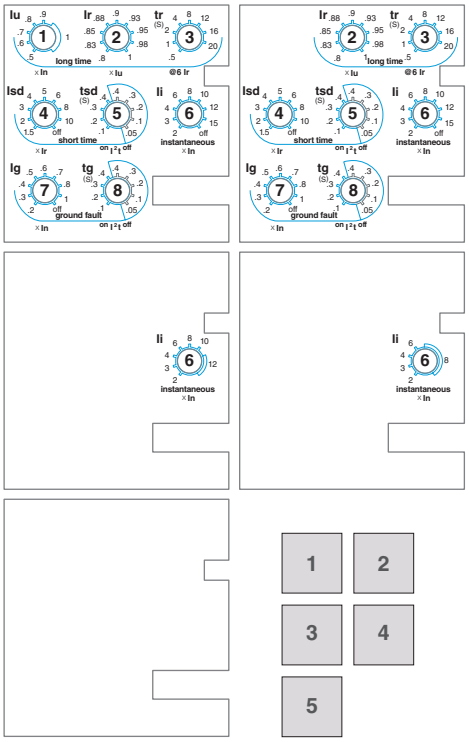
ETM

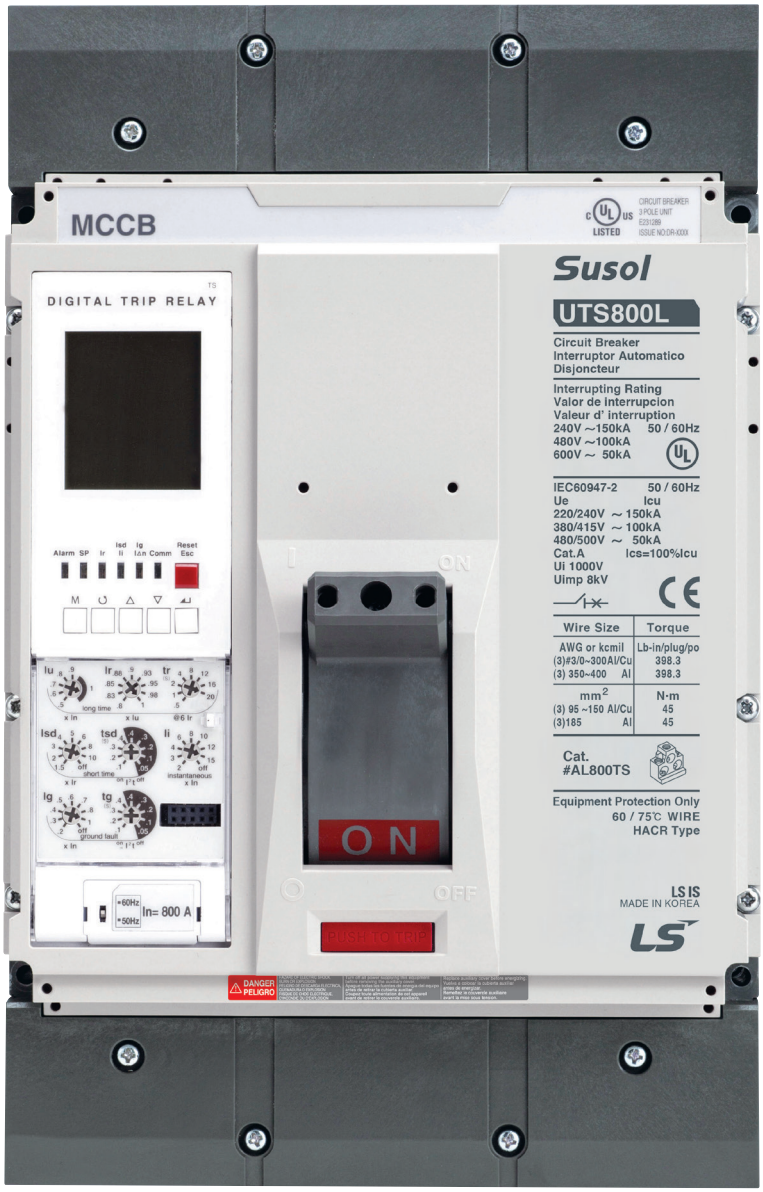
- Electronic trip unit for UTS400, UTS600



ELECTRONIC TRIP UNITS

- UTS800, UTS1200 Frame
- 400-1200 Amperes
- Factory-installed internal trip units.
- Several versions by rated current and function



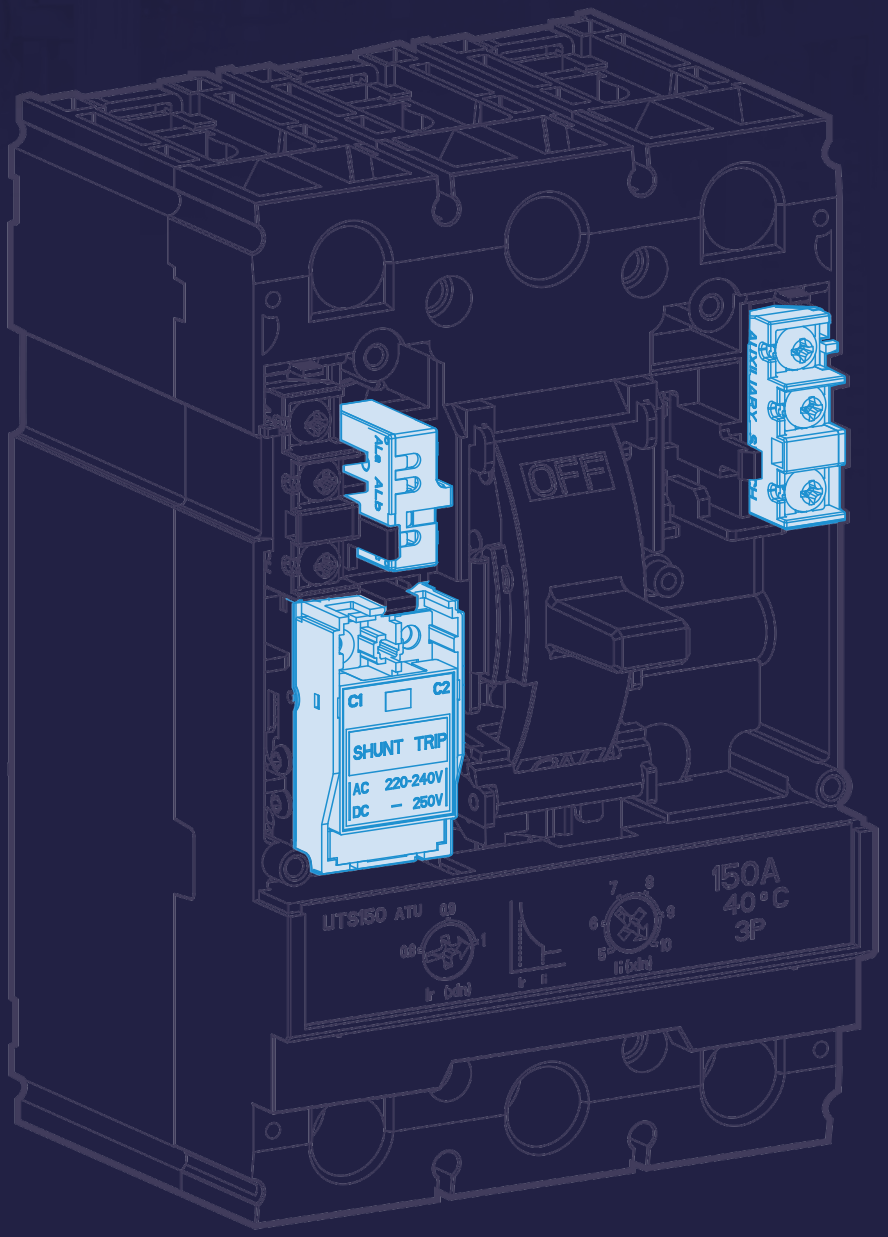


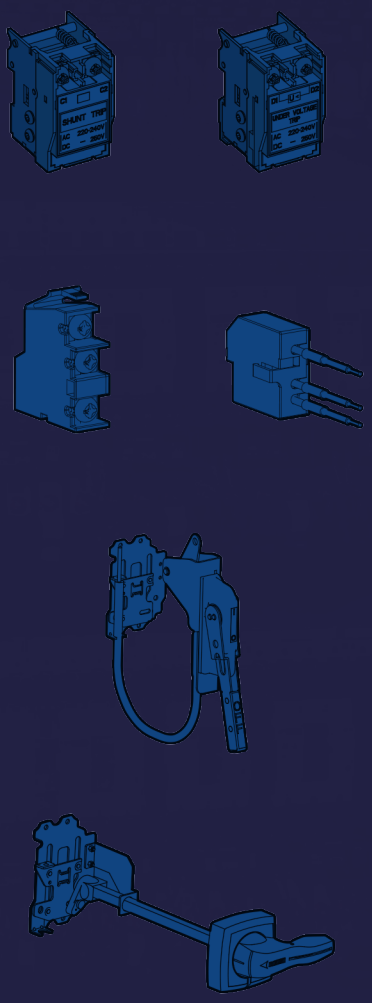
1. N, A type Knob information
2. P, S type Knob information
3. MCP800 type Knob information
4. MCP1200 type Knob information
5. MCS800/1200 type Knob information

FUTURING SMART ENERGY

FOR EXTENSIVE APPLICATIONS

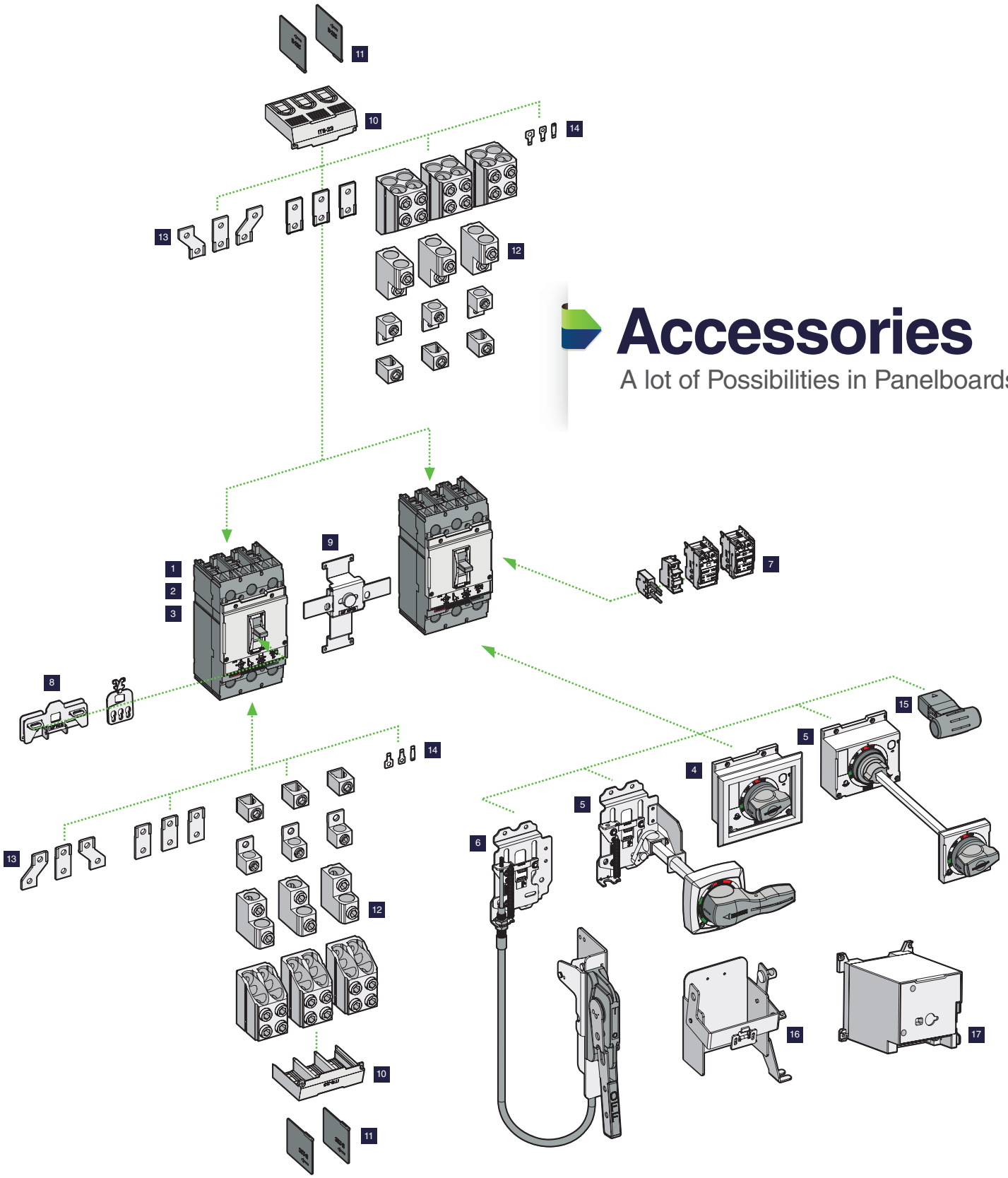
Wide range of optimized auxiliaries and accessories





Accessories

A lot of Possibilities in Panelboards



1 Molded Case Circuit Breaker
2 Motor Circuit Protector
3 Molded Case Switch
4 Direct Rotary Handle
5 Extended Handle
6 Flange Cable Handle
7 Inner Accessories (AL, AX, UVT, SHT)
8 Locking Device (Handle)
9 Mechanical Interlock
10 Terminal Shield
11 Interphase Barriers
12 Mechanical Lugs
13 Busbar Connectors
14 Control wire Terminal
15 Aux. Handle
16 Operating Mechanism (VDM/COM)
17 Motor operator (MOP)

Series Overview




Frame		UTE100			UTE100			UTS150			UTS250		
Maximum rated current		100A		30A	100A		30A	150A			250A		
Number of poles		2			3			2, 3			2, 3		
Breaker type		E	N	H	E	N	H	N	H	L	N	H	L
UL489/CSA C22.2		UTE100			UTE100			UTS150			UTS250		
Interrupting capacity (kA rms) AC(50/60HZ) UL, CSA	120/240V	50	65	100	50	65	100	-	-	-	-	-	-
	240V ac	50	65	100	50	65	100	65	100	150	65	100	150
	480V ac	25	35	65	25	35	65	35	65	100	35	65	100
	600V ac		-			-		18	35	50	18	35	50
	600Y/347V ac	14	18	35	14	18	35	-	-	-	-	-	-
UL489 DC		UTE100			UTE100			UTS 150			UTS 250		
Interrupting capacity (kA) DC UL, CSA	250V dc-2P	16	25	-	16	25	-	35	50	65	35	50	65
	500V dc-3P		-		25	35	-	-	-	-	-	-	-
	600V dc-3P		-			-		35	50	65	35	50	65
IEC 60947-2		UTE100			UTE100			UTS150			UTS250		
Ultimate breaking capacity, (kA rms) AC 50/60Hz, Icu	220/240V	50	65	65	50	65	65	65	100	150	65	100	150
	380/415V	25	35	35	25	35	35	35	65	100	35	65	100
	480/500V		-			-		18	35	50	18	35	50
Service breaking capacity, Ics (%Icu)			100%			100%			100%			100%	
Insulation voltage, Ui			750 Vac			750 Vac			750 Vac			750 Vac	
Impulse withstand voltage, Uimp			8 kVac			8 kVac			8 kVac			8 kVac	
Rated short-time withstand current (Icw)			-			-			-			-	
Utilization category			A			A			A			A	
TRIP UNITS F : Fixed A : Adjustable T : Thermal M : Magnetic E : Electronics	Amperes	15~100A		15~30A	15~100A		15~30A	40~150A			150~250A		
	ATU		-			-			●			●	
	FMU		-			●			●			●	
	FTU		●			●			●			●	
	ETS		-			-			●(60,100,150A)			●(150, 250A)	
	ETM		-			-			-			-	
	OCR		-			-			-			-	
MCP	Amperes		-			-			1.6~60A 100~150A			220A	
	MCP		-			-			●			●	
MCS	Amperes	100A		-	100A		-	150A			250A		
	MCS	●		-	●		-	●			●		
Unit mounted			●			●			●			●	
Mechanical lugs			●			●			●			●	
Busbar connectors			●			●			●			●	
Control wire terminal kit			-			-			●			●	
Terminal shields			-			-			-			-	
Interphase barriers			●			●			●			●	
Shunt trip			●			●			●			●	
Undervoltage trip			●			●			●			●	
Auxiliary switch			●			●			●			●	
Alarm switch			●			●			●			●	
Fault alarm switch			-			-			●			●	
Flange cable handle			●			●			●			●	
Flange variable-depth mechanism			●			●			●			●	
Directly-mounted rotary operating handle			-			●			●			●	
NEMA-Door-mounted operating mechanisms			●			●			●			●	
IEC-Door-mounted operating mechanisms			●			●			●			●	
Mechanical interlocks			-			●			●			●	
Handle padlock attachment			●			●			●			●	
Motor operator			-			-			●			●	
Weight(approximate) lbs.(kg)	2-Pole		1.64(0.74)			-			3.44(1.56)			3.88(1.76)	
	3-Pole		-			2.33(1.06)			3.95(1.79)			4.49(2.04)	
Dimensions Inches(mm)	W x H x D	W	H	D	W	H	D	W	H	D	W	H	D
	2-Pole	2.01(51)	5.12(130)	3.44(87.5)	-	-	-	4.13(105)	6.50(165)	3.44(87.5)	4.13(105)	7.48(190)	3.44(87.5)
	3-Pole	-	-	-	2.99(76)	5.12(130)	3.44(87.5)	4.13(105)	6.50(165)	3.44(87.5)	4.13(105)	7.48(190)	3.44(87.5)

UTS400			UTS600			UTS800			UTS1200			
400A			600A			800A			1200A			
2, 3			2, 3			3			3			
N	H	L	N	H	L	N	H	L	N	H	P	L
UTS400			UTS600			UTS800			UTS1200			
-	-	-	-	-	-	-	-	-	-	-	-	-
65	100	150	65	100	150	65	100	150	50	100	65	150
35	65	100	35	65	100	35	65	100	35	65	50	100
18	35	50	18	35	50	18	35	50	18	25	50	35
-	-	-	-	-	-	-	-	-	-	-	-	-
UTS400			UTS600			UTS800			UTS1200			
35	50	65	35	50	65		-			-		
-	-	-	-	-	-		-			-		
35	50	65	35	50	65		-			-		
UTS400			UTS600			UTS800			UTS1200			
65	100	150	65	100	150	65	100	150	50	100	65	150
35	65	100	35	65	100	35	65	100	35	65	50	100
18	35	50	18	35	50	18	35	50	25	35	50	50
100%			100%			100%			100%			
750 Vac			750 Vac			1000 Vac			1000 Vac			
8 kVac			8 kVac			8 kVac			8 kVac			
-			-			18kA	-	-	25kA	-	25kA	-
A			A			B	A	A	B	A	B	A
250/300/350/400A			500/600A			400/600/630/800A			800/1000/1200A			
●			●			-			-			
●			●			-			-			
●			●			-			-			
●(250, 400A)			●(400, 600A)			-			-			
●(250, 400A)			●(400, 600A)			-			-			
-			-			●			●			
320A			500A			800A			1200A			
●			●			●			●			
400A			600A			800A			1200A			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
-			-			-			-			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			-			-			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			●			●			
●			●			-			-			
12.02(5.45)			13.45(6.10)			-			-			
13.89(6.30)			15.79(7.16)			31.35(14.22)			40.28(18.27)			
W	H	D	W	H	D	W	H	D	W	H	D	
5.51(140)	11.42(290)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	-	-	-	-	-	-	
5.51(140)	11.42(290)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	8.27(210)	12.88(327.2)	6(152.5)	8.27(210)	16.26(413)	6(152.5)	

SELECTION GUIDE

UTE100

CATALOG NUMBERING [PRODUCT SELECTION]

UTE100 ····· **NT** ····· **FMU** ····· **100A** ····· **3P** ····· **LL** ····· **UL**

SERIES & FRAME: Susol 100AF

PERFORMANCE

Rating	80%	100%	kA
120/240Vac	E	ET	50
	N	NT	65
	H	HT	100
240Vac	E	ET	50
	N	NT	65
	H	HT	100
480Vac	E	ET	25
	N	NT	35
	H	HT	65
600Y/347Vac	E	ET	14
	N	NT	18
	H	HT	35

TRIP UNIT

FTU: Fixed Thermal, Fixed Magnet
FMU: Adj. Thermal, Fixed Magnet
MCS: Molded Case Switch

AMPERES

15	20
25	30
35	40
45	50
60	70
80	90
100	

POLES

2: Two
3: Three

TERMINALS

LL: Lugs Line/Load Side
L : Lugs Line Side
LO: Lugs Load Side
- : Bolt-on

SUFFIX

UL : UL

UTE100 FRAME

- **UTE100 breaker is HACR rated**
- **SWD switch duty rating**
  (applied only to 15 and 20A /347Vac or less)
- **HID high intensity discharge lighting rating**
  (15~50A /480Vac or less)

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz				INTERRUPTING CAPACITY (kA) DC	
		120/240V	240V	480V	600Y 347V	250V DC-2P	500V DC-3P
UTE100E	2, 3	50	50	25	14	16	25
UTE100N	2, 3	65	65	35	18	25	35
UTE100H	2, 3	100	100	65	35	-	-

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu	
		220/240V	380/415V
UTE100E	2, 3	50	25
UTE100N	2, 3	65	35
UTE100H	2, 3	65	35
Service breaking capacity, Ics (%Icu)		100%	
Insulation Voltage, Ui		750 Vac	
Impulse Withstand Voltage, Uimp		8 kVac	
Utilization Category		A	

DIMENSIONS

POLES	DIMENSIONS inch (mm)		
	W	H	D
2-Pole	2.01 (51)	5.12 (130)	3.44 (87.5)
3-Pole	2.99 (76)	5.12 (130)	3.44 (87.5)

TRIP UNIT TYPES

	THERMAL	MAGNETIC	REMARKS
FTU	Fixed	Fixed	
FMU	Adjustable, 0.8~1 x In	Fixed	
MCS	N.A	Fixed, 10 x In	Magnetic only

CIRCUIT BREAKER

WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)						
Ampere Rating, In	50kA at 120/240V, 50kA at 240Vac		65kA at 120/240V, 65kA at 240Vac		100kA at 120/240Vac, 100kA at 240Vac	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
15A	UTE100-E-FTU-15-2	UTE100-E-FTU-15-3	UTE100-N-FTU-15-2	UTE100-N-FTU-15-3	UTE100-H-FTU-15-2	UTE100-H-FTU-15-3
20A	UTE100-E-FTU-20-2	UTE100-E-FTU-20-3	UTE100-N-FTU-20-2	UTE100-N-FTU-20-3	UTE100-H-FTU-20-2	UTE100-H-FTU-20-3
25A	UTE100-E-FTU-25-2	UTE100-E-FTU-25-3	UTE100-N-FTU-25-2	UTE100-N-FTU-25-3	UTE100-H-FTU-25-2	UTE100-H-FTU-25-3
30A	UTE100-E-FTU-30-2	UTE100-E-FTU-30-3	UTE100-N-FTU-30-2	UTE100-N-FTU-30-3	UTE100-H-FTU-30-2	UTE100-H-FTU-30-3
35A	UTE100-E-FTU-35-2	UTE100-E-FTU-35-3	UTE100-N-FTU-35-2	UTE100-N-FTU-35-3	-	-
40A	UTE100-E-FTU-40-2	UTE100-E-FTU-40-3	UTE100-N-FTU-40-2	UTE100-N-FTU-40-3	-	-
45A	UTE100-E-FTU-45-2	UTE100-E-FTU-45-3	UTE100-N-FTU-45-2	UTE100-N-FTU-45-3	-	-
50A	UTE100-E-FTU-50-2	UTE100-E-FTU-50-3	UTE100-N-FTU-50-2	UTE100-N-FTU-50-3	-	-
60A	UTE100-E-FTU-60-2	UTE100-E-FTU-60-3	UTE100-N-FTU-60-2	UTE100-N-FTU-60-3	-	-
70A	UTE100-E-FTU-70-2	UTE100-E-FTU-70-3	UTE100-N-FTU-70-2	UTE100-N-FTU-70-3	-	-
80A	UTE100-E-FTU-80-2	UTE100-E-FTU-80-3	UTE100-N-FTU-80-2	UTE100-N-FTU-80-3	-	-
90A	UTE100-E-FTU-90-2	UTE100-E-FTU-90-3	UTE100-N-FTU-90-2	UTE100-N-FTU-90-3	-	-
100A	UTE100-E-FTU-100-2	UTE100-E-FTU-100-3	UTE100-N-FTU-100-2	UTE100-N-FTU-100-3	-	-

UTE100 FRAME

CIRCUIT BREAKER

WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)						
Ampere Rating, In	25kA at 480V, 14kA at 600Y 347Vac		35kA at 480V, 18kA at 600Y 347Vac		65kA at 480V, 35kA at 600Y/347Vac	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
15A	UTE100·E·FTU·15·2	UTE100·E·FTU·15·3	UTE100·N·FTU·15·2	UTE100·N·FTU·15·3	UTE100·H·FTU·15·2	UTE100·H·FTU·15·3
20A	UTE100·E·FTU·20·2	UTE100·E·FTU·20·3	UTE100·N·FTU·20·2	UTE100·N·FTU·20·3	UTE100·H·FTU·20·2	UTE100·H·FTU·20·3
25A	UTE100·E·FTU·25·2	UTE100·E·FTU·25·3	UTE100·N·FTU·25·2	UTE100·N·FTU·25·3	UTE100·H·FTU·25·2	UTE100·H·FTU·25·3
30A	UTE100·E·FTU·30·2	UTE100·E·FTU·30·3	UTE100·N·FTU·30·2	UTE100·N·FTU·30·3	UTE100·H·FTU·30·2	UTE100·H·FTU·30·3
35A	UTE100·E·FTU·35·2	UTE100·E·FTU·35·3	UTE100·N·FTU·35·2	UTE100·N·FTU·35·3	-	-
40A	UTE100·E·FTU·40·2	UTE100·E·FTU·40·3	UTE100·N·FTU·40·2	UTE100·N·FTU·40·3	-	-
45A	UTE100·E·FTU·45·2	UTE100·E·FTU·45·3	UTE100·N·FTU·45·2	UTE100·N·FTU·45·3	-	-
50A	UTE100·E·FTU·50·2	UTE100·E·FTU·50·3	UTE100·N·FTU·50·2	UTE100·N·FTU·50·3	-	-
60A	UTE100·E·FTU·60·2	UTE100·E·FTU·60·3	UTE100·N·FTU·60·2	UTE100·N·FTU·60·3	-	-
70A	UTE100·E·FTU·70·2	UTE100·E·FTU·70·3	UTE100·N·FTU·70·2	UTE100·N·FTU·70·3	-	-
80A	UTE100·E·FTU·80·2	UTE100·E·FTU·80·3	UTE100·N·FTU·80·2	UTE100·N·FTU·80·3	-	-
90A	UTE100·E·FTU·90·2	UTE100·E·FTU·90·3	UTE100·N·FTU·90·2	UTE100·N·FTU·90·3	-	-
100A	UTE100·E·FTU·100·2	UTE100·E·FTU·100·3	UTE100·N·FTU·100·2	UTE100·N·FTU·100·3	-	-

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	50kA at 120/240V, 50kA at 240Vac	65kA at 120/240V, 65kA at 240Vac	100kA at 120/240Vac, 100kA at 240VAC	Thermal range
	3-Pole	3-Pole	3-Pole	
25A	UTE100·E·FMU·25·3	UTE100·N·FMU·25·3	UTE100·H·FMU·25·3	20-25A
40A	UTE100·E·FMU·40·3	UTE100·N·FMU·40·3	-	32-40A
60A	UTE100·E·FMU·60·3	UTE100·N·FMU·60·3	-	48-60A
80A	UTE100·E·FMU·80·3	UTE100·N·FMU·80·3	-	64-80A
100A	UTE100·E·FMU·100·3	UTE100·N·FMU·100·3	-	80-100A

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	25kA at 480V, 14kA at 600Y 347Vac	35kA at 480V, 18kA at 600Y 347Vac	65kA at 480V, 35kA at 600Y/347Vac	Thermal range
	3-Pole	3-Pole	3-Pole	
25A	UTE100·E·FMU·25·3	UTE100·N·FMU·25·3	UTE100·H·FMU·25·3	20-25A
40A	UTE100·E·FMU·40·3	UTE100·N·FMU·40·3	-	32-40A
60A	UTE100·E·FMU·60·3	UTE100·N·FMU·60·3	-	48-60A
80A	UTE100·E·FMU·80·3	UTE100·N·FMU·80·3	-	64-80A
100A	UTE100·E·FMU·100·3	UTE100·N·FMU·100·3	-	80-100A

MOLDED CASE SWITCH

WITH MCS TRIP UNIT				
Ampere Rating, In	50kA at 120/240V, 50kA at 240V		65kA at 120/240V, 65kA at 240V	
	2-Pole	3-Pole	2-Pole	3-Pole
100A	UTE100·E·MCS·100·2	UTE100·E·MCS·100·3	UTE100·N·MCS·100·2	UTE100·N·MCS·100·3

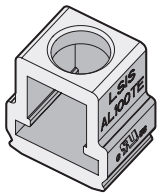
Ampere Rating, In	25kA at 480V, 14kA at 600Y 347Vac		35kA at 480V, 18kA at 600Y 347Vac	
	2-Pole	3-Pole	2-Pole	3-Pole
100A	UTE100·E·MCS·100·2	UTE100·E·MCS·100·3	UTE100·N·MCS·100·2	UTE100·N·MCS·100·3

ACCESSORIES FOR UTE100

MECHANICAL LUGS

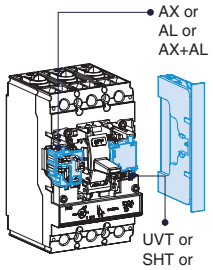
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
100A	Aluminum	Cu/Al	AL100TE

AL100TE 15-100A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
AX + AL		
Shunt Trip, SHT	AC/DC 12V	
	AC/DC 24V	
	AC/DC 48V	
	AC/DC 60V	
	AC/DC 100~130V	
	AC/DC 200~250V	
	AC 380~450V	
	AC 440~500V	
Undervoltage Trip, UVT	AC/DC 24V	
	AC/DC 48V	
	AC/DC 100~110V	
	AC/DC 200~220V	
	AC 380~440V	
	AC 440~480V	



Type	Left(R)	Right(T)
AX	1	1
AL	1	1
AX+AL	1	1
SHT		1
UVT		1

- Applicable in indicated pole position-not synchronous
- 2P : Right only

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL0

<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL0

<Plate Handle Lock>

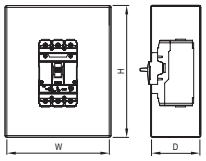
MECHANICAL INTERLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT03

<Mechanical Interlock>

ENCLOSURE

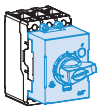
ENCLOSURE DIMENSION (W X H X D) inch(mm)	ORDERING TYPE
8.27(210) x 17.3(439.4) x 4.0(101.6)	-



ACCESSORIES FOR UTE100

ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-0
Extended (Door-Mounted)	NEMA Type 1	REH-0
	NEMA Type 1	REH-0C
NEMA Door-Mounted	NEMA Type 1, 12	EHU-0
	NEMA Type 3, 3R, 4	EHV-0
	NEMA Type 3, 4, 4X	EHX-0
	NEMA Type 1, 12	EHU-0C
	NEMA Type 3, 3R, 4	EHV-0C
	NEMA Type 3, 4, 4X	EHX-0C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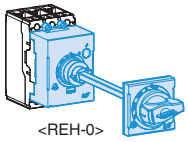
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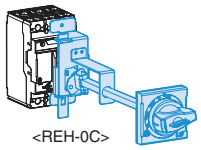
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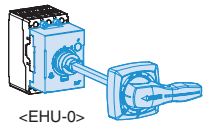
FLANGE HANDLES WITH CABLE OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-0
Standard type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S
Cable	36 inch	FH2-36
	48 inch	FH2-48
	60 inch	FH2-60
	72 inch	FH2-72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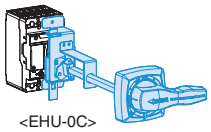
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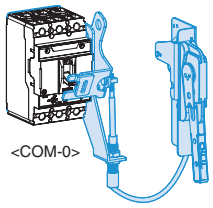
FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-0
Standard type handle with operating mechanism	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S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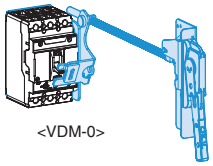
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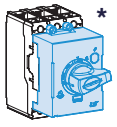
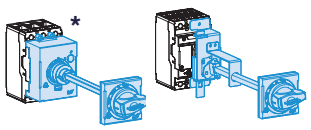
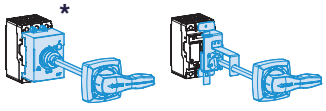
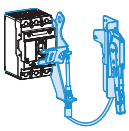
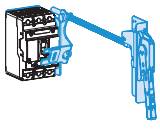
Description	Directly Mounted	Door Mounted	Flange Handle with Cable Operation Mechansm	Flange Handle with Variable Depth Mechansm
NEMA Type 1	 *	 *	-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-	 *		

* Only 3 Pole

SELECTION GUIDE

UTS150

CATALOG NUMBERING [PRODUCT SELECTION]

UTS150	NT	ATU	150A	3P	LL	UL

SERIES & FRAME: Susol 150AF

PERFORMANCE

Rating	80%	100%	kA
240Vac	N	NT	65
	H	HT	100
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	L	LT	100
600Vac	N	NT	18
	H	HT	35
	L	LT	50

TRIP UNIT

- **FTU**: Fixed Thermal, Fixed Magnet
- **FMU**: Adj. Thermal, Fixed Magnet
- **ATU**: Adj Thermal & Magnet
- **ETS**: Electronic trip unit standard
- **MCP**: Motor Circuit Protector
- **MCS:** Molded Case Switch

AMPERES

MCCB	MCP
40	1.6
50	3.2
60	6.3
70	12
80	20
90	32
100	50
125	60
150	100
	150

POLES

- 2: Two
- 3: Three

TERMINALS

- LL: Lugs Line/Load Side
- L : Lugs Line Side
- LO: Lugs Load Side
- - : Bolt-on

SUFFIX

- UL : UL

UTS150 FRAME

• UTS150 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz			INTERRUPTING CAPACITY (kA) DC	
		240V ac	480V ac	600V ac	250V DC-2P	600V DC-3P
UTS150N	2, 3	65	35	18	35	35
UTS150H	2, 3	100	65	35	50	50
UTS150L	2, 3	150	100	50	65	65

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu		
		220/240V	380/415V	480/500V
UTS150N	2, 3	65	35	18
UTS150H	2, 3	100	65	35
UTS150L	2, 3	150	100	50
Service breaking capacity, Ics (%Icu)			100%	
Insulation Voltage, Ui			750 Vac	
Impulse Withstand Voltage, Uimp			8 kVac	
Utilization Category			A	

DIMENSIONS

POLES	DIMENSIONS inch (mm)		
	W	H	D
2-Pole	4.13 (105)	6.50 (165)	3.44 (87.5)
3-Pole			

TRIP UNIT TYPES

	THERMAL	MAGNETIC	REMARKS
FTU	Fixed	Fixed	
FMU	Adjustable, 0.8~1 x In	Fixed	
ATU	Adjustable, 0.8~1 x In	Adjustable, 5~10 x In	
ETS	Adjustable, 15~150A	Adjustable, 1.5~11 x In	Electronic
MCS	N.A.	Fixed, 10xIn	Magnetic only
MCP	N.A.	Adjustable, 6~12 x In	Magnetic only

* MCP 60A: 6.7 ~ 13.3 x In

CIRCUIT BREAKER

WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)						
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V		150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole	2-Pole	3-Pole
40A	UTS150·N·FTU·40·2	UTS150·N·FTU·40·3	UTS150·H·FTU·40·2	UTS150·H·FTU·40·3	UTS150·L·FTU·40·2	UTS150·L·FTU·40·3
50A	UTS150·N·FTU·50·2	UTS150·N·FTU·50·3	UTS150·H·FTU·50·2	UTS150·H·FTU·50·3	UTS150·L·FTU·50·2	UTS150·L·FTU·50·3
60A	UTS150·N·FTU·60·2	UTS150·N·FTU·60·3	UTS150·H·FTU·60·2	UTS150·H·FTU·60·3	UTS150·L·FTU·60·2	UTS150·L·FTU·60·3
70A	UTS150·N·FTU·70·2	UTS150·N·FTU·70·3	UTS150·H·FTU·70·2	UTS150·H·FTU·70·3	UTS150·L·FTU·70·2	UTS150·L·FTU·70·3
80A	UTS150·N·FTU·80·2	UTS150·N·FTU·80·3	UTS150·H·FTU·80·2	UTS150·H·FTU·80·3	UTS150·L·FTU·80·2	UTS150·L·FTU·80·3
90A	UTS150·N·FTU·90·2	UTS150·N·FTU·90·3	UTS150·H·FTU·90·2	UTS150·H·FTU·90·3	UTS150·L·FTU·90·2	UTS150·L·FTU·90·3
100A	UTS150·N·FTU·100·2	UTS150·N·FTU·100·3	UTS150·H·FTU·100·2	UTS150·H·FTU·100·3	UTS150·L·FTU·100·2	UTS150·L·FTU·100·3
125A	UTS150·N·FTU·125·2	UTS150·N·FTU·125·3	UTS150·H·FTU·125·2	UTS150·H·FTU·125·3	UTS150·L·FTU·125·2	UTS150·L·FTU·125·3
150A	UTS150·N·FTU·150·2	UTS150·N·FTU·150·3	UTS150·H·FTU·150·2	UTS150·H·FTU·150·3	UTS150·L·FTU·150·2	UTS150·L·FTU·150·3

CIRCUIT BREAKER

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
40A	UTS150·N·FMU·40·2	UTS150·N·FMU·40·3	UTS150·H·FMU·40·2	UTS150·H·FMU·40·3
60A	UTS150·N·FMU·60·2	UTS150·N·FMU·60·3	UTS150·H·FMU·60·2	UTS150·H·FMU·60·3
80A	UTS150·N·FMU·80·2	UTS150·N·FMU·80·3	UTS150·H·FMU·80·2	UTS150·H·FMU·80·3
100A	UTS150·N·FMU·100·2	UTS150·N·FMU·100·3	UTS150·H·FMU·100·2	UTS150·H·FMU·100·3
125A	UTS150·N·FMU·125·2	UTS150·N·FMU·125·3	UTS150·H·FMU·125·2	UTS150·H·FMU·125·3
150A	UTS150·N·FMU·150·2	UTS150·N·FMU·150·3	UTS150·H·FMU·150·2	UTS150·H·FMU·150·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Thermal range
	2-Pole	3-Pole	
40A	UTS150·L·FMU·40·2	UTS150·L·FMU·40·3	32-40A
60A	UTS150·L·FMU·60·2	UTS150·L·FMU·60·3	48-60A
80A	UTS150·L·FMU·80·2	UTS150·L·FMU·80·3	64-80A
100A	UTS150·L·FMU·100·2	UTS150·L·FMU·100·3	80-100A
125A	UTS150·L·FMU·125·2	UTS150·L·FMU·125·3	100~125A
150A	UTS150·L·FMU·150·2	UTS150·L·FMU·150·3	120-150A

WITH ATU TRIP UNIT (ADJUSTABLE THERMAL, ADJUSTABLE MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
100A	UTS150·N·ATU·100·2	UTS150·N·ATU·100·3	UTS150·H·ATU·100·2	UTS150·H·ATU·100·3
125A	UTS150·N·ATU·125·2	UTS150·N·ATU·125·3	UTS150·H·ATU·125·2	UTS150·H·ATU·125·3
150A	UTS150·N·ATU·150·2	UTS150·N·ATU·150·3	UTS150·H·ATU·150·2	UTS150·H·ATU·150·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Adjustable range	
	2-Pole	3-Pole	Thermal	Magnetic
100A	UTS150·L·ATU·100·2	UTS150·L·ATU·100·3	80-100A	500-1000A
125A	UTS150·L·ATU·125·2	UTS150·L·ATU·125·3	100~125A	625~1250A
150A	UTS150·L·ATU·150·2	UTS150·L·ATU·150·3	120-150A	750-1500A

WITH ETS23 LI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
60A	UTS150·N·ETS23·60·3	UTS150·H·ETS23·60·3
100A	UTS150·N·ETS23·100·3	UTS150·H·ETS23·100·3
150A	UTS150·N·ETS23·150·3	UTS150·H·ETS23·150·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Tr (s)
60A	UTS150·L·ETS23·60·3	15~60A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.5, 1, 2, 4, 8, 16, Accuracy ±20%
100A	UTS150·L·ETS23·100·3	40~100A		
150A	UTS150·L·ETS23·150·3	60~150A		

UTS150 FRAME

CIRCUIT BREAKER

WWITH ETS23 LSI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
60A	UTS150·N·ETS23·60·3	UTS150·H·ETS23·60·3
100A	UTS150·N·ETS23·100·3	UTS150·H·ETS23·100·3
150A	UTS150·N·ETS23·150·3	UTS150·H·ETS23·150·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Isd (A)	Ii (A)
60A	UTS150·L·ETS23·60·3	15~60A	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy ±15%	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In
100A	UTS150·L·ETS23·100·3	40~100A		
150A	UTS150·L·ETS23·150·3	60~150A		

* Time delay at 6 x Ir: fixde 16s, accuracy ±20%
* Time delay: non-tripping time 70ms / maximum break time 140ms
* Tripping time: ≤60ms

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
150A	UTS150·N·MCS·150·2	UTS150·N·MCS·150·3	UTS150·H·MCS·150·2	UTS150·H·MCS·150·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
150A	UTS150·L·MCS·150·2	UTS150·L·MCS·150·3

MOTOR CIRCUIT PROTECTOR

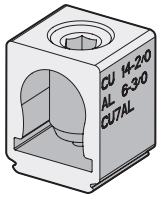
WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)				
Ampere Rating, In	3-Pole	3-Pole	3-Pole	Magnetic range
1.6A	UTS150·N·MCP·1.6·3	UTS150·H·MCP·1.6·3	UTS150·L·MCP·1.6·3	10-20A
3.2A	UTS150·N·MCP·3.2·3	UTS150·H·MCP·3.2·3	UTS150·L·MCP·3.2·3	20-40A
6.3A	UTS150·N·MCP·6.3·3	UTS150·H·MCP·6.3·3	UTS150·L·MCP·6.3·3	40-80A
12A	UTS150·N·MCP·12·3	UTS150·H·MCP·12·3	UTS150·L·MCP·12·3	70-140A
20A	UTS150·N·MCP·20·3	UTS150·H·MCP·20·3	UTS150·L·MCP·20·3	120-240A
32A	UTS150·N·MCP·32·3	UTS150·H·MCP·32·3	UTS150·L·MCP·32·3	190-380A
50A	UTS150·N·MCP·50·3	UTS150·H·MCP·50·3	UTS150·L·MCP·50·3	300-600A
60A	UTS150·N·MCP·60·3	UTS150·H·MCP·60·3	UTS150·L·MCP·60·3	400-800A
100A	UTS150·N·MCP·100·3	UTS150·H·MCP·100·3	UTS150·L·MCP·100·3	600-1200A
150A	UTS150·N·MCP·150·3	UTS150·H·MCP·150·3	UTS150·L·MCP·150·3	900-1800A

ACCESSORIES FOR UTS150

MECHANICAL LUGS

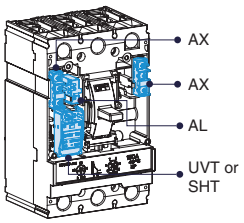
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
150A	Aluminum	Cu/Al	AL150TS

AL150TS 1.6~150A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Fault alarm switch, FAL		
Shunt Trip, SHT	DC 12V	
	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~500V	
Undervoltage Trip, UVT	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~440V	
	AC 440~480V	



Type	Left(R)	Right(T)
AX	1	1
AL	1	-
FAL	-	1**
SHT	1*	-
UVT	1*	-

* Applicable in indicated pole position-not synchronous

** FAL can be applied to only MCCB with electronic trip release.

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL2

<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “ON” “OFF or “ON”	PHL2

<Plate Handle Lock>

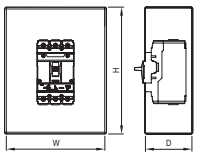
MECHANICAL INTERLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT23

<Mechanical Interlock>

ENCLOSURE

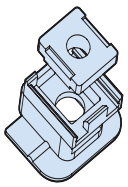
ENCLOSURE DIMENSION (W X H X D) Inch (mm)	ORDERING TYPE
8.58 (218) x 18.11 (460) x 4.02 (102)	-



ACCESSORIES FOR UTS150

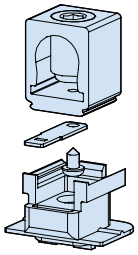
TERMINAL PLATES FOR BUSBAR CONNECTION

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker	2	SP22a
For 3-Pole breaker	3	SP23a



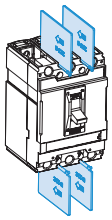
CONTROL WIRE TERMINALS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For Mechanical Lugs and Terminal Plate	2	CWT



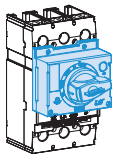
INSULATION BARRIERS

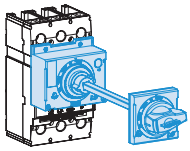
DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker		B22
For 3-Pole breaker		B23

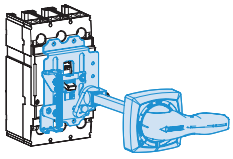


ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-2
Directly Mounted (with Key lock)	NEMA Type 1	DHK-2
Extended (Door-Mounted)	NEMA Type 1	REH-2
NEMA Door-Mounted	NEMA Type 1, 12	EHU-2
	NEMA Type 3, 3R, 4	EHV-2
	NEMA Type 3, 4, 4X	EHX-2

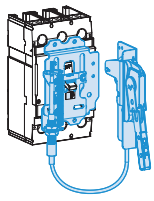






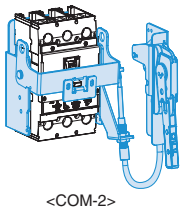
FLANGE HANDLES WITH SLIDING OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Handle (with sliding mechanism and without cable)	NEMA Type 1, 12, 3, 3R, 4	FHU-2
	NEMA Type 4, 4X	FHX-2
Cable	36 inch	FH2-36
	48 inch	FH2-48
	60 inch	FH2-60
	72 inch	FH2-72



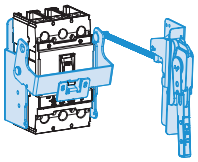
FLANGE HANDLES WITH CABLE OPERATING MECHANISM

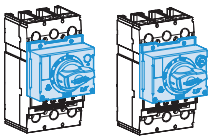
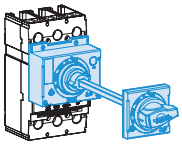
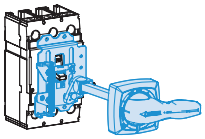
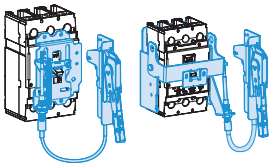
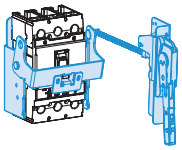
DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-2
Standard type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S
Cable	36 inch	FH2-36
	48 inch	FH2-48
	60 inch	FH2-60
	72 inch	FH2-72


<COM-2>

FLANGE HANDLES WITH CABLE OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-2
Standard type handle with operating mechanism	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S


<VDM-2>

TYPE	DIRECTLY MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA Type 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

MOTOR OPERATOR

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Standard type (Not lockable)	DC 24V	MOP2U
	AC 110V/DC 110V	MOP2U
	AC 230V/DC 220V	MOP2U
Lockable type	DC 24V	MOP2U-L
	AC 110V/DC 110V	MOP2U-L
	AC 230V/DC 220V	MOP2U-L

MOP2U-L

SELECTION GUIDE

UTS250

CATALOG NUMBERING [PRODUCT SELECTION]

UTS250 ····· NT ····· ATU ····· 250A ····· 3P ····· LL ····· UL

SERIES & FRAME: Susol 250AF

PERFORMANCE

Rating	80%	100%	kA
240Vac	N	NT	65
	H	HT	100
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	L	LT	100
600Vac	N	NT	18
	H	HT	35
	L	LT	50

TRIP UNIT

FTU: Fixed Thermal, Fixed Magnet
FMU: Adj. Thermal, Fixed Magnet
ATU: Adj Thermal & Magnet
ETS: Electronic trip unit standard
MCP: Motor Circuit Protector
MCS: Molded Case Switch

AMPERES

150	160
175	200
225	250

POLES

2: Two
3: Three

TERMINALS

LL: Lugs Line/Load Side
L : Lugs Line Side
LO: Lugs Load Side
- : Bolt-on

SUFFIX

UL : UL

UTS250 FRAME

UTS250 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz			INTERRUPTING CAPACITY (kA) DC	
		240V ac	480V ac	600V ac	250V DC-2P	600V DC-3P
UTS250N	2, 3	65	35	18	35	35
UTS250H	2, 3	100	65	35	50	50
UTS250L	2, 3	150	100	50	65	65

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu		
		220/240V	380/415V	480/500V
UTS250N	2, 3	65	35	18
UTS250H	2, 3	100	65	35
UTS250L	2, 3	150	100	50
Service breaking capacity, Ics (%Icu)			100%	
Insulation Voltage, Ui			750 Vac	
Impulse Withstand Voltage, Uimp			8 kVac	
Utilization Category			A	

DIMENSIONS

POLES	DIMENSIONS inch (mm)		
	W	H	D
2-Pole 3-Pole	4.13 (105)	7.48 (190)	3.44 (87.5)

TRIP UNIT TYPES

	THERMAL	MAGNETIC	REMARKS
FTU	Fixed	Fixed	
FMU	Adjustable, 0.8~1 x In	Fixed	
ATU	Adjustable, 0.8~1 x In	Adjustable, 5~10 x In	
ETS	Adjustable, 60~250A	Adjustable, 1.5~11 x In	Electronic
MCS	N.A.	Fixed, 10 x In	Magnetic only
MCP	N.A.	Adjustable, 6~12 x In	Magnetic only

UTS250 FRAME

CIRCUIT BREAKER

WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
150A	UTS250·N·FTU·150·2	UTS250·N·FTU·150·3	UTS250·H·FTU·150·2	UTS250·H·FTU·150·3
175A	UTS250·N·FTU·175·2	UTS250·N·FTU·175·3	UTS250·H·FTU·175·2	UTS250·H·FTU·175·3
200A	UTS250·N·FTU·200·2	UTS250·N·FTU·200·3	UTS250·H·FTU·200·2	UTS250·H·FTU·200·3
225A	UTS250·N·FTU·225·2	UTS250·N·FTU·225·3	UTS250·H·FTU·225·2	UTS250·H·FTU·225·3
250A	UTS250·N·FTU·250·2	UTS250·N·FTU·250·3	UTS250·H·FTU·250·2	UTS250·H·FTU·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
150A	UTS250·L·FTU·150·2	UTS250·L·FTU·150·3
175A	UTS250·L·FTU·175·2	UTS250·L·FTU·175·3
200A	UTS250·L·FTU·200·2	UTS250·L·FTU·200·3
225A	UTS250·L·FTU·225·2	UTS250·L·FTU·225·3
250A	UTS250·L·FTU·250·2	UTS250·L·FTU·250·3

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
160A	UTS250·N·FMU·160·2	UTS250·N·FMU·160·3	UTS250·H·FMU·160·2	UTS250·H·FMU·160·3
200A	UTS250·N·FMU·200·2	UTS250·N·FMU·200·3	UTS250·H·FMU·200·2	UTS250·H·FMU·200·3
250A	UTS250·N·FMU·250·2	UTS250·N·FMU·250·3	UTS250·H·FMU·250·2	UTS250·H·FMU·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Thermal range
	2-Pole	3-Pole	
160A	UTS250·L·FMU·160·2	UTS250·L·FMU·160·3	128-160A
200A	UTS250·L·FMU·200·2	UTS250·L·FMU·200·3	160-200A
250A	UTS250·L·FMU·250·2	UTS250·L·FMU·250·3	200-250A

WITH ATU TRIP UNIT (ADJUSTABLE THERMAL, ADJUSTABLE MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
160A	UTS250·N·ATU·160·2	UTS250·N·ATU·160·3	UTS250·H·ATU·160·2	UTS250·H·ATU·160·3
200A	UTS250·N·ATU·200·2	UTS250·N·ATU·200·3	UTS250·H·ATU·200·2	UTS250·H·ATU·200·3
250A	UTS250·N·ATU·250·2	UTS250·N·ATU·250·3	UTS250·H·ATU·250·2	UTS250·H·ATU·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Adjustable range	
	2-Pole	3-Pole	Thermal	Magnetic
160A	UTS250·L·ATU·160·2	UTS250·L·ATU·160·3	128-160A	800-1600A
200A	UTS250·L·ATU·200·2	UTS250·L·ATU·200·3	160-200A	1000-2000A
250A	UTS250·L·ATU·250·2	UTS250·L·ATU·250·3	200-250A	1250-2500A

CIRCUIT BREAKER

WITH ETS23 LI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
150A	UTS250·N·ETS23·150·3	UTS250·H·ETS23·150·3
250A	UTS250·N·ETS23·250·3	UTS250·H·ETS23·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Tr (s)
150A	UTS250·L·ETS23·150·3	60~150A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.5, 1, 2, 4, 8, 16, Accuracy ±20%
250A	UTS250·L·ETS23·250·3	80~250A		

WITH ETS23 LSI TRIP UNIT FOR UTS150 (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
150A	UTS250·N·ETS23·150·3	UTS250·H·ETS23·150·3
250A	UTS250·N·ETS23·250·3	UTS250·H·ETS23·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Isd (A)
150A	UTS250·L·ETS23·150·3	60~150A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy±15%
250A	UTS250·L·ETS23·250·3	80~250A		

* Time delay at 6 x Ir: fixde 16s, accuracy ±20%
* Time delay: non-tripping time 70ms / maximum break time 140ms
* Tripping time: ≤60ms

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
175A	UTS250·N·MCS·175·2	UTS250·N·MCS·175·3	UTS250·H·MCS·175·2	UTS250·H·MCS·175·3
250A	UTS250·N·MCS·250·2	UTS250·N·MCS·250·3	UTS250·H·MCS·250·2	UTS250·H·MCS·250·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
175A	UTS250·L·MCS·175·2	UTS250·L·MCS·175·3
250A	UTS250·L·MCS·250·2	UTS250·L·MCS·250·3

MOTOR CIRCUIT PROTECTOR

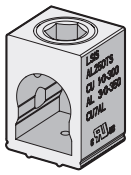
WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)				
Ampere Rating, In	3-Pole	3-Pole	3-Pole	Magnetic range
220A	UTS250·N·MCP·220·3	UTS250·H·MCP·220·3	UTS250·L·MCP·220·3	1320-2640A

ACCESSORIES FOR UTS250

MECHANICAL LUGS

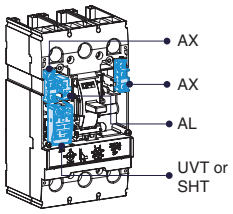
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
250A	Aluminum	Cu/Al	AL250TS

AL250TS 150~250A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Fault alarm switch, FAL		
Shunt Trip, SHT	DC 12V	
	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~500V	
Undervoltage Trip, UVT	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~440V	
	AC 440~480V	



Type	Left(R)	Right(T)
AX	1	1
AL	1	-
FAL	-	1**
SHT	1*	-
UVT	1*	-

* Applicable in indicated pole position-not synchronous

** FAL can be applied to only MCCB with electronic trip release.

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL2

<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL2

<Plate Handle Lock>

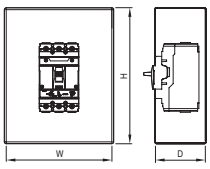
MECHANICAL INTERLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT23

<Mechanical Interlock>

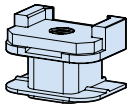
ENCLOSURE

ENCLOSURE DIMENSION (W X H X D) Inch (mm)	ORDERING TYPE
12.13 (308) x 28.5 (724) x 5.35 (136)	-



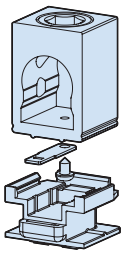
TERMINAL PLATES FOR BUSBAR CONNECTION

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker	2	SP22a
For 3-Pole breaker	3	SP23a



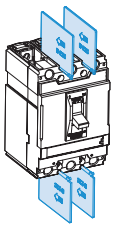
CONTROL WIRE TERMINALS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For Mechanical Lugs and Terminal Plate	2	CWT



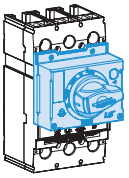
INSULATION BARRIERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker		B22
For 3-Pole breaker		B23



ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-2
Directly Mounted (with Key lock)	NEMA Type 1	DHK-2
Extended (Door-Mounted)	NEMA Type 1	REH-2
NEMA Door-Mounted	NEMA Type 1, 12	EHU-2
	NEMA Type 3, 3R, 4	EHV-2
	NEMA Type 3, 4, 4X	EHX-2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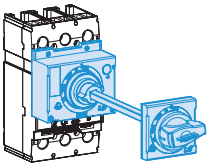
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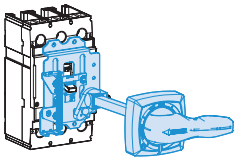
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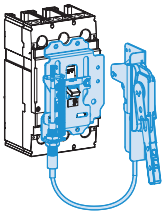
FLANGE HANDLES WITH SLIDING OPERATING MECHANISM

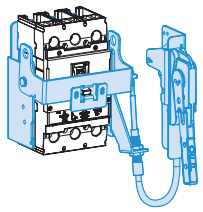
DESCRIPTION	TYPE	ORDERING TYPE
Handle (with sliding mechanism and without cable)	NEMA Type 1, 12, 3, 3R, 4	FHU-2
	NEMA Type 4, 4X	FHX-2
Cable	36 inch	FH2-36
	48 inch	FH2-48
	60 inch	FH2-60
	72 inch	FH2-72


<FHU-2>

ACCESSORIES FOR UTS250

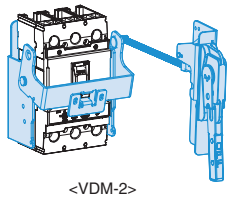
FLANGE HANDLES WITH CABLE OPERATING MECHANISM

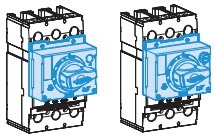
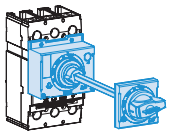
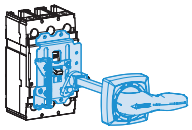
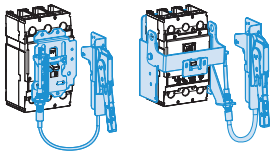
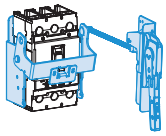
DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-2
Standard type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S
Cable	36 inch	FH2-36
	48 inch	FH2-48
	60 inch	FH2-60
	72 inch	FH2-72


<COM-2>

FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-2
Standard type handle with operating mechanism	NEMA Type 1, 12, 3, 3R, 4	FHU-S
	NEMA Type 4, 4X	FHX-S


<VDM-2>

TYPE	DIRECTLY MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA TYPE 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

MOTOR OPERATOR

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Standard type (Not lockable)	DC 24V	MOP2U
	AC 110V/DC 110V	MOP2U
	AC 230V/DC 220V	MOP2U
Lockable type	DC 24V	MOP2U-L
	AC 110V/DC 110V	MOP2U-L
	AC 230V/DC 220V	MOP2U-L


MOP2U-L

SELECTION GUIDE

UTS400

CATALOG NUMBERING [PRODUCT SELECTION]

UTS400	NT	ATU	400A	3P	LL	UL

SERIES & FRAME: Susol 400AF

PERFORMANCE

Rating	80%	100%	kA
240Vac	N	NT	65
	H	HT	100
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	L	LT	100
600Vac	N	NT	18
	H	HT	35
	L	LT	50

TRIP UNIT

FTU: Fixed Thermal, Fixed Magnet
FMU: Adj. Thermal, Fixed Magnet
ATU: Adj Thermal & Magnet
ETS: Electronic trip unit standard
ETM: Electronic trip unit muli function
MCP: Motor Circuit Protector
MCS: Molded Case Switch

AMPERES

250	300
350	400

POLES

2: Two
3: Three

TERMINALS

LL: Lugs Line/Load Side
L : Lugs Line Side
LO: Lugs Load Side
- : Bolt-on

SUFFIX

UL : UL

UTS400 FRAME

UTS400 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz			INTERRUPTING CAPACITY (kA) DC	
		240V ac	480V ac	600V ac	250V DC-2P	600V DC-3P
UTS400N	2, 3	65	35	18	35	35
UTS400H	2, 3	100	65	35	50	50
UTS400L	2, 3	150	100	50	65	65

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu		
		220/240V	380/415V	480/500V
UTS400N	2, 3	65	35	18
UTS400H	2, 3	100	65	35
UTS400L	2, 3	150	100	50
Service breaking capacity, Ics (%Icu)			100%	
Insulation Voltage, Ui			750 VAC	
Impulse Withstand Voltage, Uimp			8 KVAC	
Utilization Category			A	

DIMENSIONS

POLE	DIMENSIONS inch (mm)		
	W	H	D
2-Pole 3-Pole	5.51 (140)	11.42 (290)	4.33 (110)

TRIP UNIT TYPES

	THERMAL	MAGNETIC	REMARKS
FTU	Fixed	Fixed	
FMU	Adjustable, 0.8~1 x In	Fixed	
ATU	Adjustable, 0.8~1 x In	Adjustable, 5~10 x In	
ETS	Adjustable, 80~600 A	Adjustable, 1.5~11 x In	Electronic
ETM	Adjustable, 80~600 A	Adjustable, 1.5~11 x In	Electronic
MCS	N.A.	Fixed, 10 x In	Magnetic only
MCP	N.A.	Adjustable, 6~12 x In	Magnetic only

CIRCUIT BREAKER

Ampere Rating, In	WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)			
	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
250A	UTS400·N·FTU·250·2	UTS400·N·FTU·250·3	UTS400·H·FTU·250·2	UTS400·H·FTU·250·3
300A	UTS400·N·FTU·300·2	UTS400·N·FTU·300·3	UTS400·H·FTU·300·2	UTS400·H·FTU·300·3
350A	UTS400·N·FTU·350·2	UTS400·N·FTU·350·3	UTS400·H·FTU·350·2	UTS400·H·FTU·350·3
400A	UTS400·N·FTU·400·2	UTS400·N·FTU·400·3	UTS400·H·FTU·400·2	UTS400·H·FTU·400·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
250A	UTS400·L·FTU·250·2	UTS400·L·FTU·250·3
300A	UTS400·L·FTU·300·2	UTS400·L·FTU·300·3
350A	UTS400·L·FTU·350·2	UTS400·L·FTU·350·3
400A	UTS400·L·FTU·400·2	UTS400·L·FTU·400·3

CIRCUIT BREAKER

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
300A	UTS400·N·FMU·300·2	UTS400·N·FMU·300·3	UTS400·H·FMU·300·2	UTS400·H·FMU·300·3
400A	UTS400·N·FMU·400·2	UTS400·N·FMU·400·3	UTS400·H·FMU·400·2	UTS400·H·FMU·400·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Thermal range
	2-Pole	3-Pole	
300A	UTS400·L·FMU·300·2	UTS400·L·FMU·300·3	240~300A
400A	UTS400·L·FMU·400·2	UTS400·L·FMU·400·3	320~400A

WITH ATU TRIP UNIT (ADJUSTABLE THERMAL, ADJUSTABLE MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
300A	UTS400·N·ATU·300·2	UTS400·N·ATU·300·3	UTS400·H·ATU·300·2	UTS400·H·ATU·300·3
400A	UTS400·N·ATU·400·2	UTS400·N·ATU·400·3	UTS400·H·ATU·400·2	UTS400·H·ATU·400·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Adjustable range	
	2-Pole	3-Pole	Thermal	Magnetic
300A	UTS400·L·ATU·300·2	UTS400·L·ATU·300·3	240-300A	1500-3000A
400A	UTS400·L·ATU·400·2	UTS400·L·ATU·400·3	320-400A	2000-4000A

WITH ETS33 LI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
250A	UTS400·N·ETS33·250·3	UTS400·H·ETS33·250·3
400A	UTS400·N·ETS33·450·3	UTS400·H·ETS33·450·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Tr (s)
250A	UTS400·L·ETS33·250·3	80~250A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.5, 1, 2, 4, 8, 16, Accuracy ±20%
400A	UTS400·L·ETS33·450·3	150~400A		

WITH ETS33 LSI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
250A	UTS400·N·ETS33·250·3	UTS400·H·ETS33·250·3
400A	UTS400·N·ETS33·450·3	UTS400·H·ETS33·450·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Isd (A)
250A	UTS400·L·ETS33·250·3	80~250A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy±15%
400A	UTS400·L·ETS33·450·3	150~400A		

* Time delay at 6 x Ir: fixde 16s, accuracy ±20%
* Time delay: non-tripping time 20ms / maximum break time 80ms
* Tripping time: ≤50ms

UTS400 FRAME

CIRCUIT BREAKER

WITH ETM33 TRIP UNIT (ELECTRONIC)			
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
250A	UTS400·N·ETM33·250·3	UTS400·H·ETM33·250·3	UTS400·L·ETM33·250·3
400A	UTS400·N·ETM33·450·3	UTS400·H·ETM33·450·3	UTS400·L·ETM33·450·3

Ampere Rating, In	Setting value						
	Overload protection (long time)		Short-circuit protection (short time)		Instantaneous	Option	
	Ir (A)	Tr (s)	Isd (A)	tsd (ms)	Ii (A)	Ig (A)	tg (A)
250A	80~250A	0.5, 1, 2, 4, 8, 16, Accuracy ±20%	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy ±15%	50, 100, 200, 300, 400	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.2~1 x In	100, 200, 300, 400
400A	150~400A						

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
400A	UTS400·N·MCS·400·2	UTS400·N·MCS·400·3	UTS400·H·MCS·400·2	UTS400·H·MCS·400·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
400A	UTS400·L·MCS·400·2	UTS400·L·MCS·400·3

MOTOR CIRCUIT PROTECTOR

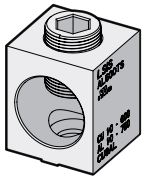
WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)				
Ampere Rating, In	3-Pole	3-Pole	3-Pole	Magnetic Range
320A	UTS400·N·MCP·320·3	UTS400·H·MCP·320·3	UTS400·L·MCP·320·3	1920-3840A

ACCESSORIES FOR UTS400

MECHANICAL LUGS

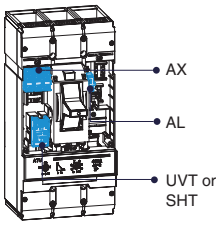
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
400A	Aluminum	Cu/Al	AL400TS

AL400TS 250~400A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Fault alarm switch, FAL		
Shunt Trip, SHT	DC 12V	
	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~500V	
Undervoltage Trip, UVT	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC 220~240V/DC 250V	
	AC 380~440V	
	AC 440~480V	



Type	Left(R)	Right(T)
AX	1	1
AL	1	-
FAL	-	1**
SHT	1*	-
UVT	1*	-

* Applicable in indicated pole position-not synchronous

** FAL can be applied to only MCCB with electronic trip release.

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL3


<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL3


<Plate Handle Lock>

MECHANICAL INTERLOCKING DEVICE

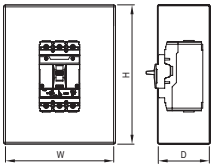
DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT33


<Mechanical Interlock>

ACCESSORIES FOR UTS400

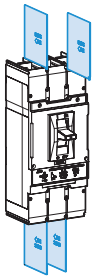
ENCLOSURE

ENCLOSURE DIMENSION (W X H X D) inch (mm)	ORDERING TYPE
13.78 (350) x 40.16 (1020) x 5.98 (152) : 80% rated	-
13.78 (350) x 40.16 (1020) x 7.17 (182) : 100% rated	-



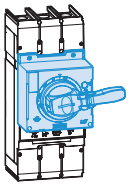
INSULATION BARRIERS

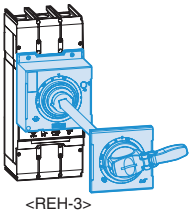
DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker		B32
For 3-Pole breaker		B33



ROTARY OPERATING HANDLES

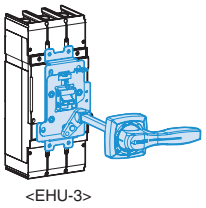
DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-3
Directly Mounted (with Key lock)	NEMA Type 1	DHK-3
Extended (Door-Mounted)	NEMA Type 1	REH-3
NEMA Door-Mounted	NEMA Type 1, 12	EHU-3
	NEMA Type 3, 3R, 4	EHV-3
	NEMA Type 3, 4, 4X	EHX-3





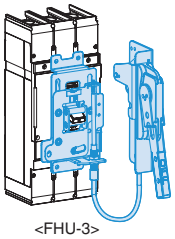
FLANGE HANDLES WITH SLIDING OPERATING MECHANISM

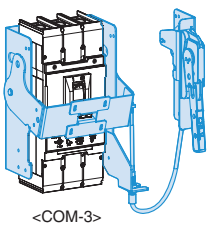
DESCRIPTION	TYPE	ORDERING TYPE
Handle (with sliding mechanism and without cable)	NEMA Type 1, 12, 3, 3R, 4	FHU-3
	NEMA Type 4, 4X	FHX-3
Cable	36 inch	FH3-36
	48 inch	FH3-48
	60 inch	FH3-60
	72 inch	FH3-72



FLANGE HANDLES WITH CABLE OPERATING MECHANISM

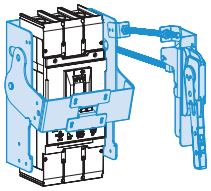
DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-3
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L
Cable	36 inch	FH3-36
	48 inch	FH3-48
	60 inch	FH3-60
	72 inch	FH3-72





FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-3
Long type handle with operating mechanism	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L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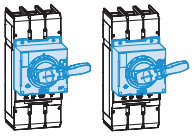
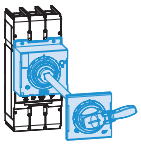
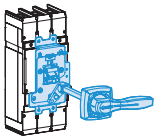
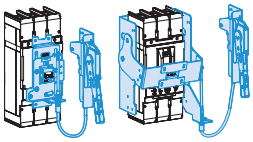
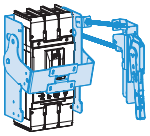
TYPE	DIRECTL MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA TYPE 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

MOTOR OPERATOR

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Standard type (Not lockable)	DC 24V	MOP3U
	AC 110V/DC 110V	MOP3U
	AC 230V/DC 220V	MOP3U
Lockable type	DC 24V	MOP3U-L
	AC 110V/DC 110V	MOP3U-L
	AC 230V/DC 220V	MOP3U-L

MOP3U-L

SELECTION GUIDE

UTS600

CATALOG NUMBERING [PRODUCT SELECTION]

UTS600	NT	ATU	600A	3P	LL	UL

SERIES & FRAME: Susol 600AF

PERFORMANCE

Rating	80%	100%	kA
240Vac	N	NT	65
	H	HT	100
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	L	LT	100
600Vac	N	NT	18
	H	HT	35
	L	LT	50

TRIP UNIT

FTU: Fixed Thermal, Fixed Magnet
FMU: Adj. Thermal, Fixed Magnet
ATU: Adj Thermal & Magnet
ETS: Electronic trip unit standard
ETM: Electronic trip unit muli function
MCP: Motor Circuit Protector
MCS: Molded Case Switch

AMPERES

500
600

POLES

2: Two
3: Three

TERMINALS

LL: Lugs Line/Load Side
L : Lugs Line Side
LO: Lugs Load Side
- : Bolt-on

SUFFIX

UL : UL

UTS600 FRAME

UTS600 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz			INTERRUPTING CAPACITY (kA) DC	
		240V ac	480V ac	600V ac	250V DC-2P	600V DC-3P
UTS600N	2, 3	65	35	18	35	35
UTS600H	2, 3	100	65	35	50	50
UTS600L	2, 3	150	100	50	65	65

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu		
		220/240V	380/415V	480/500V
UTS600N	2, 3	65	35	18
UTS600H	2, 3	100	65	35
UTS600L	2, 3	150	100	50
Service breaking capacity, Ics (%Icu)			100%	
Insulation Voltage, Ui			750 VAC	
Impulse Withstand Voltage, Uimp			8 KVAC	
Utilization Category			A	

DIMENSIONS

POLE	DIMENSIONS inch (mm)		
	W	H	D
2-Pole 3-Pole	5.51 (140)	13.39 (340)	4.33 (110)

TRIP UNIT TYPES

	THERMAL	MAGNETIC	REMARKS
FTU	Fixed	Fixed	
FMU	Adjustable, 0.8~1 x In	Fixed	
ATU	Adjustable, 0.8~1 x In	Adjustable, 5~10 x In	
ETS	Adjustable, 80~600 A	Adjustable, 1.5~11 x In	Electronic
ETM	Adjustable, 80~600 A	Adjustable, 1.5~11 x In	Electronic
MCS	N.A.	Fixed, 10 x In	Magnetic only
MCP	N.A.	Adjustable, 6~12 x In	Magnetic only

CIRCUIT BREAKER

WITH FTU TRIP UNIT (FIXED THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
500A	UTS600·N·FTU·500·2	UTS600·N·FTU·500·3	UTS600·H·FTU·500·2	UTS600·H·FTU·500·3
600A	UTS600·N·FTU·600·2	UTS600·N·FTU·600·3	UTS600·H·FTU·600·2	UTS600·H·FTU·600·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	
	2-Pole	3-Pole
500A	UTS600·L·FTU·500·2	UTS600·L·FTU·500·3
600A	UTS600·L·FTU·600·2	UTS600·L·FTU·600·3

UTS600 FRAME

CIRCUIT BREAKER

WITH FMU TRIP UNIT (ADJUSTABLE THERMAL, FIXED MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
500A	UTS600·N·FMU·500·2	UTS600·N·FMU·500·3	UTS600·H·FMU·500·2	UTS600·H·FMU·500·3
600A	UTS600·N·FMU·600·2	UTS600·N·FMU·600·3	UTS600·H·FMU·600·2	UTS600·H·FMU·600·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Themal Range
	2-Pole	3-Pole	
500A	UTS600·L·FMU·500·2	UTS600·L·FMU·500·3	400-500A
600A	UTS600·L·FMU·600·2	UTS600·L·FMU·600·3	480-600A

WITH ATU TRIP UNIT (ADJUSTABLE THERMAL, ADJUSTABLE MAGNETIC)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V		100kA at 240V, 65kA at 480V, 35kA at 600V	
	2-Pole	3-Pole	2-Pole	3-Pole
500A	UTS600·N·ATU·500·2	UTS600·N·ATU·500·3	UTS600·H·ATU·500·2	UTS600·H·ATU·500·3
600A	UTS600·N·ATU·600·2	UTS600·N·ATU·600·3	UTS600·H·ATU·600·2	UTS600·H·ATU·600·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V		Adjustable range	
	2-Pole	3-Pole	Thermal	Magnetic
500A	UTS600·L·ATU·500·2	UTS600·L·ATU·500·3	400-500A	2500-5000A
600A	UTS600·L·ATU·600·2	UTS600·L·ATU·600·3	480-600A	3000-6000A

WITH ETS33 LI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
400A	UTS600·N·ETS33·400·3	UTS600·H·ETS33·400·3
600A	UTS600·N·ETS33·600·3	UTS600·H·ETS33·600·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Tr (s)
400A	UTS600·L·ETS33··400·3	150~400A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.5, 1, 2, 4, 8, 16, Accuracy ±20%
600A	UTS600·L·ETS33·600·3	225~600A		

WITH ETS33 LSI TRIP UNIT (ELECTRONIC)		
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V
	3-Pole	3-Pole
400A	UTS600·N·ETS33·400·3	UTS600·H·ETS33·400·3
600A	UTS600·N·ETS33·600·3	UTS600·H·ETS33·600·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 50kA at 600V	Setting value		
	3-Pole	Ir (A)	Ii (A)	Isd (A)
400A	UTS600·L·ETS33·400·3	150~400A	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy±15%
600A	UTS600·L·ETS33·600·3	225~600A		

* Time delay at 6 x Ir: fixde 16s, accuracy ±20%
* Time delay: non-tripping time 20ms / maximum break time 80ms
* Tripping time: ≤50ms

CIRCUIT BREAKER

WITH ETM33 TRIP UNIT (ELECTRONIC)			
Ampere Rating, In	**65kA at 240V, 35kA at 480V, 18kA at 600V**	**100kA at 240V, 65kA at 480V, 35kA at 600V**	**150kA at 240V, 100kA at 480V, 50kA at 600V**
	3-Pole	**3-Pole**	**3-Pole**
400A	UTS600·N·ETM33·400·3	UTS600·H·ETM33·400·3	UTS600·L·ETM33·400·3
600A	UTS600·N·ETM33·600·3	UTS600·H·ETM33·600·3	UTS600·L·ETM33·600·3

Ampere Rating, In	**Setting value**						
	Overload protection (long time)		**Short-circuit protection (short time)**		**Instantaneous**	**Option**	
	Ir (A)	**Tr (s)**	**Isd (A)**	**tsd (ms)**	**Ii (A)**	**Ig (A)**	**tg (A)**
400A	150~400A	0.5, 1, 2, 4, 8, 16, Accuracy ±20%	(1.5, 2, 3, 4, 5, 6, 7, 8, 10) x Ir Accuracy ±15%	50, 100, 200, 300, 400	(1.5, 2, 3, 4, 5, 6, 8, 10, 11) x In	0.2~1 x In	100, 200, 300, 400
600A	225~600A						

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)				
Ampere Rating, In	**65kA at 240V, 35kA at 480V, 18kA at 600V**		**100kA at 240V, 65kA at 480V, 35kA at 600V**	
	2-Pole	**3-Pole**	**2-Pole**	**3-Pole**
600A	UTS600·N·MCS·600·2	UTS600·N·MCS·600·3	UTS600·H·MCS·600·2	UTS600·H·MCS·600·3

Ampere Rating, In	**150kA at 240V, 100kA at 480V, 50kA at 600V**	
	2-Pole	**3-Pole**
600A	UTS600·L·MCS·600·2	UTS600·L·MCS·600·3

MOTOR CIRCUIT PROTECTOR

WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)		
Ampere Rating, In	**3-Pole**	**3-Pole**
500A	UTS600·N·MCP·500·3	UTS600·H·MCP·500·3

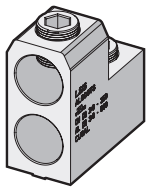
Ampere Rating, In	**3-Pole**	**Magnetic Range**
500A	UTS600·L·MCP·500·3	3000-6000A

ACCESSORIES FOR UTS600

MECHANICAL LUGS

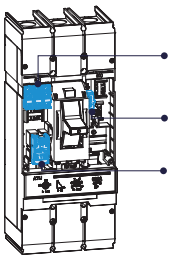
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
600A	Aluminum	Cu/Al	AL600TS

AL600TS 500~600A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Fault alarm switch, FAL		
Shunt Trip, SHT	DC 12V	
	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC220~240V/DC250V	
	AC 380~500V	
Undervoltage Trip, UVT	AC/DC 24V	
	AC/DC 48V	
	AC/DC 110~130V	
	AC220~240V/DC250V	
	AC 380~440V	
	AC 440~480V	



Type	Left(R)	Right(T)
AX	1	1
AL	1	-
FAL	-	1**
SHT	1*	-
UVT	1*	-

* Applicable in indicated pole position-not synchronous

** FAL can be applied to only MCCB with electronic trip release.

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL3

<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL3

<Plate Handle Lock>

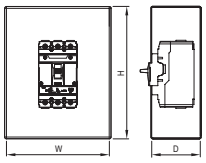
MECHANICAL INTERLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT33

<Mechanical Interlock>

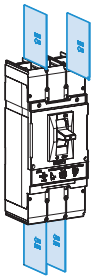
ENCLOSURE

ENCLOSURE DIMENSION(W X H X D) inch(mm)	ORDERING TYPE
13.78(350) x 40.16(1020) x 5.98(152) : 80% rated	-
14.17(360) x 41.34(1050) x 7.17(182) : 100% rated	-



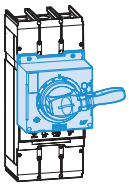
INSULATION BARRIERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
For 2-Pole breaker		B32
For 3-Pole breaker		B33



ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-3
Directly Mounted (with Key lock)	NEMA Type 1	DHK-3
Extended (Door-Mounted)	NEMA Type 1	REH-3
NEMA Door-Mounted	NEMA Type 1, 12	EHU-3
	NEMA Type 3, 3R, 4	EHV-3
	NEMA Type 3, 4, 4X	EHX-3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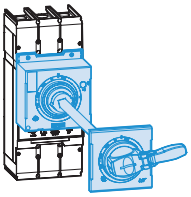
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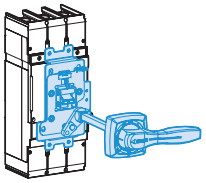
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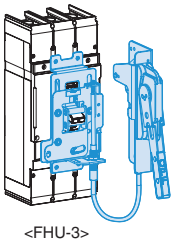
FLANGE HANDLES WITH SLIDING OPERATING MECHANISM

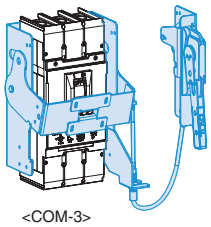
DESCRIPTION	TYPE	ORDERING TYPE
Handle(with sliding mechanism and without cable)	NEMA Type 1, 12, 3, 3R, 4	FHU-3
	NEMA Type 4, 4X	FHX-3
Cable	36 inch	FH3-36
	48 inch	FH3-48
	60 inch	FH3-60
	72 inch	FH3-72


<FHU-3>

ACCESSORIES FOR UTS600

FLANGE HANDLES WITH CABLE OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-3
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L
Cable	36 inch	FH3-36
	48 inch	FH3-48
	60 inch	FH3-60
	72 inch	FH3-72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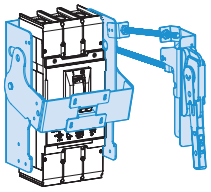
FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-3
Long type handle with operating mechanism	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L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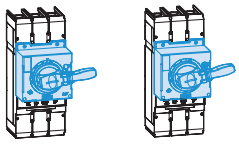
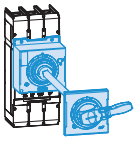
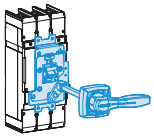
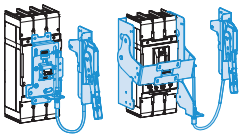
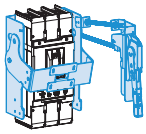
TYPE	DIRECTLY MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA Type 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

MOTOR OPERATOR

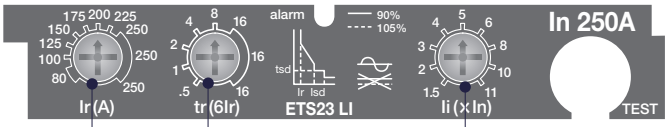
DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Standard type (Not lockable)	DC 24V	MOP3U
	AC 110V/DC 110V	MOP3U
	AC 230V/DC 220V	MOP3U
Lockable type	DC 24V	MOP3U-L
	AC 110V/DC 110V	MOP3U-L
	AC 230V/DC 220V	MOP3U-L

MOP3U-L

ELECTRONIC TRIP UNITS (STANDARD)
ETS23 LI, ETS33 LI FOR UTS150/UTS250/UTS400/UTS600

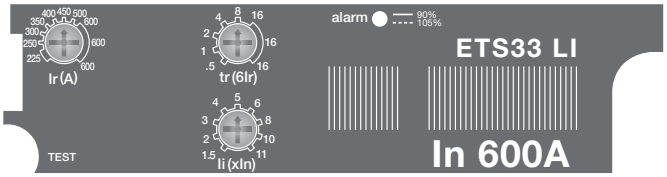
Configuration

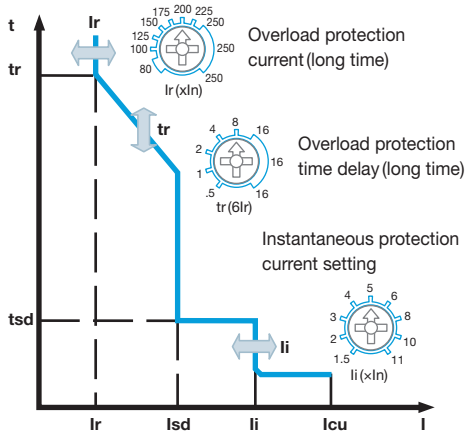
ETS23 LI TYPE



Ii: Adjustable instantaneous current setting
tr: Adjustable long time setting
Ir: Adjustable rated current setting

ETS33 LI TYPE





PROTECTION (LI)

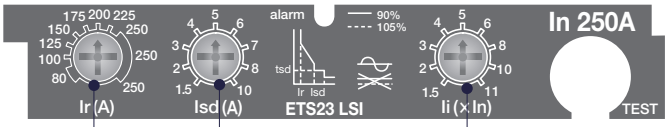
LONG TIME										
	In (A)	**Overload protection setting current(Ir=Setting value)**								
Current setting (A), Ir	60A	15	20	25	30	35	40	45	50	60
	100A	40	45	50	60	70	80	90	100	-
	150A	60	70	80	90	100	110	125	150	-
	250A	80	100	125	150	175	200	225	250	-
	400A	150	175	200	225	250	300	350	400	-
	600A	225	250	300	350	400	450	500	600	-
Time delay (s), tr accuracy=±20%	tr@(6.0 x Ir)	0.5	1	2	4	8	16	-	-	-

INSTANTANEOUS										
Current setting (A), Ii	Ii=In X …	1.5	2	3	4	5	6	8	10	11
Tripping time					≤60ms					

ELECTRONIC TRIP UNITS (STANDARD)
ETS23 LSI, ETS33 LSI FOR UTS150/UTS250/UTS400/UTS600

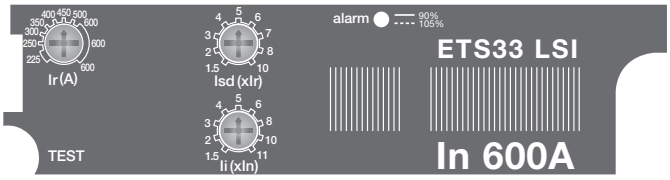
Configuration

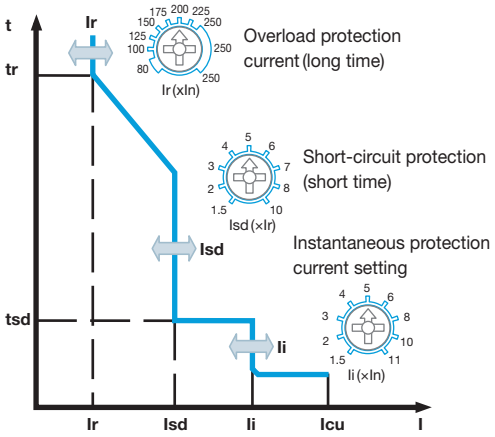
ETS23 LSI TYPE



Ii: Adjustable instantaneous current setting
Isd: Adjustable short time current setting
Ir: Adjustable rated current setting

ETS33 LSI TYPE





PROTECTION (LSI)

LONG TIME										
	In (A)	Overload protection setting current(Ir=Setting value)								
Current setting (A), Ir	60A	15	20	25	30	35	40	45	50	60
	100A	40	45	50	60	70	80	90	100	-
	150A	60	70	80	90	100	110	125	150	-
	250A	80	100	125	150	175	200	225	250	-
	400A	150	175	200	225	250	300	350	400	-
	600A	225	250	300	350	400	450	500	600	-
Time delay (s), tr	tr@6.0 x Ir	Fixed 16s								

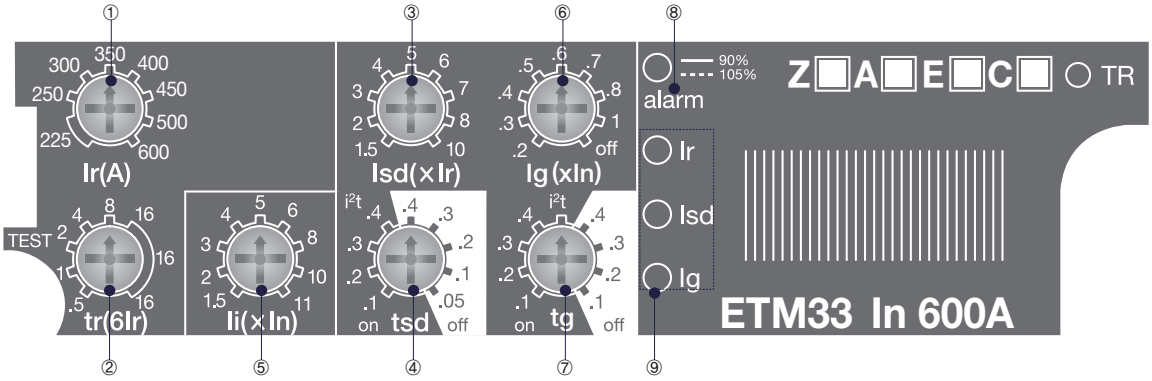
SHORT TIME										
Current setting (A), Isd accuracy=±15%	Isd=Ir X …	1.5	2	3	4	5	6	7	8	10
Tripping time (Non-adjustable)	Non-Tripping time	70ms								
	Maximen break time	140ms								

INSTANTANEOUS										
Current setting (A), Ii	Ii=In X …	1.5	2	3	4	5	6	8	10	11
Tripping time		≤60ms								

ELECTRONIC TRIP UNITS (MULI-FUNCTION)
ETM33 FOR UTS400/UTS600

Configuration

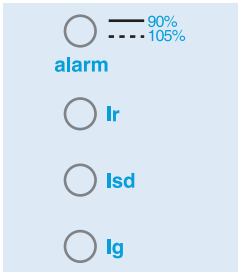
ETM33 TYPE



① Ir: Adjustable rated current setting
② tr: Adjustable long time setting
③ Isd: Adjustable short time current setting
④ tsd: Adjustable time delay setting
⑤ Ii: Adjustable instantaneous current setting
⑥ Ig: Adjustable earth fault current setting
⑦ tg: Adjustable earth fault delay setting
⑧ Alarm LED
⑨ Indication LED

Alarm indication

The LED lights and remains lit when the load exceeds 90 % of Ir.
The LED blinks for an overload(≥105% Ir), warning that the circuit breaker may trip.



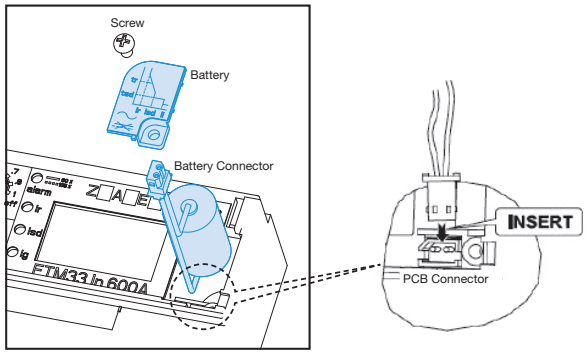
Fault indications

LEDs indicate the type of fault that caused tripping:
Ir : overload
Isd : short-circuit (short time, instantaneous)
Ig : earth fault

If push the TR button to indicate the tripping reason, the indication LED of tripping is ON.
The information is however stored in memory and the LED can be reilluminated by pressing the TR button.
The LED automatically goes off and the memory is cleared when the circuit breaker is reset.
In normal condition, if push TR button, all indication LED is ON for testing auxiliary power and LED.

Maintenance the Battery

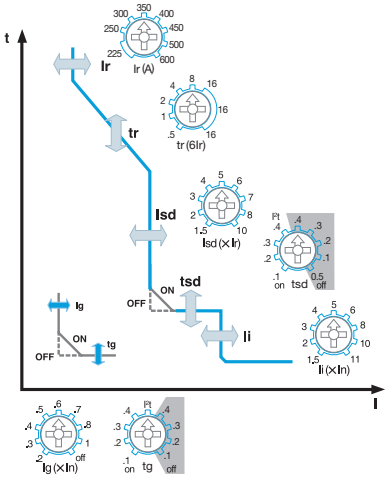
1. Battery Inspection Method
   Please check if over-current LED is ON.
   by pressing TR button more than once a year and if it is NOT, replace the battery.
2. When battery discharged
   Fault Indicator LED is not on and if a circuit-breaker is tripped by over-current,
   Thermal Memory does not operate and accordingly it holds the cold characteristic.
3. Please contact our sales team for battery purchase.
   (LS exclusive battery shall be used.)



Change the Battery for ETM33 Series

1. Unfasten the Screw.
2. Remove the Battery.
3. Insert a New battery.
4. Insert the Battery connector into the PCB connector.
5. Fasten the screw.
6. Press the TR button.
   Confirm the alarm indication LED light.

ELECTRONIC TRIP UNITS (MULI-FUNCTION)
ETM33 FOR UTS400/UTS600



Long time protection against overloads
Ir = Fine adjustment
tr = Long time delay

Short circuit protection
Isd = Short circuit threshold,
tsd = Short circuit time delay
I²t curve in position ON or OFF

Instantaneous protection
Ii = Instantaneous threshold

Earth fault protection
Ig = Insulation fault threshold
tg = Earth fault time delay
I²t curve in position ON or OFF

PROTECTION

LONG TIME										
	In (A)	**Overload protection setting current(Ir=Setting value)**								
Current setting (A), Ir	250A	80	100	125	150	175	200	225	250	-
	400A	150	175	200	225	250	300	350	400	-
	600A	225	250	300	350	400	450	500	600	-
Time delay(s),tr accuracy=±20%	tr@6.0 x Ir	0.5	1	2	4	8	16	-	-	-

SHORT TIME										
Current setting (A), Isd accuracy=±15%	Isd=Ir X …	1.5	2	3	4	5	6	7	8	10
Time delay(ms), tsd constant "I²t=fuction" On, Off	adjustable	50	100		200		300		400	
	I²t On	-	Tripping time ±40ms or ±20%							
	(I²t Off) Min.trip time (ms)	30	70		140		240		350	
	(I²t Off) Max.trip time (ms)	70	140		240		350		500	

INSTANTANEOUS										
Current setting (A), Ii	Ii=In X …	1.5	2	3	4	5	6	8	10	11
Tripping time	≤60ms									

INDICATION OF TRIPPING REASON	
Trip reason LED indication	Ir, Isd, Ii, (Ig)

OPTION FOR ETM	
Ammeter (A)	Maximum load phase current and R,ST phase current
Earth fault protection (E)	

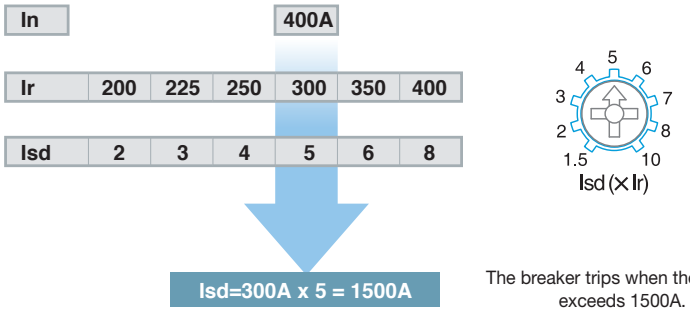
GROUND FAULT										
Pick-up (A), Ig	Ig=In X …	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Time delay(ms), tg	adjustable	100		200		300		400		-
	I²t On	Tripping time ±40ms or ±20%								-
	(I²t Off) Min.trip time (ms)	60		140		230		350		-
	(I²t Off) Max.trip time (ms)	140		230		350		500		-
Communication (C)	Setting, R,S,T phase current, tripping reason									
ZSI (Z)	ZSI input and output signal									

ELECTRONIC TRIP UNITS (MULI-FUNCTION)
ETM33 FOR UTS400/UTS600

Short circuit protection

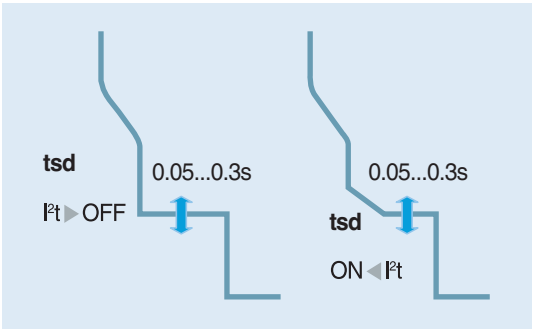
The short circuit threshold, Isd is a multiple of the overload setting, Ir.

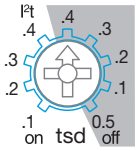
Setting example :



The breaker trips when the current exceeds 1500A.

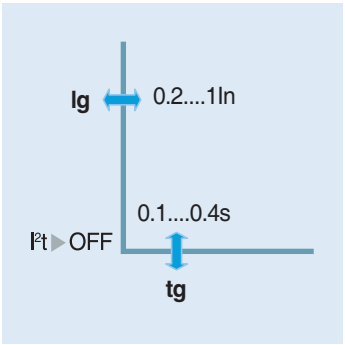
Short circuit time delay

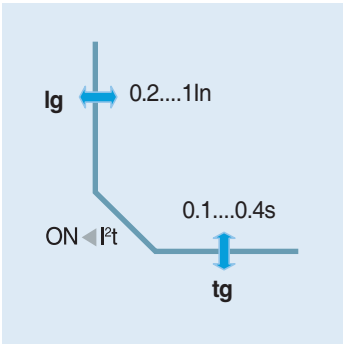


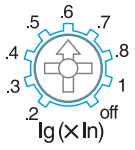


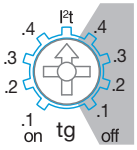
Earth fault protection(E), optional

The ETM trip units measure the vectorial sum of the three phase current and, if present, that of the neutral conductor.
If the sum of these values exceeds the set current thresholds for a period of time greater than the time delay, the breaker is tripped.









Ig = insulation fault threshold
tg = earth fault time delay

ELECTRONIC TRIP UNITS (MULI-FUNCTION)
ETM33 FOR UTS400/UTS600

Ammeter (A), optional

The Ammeter device has an accuracy of ±10%.
The highest phase current is displayed in upper line.
In under line, R, S and T phase current is scrolled autom.

Ammeter display limits:

- minimum current ≥ 0.3×In (one phase)
- maximum current ≤ 10×In

Zone selective interlocking (ZSI), optional

Zone Selective Interlocking is mainly used in systems with high rated current and short circuit current values, with safety and service continuity requirements.
This type of discrimination can be achieved with circuit breakers equipped with specially designed electronic trip units (ETM for TS circuit breakers).

Zone selective interlocking (ZSI) is a system designed

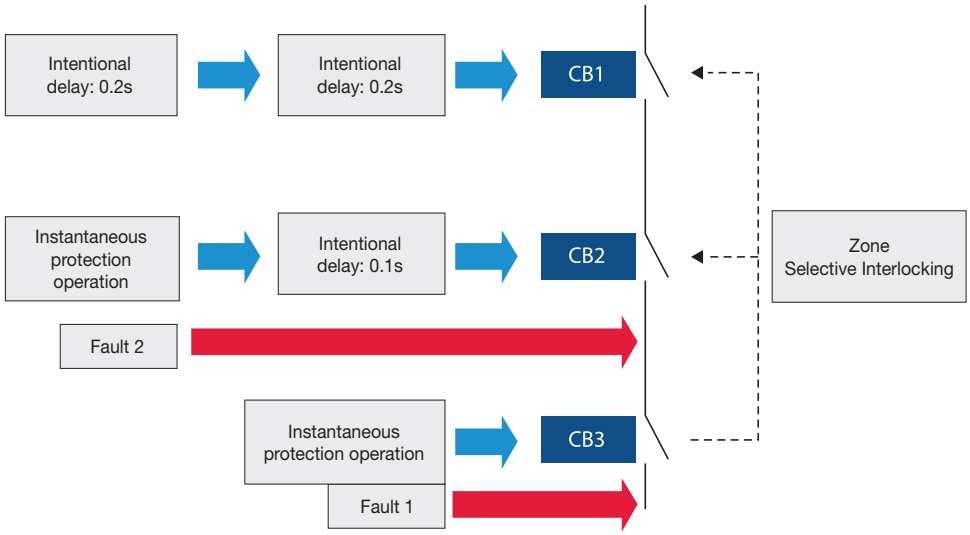
- to reduce the stress on electrical distribution components during short-circuit or earth fault conditions.
- to reduce the tripping times (Lower than hundred milliseconds).
- to reduce the damage caused by the fault and of interferences to the power supply system;

A number of circuit breakers are interconnected one after another by a pilot-wire.

Power source: DC24V Power is required.

Operation

- With ZSI, ETM trip unit detects the fault and then send the signal to upstream circuit breaker which applies the set time delay and ignore its present short-time and or/ earth fault delay and clear the fault with no intentional delay.
- Without ZSI, ETM trip unit detects the fault and then trips the circuit breaker with intentional delay



ELECTRONIC TRIP UNITS (MULI-FUNCTION)
ETM33 FOR UTS400/UTS600

Communication(C), optional

Communication interface: RS485 (Modbus-RTU)

The Modbus RS485 system is an open bus on which communicating Modbus devices are installed. All kinds of PLCs and computers can be connected to the bus.

Transmitted data :

- Protection setting values
- Highest current of the three phases
- Measurement: R, S, T and N phase current
- Fault reading: Type of fault (Overload, short-circuit, etc)

The setting of communication address using TR button and LCD display (Ammeter).

Power source: DC24V Power is required.

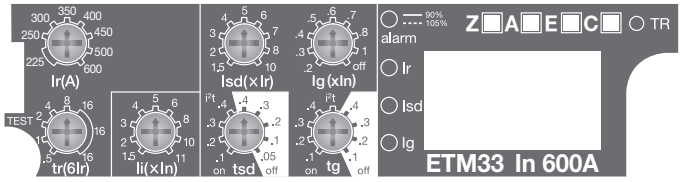
Combination of options

☐ A(Ammeter)
☐ E(Earth fault protection)
☐ A+E
☐ A+C(Communication)
☐ A+E+C
☐ Z(Zone selective interlocking)
☐ Z+A
☐ Z+E
☐ Z+A+E
☐ Z+A+C
☐ Z+A+E+C

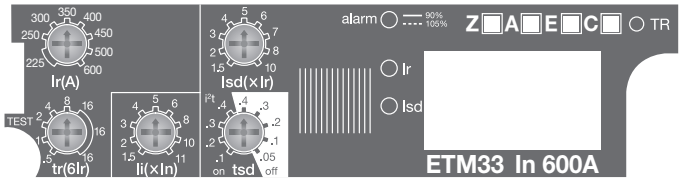
A: Ammeter
E: Earth fault protection
C: Communication
Z: Zone selective interlocking

FEATURE OF TRIP UNIT ACCORDING TO OPTION

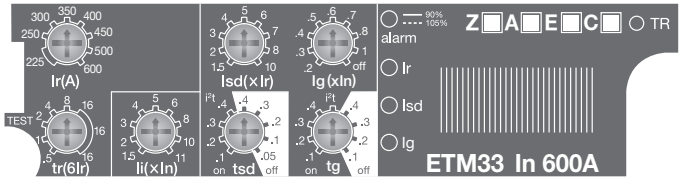
ETM33 A+E
ETM33 A+E+C
ETM33 Z+A+E
ETM33 Z+A+E+C



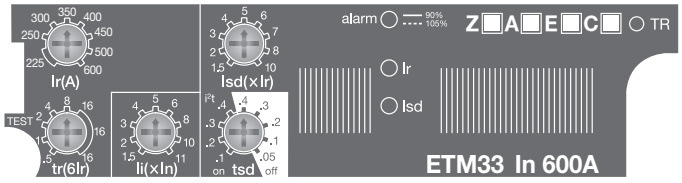
ETM33 A
ETM33 A+C
ETM33 Z+A
ETM33 Z+A+C



ETM33 E
ETM33 E+Z



ETM33
ETM33 Z



SELECTION GUIDE

UTS800

CATALOG NUMBERING [PRODUCT SELECTION]

UTS800	NT	N	G	O	800A	3P	LL	UL

SERIES & FRAME: Susol 800AF

PERFORMANCE

Rating	80%	100%	kA
240Vac	N	NT	65
	H	HT	100
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	L	LT	100
600Vac	N	NT	18
	H	HT	35
	L	LT	50

OCR-I

N - Normal	**A** - Ammeter
P - Power meter	**S** - Super meter

MCP: Motor Circuit Protector

MCS: Molded Case Switch

OCR-II

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

AMPERES

- 400
- 600
- 630
- 800

OCR-III

- **0:** Power(X), 60Hz
- **1:** AC/DC 100~250V, 60Hz
- **2:** DC 24~60V, 60Hz
- **5:** Power(X), 50Hz
- **6:** AC/DC 100~250V, 50Hz
- **7:** DC 24~60V, 50Hz

POLES

- 3: Three

TERMINALS

- **LL:** Lugs Line/Load Side
- **L :** Lugs Line Side
- **LO:** Lugs Load Side
- **- :** Bolt-on

SUFFIX

- UL : UL

UTS800 FRAME

UTS800 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz		
		240V ac	480V ac	600V ac
UTS800N	3	65	35	18
UTS800H	3	100	65	35
UTS800L	3	150	100	50

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu			RATED SHORT-TIME WITHSTAND CURRENT (Icw)	UTILIZATION CATEGORY
		220/240V	380/415V	480/500V		
UTS800N	3	65	35	18	18kA	B
UTS800H	3	100	65	35	-	A
UTS800L	3	150	100	50	-	A
Service breaking capacity, Ics (%Icu)				100%		
Insulation Voltage, Ui				1000 Vac		
Impulse Withstand Voltage, Uimp				8 kVac		

DIMENSIONS

POLE	DIMENSIONS inch (mm)		
	W	H	D
3-Pole	8.27 (210)	12.88 (327.2)	6 (152.5)

CIRCUIT BREAKER

WITH N (NORMAL) TYPE TRIP UNIT				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V	Remarks
	3-Pole	3-Pole	3-Pole	N(normal) type trip unit *1
400A	UTS800·N·N●■·400·3	UTS800·H·N●■·400·3	UTS800·L·N●■·400·3	Long time delay / Short time delay Instantaneous / Ground faults / Self power ※ LCD/SMPS is Removed from A type
600A	UTS800·N·N●■·600·3	UTS800·H·N●■·600·3	UTS800·L·N●■·600·3	
630A	UTS800·N·N●■·630·3	UTS800·H·N●■·630·3	UTS800·L·N●■·630·3	
800A	UTS800·N·N●■·800·3	UTS800·H·N●■·800·3	UTS800·L·N●■·800·3	

WITH A (AMMETER) TYPE TRIP UNIT				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V	Remarks
	3-Pole	3-Pole	3-Pole	A(ammeter) type trip unit *1
400A	UTS800·N·A●■·400·3	UTS800·H·A●■·400·3	UTS800·L·A●■·400·3	All function of N type / Earth Leakage (Except residual current) ZSI / Comm. (Modbus, Profibus) AC/DC 100-250V / DC 24~60V Fault Recording 10ea
600A	UTS800·N·A●■·600·3	UTS800·H·A●■·600·3	UTS800·L·A●■·600·3	
630A	UTS800·N·A●■·630·3	UTS800·H·A●■·630·3	UTS800·L·A●■·630·3	
800A	UTS800·N·A●■·800·3	UTS800·H·A●■·800·3	UTS800·L·A●■·800·3	

WITH P (POWER METER) TYPE TRIP UNIT				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V	Remarks
	3-Pole	3-Pole	3-Pole	P(power meter) type trip unit *1
400A	UTS800·N·P●■·400·3	UTS800·H·P●■·400·3	UTS800·L·P●■·400·3	All function of A type (UV/OV/OF/UF/RV/Vun/Cun) a) Measuring (V/A/W/P/F/PF) b) Fault Recording 256ea/ Event Recording 256ea
600A	UTS800·N·P●■·600·3	UTS800·H·P●■·600·3	UTS800·L·P●■·600·3	
630A	UTS800·N·P●■·630·3	UTS800·H·P●■·630·3	UTS800·L·P●■·630·3	
800A	UTS800·N·P●■·800·3	UTS800·H·P●■·800·3	UTS800·L·P●■·800·3	

Note :

a) UV: Under Voltage // OV: Over Voltage // OF: Over Frequency // UF: Under Frequency // RV: Reverse power // Vun: Voltage Unbalance // Cun: Current Unbalance

b) V: Voltage // A: Ampere // W: Watt // P: Power // F: Frequency // PF: Power factor

* ●: OCR-II, ■: OCR-III

UTS800 FRAME

CIRCUIT BREAKER

WITH S (SUPER METER) TYPE TRIP UNIT				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V	Remarks
	3-Pole	3-Pole	3-Pole	S(super meter) type trip unit *1
400A	UTS800·N·S● ■ ·400·3	UTS800·H·S● ■ ·400·3	UTS800·L·S● ■ ·400·3	All function of P type Display Harmonics and wave forms
600A	UTS800·N·S● ■ ·600·3	UTS800·H·S● ■ ·600·3	UTS800·L·S● ■ ·600·3	
630A	UTS800·N·S● ■ ·630·3	UTS800·H·S● ■ ·630·3	UTS800·L·S● ■ ·630·3	
800A	UTS800·N·S● ■ ·800·3	UTS800·H·S● ■ ·800·3	UTS800·L·S● ■ ·800·3	

Note *1 : The range of rated current setting is same with 4 Types but P/S type is able to set detail adjustment of rated current per 1A (Fine Adjustable)

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)				
Ampere Rating, In	65kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 35kA at 600V	150kA at 240V, 100kA at 480V, 50kA at 600V	Remarks
	3-Pole	3-Pole	3-Pole	MCS type trip unit
800A	UTS800·N·MCS● ■ ·800·3	UTS800·H·MCS● ■ ·800·3	UTS800·L·MCS● ■ ·800·3	Magnetic range : 12000A fixed

MOTOR CIRCUIT PROTECTOR

WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)				
Ampere Rating, In	3-Pole	3-Pole	3-Pole	Remarks
				MCP type trip unit
800A	UTS800·N·MCP● ■ ·800·3	UTS800·H·MCP● ■ ·800·3	UTS800·L·MCP● ■ ·800·3	Magnetic range : 2~12In

ITEM	SETTING RANGE
Ir (rated current)	0.4~1.0 In
Tr (long time tripping delay)	0.5~20 (s)
Isd (short time current)	1.5~10 Ir
Tsd (short time tripping delay)	0.05~0.4 (s)

ITEM	SETTING RANGE
Ii (instantaneous current)	2~15 In
Tg (ground fault tripping delay)	0.05~0.4 (s)
Ig (ground fault current)	0.2~1In

●

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

■

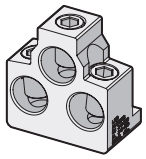
OCR-III
0: Power(X), 60Hz
1: AC/DC 100~250V, 60Hz
2: DC 24~60V, 60Hz
5: Power(X), 50Hz
6: AC/DC 100~250V, 50Hz
7: DC 24~60V, 50Hz

ACCESSORIES FOR UTS800

MECHANICAL LUGS

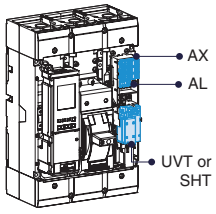
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	WIRE TYPE	ORDERING TYPE
800A	Aluminum	Cu/Al	AL800TS

AL800TS 400~800A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Shunt Trip, SHT	DC 24~30V	
	AC 48V/DC 48~60V	
	AC/DC 100~130V	
	AC/DC 200~250V	
	AC 380~480V	
Undervoltage Trip, UVT	DC 24~30V	
	AC 48V/DC 48~60V	
	AC/DC 100~130V	
	AC/DC 200~250V	
	AC 380~480V	



Type	Right(T)
AX	3
AL	1
SHT	1*
UVT	1*

* Applicable in indicated pole position-not synchronous

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL5


<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL5


<Plate Handle Lock>

MECHANICAL INTERLOCKING DEVICE

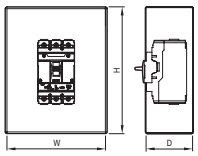
DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT53


<Mechanical Interlock>

ACCESSORIES FOR UTS800

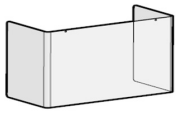
ENCLOSURE

ENCLOSURE DIMENSION (W X H X D) inch (mm)	ORDERING TYPE
20.25 (514.4) x 51.9 (1318.3) x 7.75 (196.9)	-



TERMINAL COVERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
Terminal Cover(800AF)		ITU5a3
Terminal Cover(800,1200AF)		ITS53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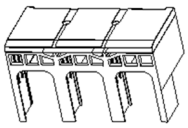
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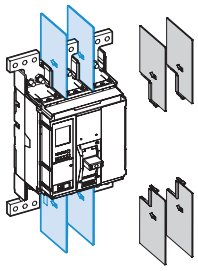
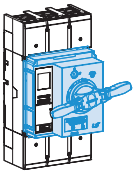
INSULATION BARRIERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
Standard type		B53
Rear type		BR53
Extended type		BE53



ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-5
Directly Mounted (with Key lock)	NEMA Type 1	DHK-5
Extended (Door-Mounted)	NEMA Type 1	REH-5
NEMA Door-Mounted	NEMA Type 1, 12	EHU-5
	NEMA Type 3, 3R, 4	EHV-5
	NEMA Type 3, 4, 4X	EHX-5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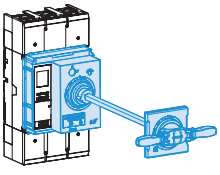
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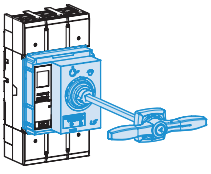
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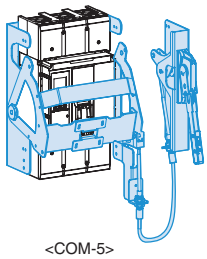
FLANGE HANDLES WITH CABLE OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-5
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L
Cable	60 inch	FH5-60
	84 inch	FH5-84
	120 inch	FH5-120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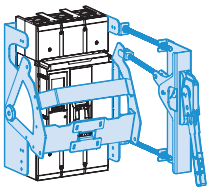
FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

Description	Type	Ordering type
Variable depth operating mechanism with threaded-rod and handle		VDM-5
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L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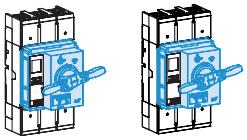
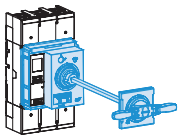
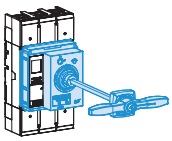
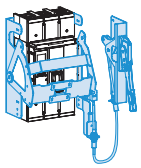
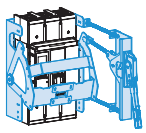
TYPE	DIRECTLY MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA TYPE 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

SELECTION GUIDE

UTS1200

CATALOG NUMBERING [PRODUCT SELECTION]

UTS1200	NT	N	G	O	1200A	3P	LL	UL

SERIES & FRAME: Susol 1200AF

Performance

Rating	80%	100%	kA
240Vac	N	NT	50
	H	HT	100
	P	PT	65
	L	LT	150
480Vac	N	NT	35
	H	HT	65
	P	PT	50
	L	LT	100
600Vac	N	NT	18
	H	HT	25
	P	PT	50
	L	LT	35

OCR-I

N - Normal	**A** - Ammeter
P - Power meter	**S** - Super meter

MCP : Motor Circuit Protector

MCS: Molded Case Switch

OCR-II

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

OCR-III

- **0 :** Power(X), 60Hz
- **1:** AC/DC 100~250V, 60Hz
- **2:** DC 24~60V, 60Hz
- **5:** Power(X), 50Hz
- **6:** AC/DC 100~250V, 50Hz
- **7:** DC 24~60V, 50Hz

AMPERES

- 800
- 1000
- 1200

POLES

- **3:** Three

SUFFIX

- UL : UL

TERMINALS

- **LL:** Lugs Line/Load Side
- **L :** Lugs Line Side
- **LO:** Lugs Load Side
- **- :** Bolt-on

UTS1200 FRAME

UTS1200 breaker is HACR rated

UL489 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY (kA rms) AC 50/60Hz		
		240V ac	480V ac	600V ac
UTS1200N	3	50	35	18
UTS1200H	3	100	65	25
UTS1200P	3	65	50	50
UTS1200L	3	150	100	35

IEC60947-2 RATINGS

BREAKER TYPE	NUMBER OF POLES	INTERRUPTING CAPACITY(kA rms) AC 50/60Hz, Icu			RATED SHORT-TIME WITHSTAND CURRENT (Icw)	UTILIZATION CATEGORY
		220/240V	380/415V	480/500V		
UTS1200N	3	50	35	25	25kA	B
UTS1200H	3	100	65	35	-	A
UTS1200P	3	65	50	50	25kA	B
UTS1200L	3	150	100	50	-	A
Service breaking capacity, Ics (%Icu)				100%		
Insulation Voltage, Ui				1000 Vac		
Impulse Withstand Voltage, Uimp				8 kVac		

DIMENSIONS

POLE	DIMENSIONS inch (mm)		
	W	H	D
3-Pole	8.27 (210)	16.26 (413)	6 (152.5)

CIRCUIT BREAKER

WITH N (NORMAL) TYPE TRIP UNIT			
Ampere Rating, In	50kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 25kA at 600V	65kA at 240V, 50kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
800A	UTS1200·N·N● ■ ·800·3	UTS1200·H·N● ■ ·800·3	UTS1200·P·N● ■ ·800·3
1000A	UTS1200·N·N● ■ ·1000·3	UTS1200·H·N● ■ ·1000·3	UTS1200·P·N● ■ ·1000·3
1200A	UTS1200·N·N● ■ ·1200·3	UTS1200·H·N● ■ ·1200·3	UTS1200·P·N● ■ ·1200·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 35kA at 600V	Remarks
	3-Pole	N(normal) type trip unit *1
800A	UTS1200·L·N● ■ ·800·3	Long time delay / Short time delay Instantaneous / Ground faults / Self power *LCD/SMPS is Removed from A type
1000A	UTS1200·L·N● ■ ·1000·3	
1200A	UTS1200·L·N● ■ ·1200·3	

WITH A (AMMETER) TYPE TRIP UNIT			
Ampere Rating, In	50kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 25kA at 600V	65kA at 240V, 50kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
800A	UTS1200·N·A● ■ ·800·3	UTS1200·H·A● ■ ·800·3	UTS1200·P·A● ■ ·800·3
1000A	UTS1200·N·A● ■ ·1000·3	UTS1200·H·A● ■ ·1000·3	UTS1200·P·A● ■ ·1000·3
1200A	UTS1200·N·A● ■ ·1200·3	UTS1200·H·A● ■ ·1200·3	UTS1200·P·A● ■ ·1200·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 35kA at 600V	Remarks
	3-Pole	A(ammeter) type trip unit *1
800A	UTS1200·L·A● ■ ·800·3	All function of N type / Earth Leakage (Except residual current) ZSI / Comm. (Modbus, Profibus) AC/DC 100~250V / DC 24~60V Fault Recording 10ea
1000A	UTS1200·L·A● ■ ·1000·3	
1200A	UTS1200·L·A● ■ ·1200·3	

* ●: OCR-II, ■: OCR-III

UTS1200 FRAME

CIRCUIT BREAKER

WITH P (POWER METER) TYPE TRIP UNIT			
Ampere Rating, In	50kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 25kA at 600V	65kA at 240V, 50kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
800A	UTS1200·N·P● ■ ·800·3	UTS1200·H·P● ■ ·800·3	UTS1200·P·P● ■ ·800·3
1000A	UTS1200·N·P● ■ ·1000·3	UTS1200·H·P● ■ ·1000·3	UTS1200·P·P● ■ ·1000·3
1200A	UTS1200·N·P● ■ ·1200·3	UTS1200·H·P● ■ ·1200·3	UTS1200·P·P● ■ ·1200·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 35kA at 600V	Remarks
	3-Pole	P(power meter) type trip unit *1
800A	UTS1200·L·P● ■ ·800·3	All function of A type (UV/OV/OF/UF/RV/Vun/Cun) a) Measuring (V/A/W/P/F/PF) b) Fault Recording 256ea / Event Recording 256ea
1000A	UTS1200·L·P● ■ ·1000·3	
1200A	UTS1200·L·P● ■ ·1200·3	

Note :
a) UV: Under Voltage // OV: Over Voltage // OF: Over Frequency // UF: Under Frequency // RV: Reverse power // Vun: Voltage Unbalance // Cun: Current Unbalance
b) V: Voltage // A: Ampere // W: Watt // P: Power // F: Frequency // PF: Power factor

WITH S (SUPER METER) TYPE TRIP UNIT			
Ampere Rating, In	50kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 25kA at 600V	65kA at 240V, 50kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
800A	UTS1200·N·S● ■ ·800·3	UTS1200·H·S● ■ ·800·3	UTS1200·P·S● ■ ·800·3
1000A	UTS1200·N·S● ■ ·1000·3	UTS1200·H·S● ■ ·1000·3	UTS1200·P·S● ■ ·1000·3
1200A	UTS1200·N·S● ■ ·1200·3	UTS1200·H·S● ■ ·1200·3	UTS1200·P·S● ■ ·1200·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 35kA at 600V	Remarks
	3-Pole	S(super meter) type trip unit *1
800A	UTS1200·L·S● ■ ·800·3	All function of P type Display Harmonics and wave forms
1000A	UTS1200·L·S● ■ ·1000·3	
1200A	UTS1200·L·S● ■ ·1200·3	

Note *1 : The range of rated current setting is same with 4 Types but P/S type is able to set detail adjustment of rated current per 1A (Fine Adjustable)

MOLDED CASE SWITCH

WITH MCS TRIP UNIT (FIXED MAGNETIC ONLY)			
Ampere Rating, In	50kA at 240V, 35kA at 480V, 18kA at 600V	100kA at 240V, 65kA at 480V, 25kA at 600V	65kA at 240V, 50kA at 480V, 50kA at 600V
	3-Pole	3-Pole	3-Pole
1200A	UTS1200·N·MCS● ■ ·1200·3	UTS1200·H·MCS● ■ ·1200·3	UTS1200·P·MCS● ■ ·1200·3

Ampere Rating, In	150kA at 240V, 100kA at 480V, 35kA at 600V	Remarks
	3-Pole	MCS type trip unit
1200A	UTS1200·L·MCS● ■ ·1200·3	Magnetic range : 18000A fixed and wave forms

MOTOR CIRCUIT PROTECTOR

WITH MCP TRIP UNIT (ADJUSTABLE MAGNETIC ONLY)			
Ampere Rating, In	**3-Pole**	**3-Pole**	**3-Pole**
1200A	UTS1200·N·MCP● ■·1200·3	UTS1200·H·MCP● ■·1200·3	UTS1200·P·MCP● ■·1200·3

Ampere Rating, In	**3-Pole**	**Remarks**
		MCP type trip unit
1200A	UTS1200·L·MCP● ■·1200·3	Magnetic range : 2~8In

ITEM	SETTING RANGE
Ir (rated current)	0.4~1.0 In
Tr (long time tripping delay)	0.5~20 (s)
Isd (short time current)	1.5~10 Ir
Tsd (short time tripping delay)	0.05~0.4 (s)

ITEM	SETTING RANGE
Ii (instantaneous current)	2~15 In
Tg (ground fault tripping delay)	0.05~0.4 (s)
Ig (ground fault current)	0.2~1In

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

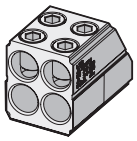
■	OCR-III
	0: Power(X), 60Hz
	1: AC/DC 100~250V, 60Hz
	2: DC 24~60V, 60Hz
	5: Power(X), 50Hz
	6: AC/DC 100~250V, 50Hz
	7: DC 24~60V, 50Hz

ACCESSORIES FOR UTS1200

MECHANICAL LUGS

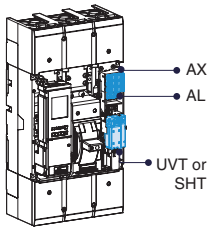
MAXIMUM BREAKER AMPERES	TERMINAL BODY MATERIAL	Wire type	Ordering type
1200A	Aluminum	Cu/Al	AL1200TS

AL 1200TS 800~1200A Lug



INNER ACCESSORIES

DESCRIPTION	CONTROL VOLTAGE	ORDERING TYPE
Auxiliary Switch, AX		
Alarm Switch, AL		
Shunt Trip, SHT	DC 24~30V	
	AC 48V/DC 48~60V	
	AC/DC 100~130V	
	AC/DC 200~250V	
	AC 380~480V	
Undervoltage Trip, UVT	DC 24~30V	
	AC 48V/DC 48~60V	
	AC/DC 100~130V	
	AC/DC 200~250V	
	AC 380~480V	



Type	Right(T)
AX	3
AL	1
SHT	1*
UVT	1*

* Applicable in indicated pole position-not synchronous

ACCESSORIES FOR UTS1200

PADLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” position	PL5


<Pad Lock>

PLATE HANDLE LOCKING DEVICE

DESCRIPTION	ORDERING TYPE
Lock in “OFF” or “ON” position	PHL5


<Plate Handle Lock>

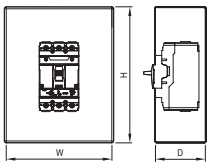
MECHANICAL INTERLOCKING DEVICE

DESCRIPTION	ORDERING TYPE
For 3-Pole breaker	MIT53


<Mechanical Interlock>

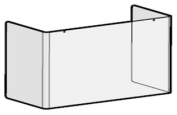
ENCLOSURE

ENCLOSURE DIMENSION(W X H X D) inch (mm)	ORDERING TYPE
20.25 (514.4) x 51.9 (1318.3) x 7.75 (196.9) : 80% Rated	-
23.0 (584.2) x 62.25 (1581.2) x 14.75 (374.7) : 100% Rated	-



TERMINALS COVERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
Terminal Cover(1200AF)		ITU5b3
Terminal Cover(800/1200AF)		ITS53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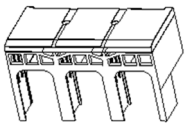
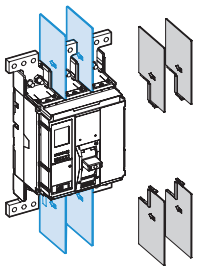

<ITU5b3>

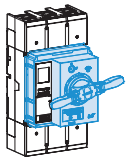
INSULATION BARRIERS

DESCRIPTION	QTY PER KIT	ORDERING TYPE
Standard type		B53
Rear type		BR53
Extended type		BE53



ROTARY OPERATING HANDLES

DESCRIPTION	TYPE	ORDERING TYPE
Directly Mounted	NEMA Type 1	DH-5
Directly Mounted (with Key lock)	NEMA Type 1	DHK-5
Extended (Door-Mounted)	NEMA Type 1	REH-5
NEMA Door-Mounted	NEMA Type 1, 12	EHU-5
	NEMA Type 3, 3R, 4	EHV-5
	NEMA Type 3, 4, 4X	EHX-5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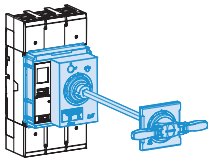
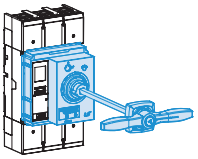

<REH-5>

FLANGE HANDLES WITH CABLE OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Cable operating mechanism (without cable)		COM-5
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L
Cable	60 inch	FH4-60
	84 inch	FH4-84
	120 inch	FH4-120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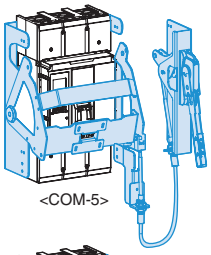
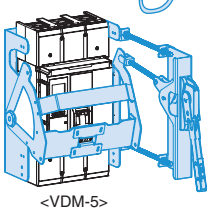
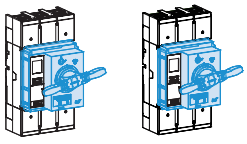
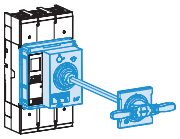
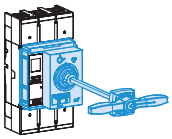
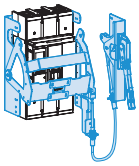
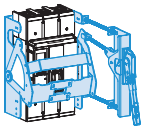

<COM-5>

FLANGE HANDLES WITH VARIABLE-DEPTH OPERATING MECHANISM

DESCRIPTION	TYPE	ORDERING TYPE
Variable depth operating mechanism with threaded-rod and handle		VDM-5
Long type handle (with operating mechanism)	NEMA Type 1, 12, 3, 3R, 4	FHU-L
	NEMA Type 4, 4X	FHX-L


<VDM-5>

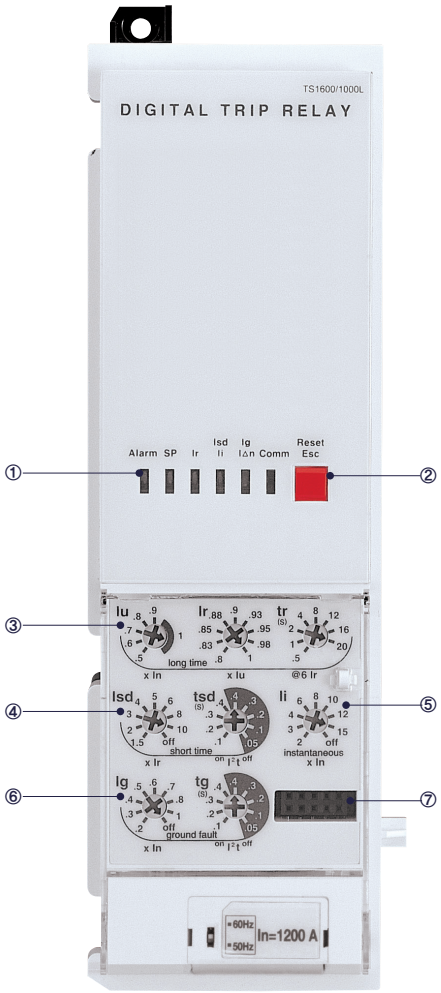
TYPE	DIRECTLY MOUNTED	DOOR MOUNTED	FLANGE HANDLE WITH CABLE OPERATION MECHANSM	FLANGE HANDLE WITH VARIABLE DEPTH MECHANSM
NEMA TYPE 1			-	-
NEMA Type 1, 12, 3, 3R, 4, 4X	-			

TRIP UNITS FOR UTS800 AND UTS1200

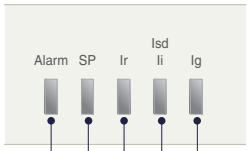
Circuit breaker includes factory-installed internal trip units. Be careful not to interchange trip units in the field. There are various kinds of trip units according to rated current and function as follows.

N type: Normal type

- Optimized protection function
- OCR, OCGR function according IEC60947-2
- Overload protection
  - Long-time delay
  - Thermal
- Short-circuit protection
  Short-time delay / Instantaneous
  -I^2t On/Off optional (for short-time delay)
- Ground fault protection
  -I^2t On/Off optional
- Self-Power



① LED: Indication of trip info, and overload state



- **Ig**: LED indicating ground-fault
- **Isd / Ii**: LED indicating short-time or instantaneous tripping
- **Ir**: LED indicating long-time delay
- **SP**: Self-protection and battery test LED
- **Alarm**: LED indicating an overload
  (Turn on above 90%, Blink above 105%)

② Reset Key: Fault reset or battery check
③ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting
④ Isd: Short-time current setting, tsd: Short-time tripping delay setting
⑤ Ii: Instantaneous current setting
⑥ Ig: Ground fault setting, tg: Ground fault tripping delay setting
⑦ Test terminal: OCR test terminal (Connected with OCR tester)

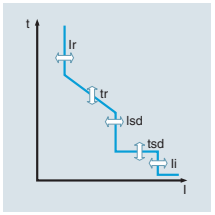
PROTECTION

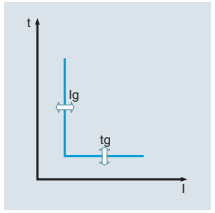
LONG TIME											
Current setting (A)	Iu = In X ...		0.5	0.6	0.7	0.8	0.9	1.0			
	Ir = Iu X ...		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0
Time delay (s) Accuracy: ±15% or below 100ms	tr@(1.5 x Ir)		12.5	25	50	100	200	300	400	500	
	tr@(6.0 x Ir)		0.5	1	2	4	8	12	16	20	
	tr@(7.2 x Ir)		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	

SHORT TIME											
Current setting (A) Accuracy: ±10%	Isd=Ir X ...		1.5	2	3	4	5	6	8	10	Off
Time delay (s) @ 10 x Ir	tsd	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

INSTANTANEOUS											
Current setting (A)	Ii=In X ...		2	3	4	6	8	10	12	15	Off
Tripping time			50(±10)ms								

GROUND FAULT											
Pick-up (A) Accuracy: ±10% (Ig>0.4In) ±20% (Ig<0.4In)	Ig=In X ...		0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) @ 1 x In	tg	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

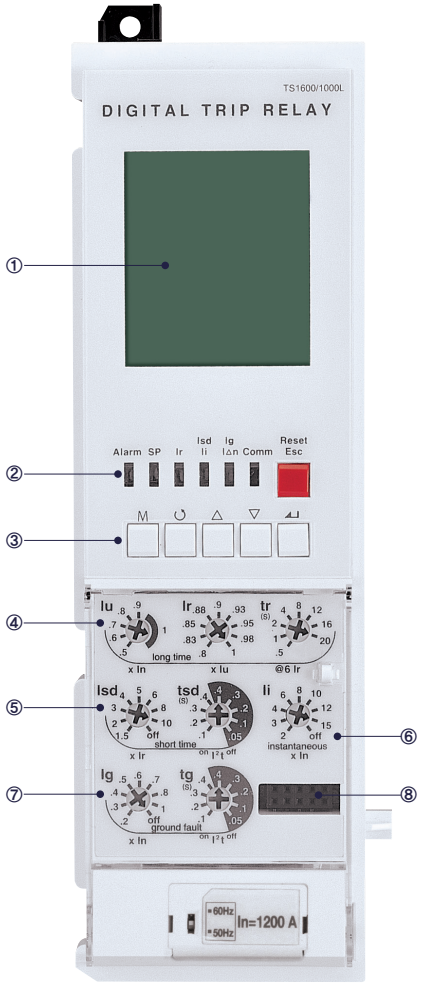




TRIP UNITS FOR UTS800 AND UTS1200

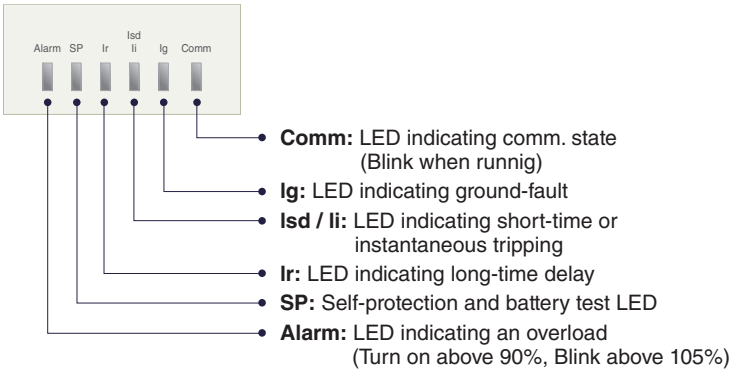
A type: Ammeter type

- Overload protection
  - Long-time delay
  - Thermal
- Short-circuit protection
  - Short-time delay/ Instantaneous
  - I^2t On/Off optional (for short-time delay)
- Ground fault protection
  - I^2t On/Off optional
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- High-performance and high-speed MCU buillt-in
  - Accurate measurement with tolerance of 1.0%
- Fault recording
  - Records Max. up to 10 fault information about fault type, fault phase, fault data, occurrence time of fault
- SBO (Select Before Operation)
  - High reliability for control and setting change method
- 3 DO(Digital Output)
  - Fixed
- Communication
  - Modbus/RS485
  - Profibus-DP

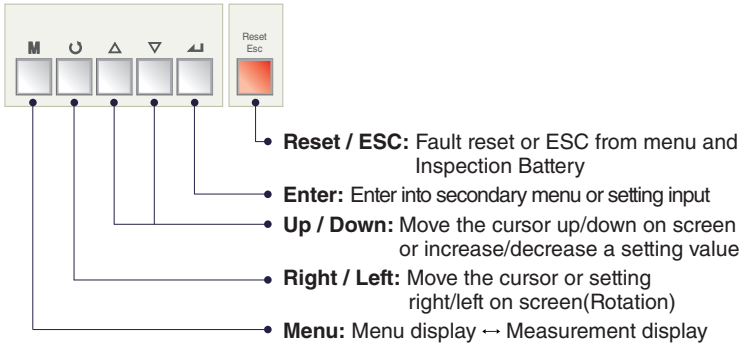


① LCD: Indication of measurement and information

② LED: Indication of trip info, and overload state



③ Key: Move to menu of reset



④ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting

⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting

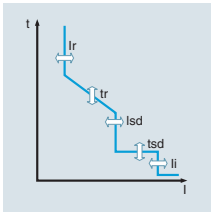
⑥ Ii: Instantaneous current setting

⑦ Ig: Ground fault setting, tg: Ground fault tripping delay setting

⑧ Test terminal: OCR test terminal (Connected with OCR tester)

PROTECTION

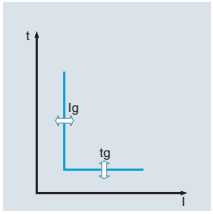
LONG TIME											
Current setting (A)	Iu = In X ...		0.5	0.6	0.7	0.8	0.9	1.0			
	Ir = Iu X ...		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1.0
Time delay (s) Accuracy: ±15% or below 100ms	tr@(1.5 x Ir)		12.5	25	50	100	200	300	400	500	
	tr@(6.0 x Ir)		0.5	1	2	4	8	12	16	20	
	tr@(7.2 x Ir)		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	



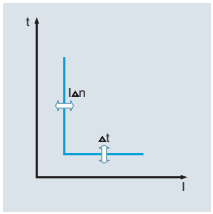
SHORT TIME											
Current setting (A) Accuracy: ±10%	Isd=Ir X ...		1.5	2	3	4	5	6	8	10	Off
Time delay (s) @ 10 x Ir	tsd	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time (ms)	20	80	160	260	360				
		Max. Trip Time (ms)	80	140	240	340	440				

INSTANTANEOUS											
Current setting (A)	Ii=In X ...		2	3	4	6	8	10	12	15	Off
Tripping time			50(±10)ms								

GROUND FAULT											
Pick-up (A) Accuracy: ±10% (Ig>0.4In) ±20% (Ig<0.4In)	Ig=In X ...		0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) @ 1 x In	tg	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				



EARTH LEAKAGE (OPTION)											
Current setting (A)	IΔn		0.5	1	2	3	5	10	20	30	Off
Time delay (ms) Accuracy: ±15%	Δt	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

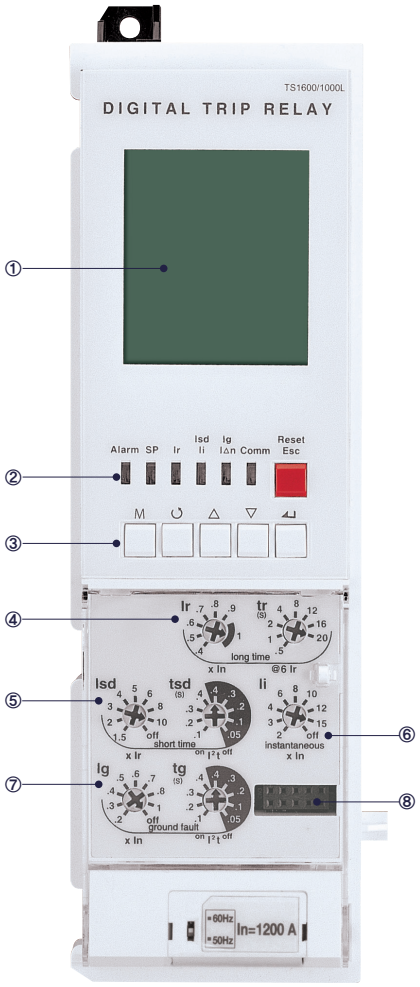


Note) Earth leakage function is available with ZCT or external CT

TRIP UNITS FOR UTS800 AND UTS1200

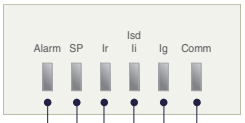
P type: Power meter type

- Overload protection
  - Long-time delay
  - Thermal
- Short-circuit protection
  - Short-time delay/ Instantaneous
  - I^2t On/Off optional (for short-time delay)
- Ground fault protection
  - I^2tOn/Off optional
- Protection for Over voltage/Under voltage/Over frequency/ Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- The fine-adjustable setting by knob and key
- IDMTL setting (SIT, VIT, EIT, EIT50, DT curve)
  - Basic setting: "None".Thermal curve.
- Measurement and Display Function
  - High detailed measurement for 3 phase Current/Voltage/ Power/Energy/Phase angle/Frequency/PF/Demand
  - 128 x 128 Graphic LCD
  - Indicates current/Voltage Vector Diagram and Waveform
- Fault recording
  - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
- Event recording
  - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
  - High reliability for control and setting change method
- 3 DO(Digital output)
  - Programmable for alarm, trip and general DO
- Communication
  - Modbus/RS485
  - Profibus-DP



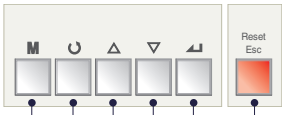
① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info, and overload state



- **Comm:** LED indicating comm. state (Blink when runnig)
- **Ig:** LED indicating ground-fault
- **Isd / Ii:** LED indicating short-time or instantaneous tripping
- **Ir:** LED indicating long-time delay
- **SP:** Self-protection and battery test LED
- **Alarm:** LED indicating an overload (Turn on above 90%, Blink above 105%)

③ Key: Move to menu of reset



- **Reset / ESC:** Fault reset or ESC from menu and Inspection Battery
- **Enter:** Enter into secondary menu or setting input
- **Up / Down:** Move the cursor up/down on screen or increase/decrease a setting value
- **Right / Left:** Move the cursor or setting right/left on screen(Rotation)
- **Menu:** Menu display ↔ Measurement display

④ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting
⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting
⑥ Ii: Instantaneous current setting
⑦ Ig: Ground fault setting, tg: Ground fault tripping delay setting
⑧ Test terminal: OCR test terminal (Connected with OCR tester)

PROTECTION

LONG TIME											
Current setting (A)	Iu = In X ...		0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s) Accuracy: ±15% or below 100ms	tr@(1.5 x Ir)		12.5	25	50	100	200	300	400	500	
	tr@(6.0 x Ir)		0.5	1	2	4	8	12	16	20	
	tr@(7.2 x Ir)		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	

SHORT TIME										
Current setting (A) Accuracy: ±10%	Isd=Ir X ...		1.5	2	3	4	5	6	8	10	Off
Time delay (s) @ 10 x Ir	tsd	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

INSTANTANEOUS										
Current setting (A)	Ii=In X ...	2	3	4	6	8	10	12	15	Off
Tripping time		50(±10)ms								

GROUND FAULT										
Pick-up (A) Accuracy: ±10% (Ig>0.4In) ±20% (Ig<0.4In)	Ig=In X ...	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) @ 1 x In	tg	I^2t Off	0.05	0.1	0.2	0.3	0.4			
		I^2t On		0.1	0.2	0.3	0.4			
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360			
		Max. Trip Time(ms)	80	140	240	340	440			

EARTH LEAKAGE (OPTION)											
Current setting (A)	IΔn		0.5	1	2	3	5	10	20	30	Off
Time delay (ms) Accuracy: ±15%	Δt	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

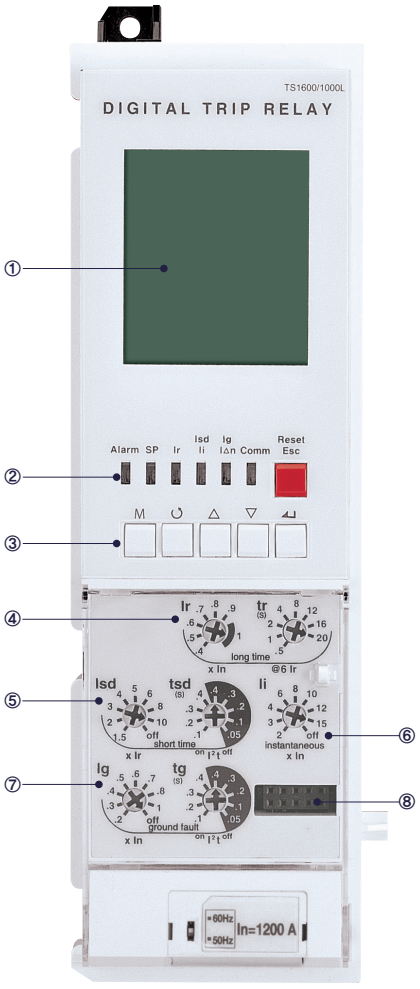
Note) Earth leakage function is available with ZCT or external CT

OTHER PROTECTION		PICK-UP			TIME DELAY(S)		
		SETTING RANGE	STEP	ACCURACY	SETTING RANGE	STEP	ACCURACY
Under Voltage		80V-0V_Pick-up	1V	±5%	1.2~40 (s)	0.1 (s)	±0.1 (s)
Over Voltage		UV_Pick-up~980V	1V	±5%			
Voltage Unbalance		6%~99%	1%	±2.5% or (*±10%)			
Reverse Power		10~500kW	1kW	±10%	0.2~40 (s)		
Over Power		500~5000W	1kW	±10%			
Current Unbalance		6%~99%	1%	±2.5% or (*±10%)			
Over Frequency	**60Hz**	UF_Pick-up~65	1Hz	±0.1Hz	1.2~40 (s)		
	50Hz	UF_Pick-up~55	1Hz	±0.1Hz			
Under Frequency	**60Hz**	55Hz~OF_Pick-up	1Hz	±0.1Hz			
	50Hz	45Hz~OF_Pick-up	1Hz	±0.1Hz			

TRIP UNITS FOR UTS800 AND UTS1200

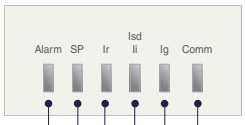
S type: Supreme meter type

- Overload protection
  - Long-time delay
  - Thermal
- Short-circuit protection
  - Short-time delay/ Instantaneous
  - I^2t On/Off optional (for short-time delay)
- Ground fault protection
  - I^2tOn/Off optional
- Protection for Over voltage/Under voltage/Over frequency/ Under frequency/Unbalance/Reverse power
- Realization of protective coordination by ZSI (Zone Selective Interlocking)
- The fine-adjustable setting by knob and key
- IDMTL setting (SIT, VIT, EIT, DT curve)
  - Basic setting: "None".Thermal curve.
- Measurement and Display Function
  - High detailed measurement for 3 phase current/ Voltage/ Power/Energy/Phase angle/Frequency/PF/Demand
  - 128 x 128 Graphic LCD
  - Indicates current/Voltage Vector Diagram and Waveform
- Fault recording
  - Records Max. up to 256 fault information about fault type, fault phase, fault value, occurrence time of fault
  - fault wave recording: records the latest fault wave
- Event recording
  - Records events of device related to setting change, operation and state change. (Max. up to 256)
- SBO (Select Before Operation)
  - High reliability for control and setting change method
- Power quality analysis
  - Measurement for 1st-63th harmonics
  - THD, TDD, k-Factor
  - Voltage/Current waveform capture
- 3 DO(Digital output)
  - Programmable for alarm, trip and general DO
- Communication
  - Modbus/RS485
  - Profibus-DP



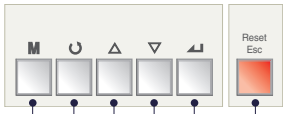
① Graphic LCD: Indication of measurement and information

② LED: Indication of trip info, and overload state



- **Comm:** LED indicating comm. state (Blink when runnig)
- **Ig:** LED indicating ground-fault
- **Isd / Ii:** LED indicating short-time or instantaneous tripping
- **Ir:** LED indicating long-time delay
- **SP:** Self-protection and battery test LED
- **Alarm:** LED indicating an overload (Turn on above 90%, Blink above 105%)

③ Key: Move to menu of reset



- **Reset / ESC:** Fault reset or ESC from menu and Inspection Battery
- **Enter:** Enter into secondary menu or setting input
- **Up / Down:** Move the cursor up/down on screen or increase/decrease a setting value
- **Right / Left:** Move the cursor or setting right/left on screen(Rotation)
- **Menu:** Menu display ↔ Measurement display

④ Iu, Ir: Long-time current setting, tr: Long-time tripping delay setting
⑤ Isd: Short-time current setting, tsd: Short-time tripping delay setting
⑥ Ii: Instantaneous current setting
⑦ Ig: Ground fault setting, tg: Ground fault tripping delay setting
⑧ Test terminal: OCR test terminal (Connected with OCR tester)

PROTECTION

LONG TIME											
Current setting (A)	Iu = In X ...		0.4	0.5	0.6	0.7	0.8	0.9	1.0		
Time delay (s) Accuracy: ±15% or below 100ms	tr@(1.5 x Ir)		12.5	25	50	100	200	300	400	500	
	tr@(6.0 x Ir)		0.5	1	2	4	8	12	16	20	
	tr@(7.2 x Ir)		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	

SHORT TIME										
Current setting (A) Accuracy: ±10%	Isd=Ir X ...		1.5	2	3	4	5	6	8	10	Off
Time delay (s) @ 10 x Ir	tsd	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

INSTANTANEOUS										
Current setting (A)	Ii=In X ...	2	3	4	6	8	10	12	15	Off
Tripping time		50(±10)ms								

GROUND FAULT										
Pick-up (A) Accuracy: ±10% (Ig>0.4In) ±20% (Ig<0.4In)	Ig=In X ...	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0	Off
Time delay (s) @ 1 x In	tg	I^2t Off	0.05	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	(I^2t Off)	Min. Trip Time(ms)	20	80	160	260	360				
		Max. Trip Time(ms)	80	140	240	340	440				

EARTH LEAKAGE (OPTION)											
Current setting (A)	IΔn		0.5	1	2	3	5	10	20	30	Off
Time delay (ms) Accuracy: ±15%	Δt	Alarm Time(ms)	140	230	350	800	950				
		Trip Time(ms)	140	230	350	800					

Note) Earth leakage function is available with ZCT or external CT

OTHER PROTECTION		PICK-UP			TIME DELAY (s)		
		SETTING RANGE	STEP	ACCURACY	SETTING RANGE	STEP	ACCURACY
Under Voltage		80V-0V_Pick-up	1V	±5%	1.2~40 (s)	0.1 (s)	±0.1 (s)
Over Voltage		UV_Pick-up~980V	1V	±5%			
Voltage Unbalance		6%~99%	1%	±2.5% or (*±10%)			
Reverse Power		10~500kW	1kW	±10%	0.2~40 (s)		
Over Power		500~5000W	1kW	±10%			
Current Unbalance		6%~99%	1%	±2.5% or (*±10%)			
Over Frequency	**60Hz**	UF_Pick-up~65	1Hz	±0.1Hz	1.2~40 (s)		
	50Hz	UF_Pick-up~55	1Hz	±0.1Hz			
Under Frequency	**60Hz**	55Hz~OF_Pick-up	1Hz	±0.1Hz			
	50Hz	45Hz~OF_Pick-up	1Hz	±0.1Hz			

TRIP UNITS FOR UTS800 AND UTS1200

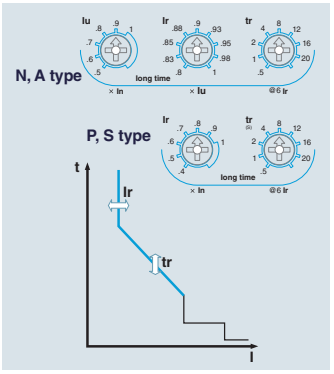
TRIP RELAY TYPES

CLASSIFICATION	N TYPE	A TYPE	P TYPE	S TYPE
Externals				
Current protection	• L / S / I / G Thermal	• L / S / I / G / Thermal • ZSI(Protective coordination)	• L / S / I / G / Thermal(Continuous) • ZSI(Protective coordination)	• L / S / I / G / Thermal(Continuous) • ZSI(Protective coordination)
Other protection	-	• Earth leakage (Option)	• Earth leakage (Option) • Over/Under voltage • Unbalance(Voltage/Current) • Reverse power/Over power	• Earth leakage (Option) • Over/Under voltage • Unbalance(Voltage/Current) • Reverse power/Over power
Measurement function	-	• Current (R / S / T)	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand	• 3 Phase Voltage/Current RMS/Vector • Power(P, Q, S), PF(3-Phase) • Energy(Positive/Negative) • Frequency, Demand • Voltage/Current harmonics (1st~63th) • 3 Phase Waveforms • THD, TDD, K-Factor
Fine adjustment	-	-	• Fine adjustment for long/short time delay/instantaneous/ ground	• Fine adjustment for long/short time delay/instantaneous/ ground
Digital Output	-	• 3DO (Fixed) • L, S/I, G Alarm	• 3DO (Programmable) • Trip, Alarm, General	• 3DO (Programmable) • Trip, Alarm, General
IDMTL setting	-	-	• Compliance with IEC60255-3 • SIT, VIT, EIT, DT	• Compliance with IEC60255-3 • SIT, VIT, EIT, DT
Communication	-	• Modbus/RS-485 • Profibus-DP	• Modbus/RS-485 • Profibus-DP	• Modbus/RS-485 • Profibus-DP
Power supply	• Self Power - Power source works over 20% of load current.	• Self Power - Power source works over 20% of oad current. - External power source are required for comm. • AC/DC 100~250V • DC 24~60V	• AC/DC 100~250V • DC 24~60V Basic protection function(L / S / I / G) is still under normal operation without control power.	• AC/DC 100~250V • DC 24~60V
RTC timer	-	• Available	• Available	• Available
LED for trip info.	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault	• Long time delay • Short time delay/Instantaneous • Ground fault
Fault recording	-	• 10 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)	• 256 records (Fault/Current/Date and Time)
Event recording	-	-	• 256 records (Content, Status, Date)	• 256 records (Content, Status, Date)
Operating button	• Reset button	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, Enter	• Reset, Menu Up/Down, Left/Right, Enter

OPERATION CHARACTERISTIC

LONG-TIME DELAY (L)

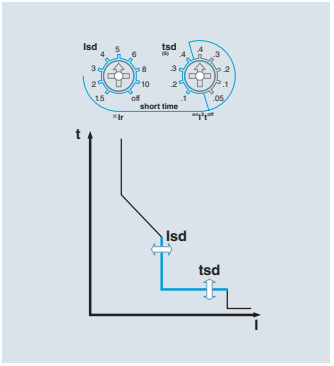
The function for overload protection which has time delayed characteristic in inverse ratio to fault current.



1. Standard current setting knob: Ir
   1)Setting range in P type and S type: (0.4-0.5-0.6-0.7-0.8-0.9-1.0)×In
   2)Setting range in N type and A type: (0.4~1.0)×In
   - **Iu**: (0.5- 0.6 - 0.7 - 0.8 - 0.9 - 1.0)×In
   - **Ir**: (0.8 - 0.83 - 0.85 - 0.88 - 0.9 - 0.93 - 0.95 - 0.98 - 1.0)×Iu
2. Time delay setting knob: tr
   - Standard operrating time is based on the time of 6×Ir
   - Setting range: 0.5-1-2-4-8-12-16-20 (s)
3. Relay pick-up current
   - When current over(1.15)×Ir fows in, relay is picked up.
4. Relay operates basing on the largest load current among R/S/T phase.

SHORT-TIME DELAY (S)

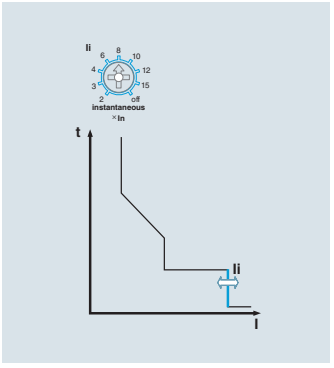
The function for fault current (over current) protection which has definite time characteristic and time delayed in inverse ratio to fault current.



1. Standard current setting knob: Isd
   - Setting range:(1.5 - 2 - 3 - 4 - 5 - 6 - 8 - 10 - Off) x Ir
2. Time delay setting knob: tsd
   - Standard operrating time is based on the time of 10×Ir
   - Inverse time(I^2t On): 01 - 0.2 - 0.3 - 0.4 (s)
   - Definite time (I^2t Off): 0.05 - 0.1 - 0.2 - 0.3 - 0.4 (s)
3. Relay operates based on the largest load current among R/S/T phase.
4. When the ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable the ZSI funcion on the last downstream device.

INSTANTANEOUS (I)

The function for breaking fault current above the setting value within the shortest time to protect the circuit from short-circuit

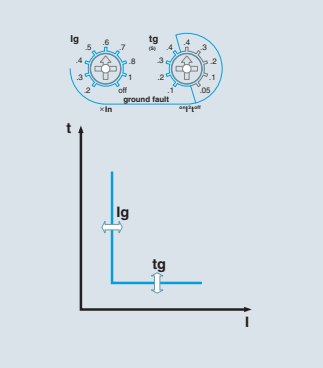


1. Standard current setting knob: Ii
   - Setting range:(2 - 3 - 4 - 6 - 8 - 10 - 12 - 15 - Off) x In
2. Relay operates based on the largest load current among R/S/T phase.
3. Total breaking time is below 50ms.

OPERATION CHARACTERISTIC

GROUND FAULT (G)

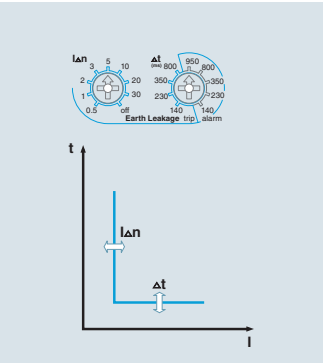
The function for breaking ground fault current above setting value after time-delay to protect the circuit from ground fault.



1. Standard setting current knob: Ig
   - Setting range: (0.2 - 0.3 - 0.4 - 0.5 - 0.6 - 0.7 - 0.8 - 1.0 - Off) x In
2. Time delay setting knob: tg
   - Inverse time (I^2t On): 0.1 - 0.2 - 0.3 - 0.4 (s)
   - Definite time (I^2t Off): 0.05 - 0.1 - 0.2 - 0.3 - 0.4 (s)
3. Ground fault current is the vector sum of each phase current. Therefore, 3Pole products may operate under its phase-unbalace including ground fault situation.(R+S+T Phase)
4. When the ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable the ZSI function on the last downstream device.
5. Ground-fault functions are basically provided with products equipped with a trip relay through its internal CT that is embedded in each phase.
   (But, it can't be used with earth - leakage protection function at the same time)

EARTH LEAKAGE (G) - OPTION

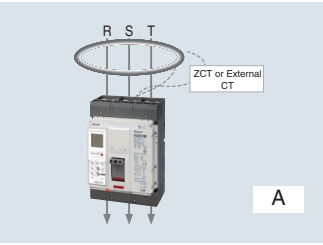
The function for breaking earth leakage current above setting value after time delay to protect the circuit from earth leakage. (A, P, S type)



1. Standard setting current knob: IΔn
   -Setting range: 0.5-1-2-3-5-10-20-30-OFF(A)
2. Time delay setting knob: Δt
   - Trip time: 140-230-350-800 ms
   - Alarm time: 140-230-350-800-950 ms
3. Settings within its alarm range will prevent its breaker from tripping but activating its alarm.
4. This function is enabled and can be used only with private external CT(secondary output 5A) selected by customers.
5. When the ZSI function is set, the protection operation will take place instantaneously with input absence by downstream devices. It is advised to disable the ZSI function on the last downstream device.

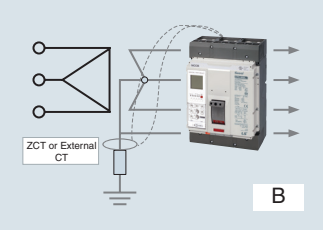
※ USE CAUTIONS WITH EARTH-LEAKAGE CURRENT SETTINGS

- When using other CT selected by customers, the setting range is from 0.5 to 5A based on its secondary current. (Secondary output rating: 5A)
  Hence, under 100:5A CT, if trip relay is set to 0.5A, earth-leakage exceeding 10A will activate its operation (0.5A x 20=10A)



※GUIDELINES FOR USING AN EXTERNAL CT

- Earth-leakage protection characteristics using the standard CT which is installed inside of MCCB can protect currents from 20 to 100% range on its rated current.
- As rated currents on MCCB increases, current that is covered by its standard CT increase as well. This can not protect against small leakage currents.
  ex) 400A MCCB Min. Earth-leakage current 400A x 20%=80A
- Therefore, customers are advised to install an external CT in accordance with its rated currents within its systems. And choose trip relay(E, X type) which is required with CT usage in order to provide earth-leakage function.



MEASUREMENT FUNCTION

A type

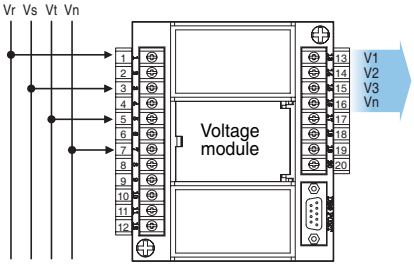
P type

S type

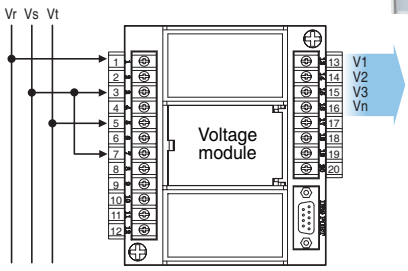
CLASS.	MEASUREMENT ELEMENT	DETAILED ELEMENT	UNIT	DISPLAY RANGE	ACCURACY
Current	Line current	Ia,Ib,Ic	A	80A~65,535A	±3%
	Normal current	I_1			
	Reverse current	I_2			
Voltage	Line voltage	Vab,Vbc,Vca	V	60~690V	±1%
	Phase voltage	Va,Vb,Vc			±1%
	Normal voltage	V_1			
	Reverse voltage	V_2			
Angle	Line-to-line Line-to-current	∠VabIa, ∠VabIb, ∠VabIc, ∠VabVbc, ∠VabVca	°	0~360°	±1°
	Phase-to-phase	∠VaVb,∠VaVc			±1°
	Phase-to-current	∠VaIa, ∠VbIb, ∠VcIc			±1°
Power	Active power	Pa(ab), Pb(bc), Pc(ca), P	kW	1kW~99,999kW	±3%
	Reactive power	Qa(ab), Qb(bc), Qc(ca), Q	kVar	1kVar~99,999kVar	±3%
	Apparent power	Sa(ab), Sb(bc), Sc(ca), S	kVA	1kVA~99,999kVA	±3%
Energy	Active energy	WHa(ab), WHb(bc), WHc(ca), WH	kWh MWh	1kWh~9999.99MWh	±3%
	Reactive energy	VARHa(ab), VARHb(bc), VARHc(ca), VARH	kVarh Mvarh	1kVarh~9999.99MVarh	±3%
	Reverse active energy	rWHa(ab), rWHb(bc), rWHc(ca), rWH	kWh MWh	1kWh ~9999.99MWh	±3%
Freq.	Frequency	F	Hz	45~65Hz	
Power factor	Power factor(PF)	PFa(ab), PFb(bc), PFc(ca), PF		+: Lead, -: Lag	
Unbalance	Unbalance rate	Iunalance, Vunbalance	%	0.0~100.0	
Demand	Active power demand	Peak demand	kW	1kW~99999kW	
	Current demand	Peak demand	A	80A~65,535A	
Harmonics	Voltage harmonics	1st~63th harmonics of Va(ab),Vb(bc),Vc(ca)	V	60~690V	
	Current harmonics	1st~63th harmonics of Ia,Ib,Ic	A	80A~65,535A	
	THD, TDD		%	0.0~100.0	
	K-Factor		-	0.0~100.0	

Voltage module

For P and S type Trip relay, separate voltage module is necessary to measure other element besides current (Separate purchase is needed)
- Voltage input range: AC 60~690V



3P4W wiring

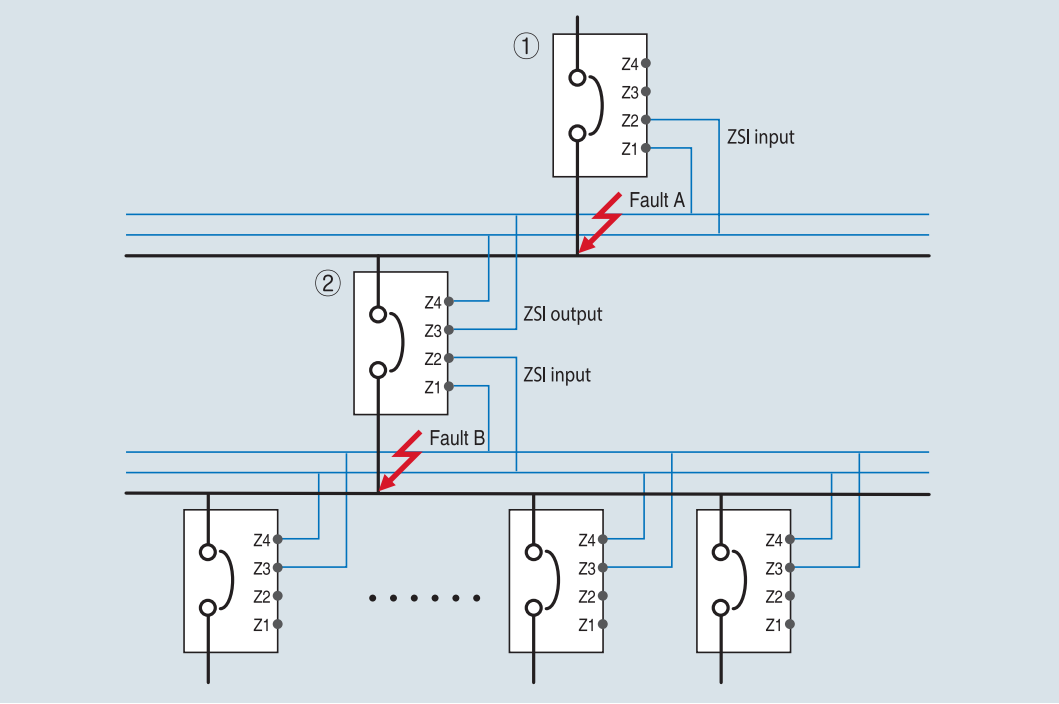


3P3W wiring

ZSI - ZONE SELECTIVE INTERLOCKING (A, P, S TYPE)

Zone-selective interlocking drops delay time that eliminates faults for breakers. It minimizes the shock that all kinds of electric machines get under fault conditions.

1. In case of that short time-delay or ground fault accident occurs at ZSI built in system, the breaker at accident site sends ZSI signal to halt upstream breaker's operation.
2. To eliminate a breakdown, trip relay of MCCB at accident site activates trip operation without time delay.
3. The upstream breaker that received ZSI signal adhere to pre-set short time-delay or ground fault time-delay for protective coordination in the system. However upstream breaker that did not receive its signal will trip instantaneously.
4. For ordinary ZSI operation, it should arrange operation time accordingly so that downstream circuit breakers will react before upstream ones under overcurrent/short time delay/ ground fault situations.
5. ZSI connecting line needs to be Max. 3m.



1) Occurrence of fault A
   - Only breaker ① performs instantaneous trip operation.
2) Occurrence of fault B
   - Breaker ② performs instantaneous trip operation, breaker ① performs trip operation after prearranged delay time
   - But if breaker ② did not break the fault normally, breaker ① performs instantaneous trip operation to protect system.

REMOTE RESET AND DIGITAL I/O (A, P, S TYPE)

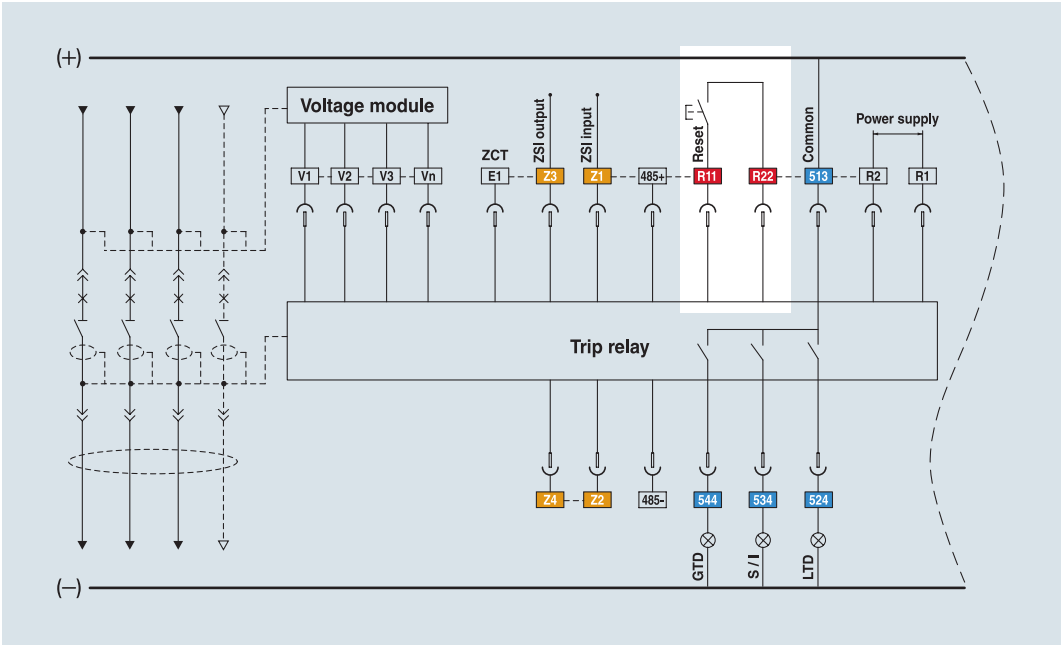
**In case of that MCCB operates due to accidents or over current,
Trip relay indicates the information of the accident through the LED and LCD.
Trip relay A, P and S type is possible to perform the remote reset by digital input,
and have 3 DO(Digital output).**

1. Methods to reset Trip relay is to push the Reset button on the frontal side and to use the remote reset.

2. Digital input
   - [R11-R22] input: Remote reset
   - [Z1-Z2] Input: Z akage detection or external CT input

※All DI are dry contact that has 3.3V of recognition voltage. When inputting close by SSR(Solid State Relay) or open-collector, connect collector(Drain) to R11.

3. Digital output 3a(524, 534, 544-513)
   - Fault output: Long/Short time delay, Instantaneous, Ground fault, UVR, OVR, UFR, OFR, rPower, Vunbal, Iunbal
     (Maintains state as Latch form until user pushes reset.)
   - General DO: when setting L/R as remote, it is available to control close/open remotely by using communication.

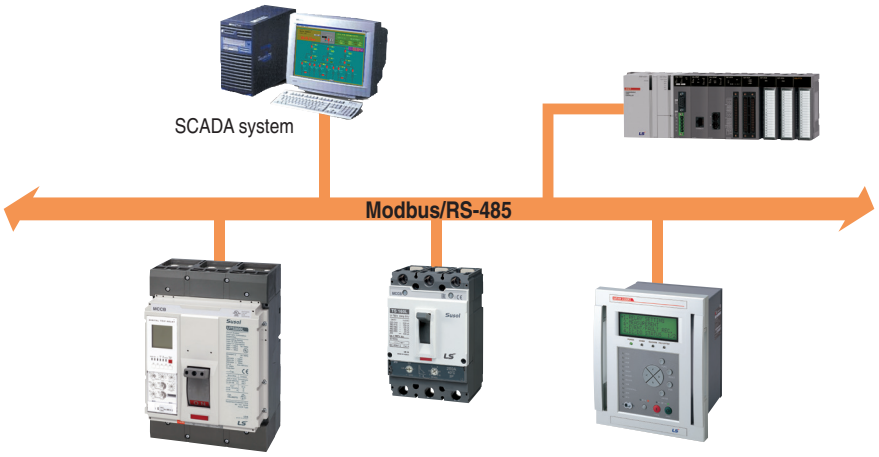


Trip Relay	Digital Output	Long time	Short time	Instantaneous	Ground	Overload Alarm	OVR	UVR	rPower	Vunbal	Iunbal	OFR	UFR	OPR	Note
P, S type	DO1(524)	●	○	○	○	○	○	○	○	○	○	○	○	○	Programmable
	DO2(534)	○	●	●	○	○	○	○	○	○	○	○	○	○	
	DO3(544)	○	○	○	●	○	○	○	○	○	○	○	○	○	
A type	DO1(524)	●	×	×	×	Not available									Fixed
	DO2(534)	×	●	●	×										
	DO3(544)	×	×	×	●										

COMMUNICATION

Modbus/RS-485

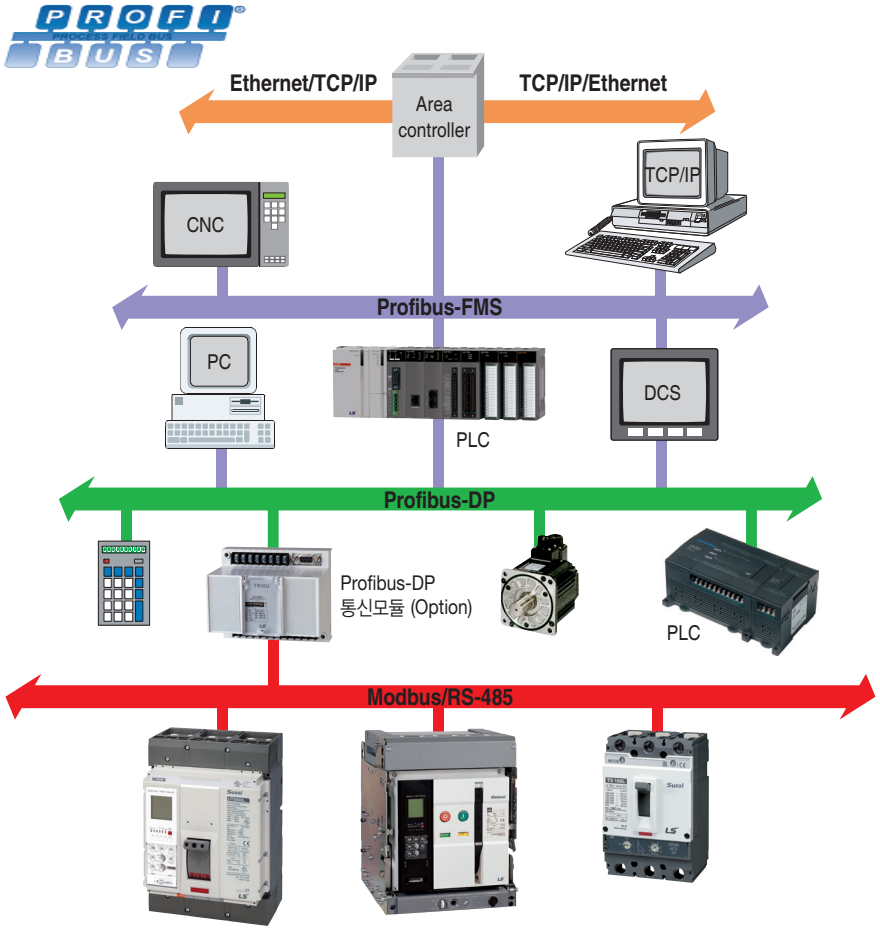
- Operation mode: Differential
- Distance: Max. 1.2km
- Cable :
  General RS-485 shielded twist 2-pair cable
- Baud rate :
  9600bps, 19200bps, 38400bps
- Transmission method: Half-Duplex
- Termination: 150Ω



Profibus-DP

- Profibus-DP module is installed separately (Option)
- Operation mode: Differential
- Distance: Max. 1.2km
- Cable :
  Profibus-DP shielded twist 2-pair cable
- Baud rate: 9600bps~12Mbps
- Transmission method: Half-Duplex
- Termination: 150Ω
- Standard: EN 50170 / DIN 19245

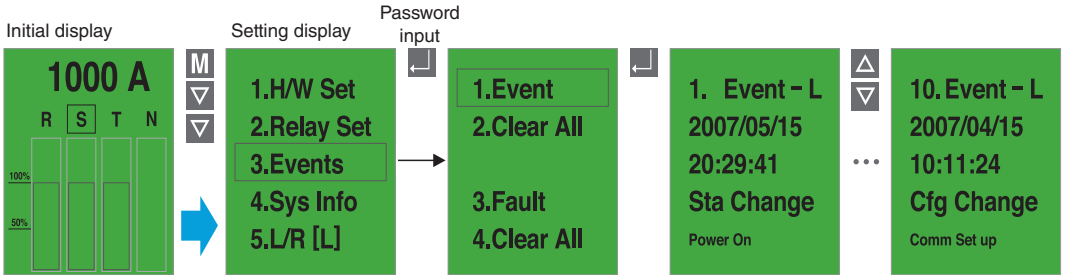
Profibus-DP
communication module
(Option)



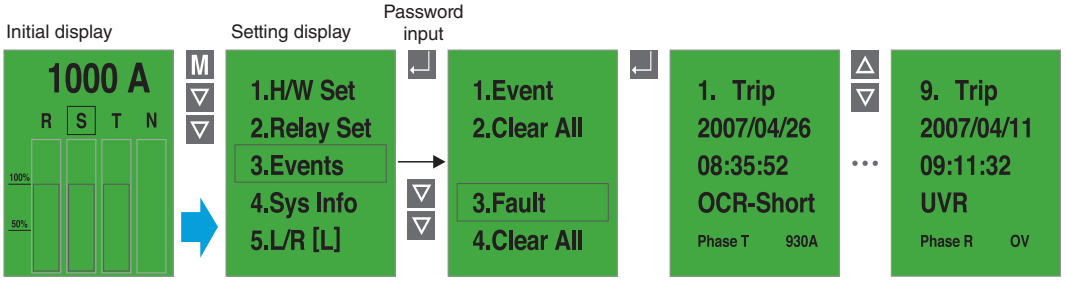
EVENT & FAULT RECORDING (P, S TYPE)

When there are events such as setting change, Info. change, error of self-diagnose, state change, P and S type record Max. up to 256 information of the events in accordance with time(ms). In addition, they can record Max. up to 256(up to 10 for A type) information of the faults such as fault cause, fault phase, fault value and so on in accordance with time(ms).

Event information display



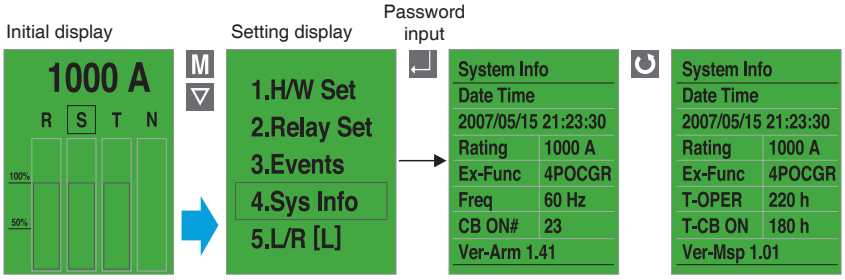
Fault information display



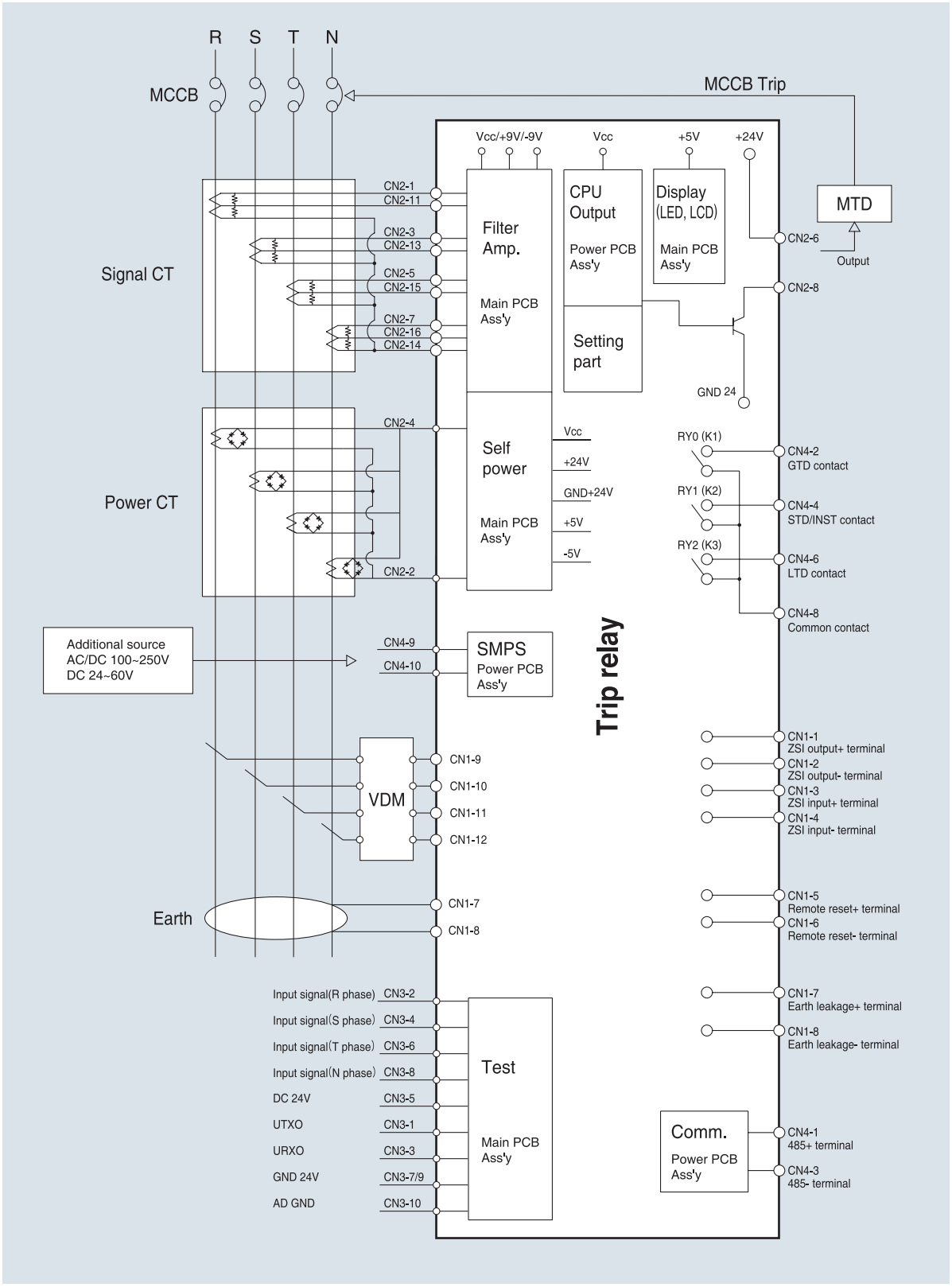
SYSTEM INFORMATION

P and S type can indicate information as followings with the information of the MCCB.
- Present time: year/month/date/hour/minute/ms
- MCCB current ratings
- N-phase current ratings: 100%
- Frequency information: 60Hz / 50Hz
- Closing numbers of breaker: CB ON numbers
- Trip relay operating time: OCR ON time
- ON time of breaker: CB ON time
- S/W ver. information

System information display



SYSTEM BLOCK DIAGRAM

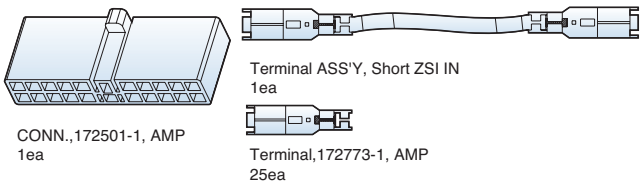


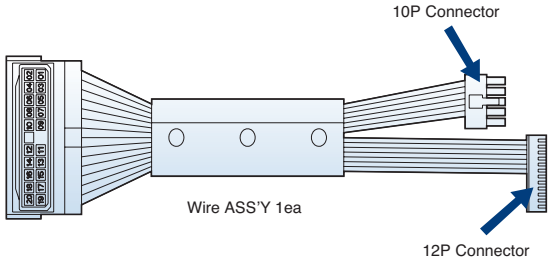
INSTALLATION AND HANDLING

Withdrawal Wiring for Trip Relay

⚠ Caution

1. In case of disassembling and assembling the main cover, screw should be tightened in specific torque of1.5N.m (15.3kgf.cm)
2. In case of disassembling and assembling the main cover by over tightening torque, the parts of MCCB can be damaged.





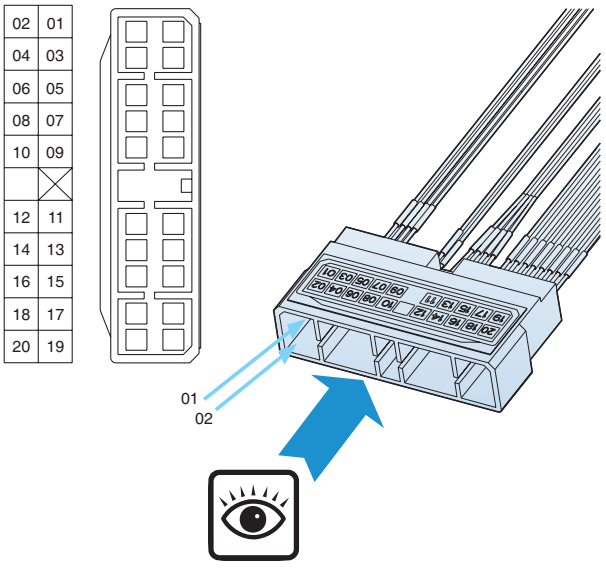
WIRE ASS'Y OCR types

No.	Drawing No.	Part Name	Functions	OCR
1	76671176310	WIRE ASS'Y AG AC OCR	Communication, Digital Output, ZSI, Remote Reset	A Type
2	76671176311	WIRE ASS'Y A ZK PS CKA OCR	Communication, Digital Output, ZSI, Remote Reset, Earth Leakage(<30A), Voltage Module	P, S Type
3	76671176312	WIRE ASS'Y AE AX PX SX OCR	Communication, Digital Output, ZSI, Remote Reset, Earth Leakage(>30A), Voltage Module	P, S Type

Components of wire ass'y OCR and types

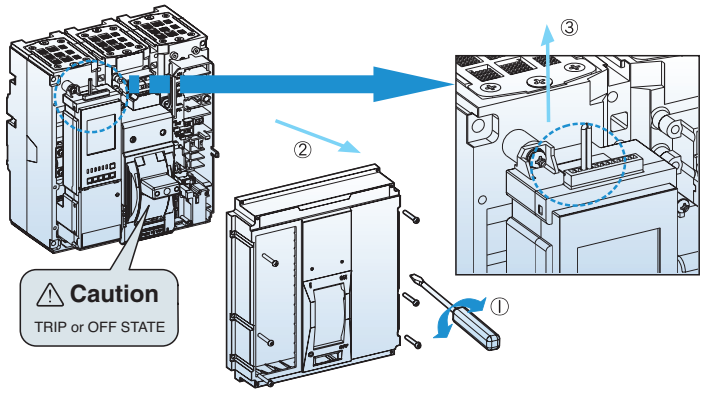
Terminal number and Description

Number	Marking	Description
01	485+	Comm. +
02	485-	Comm. -
03	R1	Power +
04	R2	Power -
05	524	Relay Output (Long time)
06	534	Relay Output (Short time/Instantaneous)
07	544	Relay Output (Ground fault/PAL)
08	513	Relay Output Common
09	Z3	ZSI Out +
10	Z4	ZSI Out -
11	Z1	ZSI In +
12	Z2	ZSI In -
13	R11	Remote Reset +
14	R22	Remote Reset -
15	E1 or B1	Earth Leakage +
16	E2 or B2	Earth Leakage -
17	V1	VR Input
18	V2	VS Input
19	V3	VT Input
20	VN	V Input Common

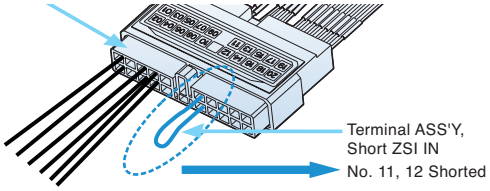


INSTALLATION AND HANDLING

1. Disassembling cover and short connector

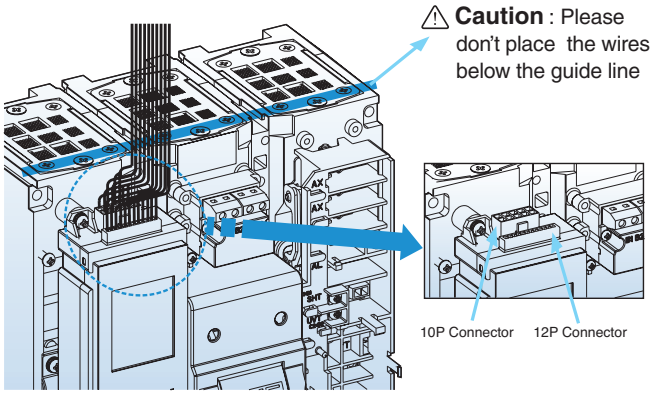


In case of not using ZSI function



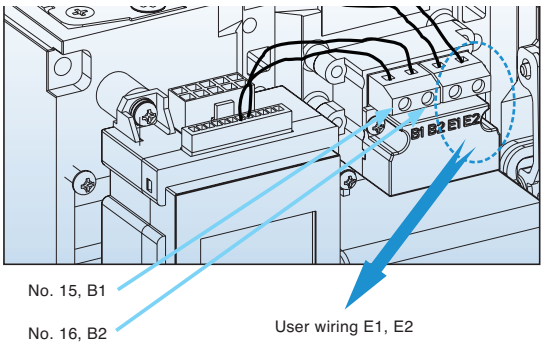
⚠ **Caution** : If not using ZSI function of Trip Relay (OCR), please short ZSI INPUT of terminal No.11,12 (ZSI IN +, ZSI IN -) by using the "TERMINAL ASS'Y, SHORT ZSI IN"

2. Assembly of wire ass'y and withdrawal of wire



In case of the wiring of Earth Leakage ≥30A

Drawing No.	Part Name
76671176312	WIRE ASS'Y AE AX PX SX OCR



Installation of withdrawal wiring for Trip Relay

Trip Relay (OCR) type and applied wire ass'y

No	Type	WIRE ASS'Y, [ ], OCR, UTS1200		
		[AG AC]	[A ZK PS CKA]	[AE AX PX SX]
		76671176310	766711762311	76671176312
1	NG0			
2	NG5			
3	AG0			
4	AG1	■		
5	AG2	■		
6	AG5			
7	AG6	■		
8	AG7	■		
9	AE0			
10	AE1			■
11	AE2			■
12	AE5			
13	AE6			■
14	AE7			■
15	AC1	■		
16	AC2	■		
17	AC6	■		
18	AC7	■		
19	AX1			■

No	Type	WIRE ASS'Y, [ ], OCR, UTS1200		
		[AG AC]	[A ZK PS CKA]	[AE AX PX SX]
		76671176310	766711762311	76671176312
20	AX2			■
21	AX6			■
22	AX7			■
23	PC1		■	
24	PC2		■	
25	PC6		■	
26	PC7		■	
27	PX1			■
28	PX2			■
29	PX6			■
30	PX7			■
31	SC1		■	
32	SC2		■	
33	SC6		■	
34	SC7		■	
35	SX1			■
36	SX2			■
37	SX6			■
38	SX7			■

MCCB FOR UL489 DC APPLICATION

Frame		**UTE100**		**UTE100**		**UTS150**			**UTS250**		
Maximum Rated Current		100A		100A		150A			250A		
Number of Poles		2		3		2, 3			2, 3		
Breaker Type		E	N	E	N	N	H	L	N	H	L
UL489 DC		**UTE100**		**UTE100**		**UTS150**			**UTS250**		
Interrupting Capacity (kA) DC UL, CSA	250V dc-2P	16	25	16	25	35	50	65	35	50	65
	500V dc-3P	-	-	25	35	-	-	-	-	-	-
	600V dc-3P	-	-	-	-	35	50	65	35	50	65
TRIP UNITS F : Fixed A : Adjustable T : Thermal M : Magnetic	Amperes	15~100A		15~100A		40~150A			150~250A		
	ATU	-		-		●			●		
	FMU	-		●		●			●		
	FTU	●		●		●			●		
MCS	Amperes	100A		100A		150A			250A		
	MCS	●		●		●			●		
Unit Mounted		●		●		●			●		
Mechanical Lugs		●		●		●			●		
Busbar connectors		●		●		●			●		
Control Wire Terminal Kit		-		-		●			●		
Terminal Shields		-		-		-			-		
Interphase Barriers		●		●		●			●		
Shunt Trip		●		●		●			●		
Undervoltage Trip		●		●		●			●		
Auxiliary Switch		●		●		●			●		
Alarm Switch		●		●		●			●		
Flange Cable Handle		●		●		●			●		
Flange Variable-Depth Mechanism		●		●		●			●		
Directly-Mounted Rotary Operating Handle		-		●		●			●		
NEMA-Door-Mounted Operating Mechanisms		●		●		●			●		
IEC-Door-Mounted Operating Mechanisms		●		●		●			●		
Mechanical Interlocks		-		●		●			●		
Handle Padlock Attachment		●		●		●			●		
Weight(approximate) lbs.(kg)	2-Pole	1.64(0.74)		-		3.44(1.56)			3.88(1.76)		
	3-Pole	-		2.33(1.06)		3.95(1.79)			4.49(2.04)		
Dimensions Inches(mm)	poles	**W**	**H**	**D**		**W**	**H**	**D**	**W**	**H**	**D**
	2-Pole	2.01(51)	5.12(130)	3.44(87.5)		4.13(105)	6.50(165)	3.44(87.5)	4.13(105)	7.48(190)	3.44(87.5)
	3-Pole	2.99(76)	5.12(130)	3.44(87.5)		4.13(105)	6.50(165)	3.44(87.5)	4.13(105)	7.48(190)	3.44(87.5)

Note1) TS800U 700A: Only FTU

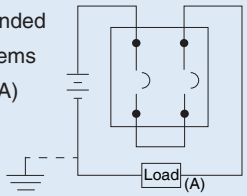


	UTS400			UTS600			TS800U	
	400A			600A			800A	
	2, 3			2, 3			2, 3	
	N	H	L	N	H	L	N	H
	UTS400			**UTS600**			**TS800U**	
	35	50	65	35	50	65	35	65
	-	-	-	-	-	-	-	-
	35	50	65	35	50	65	35	65
	250/300/350/400A			500/600A			500, 600, 700 Note1), 800A	
	●			●			●	
	●			●			●	
	●			●			●	
	400A			600A			800A	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			●	
	-			-			-	
	●			●			-	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			-	
	●			●			●	
	●			●			●	
	●			●			●	
	●			●			●	
	12.02(5.45)			13.45(6.10)			26.46(12.0)	
	13.89(6.30)			15.79(7.16)			29.98(13.6)	
	W	**H**	**D**	**W**	**H**	**D**	**W**	**H**	**D**
	5.51(140)	11.5(292)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	8.27(210)	16.85(428)	5.31(135)
	5.51(140)	11.5(292)	4.33(110)	5.51(140)	13.39(340)	4.33(110)	8.27(210)	16.85(428)	5.31(135)

Circuit Diagrams for DC Application

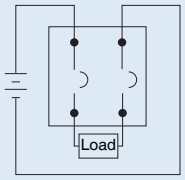
250 Vdc, 2P in Series

Suitable for use on ungrounded systems, or grounded systems that have one end of load(A) connected to grounded terminal,opposite poles in series connection.



A. Grounded System

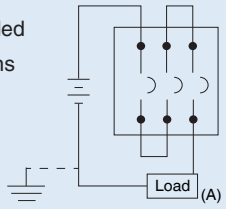
Suitable for use on ungrounded systems only



B. Ungrounded System

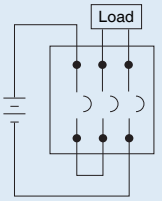
500 Vdc or 600 Vdc, 3P in Series

Suitable for use on ungrounded systems, or grounded systems that have one end of load(A) connected to grounded terminal, opposite poles in series connection.



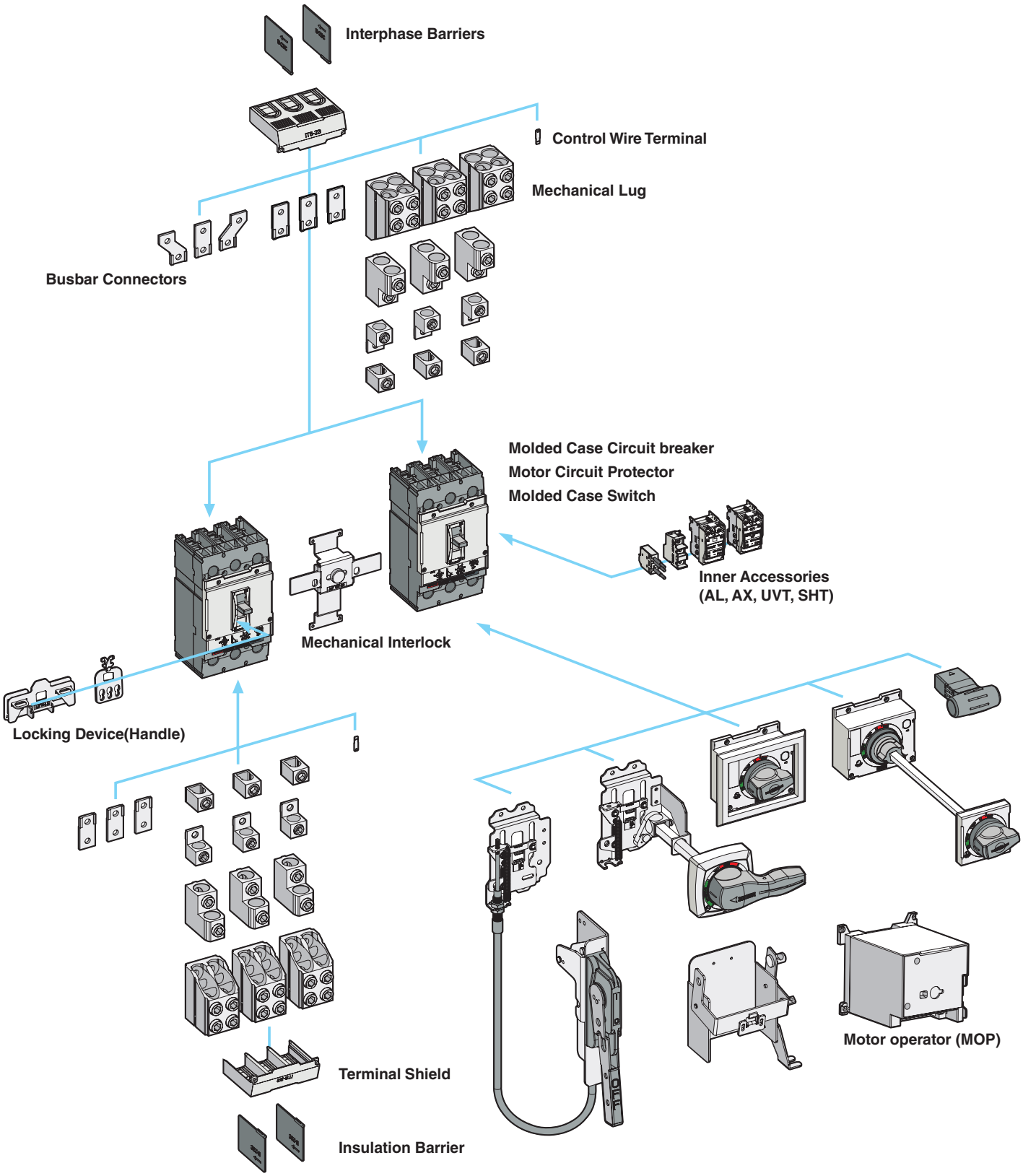
A. Grounded System

Suitable for use on ungrounded systems only



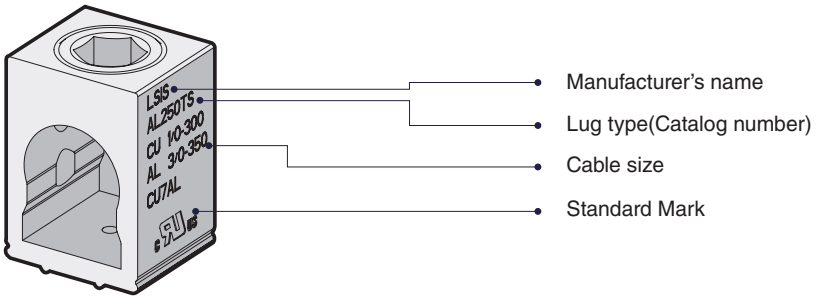
B. Ungrounded System

ACCESSORIES



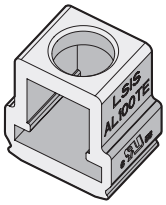
MECHANICAL LUG OVERVIEW

To UTE100 from UTS1200 frame circuit breakers can be ordered with mechanical line and load side lugs. The standard lugs can be removed for the installation of bus connections. All lugs are UL/cUL Listed Certified for their proper application and marked for use with aluminum and copper (Al/Cu) or copper only (Cu) conductors. Lugs suitable for copper and aluminum conductors are made of tin-plated aluminum.
Mechanical lugs are sold either factory installed or as field installable kits.



MECHANICAL LUG KITS FOR UTE100 CIRCUIT BREAKERS

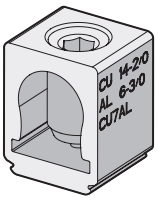
LUG TYPE	TERMINAL BODY MATERIAL	WIRE TYPE		BREAKER AMP RANGE	APPLICABLE WIRE (AWG)	TORQUE N·m (lb-in)
AL 100TE	Aluminum	CU	60 ℃	15~30A	14~10	3.6 (31.9)
				40A	8	4.5 (39.8)
				50~80A	6~3	5.4 (47.8)
				90~100A	2~1	6.3 (55.8)
			75 ℃	15~30A	14~10	3.6 (31.9)
				40~50A	8	4.5 (39.8)
				60~100A	6~3	5.4 (47.8)
		AL	60 ℃	40~60A	6~3	5.4 (47.8)
				70~80A	2~1	6.3 (55.8)
			75 ℃	50~70A	6~3	5.4 (47.8)
				80~100A	2~1/0	6.3 (55.8)



AL100TE
15~100A LUG

MECHANICAL LUG KITS FOR UTS150 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N·m (lb-in)
AL150TS	Aluminum	1.6~15A	Cu	14	4.1 (36.2)
		20~30A	Cu	12~10	5.4 (47.8)
		40~175A	Cu	8~2/0	15.1 (133.6)
		50~70A	Al	6~3	5.4 (47.8)
		90~150A	Al	2~3/0	15.7 (138.6)

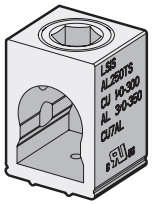


AL150TS
1.6~150A LUG

MECHANICAL LUG OVERVIEW

MECHANICAL LUG KITS FOR UTS250 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N•m (lb-in)
AL250TS	Aluminum	150~175A	Cu	1/0~2/0 AWG	32 (283.2)
		150~175A (Al) 200~225A (Cu)	Cu/Al	3/0~4/0 AWG	
		200~225A (Al) 250A (Cu)	Cu/Al	250~300kcmil	44 (389.4)
		250A	Al	350kcmil	

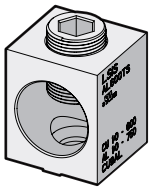


AL250TS
150~250A LUG

MECHANICAL LUG KITS FOR UTS400 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N•m (lb-in)
AL400TS	Aluminum	250A 300A 350A 400A	Cu/Al	1/0AWG ~300kcmil	40.5 (358.5)
			Cu/Al	350~600kcmil	54 (478)
			Al *	700~750kcmil	54 (478)

* Compact wire only (700~750kcmil)

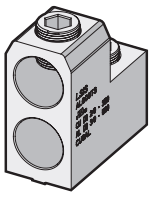


AL400TS
250~400A LUG

MECHANICAL LUG KITS FOR UTS600 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N•m (lb-in)
AL600TS	Aluminum	500A 600A	Cu	2/0AWG ~350kcmil	40.5 (358.5)
			Al *	3/0AWG ~500kcmil	40.5 (358.5)

* Compact wire only (400~500kcmil)

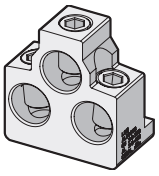


AL600TS
500~600A LUG

MECHANICAL LUG KITS FOR UTS800 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N•m (lb-in)
AL800TS	Aluminum	400A 600A 630A 800A	Cu	3/0AWG ~300kcmil	45 (398.3)
			Al *	3/0AWG ~400kcmil	45 (398.3)

* Compact wire only (350~400kcmil)

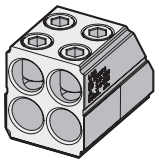


AL800TS
400~800A LUG

MECHANICAL LUG KITS FOR UTS1200 CIRCUIT BREAKERS

LUG TYPE	TERMINAL BODY MATERIAL	BREAKER AMP RANGE	WIRE TYPE	APPLICABLE WIRE (AWG)	TORQUE N•m (lb-in)
AL1200TS	Aluminum	800A 1000A 1200A	Cu	3/0AWG ~350kcmil	45 (398.3)
			Al *	3/0AWG ~500kcmil	45 (398.3)

* Compact wire only (400~500kcmil)

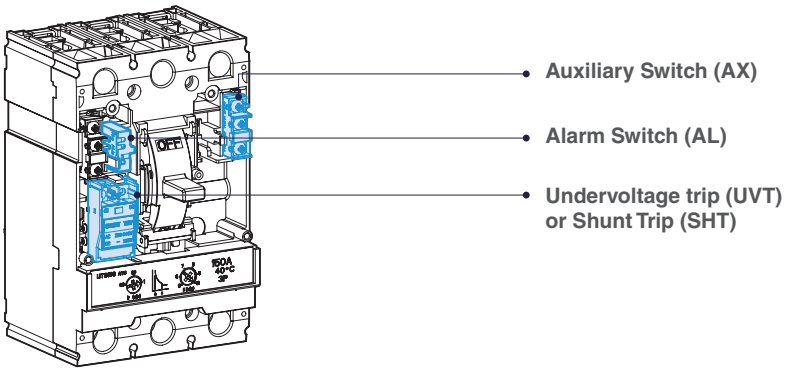


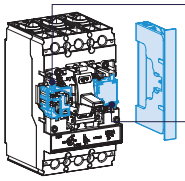
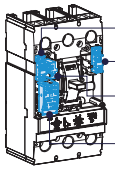
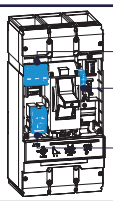
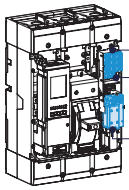
AL1200TS
800~1200A LUG

INTERNAL ACCESSORIES OVERVIEW

Field-installable accessories provide flexibility for installation at the point of use. Auxiliary switches, alarm switches, shunt trip, and undervoltage release accessories are easy to install, reliable, and common to all Susol molded case circuit breakers.
The internal accessories comply with requirements of Underwriters Laboratories® Inc. UL 489 Standards

ACCESSORY LOCATIONS

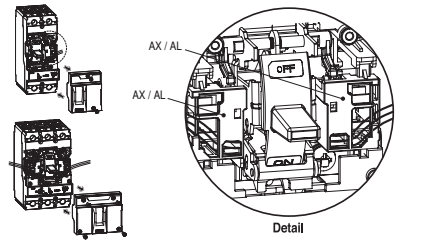


FRAME	INTERNAL ACCESSORIES LOCATIONS	TYPE	LEFT(R)	RIGHT(T)
UTE100	* 2P : Right only  AX or AL or AX+AL UVT or SHT or AX or AL or AX+AL	AX	1*	1*
		AL	1*	1*
		AX+AL	1*	1*
		SHT	-	1*
		UVT	-	1*
UTS150 UTS250	 AX AX AL UVT or SHT	AX	1	1
		AL	1	-
		SHT	1*	-
		UVT	1*	-
UTS400 UTS600	 AX AL UVT or SHT	AX	3	-
		AL	-	1
		SHT	1*	-
		UVT	1*	-
UTS800 UTS1200	 AX AL UVT or SHT	AX	-	3
		AL	-	1
		SHT	-	1*
		UVT	-	1*

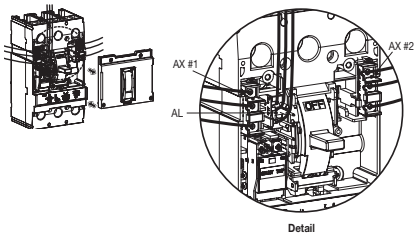
* Applicable in indicated pole position-not synchronous

ACCESSORY CONNECTIONS

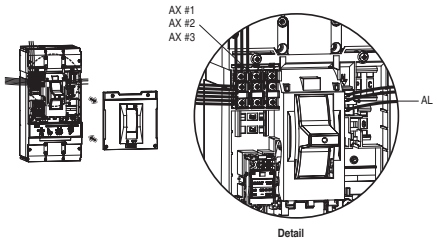
Electrical accessories are fitted with numbered terminal blocks for wires. Auxiliary circuit wiring exits fixed mounted devices through a knock-out in the front cover. The internal accessories comply with requirements of Underwriters Laboratories® Inc. UL 489 Standards



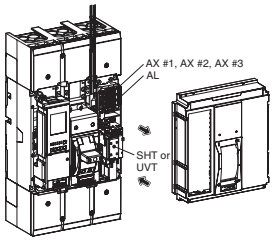
UTE100



UTS150/250



UTS400/600



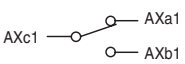
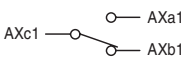
UTS800/1200

AUXILIARY SWITCH (AX) AND ALARM SWITCH (AL)

Auxiliary switches provide remote information of the circuit breaker status and can be used for indications, electrical locking, relays, etc.

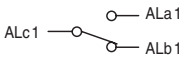
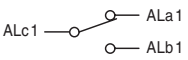
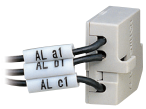
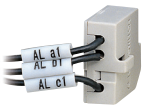
AUXILIARY SWITCH (AX):

Indicates the position of the circuit breaker contacts(Open/Closed)
Auxiliary switch is for applications requiring remote “ON” and “OFF” indication.
Each switch contains two contacts having a common connection.
One is open and the other closed when the circuit breaker is open, and vice-versa.

AX	BREAKER TYPE	WIRE SIZE	ON	OFF/TRIP
	UTE100	24 AWG (0.2 mm^2)		
	UTS150 UTS250 UTS400 UTS600	20 AWG (0.52 mm^2)		
	UTS800 UTS1200	19~16 AWG (0.65~1.31 mm^2)		

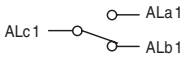
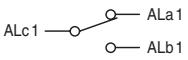
ALARM SWITCH (AL):

Alarm switches indicate that the circuit breaker has tripped due to an overload, short circuit, shunt trip, or undervoltage trip or the “push-to-trip” button.
They are particularly useful in automated plants where operators must be signaled about changes in the electrical distribution system. This switch features a closed contact when the circuit breaker is tripped automatically. In other words, this switch does not function when the breaker is operated manually. Its contact is open when the circuit breaker is reset.

AL	BREAKER TYPE	WIRE SIZE	ON/OFF	TRIP
	UTE100	24 AWG (0.2 mm^2)		
	UTS150 UTS250 UTS400 UTS600	26 AWG (0.13 mm^2)		
	UTS800 UTS1200	24 AWG (0.2 mm^2)		

FAULT ALARM SWITCH (FAL):

FAL Indicates that the breaker has tripped due to overload or short circuit.
And, it can be applied to only circuit breakers with electronic trip units.

FAL	BREAKER TYPE	WIRE SIZE	ON/OFF	TRIP
	UTS150 UTS250 UTS400 UTS600	26 AWG (0.13 mm^2)		

TECHNICAL DATA

Conventional thermal current Ith	5A				
Rated operational current Ie with rated operational voltage Ue	Voltage	Ie		Minimum load current	
		Resistance	Inductance		
- Alternating current 50/60Hz AC	125V	5	3	5V DC 160mA 30V DC 30mA	UTE100 UTS150 UTS250 UTS400 UTS600 UTS800 UTS1200
	250V	3	2		
	500V	-	-		
- Direct current DC	30V	4	3		
	125V	0.4	0.4		
	250V	0.2	0.2		

SHUNT TRIP (SHT) AND UNDERVOLTAGE TRIP (UVT) SWITCHES

A voltage release can be used to trip the circuit breaker via a control signal.

SHUNT TRIP (SHT):

The shunt trip opens the mechanism in response to an externally applied voltage signal. The releases include coil clearing contacts that automatically clear the signal circuit when the mechanism has tripped.

UTE100 SHT

CONTROL VOLTAGE, Ue		POWER CONSUMPTION		
		AC (VA)	DC (W)	mA
VOLTAGE	AC/DC 12V	0.35	0.36	30
	AC/DC 24V	0.64	0.65	27
	AC/DC 48V	1.09	1.1	23
	AC/DC 60V	1.2	1.22	20
	AC/DC 100~130V	0.73	0.75	5.8
	AC/DC 200~250V	1.21	1.35	5.4
	AC 380~450V	1.67	-	3.8
	AC 440~500V	1.68	-	3.5
Max.opening time		50ms (max.)		
Tightening torque of terminal screw		7.12 lb·in (0.8N·m)		
Operating voltage range		AC : 0.7~1.1Vn, DC : 0.8~1.1Vn		
Frequency		45Hz ~ 65 Hz (Only AC)		
Wire size		20 AWG (0.52 mm^2)		

UTE100 SHT

UTS150/250/400/600 SHT

CONTROL VOLTAGE, Ue		POWER CONSUMPTION		
		AC (VA)	DC (W)	mA
VOLTAGE	DC 12V	-	0.36	30
	AC/DC 24V	0.58	0.58	24
	AC/DC 48V	1.22	1.23	25
	AC/DC 110~130V	1.36	1.37	10.5
	AC 220~240V/DC 250V	1.8	1.88	7.5
	AC 380~500V	1.15	-	2.3
Max.opening time		50ms (max.)		
Tightening torque of terminal screw		7.12 lb·in (0.8N·m)		
Operating voltage range		0.7~1.1Vn		
Frequency		45Hz ~ 65 Hz (Only AC)		
Wire size		20 AWG (0.52 mm^2)		

UTS150/250/400/600 SHT

UTS800/1200 SHT

CONTROL VOLTAGE, Ue		OPERATING VOLTAGE RANGE	POWER CONSUMPTION (VA or W)	
			INRUSH	STEADY-STATE
VOLTAGE	DC 24~30V	0.6~1.1Vn	200	5
	AC 48V/DC 48~60V	0.6~1.1Vn		
	AC/DC 100~130V	0.56~1.1Vn		
	AC/DC 200~250V	0.56~1.1Vn		
	AC 380~480V	0.56~1.1Vn		
Max.opening time		40ms (max.)		
Frequency		45Hz~65Hz (Only AC)		
Wire size		16 AWG (1.31mm^2)~14 AWG (2.08mm^2)		

UTS800/1200 SHT

UNDERVOLTAGE TRIP (UVT) :

The undervoltage release automatically opens a circuit breaker when voltage drops to a setting value of the line voltage. The operation is instantaneous, and after tripping, the circuit breaker cannot be re-closed again until the voltage returns to a recover value of line voltage.
Continuously energized, the undervoltage release must be operating before the circuit breaker can be closed.

UTE100 UVT

CONTROL VOLTAGE, Ue		POWER CONSUMPTION		
		AC (VA)	DC (W)	mA
VOLTAGE	AC/DC 24V	0.64	0.65	27
	AC/DC 48V	1.09	1.1	23
	AC/DC 100~110V	0.73	0.75	5.8
	AC/DC 200~220V	1.21	1.35	5.4
	AC 380~440V	1.67	-	3.8
	AC 440~480V	1.68	-	3.5
Max.opening time		50ms (max.)		
Tightening torque of terminal screw		7.12 lb·in (0.8N·m)		
Operating voltage range	Trip	0.2~0.7Vn		
	Reset/Closing	≥ 0.85Vn		
Freauency		45Hz ~ 65Hz (Only AC)		
Wire size		20 AWG (0.52 mm^2)		

UTE100 UVT

UTS150/250/400/600 UVT

CONTROL VOLTAGE, Ue		POWER CONSUMPTION		
		AC (VA)	DC (W)	mA
VOLTAGE	AC/DC 24V	0.64	0.65	27
	AC/DC 48V	1.09	1.1	23
	AC/DC 110~130V	0.73	0.75	5.8
	AC 220~240V/DC 250V	1.21	1.35	5.4
	AC 380~440V	1.67	-	3.8
	AC 440~480V	1.68	-	3.5
Max.opening time		50ms (max.)		
Tightening torque of terminal screw		7.12 lb·in (0.8N·m)		
Operating voltage range	Trip	0.35~0.7Vn		
	Reset/Closing	≥ 0.85Vn		
Frequency		45Hz ~ 65 Hz (Only AC)		
Wire size		20 AWG (0.52 mm^2)		

UTS150/250/400/600 UVT

UTS800/1200 UVT

CONTROL VOLTAGE, Ue		POWER CONSUMPTION (VA or W)		MAX.OPENING TIME (ms)
		INRUSH	STEADY-STATE	
VOLTAGE	DC 24~30V	200	5	50ms (max.)
	AC 48V/DC 48~60V			
	AC/DC 100~130V			
	AC/DC 200~250V			
	AC 380~480V			
Operating voltage range	Trip	0.44~0.6Vn		
	Reset/Closing	0.65~0.85Vn		
Frequency		45Hz~65Hz (Only AC)		
Wire size		16 AWG (1.31mm^2)~ 14 AWG (2.08mm^2)		

UTS800/1200 UVT

LOCKING SYSTEMS OVERVIEW

PADLOCKING DEVICE

Padlocking device is available for to UTE100 from UTS1200 circuit breakers. The locking device is designed to be easily attached to the circuit breaker. This device allows the handle to be locked in the “OFF” position. The locking device for the toggle handle can be installed in circuit breakers.
Maximum three (3) padlocks with shackle diameters of 0.19~0.31 in. (5~8mm) may be used. (Padlocks are not supplied.)

DESCRIPTION	CIRCUIT BREAKERS	FUNCTION
PL0	UTE100	Lock in “OFF” position
PL2	UTS150/250	
PL3	UTS400/600	
PL5	UTS800/1200	

Pad Lock

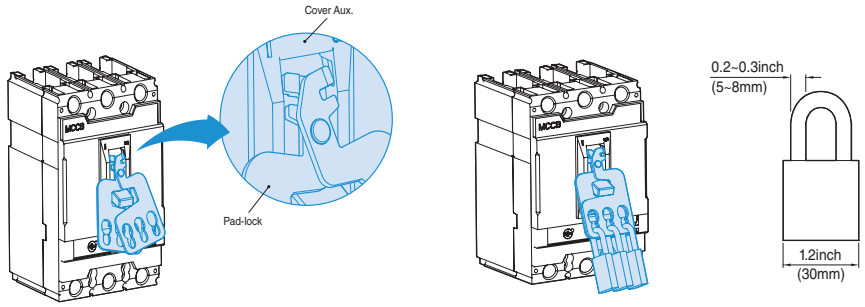
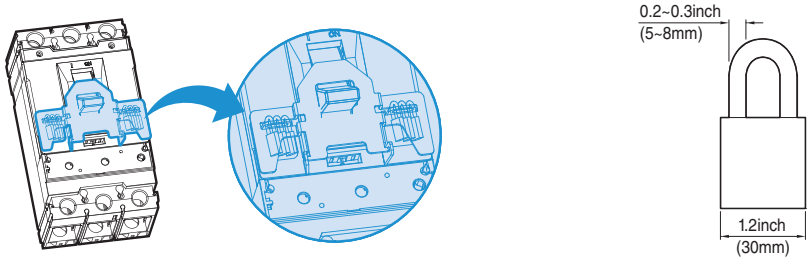


PLATE HANDLE LOCKING DEVICE

Fixed Plate Handle locking device is available for to UTE100 from UTS1200 circuit breakers. This device allows the handle to be locked in the “ON” and “OFF” position. The locking device for the toggle handle can be installed in 2-pole and 3-pole circuit breakers. Maximum three (3) padlocks with shackle diameters ranging from 0.19 to 0.31in (5~8mm) may be used. (Plate handle locks are not supplied)

DESCRIPTION	CIRCUIT BREAKERS	FUNCTION
PHL0	UTE100	Lock in “OFF” or “ON” position
PHL2	UTS150/250	
PHL3	UTS400/600	
PHL5	UTS800/1200	

Plate Handle Lock



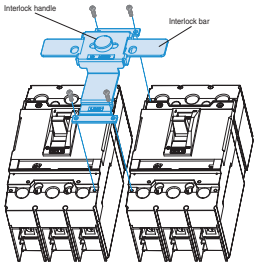
INTERLOCKING SYSTEMS OVERVIEW

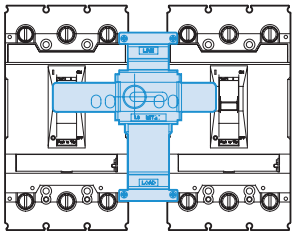
MECHANICAL INTERLOCKING DEVICE

The mechanical interlock (MIT) can be applied on the front of two breakers mounted side by side, in either the 2-pole or 3-pole version and prevents simultaneous closing of the two breakers. Fixing is carried out directly on the cover of the breakers. The front interlocking plate allows installation of a padlock in order to fix the position. (Possibility of locking in the O-O position as well) This mechanical interlocking device is very useful and simple for consisting of manual source-changeover system.

DESCRIPTION	CIRCUIT BREAKERS	POLE
MIT03	UTE100	3
MIT23	UTS150/250	2 or 3
MIT33	UTS400/600	2 or 3
MIT53	UTS800/1200	3

Mechanical Interlock



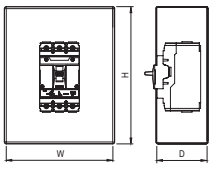


ENCLOSURE DIMENSIONS OVERVIEW

The short circuit rating of an enclosed circuit breaker is equal to the rating of the circuit breaker installed, except as footnoted.
Circuit breakers are ordered and shipped separately for field installation

ENCLOSURE DIMENSIONS

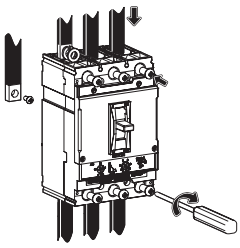
CIRCUIT BREAKER	AMPERAGE	ENCLOSURE DIMENSIONS (W X H X D) inch (mm)	
		80%	100%
UTE100	15~100A	8.27 (210) X 17.3 (439.4) X 4.0 (101.6)	
UTS150	40~150A	8.58 (218) X 18.11 (460) X 4.02 (102)	
UTS250	150~250A	12.13 (308) X 28.5 (724) X 5.35 (136)	
UTS400	250~400A	13.78 (350) X 40.16 (1020) X 5.98 (152)	13.78 (350) X 40.16 (1020) X 7.17 (182)
UTS600	500~600A	13.78 (350) X 40.16 (1020) X 5.98 (152)	14.17 (360) X 41.34 (1050) X 7.17 (182)
UTS800	400~800A	20.25 (514.4) X 51.9 (1318.3) X 7.75 (196.9)	
UTS1200	800~1200A	20.25 (514.4) X 51.9 (1318.3) X 7.75 (196.9)	23.0 (584.2) X 62.25 (1581.2) X 14.75 (374.7)



Enclosure Dimensions

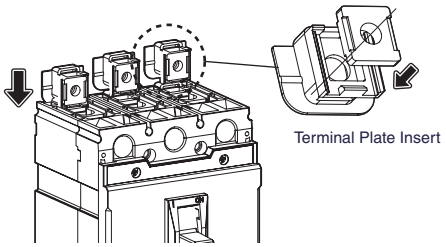
BUSBAR CONNECTIONS OVERVIEW

To UTE100 from UTS250 frame circuit breakers may be equipped with captive nuts and screws for direct connection to bars.
Terminal plates are needed for replacement of lug connections with busbar connections.
And to UTS400 from UTS1200 frame circuit breakers may be equipped without terminal plates



TERMINAL PLATE FOR BUSBAR CONNECTION OF UTE100, UTS150 AND UTS250 CIRCUIT BREAKERS

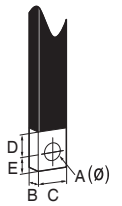
DESCRIPTION	CIRCUIT BREAKERS	TOOL	QTY PER KIT	TORQUE
Terminal Plate,UTE100-2P **Terminal Plate,UTE100-3P**	UTE100	+Driver	2 3	15.2 lb-in (1.72 N•m)
Terminal Plate,UTS150-2P **Terminal Plate,UTS150-3P**	UTS150	+Driver	2 3	50 lb-in (5.64 N•m)
Terminal Plate,UTS250-2P **Terminal Plate,UTS250-3P**	UTS250	Hex 1/4 inch	2 3	117.8 lb-in (13.3 N•m)



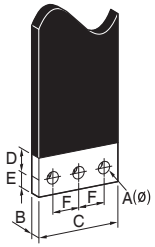
BUSBAR DIMENSION OF TO UTE100 FROM UTS1200 CIRCUIT BREAKER

Dimensions: inch(mm)

CIRCUIT BREAKERS	A	B	C	D	E	F
UTE100	0.2(5.1)	0.08~0.28(2~7.2)	0.35(9)	0.32(8)	0.26(6.5)	-
UTS150	0.26 (6.5)	0.122~0.24 (3.1~6)	0.51~0.63 (13~16)	0.49 (12.5)	0.31 (8)	-
UTS250	0.33 (8.5)	0.122~0.31 (3.1~8)	0.51~0.79 (13~20)	0.98 (25)	0.31 (8)	-
UTS400	0.39 (10)	0.118~0.31 (3~8)	1.26 (32)	1.18 (30)	0.55 (14)	-
UTS600	0.39 (10)	0.118~0.47 (3~12)	1.26 (32)	1.18 (30)	0.55 (14)	-
UTS800	0.35 (9)	0.26~0.31 (6.5~8)	2.52 (64)	1.18 (30)	0.59 (15)	0.98 (25)
UTS1200	0.43 (11)	0.31~0.39 (8~10)	3.03 (77)	1.18 (30)	0.59 (15)	0.98 (25)



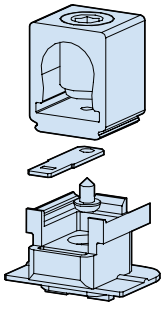
UTE100~UTS600



UTS800~UTS1200

CONTROL WIRE TERMINAL FOR MECHANICAL LUGS AND TERMINAL PLATE

Mechanical lugs may be equipped with a separate control wire terminal. The kit is available as a field installable kit. The adaptor is secured underneath the lug and has a tab extension suitable for attachment of a 1/4 inch slip-on connector.
Fully insulated type connectors must be used to prevent live parts from extending into the wiring gutter area.

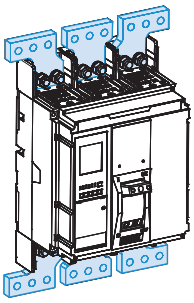


DESCRIPTION	CIRCUIT BREAKERS	QTY PER KIT
Control wire Terminal CWT	UTS150/250	2

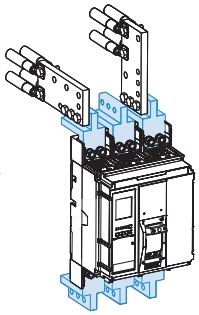
BUSBAR CONNECTIONS

Fixed, front-connection busbars are equipped with terminals comprising captive screws for direct connection of bars. Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch.

DESCRIPTION	CIRCUIT BREAKERS	POLE
SP2b3a	UTS250	2/3P
SP33a	UTS400/600	2/3P
SP53a SP53e SP53v	UTS800/1200	3P



Busbar(a)

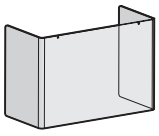


Extension Busbar(e)
Vertical Busbars(v)

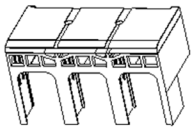
TERMINAL COVER

Mounted on fixed, front-connection devices, it insulates power-connection points.

DESCRIPTION	CIRCUIT BREAKERS	POLE
ITU5a3	UTS800	3P
ITU5b3	UTS1200	
ITL53	UTS800/1200	



Terminal Cover ITL53

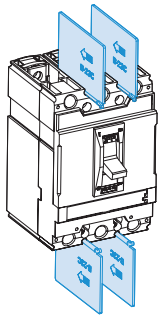


Terminal Cover ITS5b3

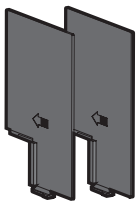
INSULATION BARRIER

These barriers are insulated between the phases for increase insulation level. The barriers can be easily installed, even on breakers that are already mounted, by inserting them into the corresponding slots. They are incompatible with both the insulating terminal covers.
It is possible to mount the phase separating partitions between two side by side circuit breakers.

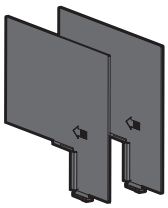
DESCRIPTION	CIRCUIT BREAKERS	POLE
B13	UTE 100	2/3P
B23	UTS150 UTS250	2/3P
B33	UTS 400 UTS600	2/3P
B53 **BR53** **BE53**	UTS800/1200	3P



Standard Type

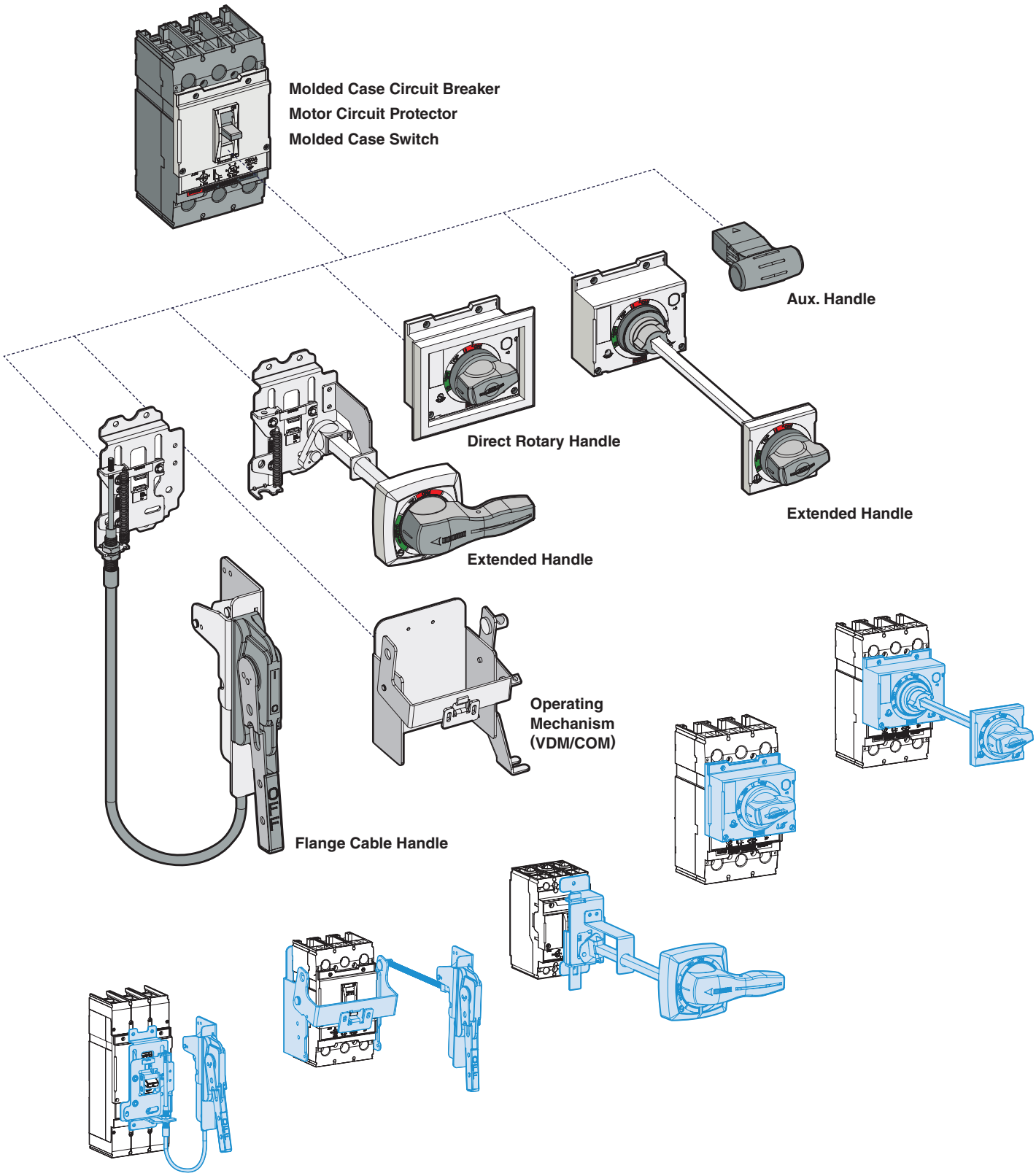


Standard Type(B53)



Extended Type(BE53)

HANDLES


Molded Case Circuit Breaker
Motor Circuit Protector
Molded Case Switch
Aux. Handle
Direct Rotary Handle
Extended Handle
Extended Handle
Operating
Mechanism
(VDM/COM)
Flange Cable Handle

HANDLE MECHANISMS OVERVIEW

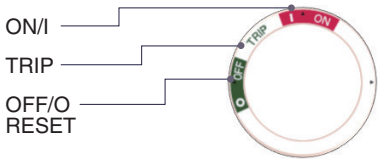
All kinds of handles are suitable for field installation in LSIS molded case circuit breakers, molded case switches and motor circuit protectors. These are directly mounted rotary, door mounted and flange handles for installation of above noted products for 2 and 3 poles. In case of extended rotary handle, Base assembly should be installed to circuit breaker, Handle should be mounted on panel door and they are interconnected by shaft. In case of flange mounting rotary handle, Base assembly should be installed to circuit breaker, Handle should be mounted on panel door and they are connected by cable.

CONSTRUCTION DETAIL:

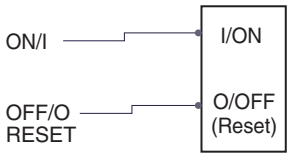
Corrosion Protection:

All iron and steel parts are protected against corrosion by painting or equivalent means.

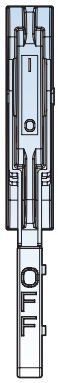
Handle indication Making: The following making are provided



[Rotary type]



[Flange type]



CAUTON Markings:

The following markings are provided:

SELECTION FOR HANDLES

• Catalog Numbering [Product Selection]

EHU **0** **12**

DESCRIPTION	
EHU	Extended Hatndle (Type 1,12)
EHV	Extended Handle (Type 3,3R,4)
EHX	Extended Handle (Type 3,4,4X)
FHU	Flange Mounting Handle (Type 1, 12, 3, 3R, 4)
FHX	Flange Mounting Handle (Type 4, 4X)
REH	Extended Rotary Handle (Type 1)
DH	Direct Rotary Handle(Type 1)
DHK	Direct Rotary Handle Keylock type(Type 1)
VDM	Variable Depth Mechanism
COM	Cable Operating Mechanism

MODEL SIZE PER CIRCUIT BREAKER FRAME	
0	100AF (for all type)
0C	100AF (for all type & Compact base)
2	150/250 AF (for all type)
3	400/600 AF (for all type)
5	800/1200 AF (for all type)
S	Standard Type (for Flange handle)
L	Long type (for Flange handle)

SHAFT & CABLE SIZE PER HANDLES	
12	12inch (Shaft)
16	16inch (Shaft)
24	24inch (Shaft)
36	36inch (Cable)
48	48inch (Cable)
60	60inch (Cable)
72	72inch (Cable)
84	84inch (Cable)
120	120inch (Cable)
BLANK	No type

APPLICATION FOR HANDLES

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations-Directly mounted, Door mounted and Flange mounted for providing safe, easy installation and dependable operation.

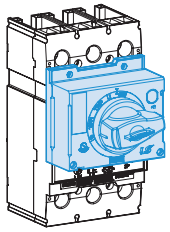
OPERATION HANDLE TYPE NAME	APPLIED TO UL489 MCCB/MCS	
	CIRCUIT BREAKER & SWITCH	TYPE
EHU0-12~24 EHV0-12~24 EHX0-12~24 EHU0C-12~24 EHV0C-12~24 EHX0C-12~24 REH0-12~24 REH0C-12~24 DH0 VDM0, FHU-S VDM0, FHX-S COM0, FHU-S COM0, FHX-S	MCCB	UTE100 (100AF, 2 or 3Pole)
	MCS	UTE100 (100AF, 3Pole)
EHU2-12~24 EHV2-12~24 EHX2-12~24 FHU2-36~72 FHX2-36~72 REH2-12~24 DH2 DHK2 VDM2, FHU-S VDM2, FHX-S COM2, FHU-S COM2, FHX-S	MCCB MCP	UTS150 (150AF, 2 or 3 Pole)
		UTS250 (250AF, 2 or 3 Pole
	MCS	UTS150 (150AF, 3 Pole)
		UTS250 (250AF, 3 Pole)
EHU3-12~24 EHV3-12~24 EHX3-12~24 FHU3-36~72 FHX3-36~72 REH3-12~24 DH3 DHK3 VDM3, FHU-L VDM3, FHX-L COM3, FHU-L COM3, FHX-L	MCCB MCP	UTS400 (400AF, 2 or 3 Pole)
		UTS600 (600AF, 2 or 3 Pole)
	MCS	UTS400 (400AF, 3 Pole)
		UTS600 (600AF, 3 Pole)
EHU5-12~24 EHV5-12~24 EHX5-12~24 REH5-12~24 DH5 DHK5 VDM5, FHU-L VDM5, FHX-L COM5, FHU-L COM5, FHX-L	MCCB MCP	UTS800 (800AF, 3 Pole)
		UTS1200 (1200AF, 3 Pole)
	MCS	UTS800 (800AF, 3 Pole)
		UTS1200 (1200AF, 3 Pole)

MCCB: Molded Case Circuit Breaker
MCP: Motor Circuit Protector
MCS: Molded Case Switch

ROTARY OPERATING HANDLES

DIRECTLY MOUNTED ROTARY OPERATING HANDLE

The directly mounted rotary operating handle replaces the circuit breaker front accessory cover. UTE100 don't need to replace the front cover.



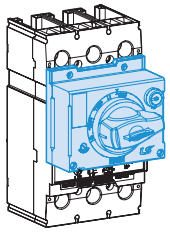
Directly Mounted Rotary Operating Handle

The direct rotary handle maintains:
- Suitability for isolation
- Indication of three positions: I (ON), Tripped and O (OFF)
- Access to the "push-to-trip" button
- Visibility of, and access to, trip unit settings
- The circuit breaker may be locked in the ON/OFF position by using padlock (not supplied)

MODELS

- Standard with dark gray handle
- Field installable (secured by screws)

UTE 100	UTS150/250	UTS 400/600	UTS 800/1200
DH-0	DH-2	DH-3	DH-5



Directly Mounted Rotary Operating Handle with key lock.

- Field installable with Key lock (secured by screws)

UTS150/250	UTS400/600	UTS800/1200
DHK-2	DHK-3	DHK-5

Accessories transform the standard direct rotary handle for the following situations:
- Opening of door prevented when circuit breaker is on
- Closing of circuit breaker inhibited when door is open

STANDARDS

The directly-mounted rotary operating handle is UL Listed under file E223241
Degree of protection NEMA Type 1

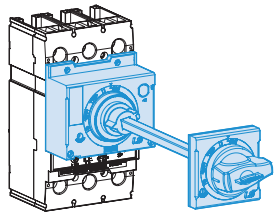
ROTARY OPERATING HANDLES

EXTENDED (DOOR-MOUNTED) ROTARY OPERATING HANDLE

The extended rotary operating handle replaces the front accessory cover of the circuit breaker (secured by screws). UTE100 don't need to replace the front cover.

The extended rotary operating handle consists of:

- A handle assembly with front plate on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally
- An adjustable extension shaft
- The handle mechanism can be used in NEMA Type 1 enclosure applications

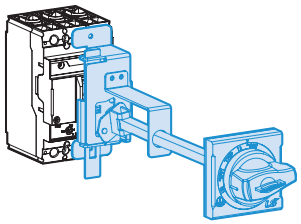


Door-Mounted Rotary Operating Handle (REH-0, 2, 3, 5)

The extended rotary operating handle makes it possible to operate circuit breakers installed in enclosure from the front.

- Suitability for isolation
- Indication of the three positions OFF (O), ON (I) and tripped
- Visibility of and access to trip unit settings when the door is open
- Degree of protection: NEMA Type 1
- Defeatable interlock prevents opening of door when circuit breaker is on

The circuit breaker may be locked in the off position by using padlock, padlock shackle diameter 0.2~0.3 inch(5~8mm); padlocks are not supplied; locking prevents opening of the enclosure door



Door-Mounted Rotary Operating Handle (REH-0C)

MODELS

- Standard with dark gray handle
- Field installable (secured by screws)

UTE 100		UTS150/250	UTS 400/600	UTS 800/1200
REH-0	REH-0C	REH-2	REH-3	REH-5

The shaft length is the distance between the back of the circuit breaker and the door:

- Minimum mounting depth is 5.51 in. (140 mm) in UTE100
- Minimum shaft length is 12 in. (305 mm) with standard shaft
- Maximum shaft length is 24 in. (600 mm) with long shaft
- Extended shaft length must be adjusted

STANDARDS

The door-mounted rotary operating handle is UL Listed under file E223241
Degree of protection NEMA Type 1

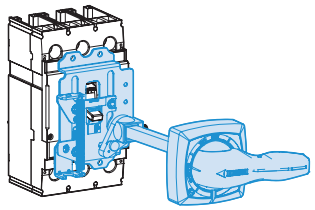
NEMA DOOR-MOUNTED ROTARY OPERATING HANDLE

The extended rotary operating handle consists of:

- A mounting plate that provides a rotary actuator for a standard toggle circuit breaker
- Handle assemblies available for NEMA Type 1, 12, 3, 3R, 4, 4X
- Available in standard or long (12~24 in.) handle assemblies

The door mounted operating handle makes it possible to operate circuit breakers installed in enclosure from the front.

- Indication of three positions: I (ON), Tripped and O (OFF) : NEMA Type 1, 12
- Provides ON (I) and OFF (O) indication : NEMA Type 3, 3R, 4, 4X
- The circuit breaker may be locked in the ON/OFF position

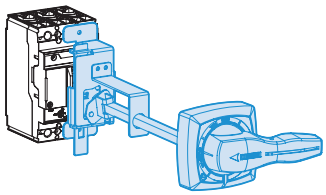


Door Mounted rotary operating handle
[EHU, V, X-0, 2, 3, 5]

MODELS

- Standard with dark gray handle(NEMA Type 1, 12)
- Out door with black handle(NEMA Type 3, 3R, 4, 4X)
- Field installable (secured by screws)

UTE100		UTS150/250	UTS 400/600	UTS 800/1200
EHU-0	EHU-0C	EHU-2	EHU-3	EHU-5
EHV-0	EHV-0C	EHV-2	EHV-3	EHV-5
EHX-0	EHX-0C	EHX-2	EHX-3	EHX-5



Door Mounted rotary operating handle
[EHU, V, X-0C]

The shaft length is the distance between the back of the circuit breaker and door:

- Minimum mounting depth is 5.51 in. (140mm) in UTE 100
- Minimum shaft length is 12 in. (305mm) with long shaft
- Minimum shaft length is 24 in. (600mm) with long shaft
- Extended shaft length must be adjusted

STANDARDS

The door-mounted rotary operating handle is UL Listed under file E223241
Degree of protection NEMA Type 1, 12, 3, 3R, 4, 4X

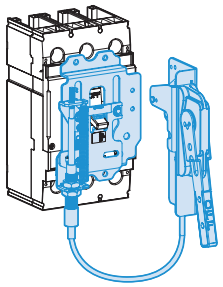
FLANGE HANDLE

FLANGE HANDLE WITH SLIDING OPERATING MECHANISM

Flange handle with sliding operating mechanism is for use with cable

The cable operator maintains:
- Suitability for isolation
- Indication of two positions: O (OFF) and I (ON)
- The circuit breaker may be locked in the off position by one to three padlocks
- Door can be locked closed due to interlocking features of the handle operator
- Operating Mechanism has one type
  - Cable operating type with sliding mechanism

Handle is mounted on flange of enclosure using specified mounting dimensions while circuit breaker and operating mechanism are mounted to inside of enclosure using screws
- Handles are available in FHU (NEMA Type 1,12, 3, 3R, 4) and FHX (NEMA Type 4, 4x)
- All circuit breaker operating mechanisms are suitable for right-hand flange mounting on the job.

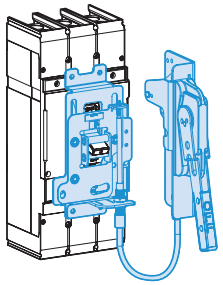


Flange handle with sliding operating mechanism and Cable [FHU-2, FHX-2]

MODELS

- Standard with painted handle (NEMA Type 1,12, 3, 3R,4)
- Out door with nickel plating handle (NEMA Type 4, 4X)
- Field installable (secured by screws)

UTE100	UTS150/250	UTS 400/600	UTS 800/1200
-	FHU-2 FHX-2	FHU-3 FHX-3	-



Flange handle with sliding operating mechanism and Cable [FHU-3, FHX-3]

FHU : Standard type handle (NEMA Type1, 12, 3, 3R, 4) with sliding mechanism and without cable
FHX : Outdoor type handle (NEMA Type 4, 4X) with sliding mechanism and without cable
Cable : Only cable

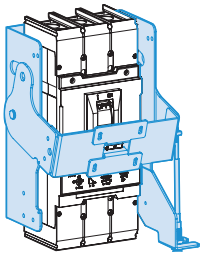
- Cable lengths available in 36~72 in. to UTS600 from UTS150 lengths to accommodate a variety of mounting locations

STANDARDS

Flange cable operating handle is UL Listed under file E223241
NEMA Type 1, 12, 3, 3R, 4, 4X

FLANGE-MOUNTED CABLE OPERATING MECHANISM

Flange-mounted handle cable operating mechanism is for use with FH or COM Type handle operators especially designed for tall, deep enclosures where placement flexibility is required.



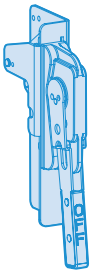
Cable Operating Mechanism without Handle and cable

The cable operator maintains:

- Suitability for isolation
- Indication of two positions: O (OFF) and I (ON)
- The circuit breaker may be locked in the off position by one to three padlocks
- Door can be locked closed due to interlocking features of the handle operator
- Operating Mechanism has one type
  - COM : Cable operating type with handle operator
- Handle operators (FHU, FHX)

Handle is mounted on flange of enclosure using specified mounting dimensions while circuit breaker and operating mechanism are mounted to inside of enclosure using screws

- Handles are available in COM and FHU NEMA Type 1,12, 3, 3R, 4 and FHX NEMA Type 4, 4x
- All circuit breaker operating mechanisms are suitable for right-hand flange mounting on the job.
- COM frame operating mechanism does not include cable.

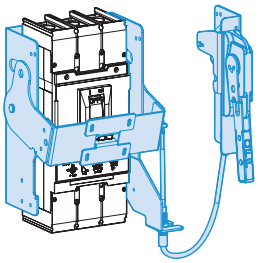


Flange Handle
[FHU, X-S, L]

MODELS

- Standard with painted handle(NEMA Type 1, 12, 3, 3R, 4): FHU
- Out door with nickel plating handle(NEMA Type 4, 4X): FHX
- Field installable (secured by screws)

UTE100	UTS150/250	UTS400/600	UTS800/1200
FHU-S FHX-S COM-0	FHU-S FHX-S COM-2	FHU-L FHX-L COM-3	FHU-L FHX-L COM-5



Handle with cable and Cable operating mechanism [COM-0, 2, 3, 5]

FHU-S, FHX-S : Standard type handle with operating mechanism
FHU-L, FHX-L : Long type handle with operating mechanism
COM : Cable operating mechanism with handle and without cable
Cable : only cable

CABLE TYPE

CABLE LENGTHS [inch]	UTE100 UTS150 UTS250	UTS400 UTS600	UTS800 UTS1200
36	FH2-36	FH4-36	-
48	FH2-48	FH4-48	-
60	FH2-60	FH4-60	FH5-60
72	FH2-72	FH4-72	-
84	-	-	FH5-84
120	-	-	FH5-120

Cable
[FH2, 4, 5-36~120]

- Cable lengths available in 36~72 in. to UTS600 from UTS150 and 60~128 in. to UTS1200 from UTS800 lengths to accommodate a variety of mounting locations

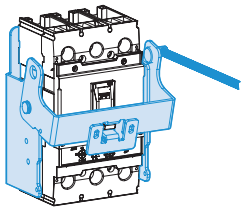
STANDARDS

Flange cable operating handle is UL Listed under file E223241
NEMA Type 1, 12, 3, 3R, 4, 4X

FLANGE HANDLE

FLANGE-MOUNTED VARIABLE DEPTH OPERATING MECHANISM

Designed for installation in custom built control enclosures where main or branch circuit protective devices are required.

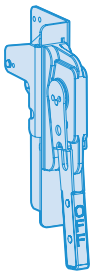


Variable-Depth operating Mechanism with Threaded-rod

The variable depth operator maintains:
- Suitability for isolation
- Indication of two positions: O (OFF) and I (ON)
- The circuit breaker may be locked in the off position by one to three padlocks
- Door can be locked closed due to interlocking features of the handle operator
- Operating Mechanism has one type

- VDM : Variable depth type with handle operator

- Handle operators(FHU, FHX)
- Threaded-rod has only one type

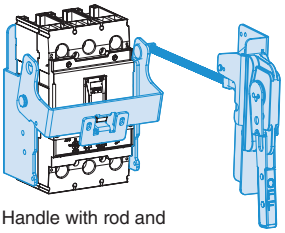


Flange Handle [FHU, X-S, L]

Handle is mounted on flange of enclosure using specified mounting dimensions while circuit breaker and
operating mechanism are mounted to inside of enclosure using screws
- Handles are available in VDM and FHU NEMA Type 1,12, 3, 3R, 4 and FHX NEMA Type 4, 4x
- All circuit breaker operating mechanisms are suitable for right-hand flange mounting on the job.
- VDM frame operating mechanism includes handle operator.

MODELS

- Standard with painted handle(NEMA Type 1,12,3,3R,4)
- Out door with nickel plating handle(NEMA Type 4, 4X)
- Field installable(secured by screws)

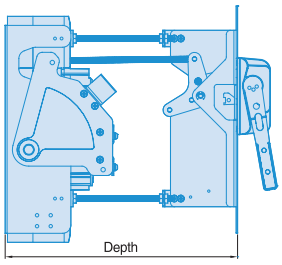


Handle with rod and Variable-Depth operating Mechanism [VDM-0, 2, 3, 5]

UTE100	UTS150/250	UTS400/600	UTS800/1200
FHU-S FHX-S VDM-0	FHU- S FHX- S VDM-2	FHU-L FHX-L VDM-3	FHU-L FHX-L VDM-5

FHU-S, FHX-S : Standard type handle with operating mechanism
FHU-L, FHX-L : Long type handle with operating mechanism
VDM : Variable depth operating mechanism with threaded-rod and handle.

The variable mounting depth length is the distance between the back of the circuit breaker and the door:
- VDM frame variable mounting depth range: 8.0~21.26 in (203-540 mm).
- Threaded-rod length : 16 in. (406 mm)



Variable mounting depth range

STANDARDS

Flange variable depth operating handle is UL Listed under file E223241
NEMA Type 1, 12, 3, 3R, 4, 4X

REMOTE OPERATION

MOTOR OPERATOR

Motor operators can also be operated by manual. The motor drives a mechanism which switches UTS toggle handle to the “ON” and “OFF/RESET” positions.

MOP2U-L

MOP3U-L

- The manual actuator handle is located on the front of the cover.
- Manual or Automatic operation can be selected.
- Applicable to 2, 3pole breakers.
- Door can be locked closed due to interlocking features of the handle operator
- Operating Mechanism has one type
  - Cable operating type with sliding mechanism

The motor operator is an essential device for constructing a remote operated automatic source-changeover system to ensure a continuous supply of electrical power at following certain installations:

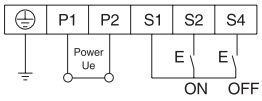
- Commercial sector: Hospital, Tall building, Bank, Insurance companies, Shopping centers
- Industry: Ships, Assembly lines at plant, Military sites, Port and Railway installation

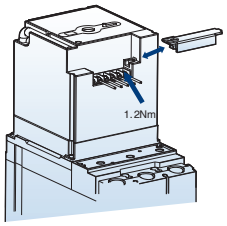
MCCB	Type	Control voltage (V)	Actuation current (A)	Response time (ms)		Consumption (W)	Mechanical service life (operations)	No. of operations per hour	Remarks
				Closing	Opening				
UTS150, 250	MOP2U	DC 24V AC 110V/DC 110V AC 230V/DC 220V	≤2.5A (DC 24V) ≤0.5A (AC)	350	230	14	25,000	120	
	MOP2U-L								Lock function
UTS400, 600	MOP3U	DC 24V AC 110V/DC 110V AC 230V/DC 220V	≤2.5A (DC 24V) ≤0.5A (AC)	500	350	35	20,000	60	
	MOP3U-L								Lock function

WIRING CONNECTION

Standard connection

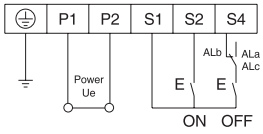
Circuit breaker On and Off controlled by remote operation and manual operation





Connection with alarm switch (AL)

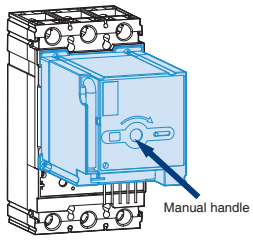
1) The below connection diagram is the method of using a alarm switch (AL) without shunt or undervoltage trip.
2) After clearing the fault surely, manual reset is mandatory in case of tripping due to an electrical fault.



MANUAL OPERATION

1) Insert the manual handle into the slot of Motor Operator surface and rotate it clockwise.
2) It must be rotated just 180° clockwise for safe operation of micro switch in the motor operator.
3) Return the manual handle after the manual operation
4) Turn the slide switch back to the position of AUTO.

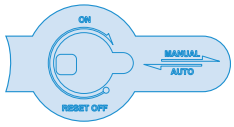
CAUTION: When the circuit breaker is tripped by trip button in the OFF status,
it is impossible to operate motor operator automatically It must be reset by manual operation.



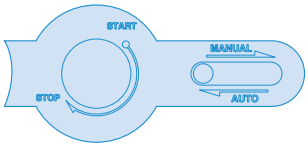
REMOTE OPERATION

AUTOMATIC OPERATION

1) Set the slide switch to AUTO, then internal power is closed automatically.
2) Operating frequency should be less than these below regulated values.
   UTS150N/H/L , UTS250N/H/L: 120 operations per hour
   UTS400N/H/L, UTS600N/H/L: 60 operations per hour
3) Use the ON/OFF switch in the range of regulated values.
4) It may interfere near communication equipments because of internal switching power supply.
   It's recommended that a noise filter be installed to power supply.
5) Please do not input ON/OFF signals at the same time during the automatic operation.
6) If the circuit breaker has a UVT attached inside, charge a UVT on the rated voltage before performing MOTOR OPERATOR.



[UTS150, 250]

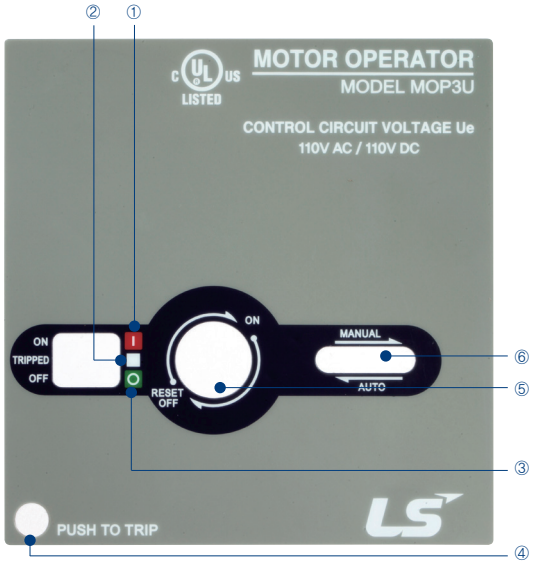


[UTS400, 630]

MOTOR OPERATOR

Feature

① On position indication (Red color)
② Trip position indication (White color)
③ Off position indication (Green color)
④ Button for push to trip
(available for only for UTS400AF and UTS600AF)
⑤ On/Off/Reset selection lever
⑥ Manual/Auto selection lever

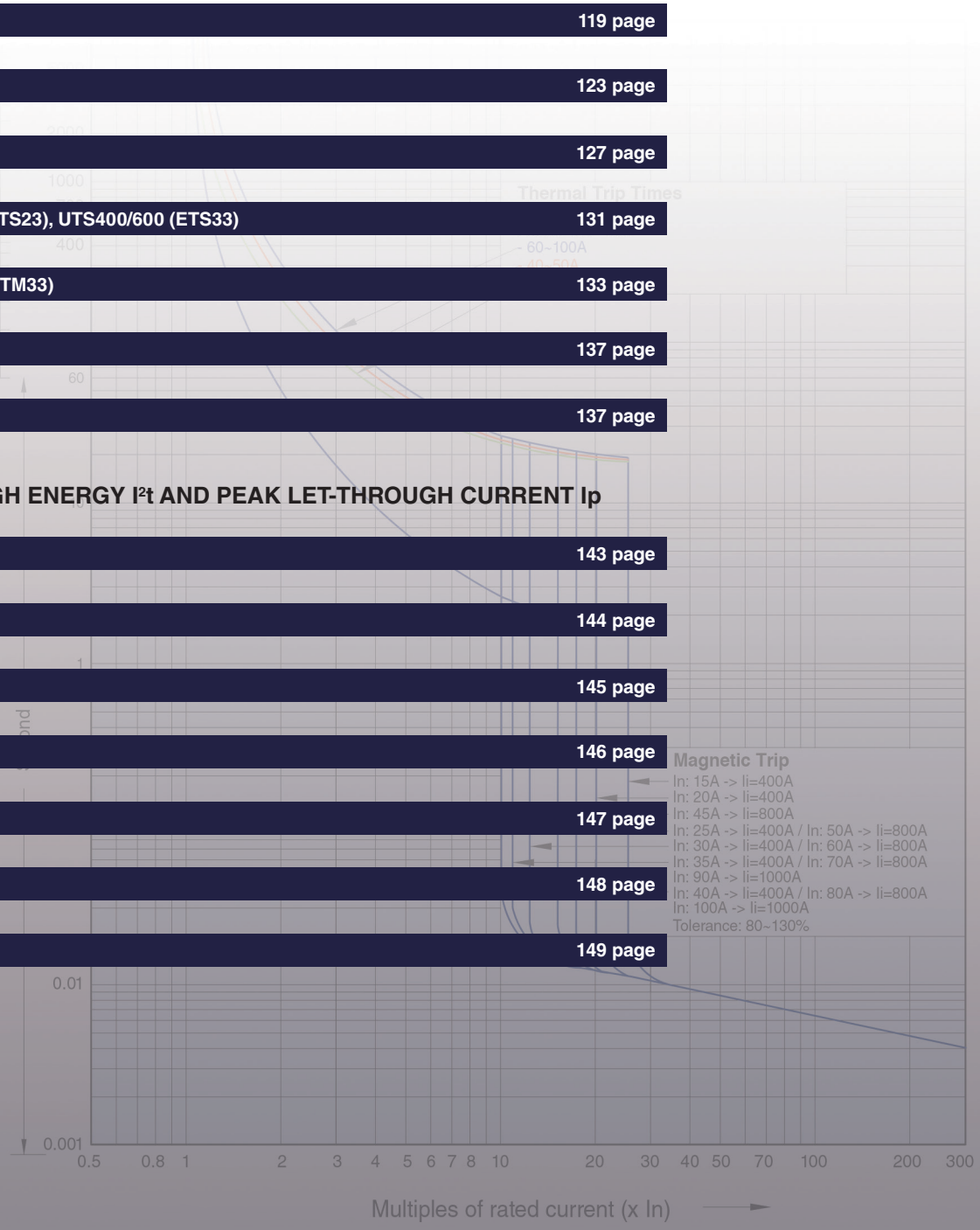


UTS150, 250 .... MOP2U

UTS400, 630 .... MOP3U

CHARACTERISTICS CURVES

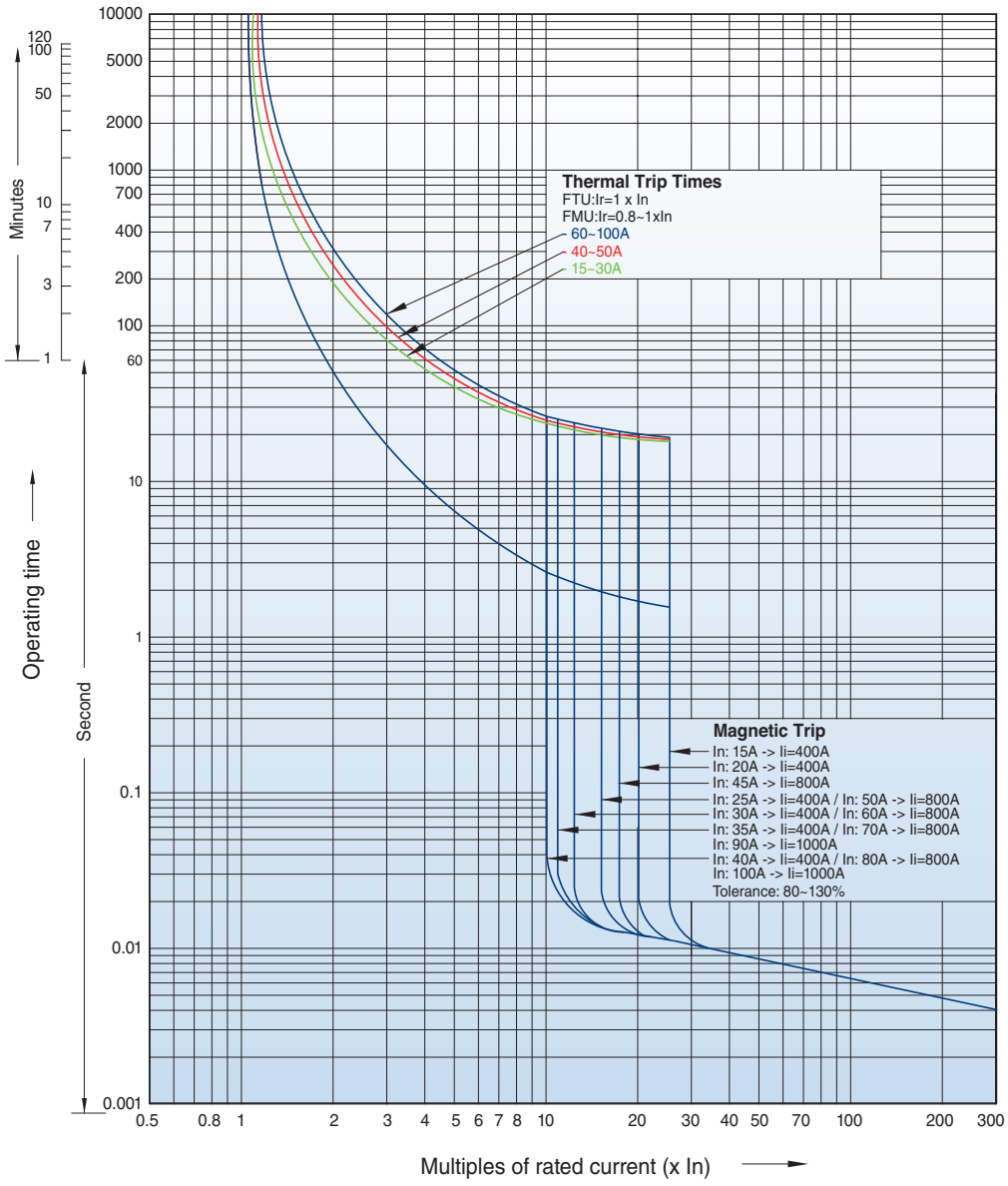
LET-THROUGH ENERGY I^2t AND PEAK LET-THROUGH CURRENT Ip



UTE100 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

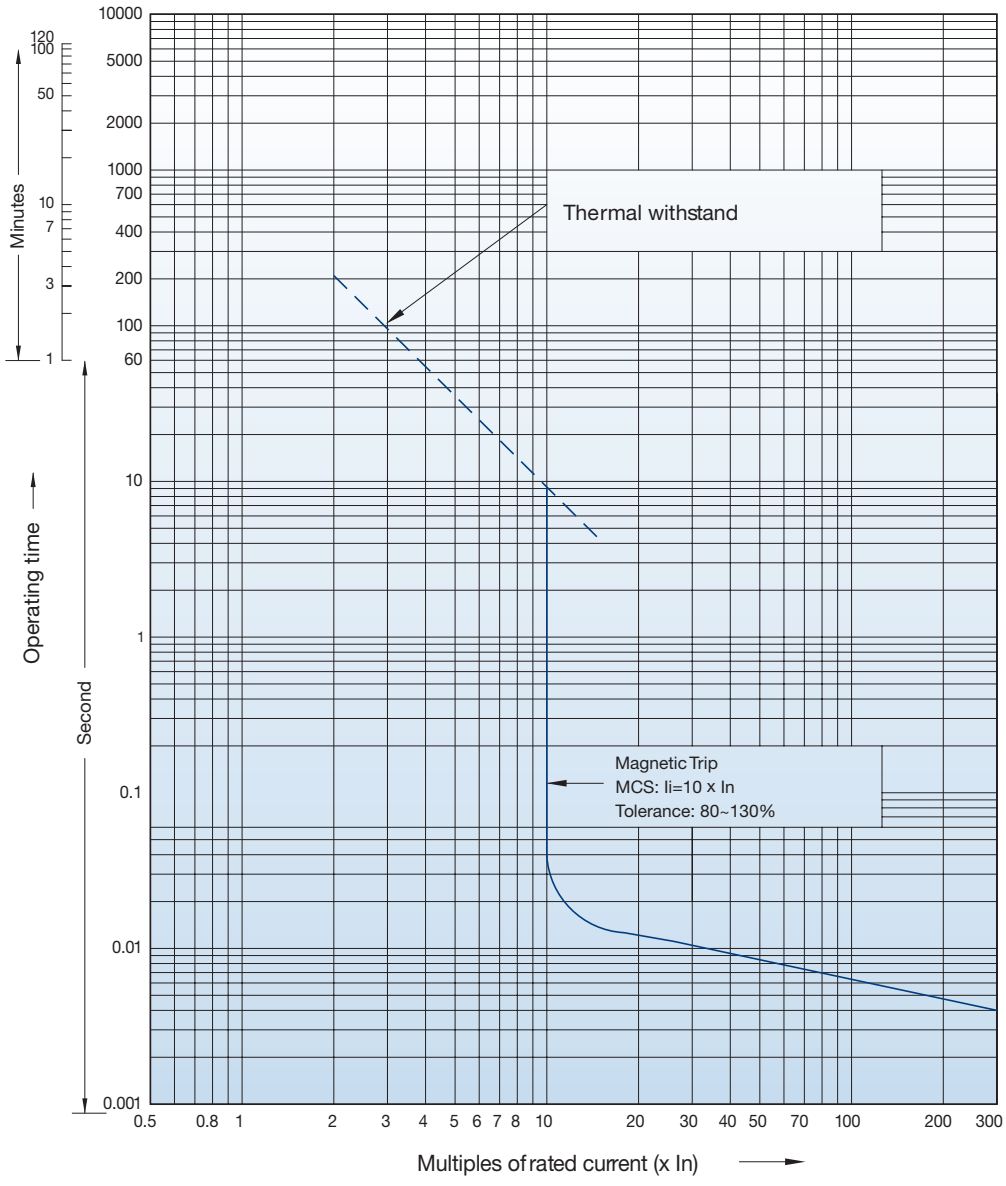
UTE100 FTU, FMU (15~100A)



RATING UTE100	FTU	
	2P/3P	MAG TRIP (80%~130%)
15	○	400A
20	○	
25	○	
30	○	
35	○	
40	○	
45	○	800A
50	○	
60	○	
70	○	
80	○	
90	○	1000A
100	○	

RATING UTE100	FMU		
	3P	RATING RANGE	MAG TRIP (80%~130%)
25	○	20~25A	400A
40	○	32~40A	
60	○	48~60A	800A
80	○	64~80A	
100	○	80~100A	1000A

UTE100 MCS (100A)

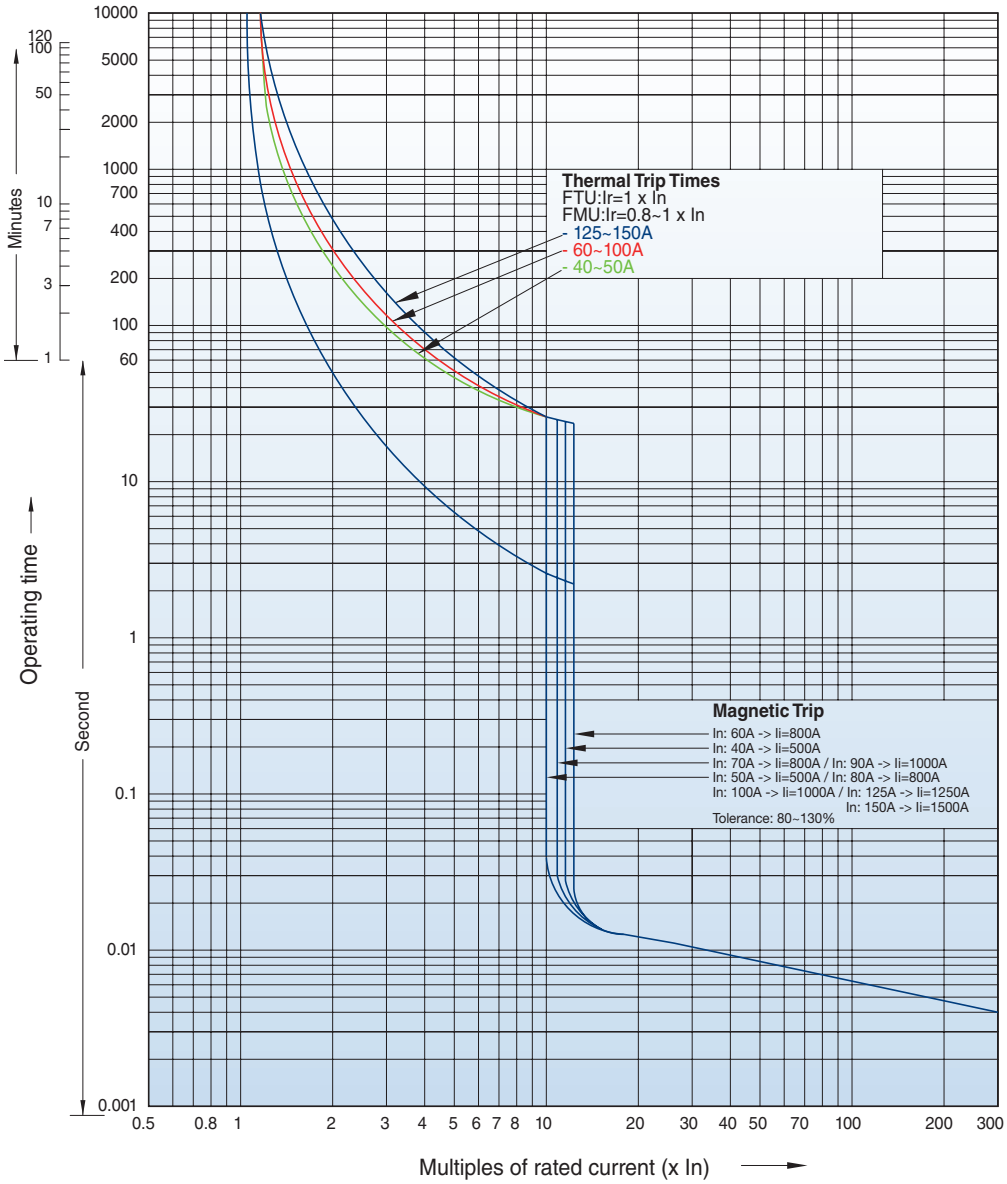


RATING UTE100	MCS (2P/3P)
	MAG TRIP (80%~130%) (10 x In)
100	1000A

UTS150 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

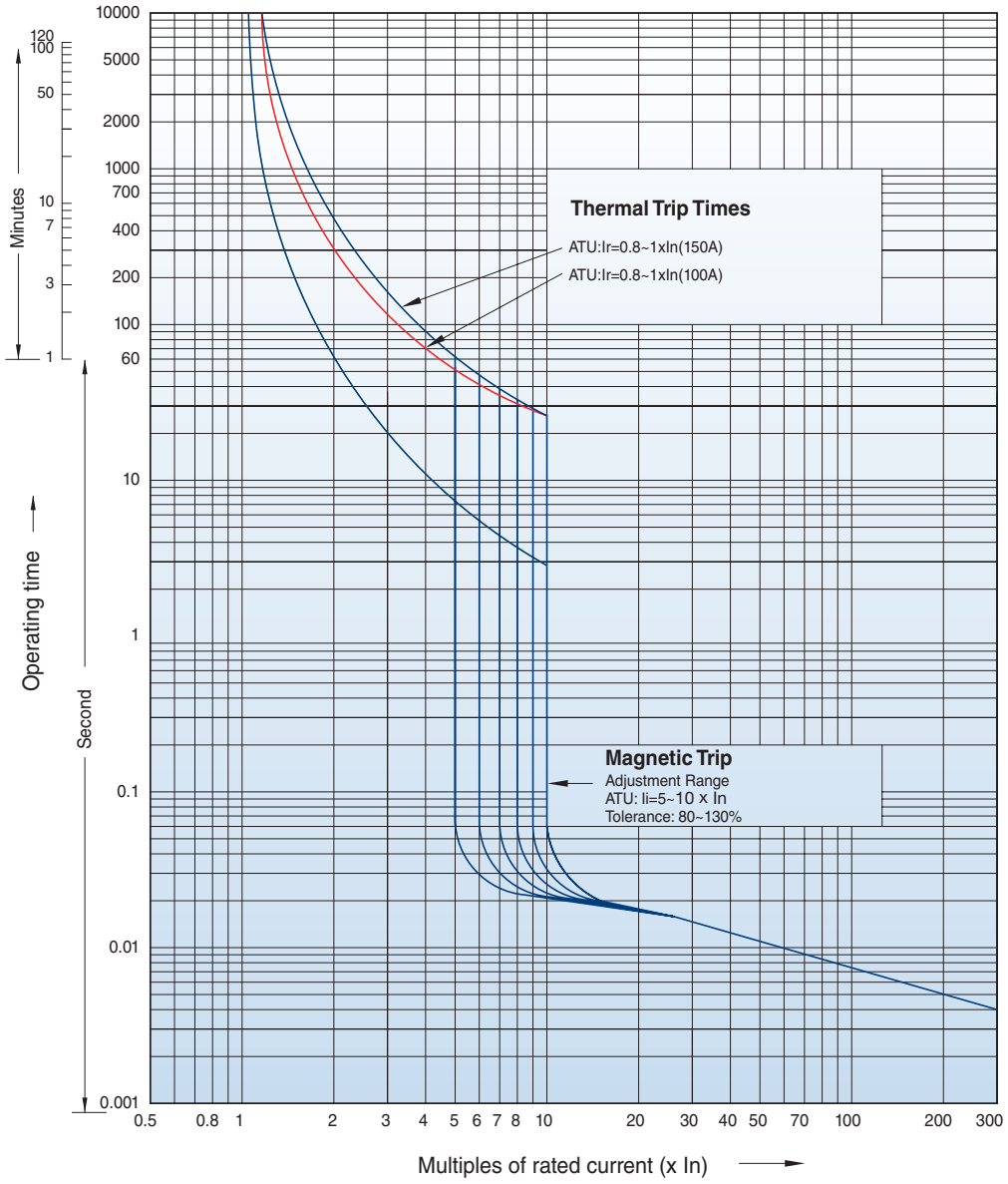
UTS150 FTU, FMU (40~150A)



RATING UTS150	FTU		
	2P/3P	MAG TRIP (80%~130%)	
40	○	500A	
50	○		
60	○	800A	
70	○		
80	○		
90	○	1000A	
100	○		
125	○	1250A	
150	○	1500A	

RATING UTS150	FMU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%)
40	○	32~40A	500A
60	○	48~60A	800A
80	○	64~80A	800A
100	○	80~100A	1000A
125	○	100~125A	1250A
150	○	120~150A	1500A

UTS150 ATU (100~150A)

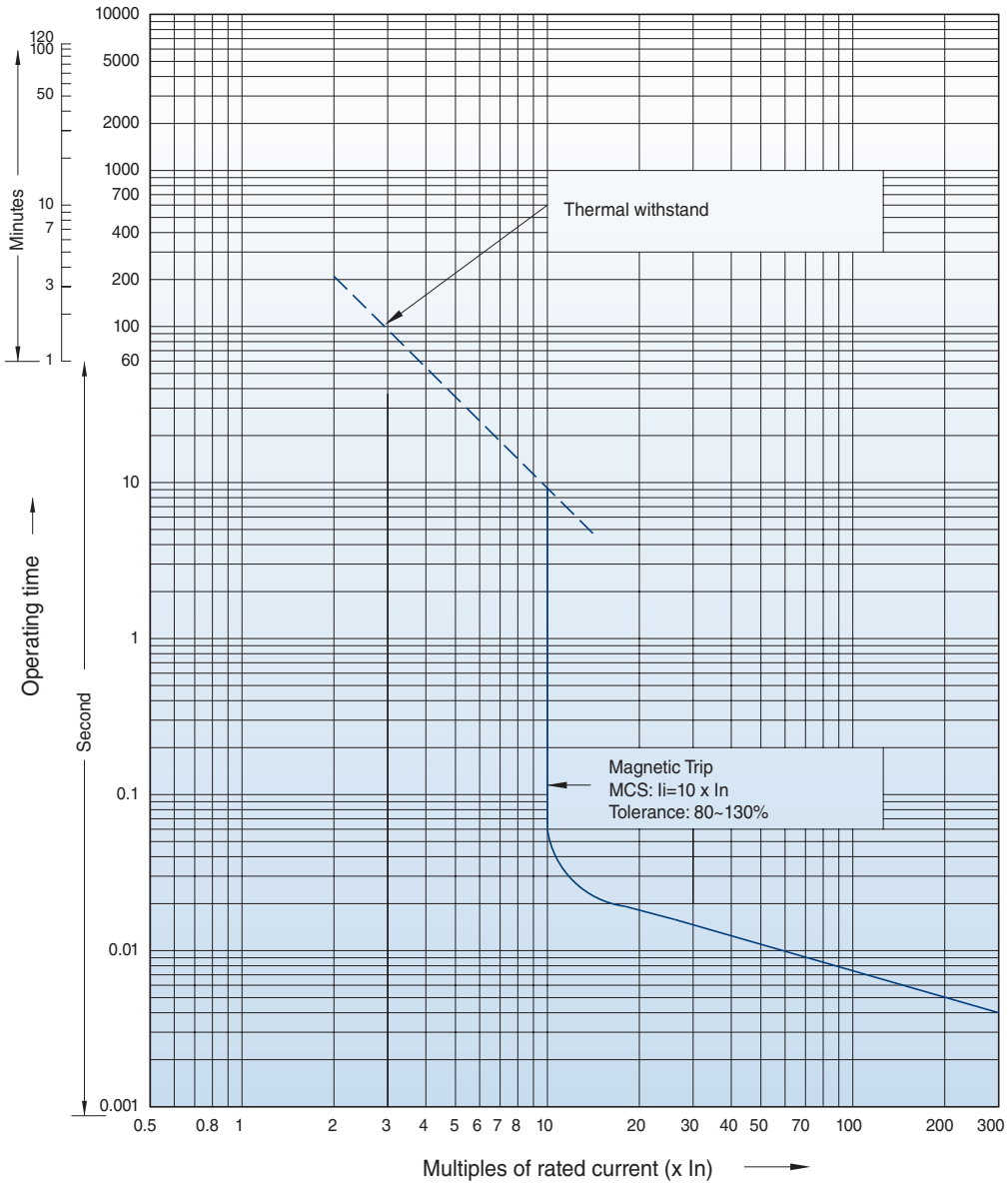


RATING UTS150	ATU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%) (5~10 x In)
100	○	80~100A	500~1000A
125	○	100~125A	625~1250A
150	○	120~150A	750~1500A

UTS150 CHARACTERISTIC

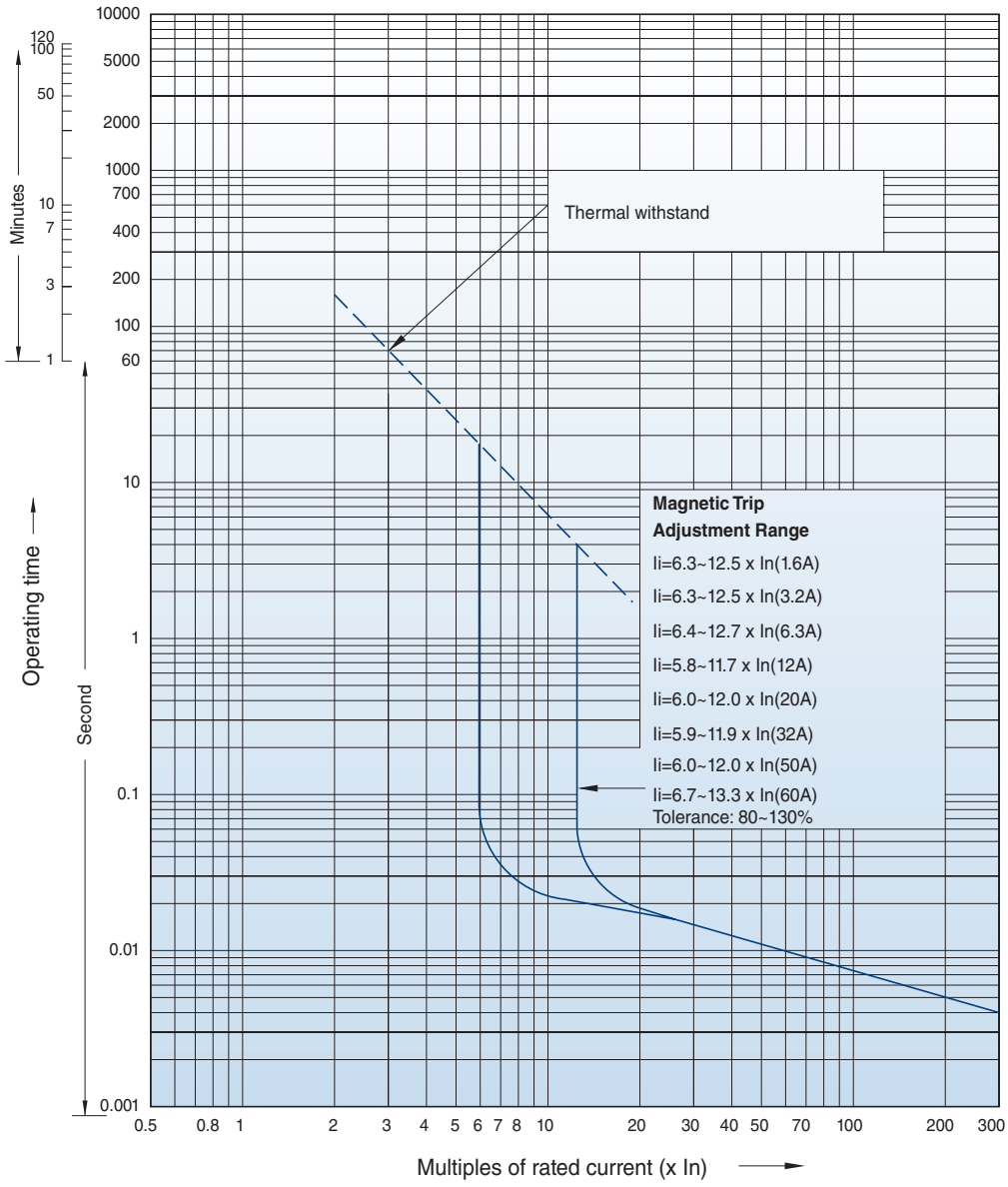
This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS150 MCS (150A)



RATING UTS150	MCS (2P/3P) MAG TRIP (80%~130%) (10 x In)
150	1500A

UTS150 MCP (1.6~60A)

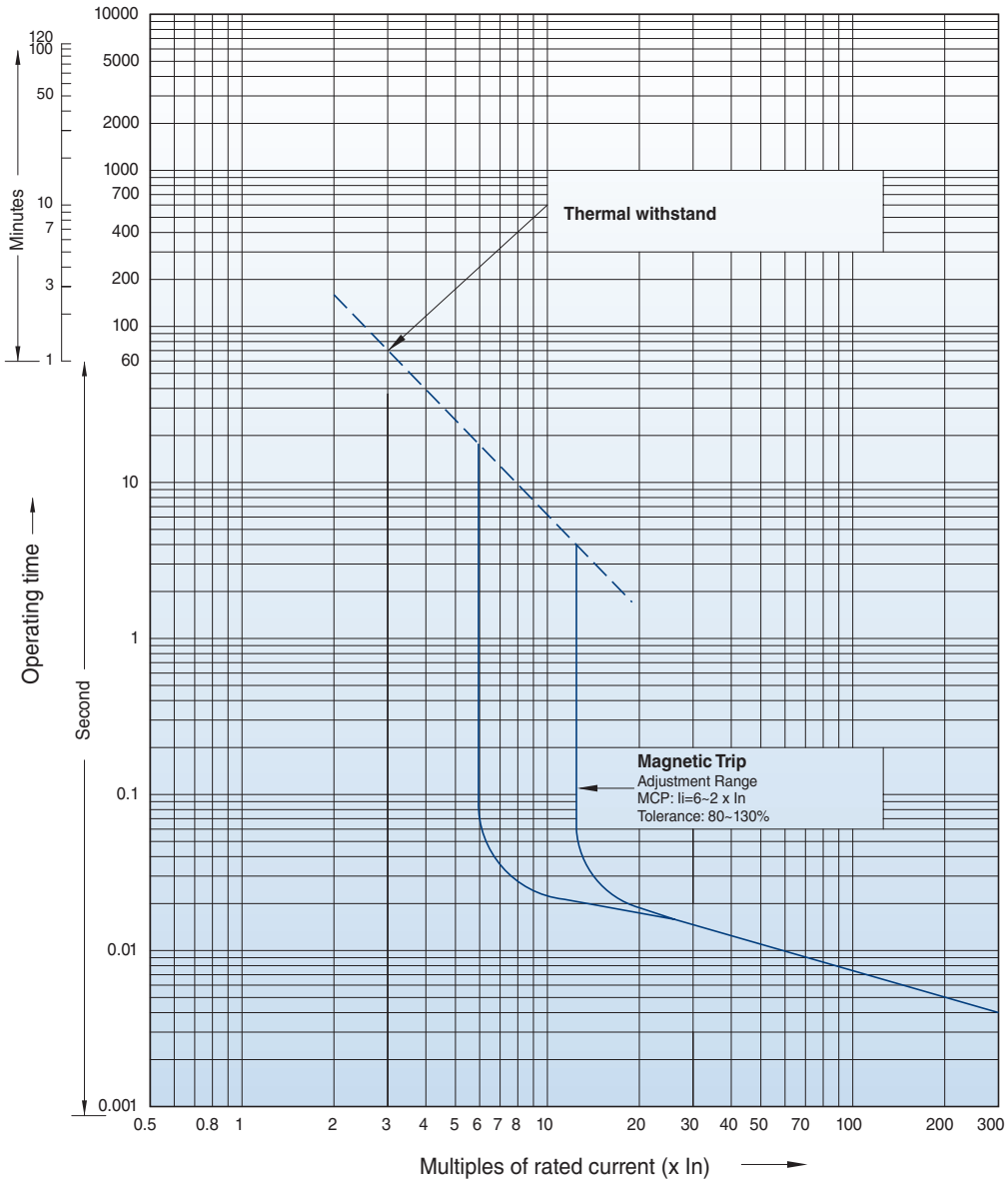


RATING UTS150	MCP (3P)
	MAG TRIP (80%~130%) (5.8~13.3 x In)
1.6	10~20A
3.2	20~40A
6.3	40~80A
12	70~140A
20	120~240A
32	190~380A
50	300~600A
60	400~800A

UTS150 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS150 MCP (100~150A)

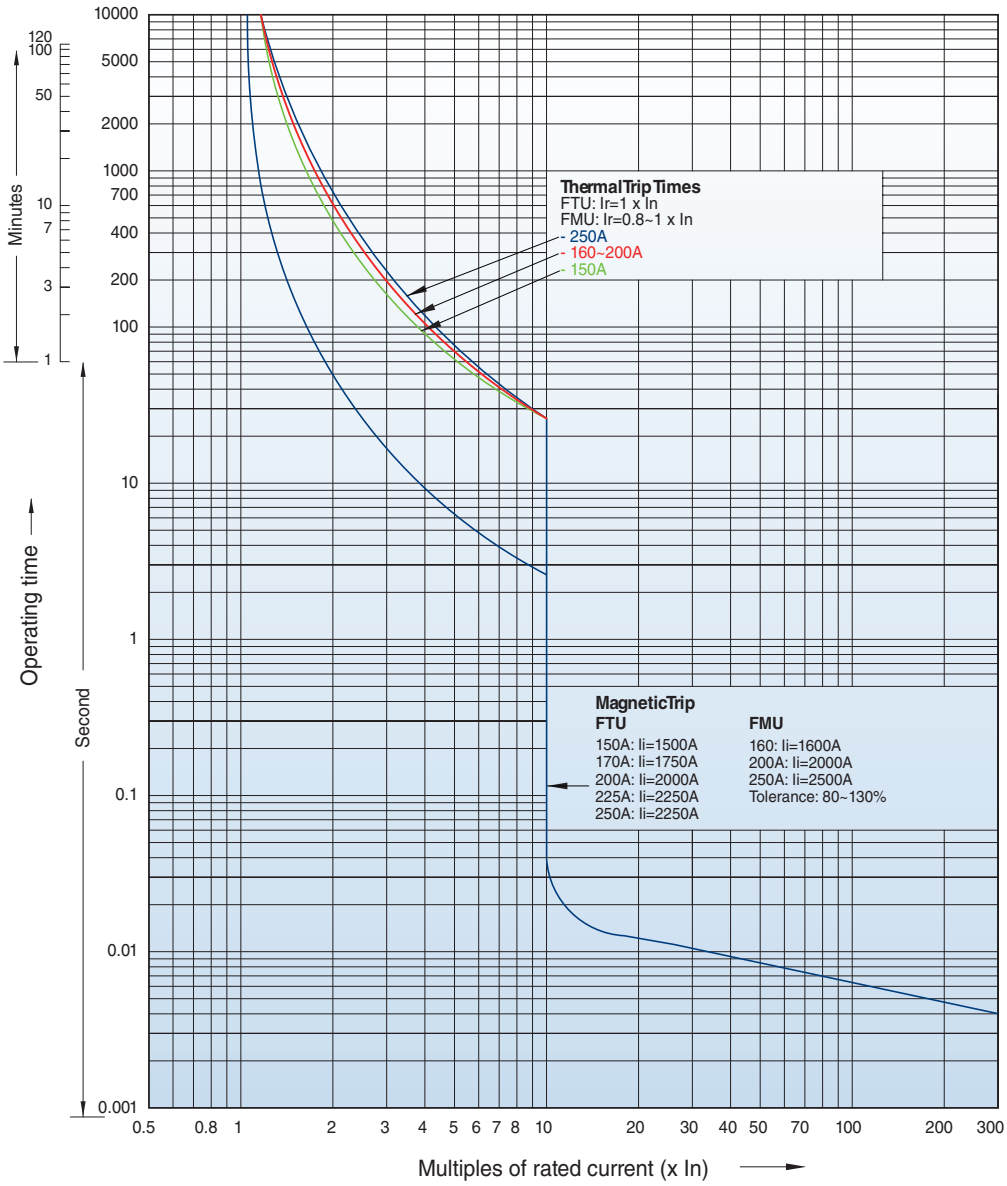


RATING UTS150	MCP (3P)
	MAG TRIP (80~130%) (6~12 x In)
100	600~1200A
150	900~1800A

UTS250 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS250 FTU, FMU (150~250A)



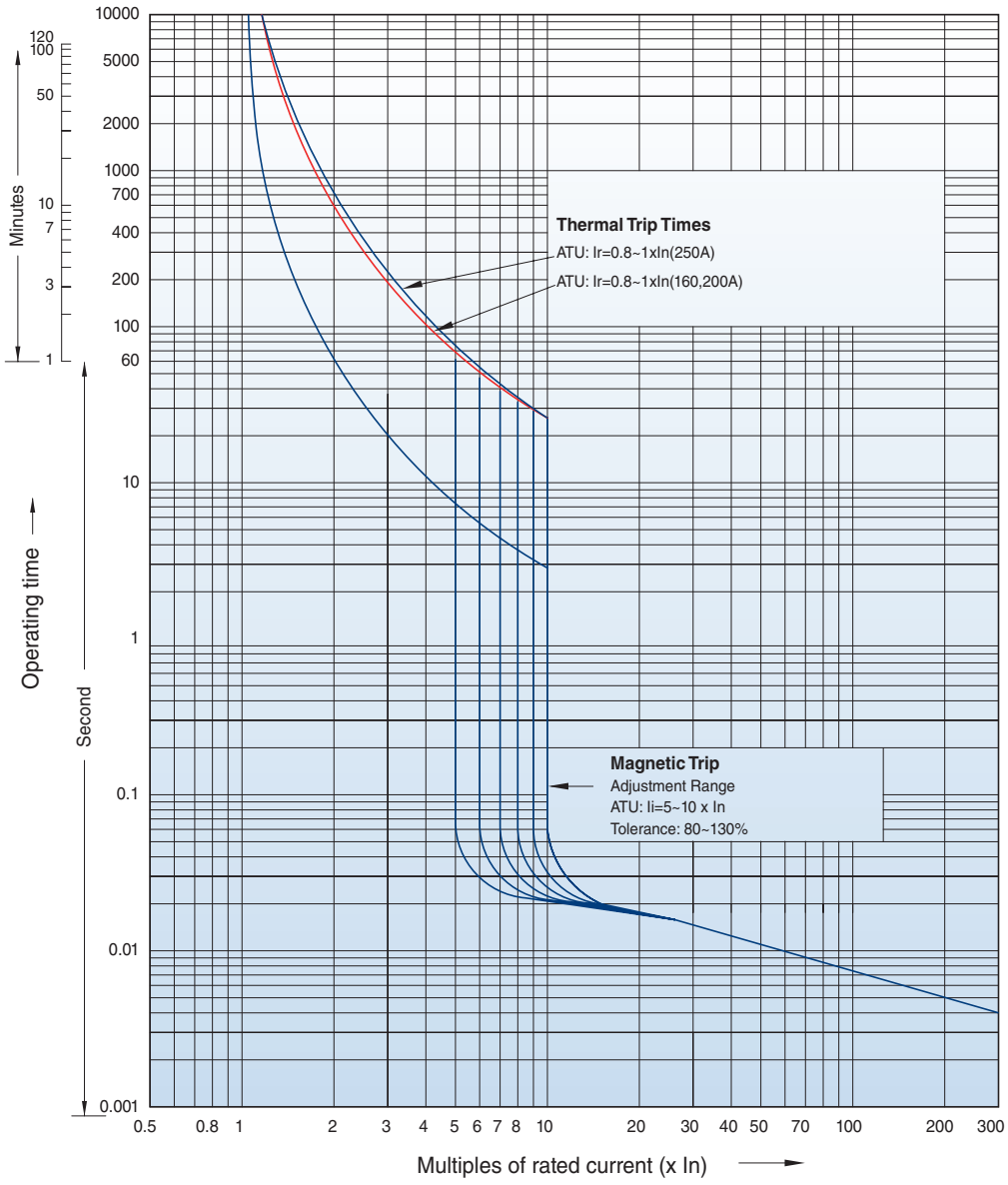
RATING UTS250	FTU	
	2P/3P	MAG TRIP (80%~130%)
150	○	1500A
175	○	1750A
200	○	2000A
225	○	2250A
250	○	2500A

RATING UTS250	FMU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%)
160	○	128~160A	1600A
200	○	160~200A	2000A
250	○	200~250A	2500A

UTS250 CHARACTERISTIC

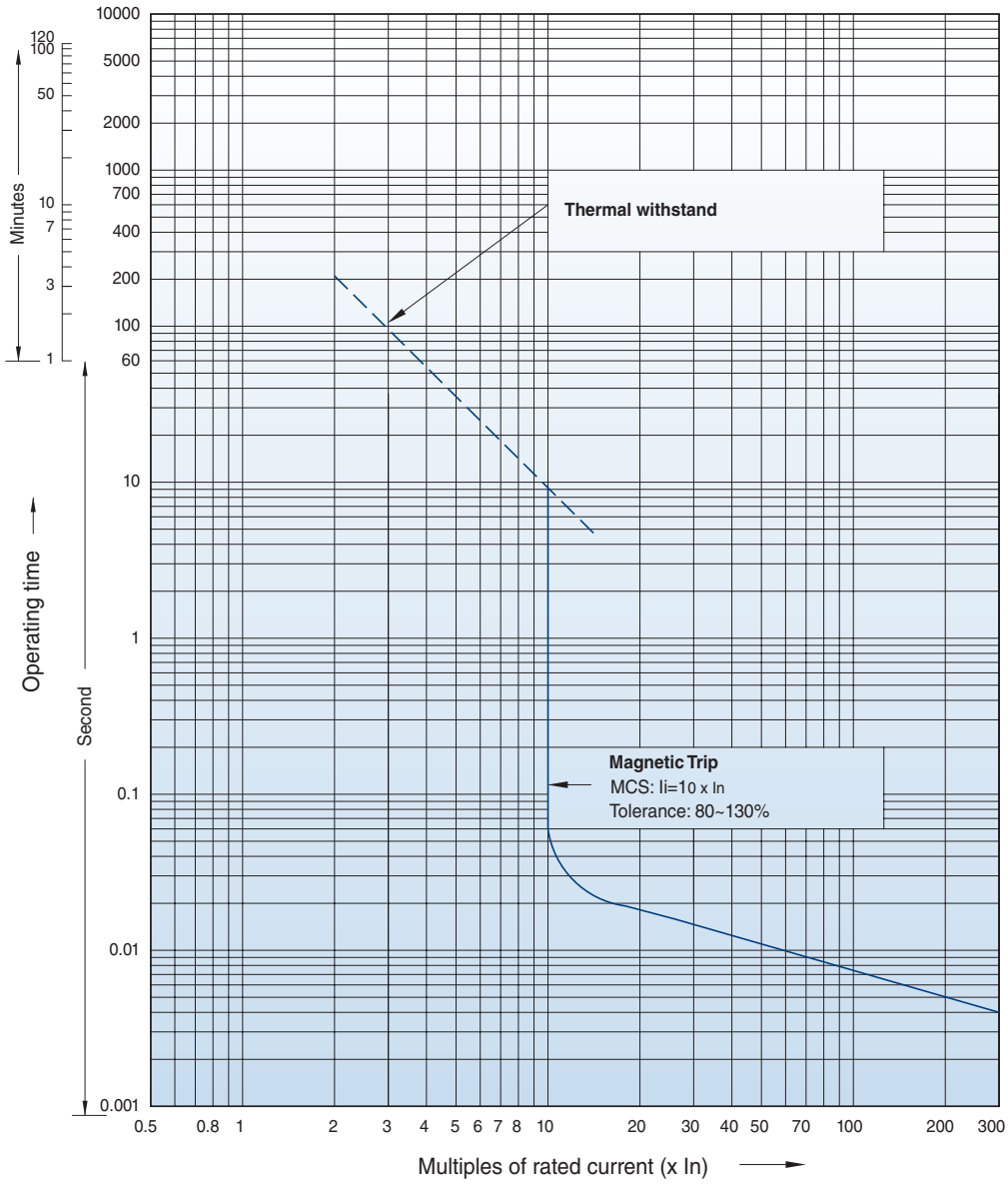
This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS250 ATU (160~250A)



RATING UTS250	ATU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%) (5~10 x In)
160	○	128~160A	800~1600A
200	○	160~200A	1000~2000A
250	○	200~250A	1250~2500A

UTS250 MCS (175~250A)

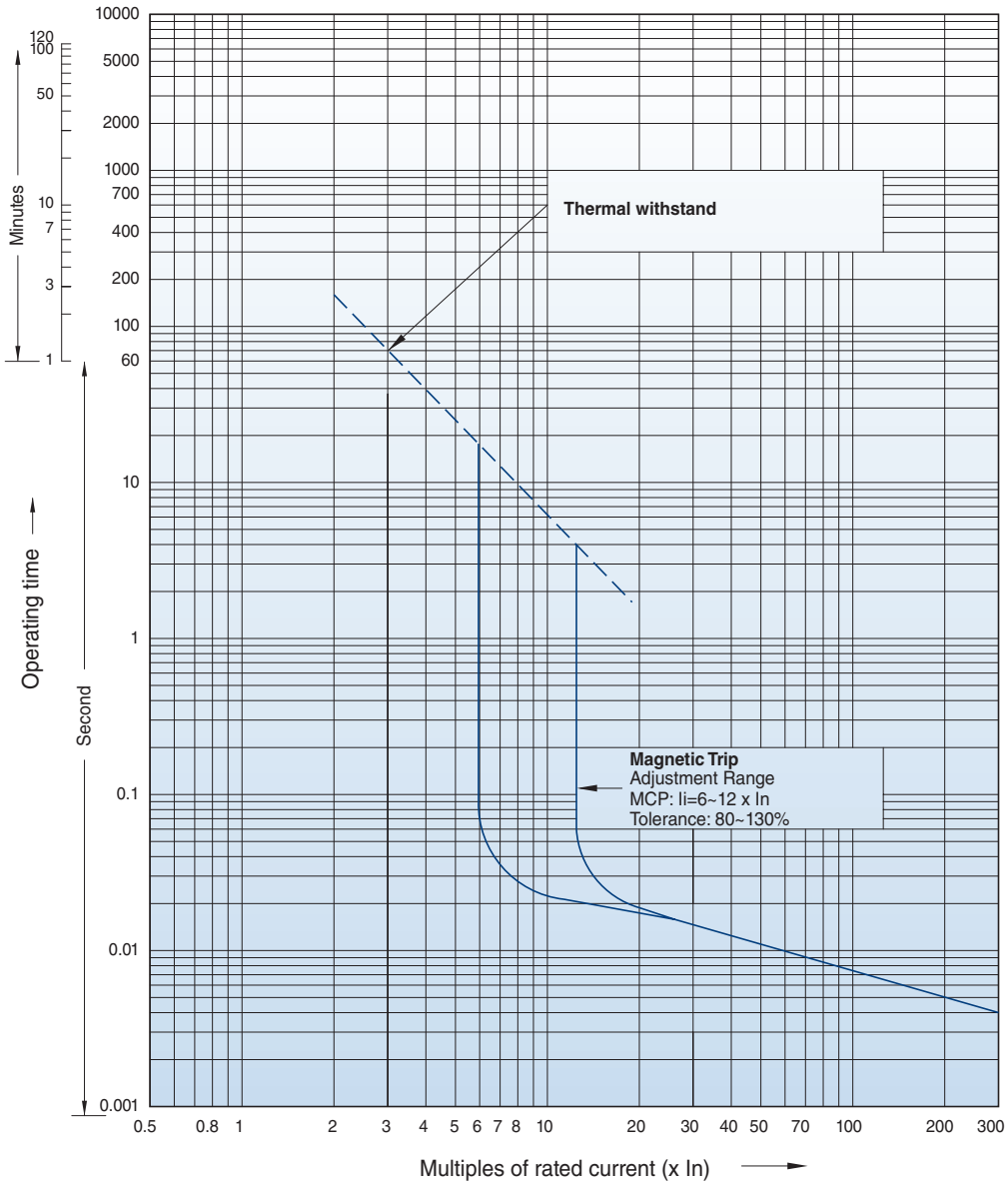


RATING UTS250	MCS (2P/3P)
	MAG TRIP (80%~130%) (10 x In)
175	1750A
250	2500A

UTS250 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS250 MCP (220A)

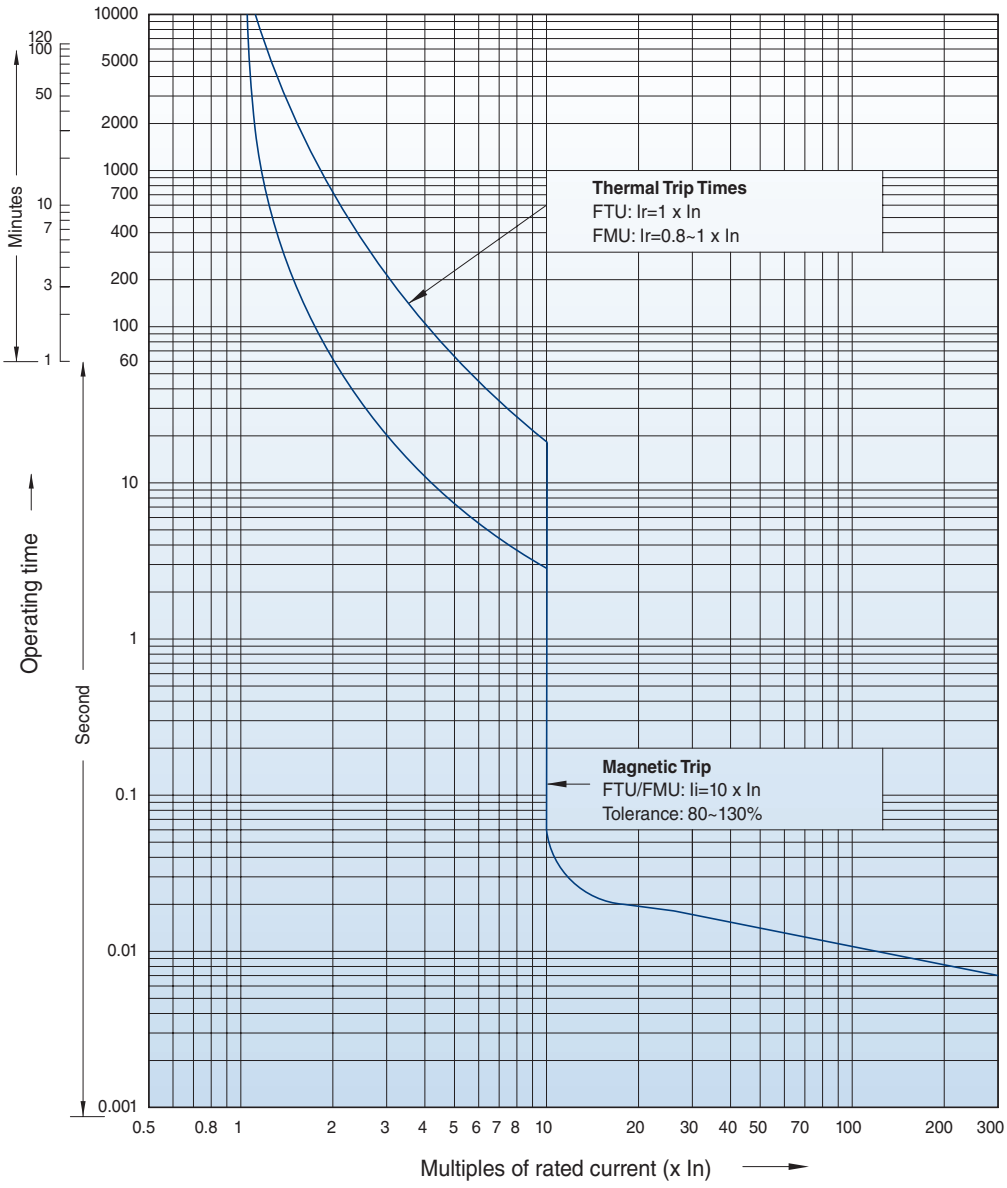


RATING UTS250	MCP (3P)
	MAG TRIP (80%~130%) (6~12 x In)
220	1320~2640A

UTS400 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS400 FTU, FMU (250~400A)



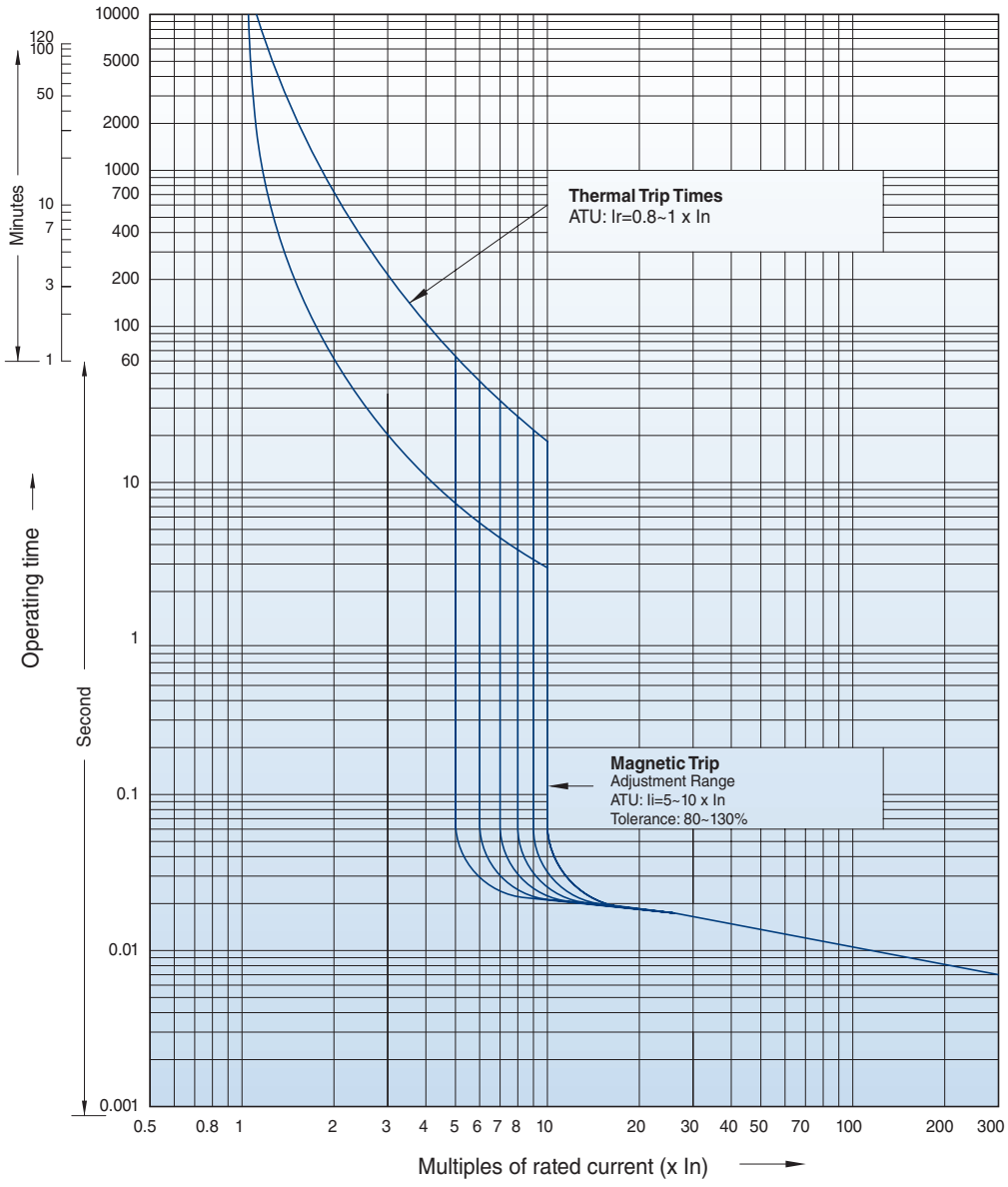
RATING UTS400	FTU	
	2P/3P	MAG TRIP (80%~130%)
250	○	2500A
300	○	3000A
350	○	3500A
400	○	4000A

RATING UTS400	FMU		
	2P/3P	RATING RANGE (0.8~1xIn)	MAG TRIP (80%~130%)
300	○	240~300A	3000A
400	○	320~400A	4000A

UTS400 CHARACTERISTIC

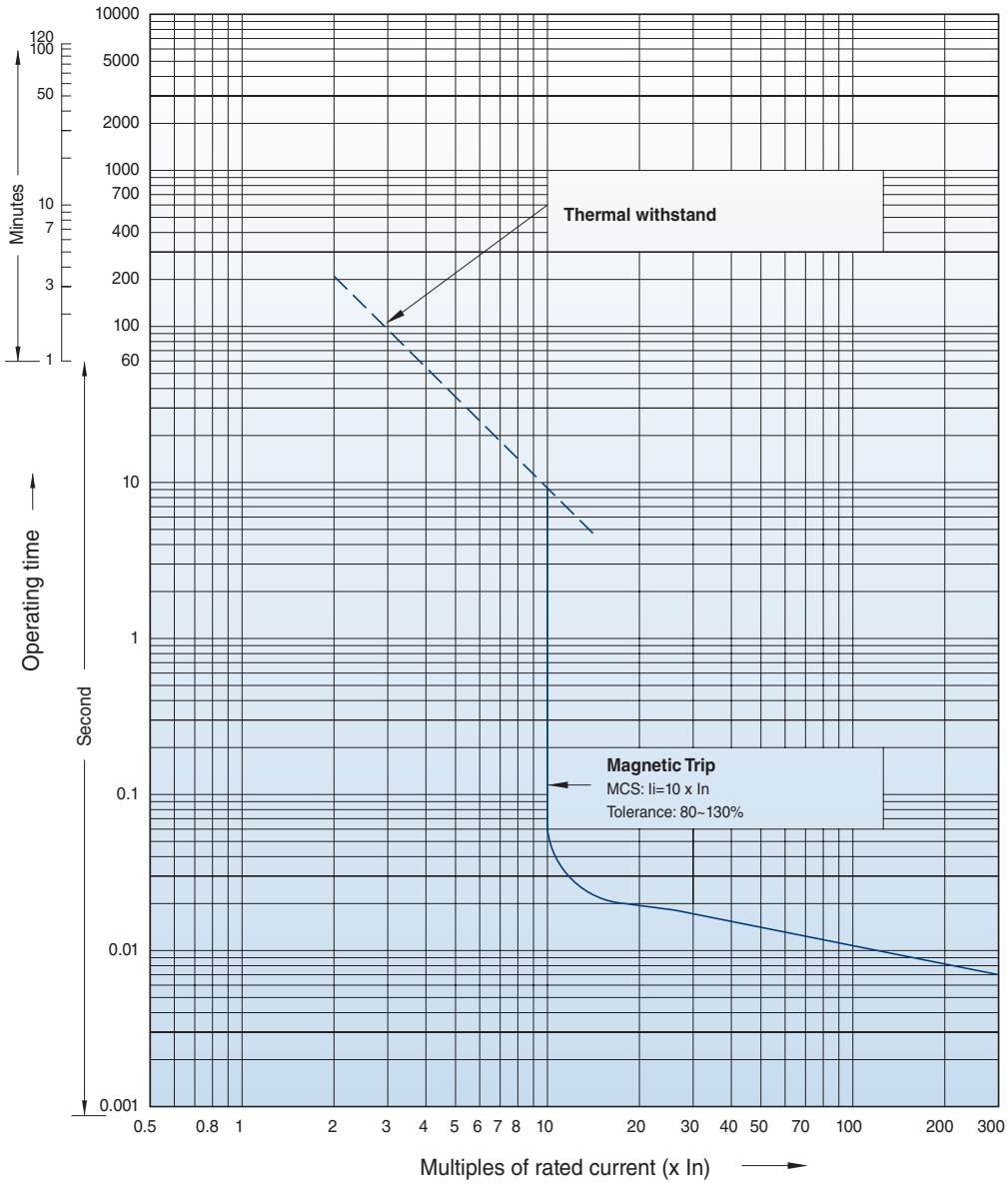
This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS400 ATU (300~400A)



RATING UTS400	ATU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%) (5~10 x In)
300	○	240~300A	1500~3000A
400	○	320~400A	2000~4000A

UTS400 MCS (400A)

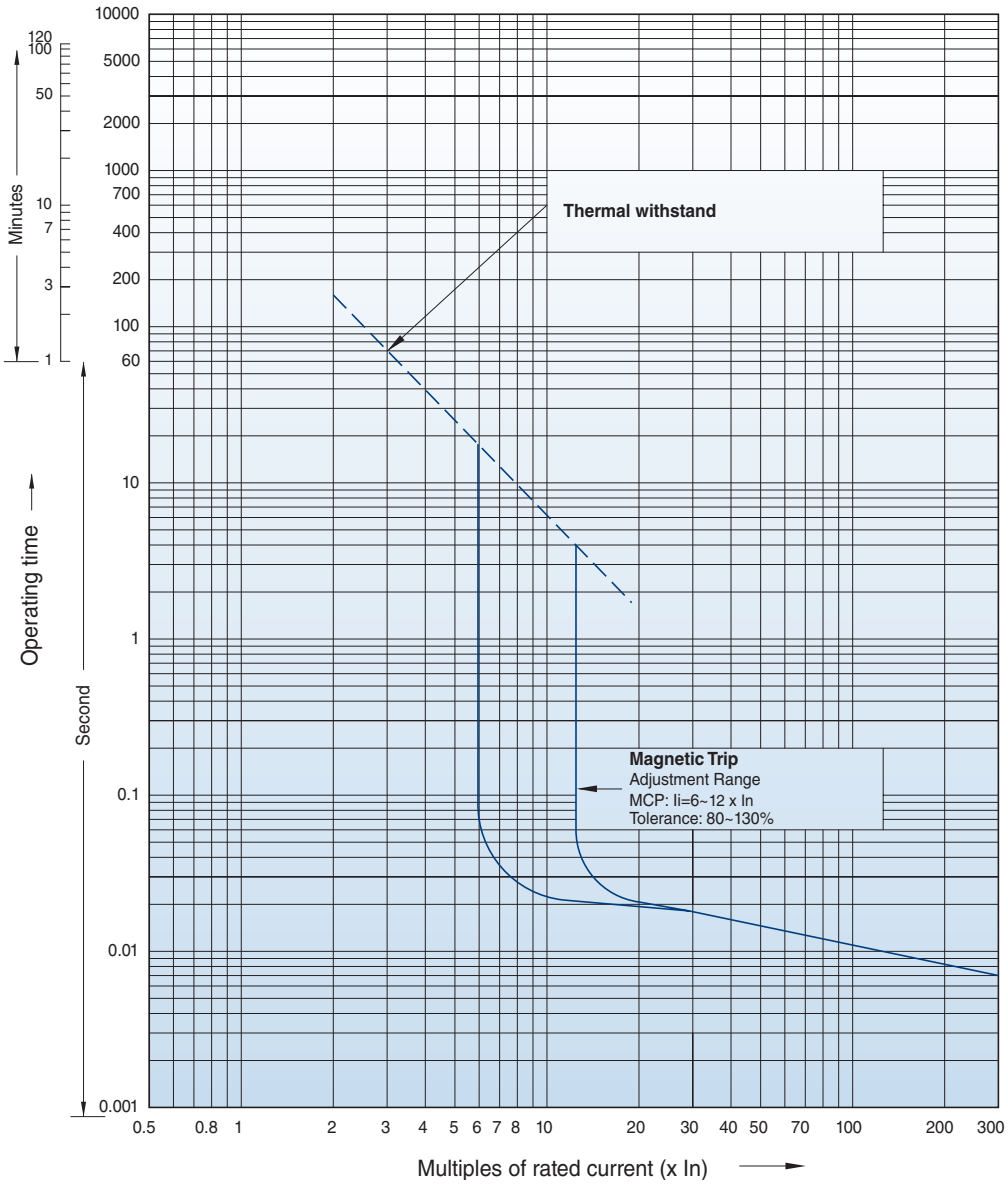


RATING UTS400	MCS (2P/3P)
	MAG TRIP (80%~130%) (10 x In)
400	4000A

UTS400 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS400 MCP (320A)

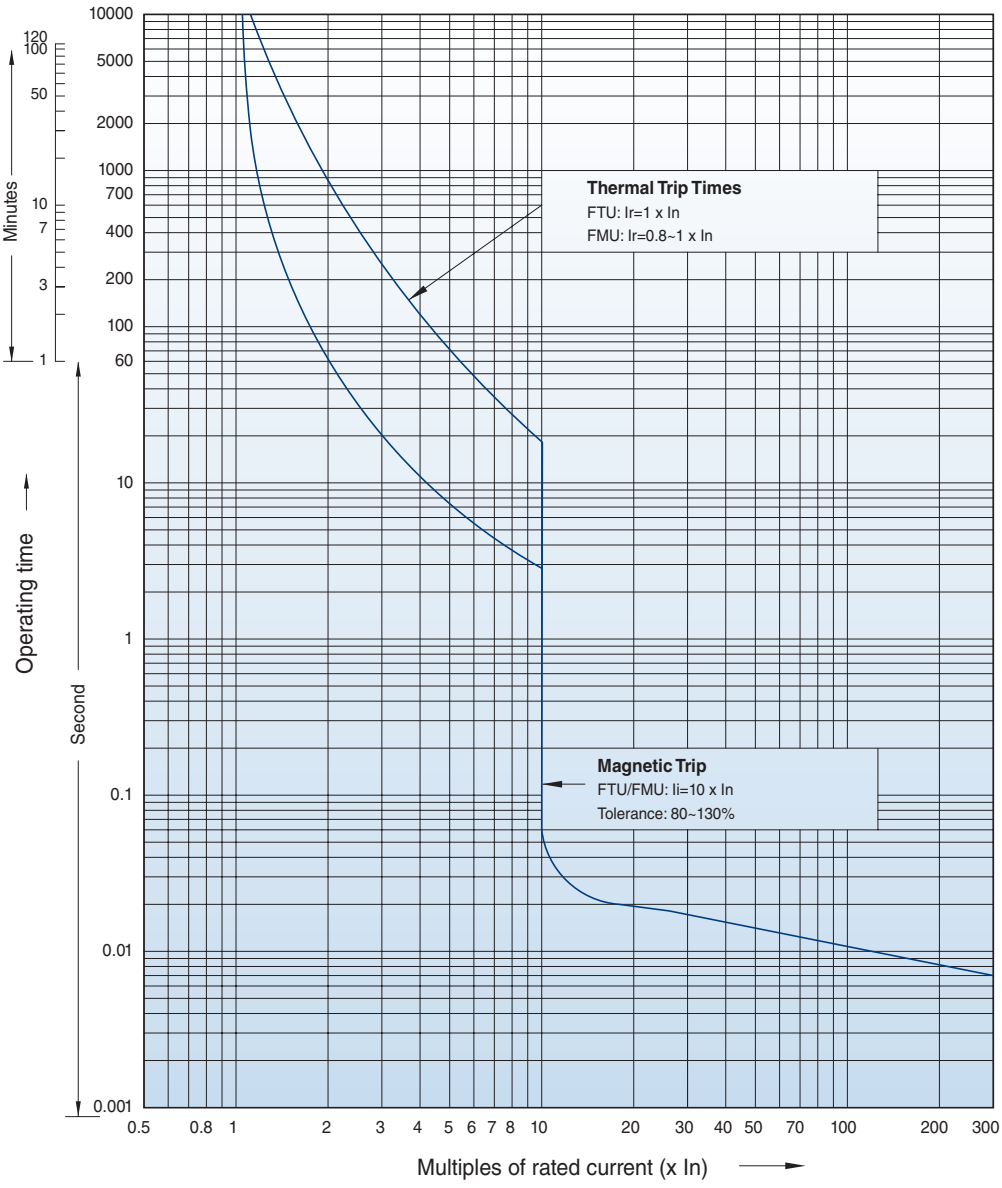


RATING UTS400	MCP (3P)
	MAG TRIP (80%~130%) (6~12 x In)
320	1920~3840A

UTS600 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS600 FTU, FMU (500~600A)



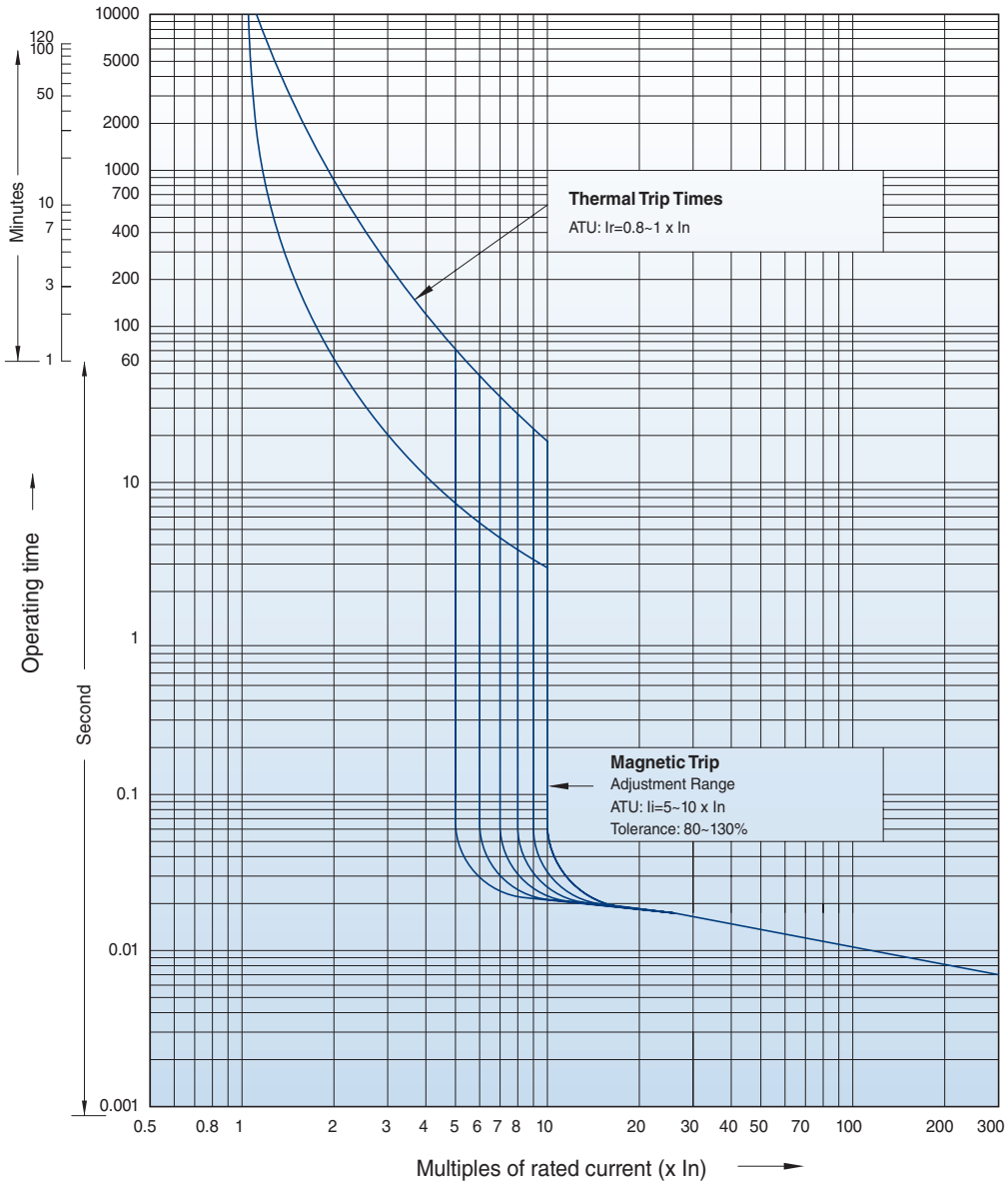
RATING UTS600	FTU	
	2P/3P	MAG TRIP (80%~130%)
500	○	5000A
600	○	6000A

RATING UTS600	FMU		
	2P/3P	RATING RANGE (0.8~1xIn)	MAG TRIP (80%~130%)
500	○	400~500A	5000A
600	○	480~600A	6000A

UTS600 CHARACTERISTIC

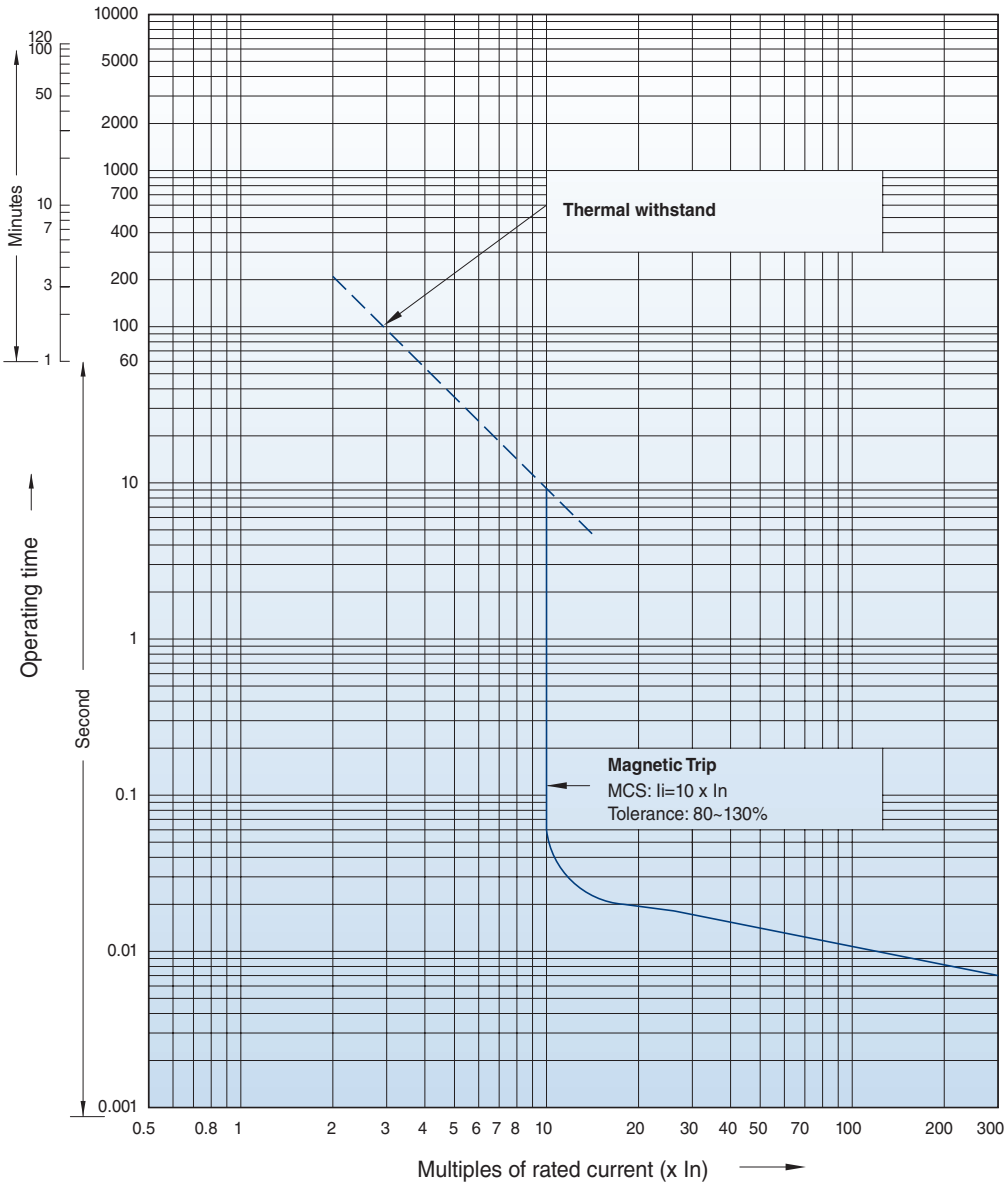
This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

UTS600 ATU (500~600A)



RATING UTS600	ATU		
	2P/3P	RATING RANGE (0.8~1 x In)	MAG TRIP (80%~130%) (5~10 x In)
500	○	400~500A	2500~5000A
600	○	480~600A	3000~6000A

UTS600 MCS (600A)

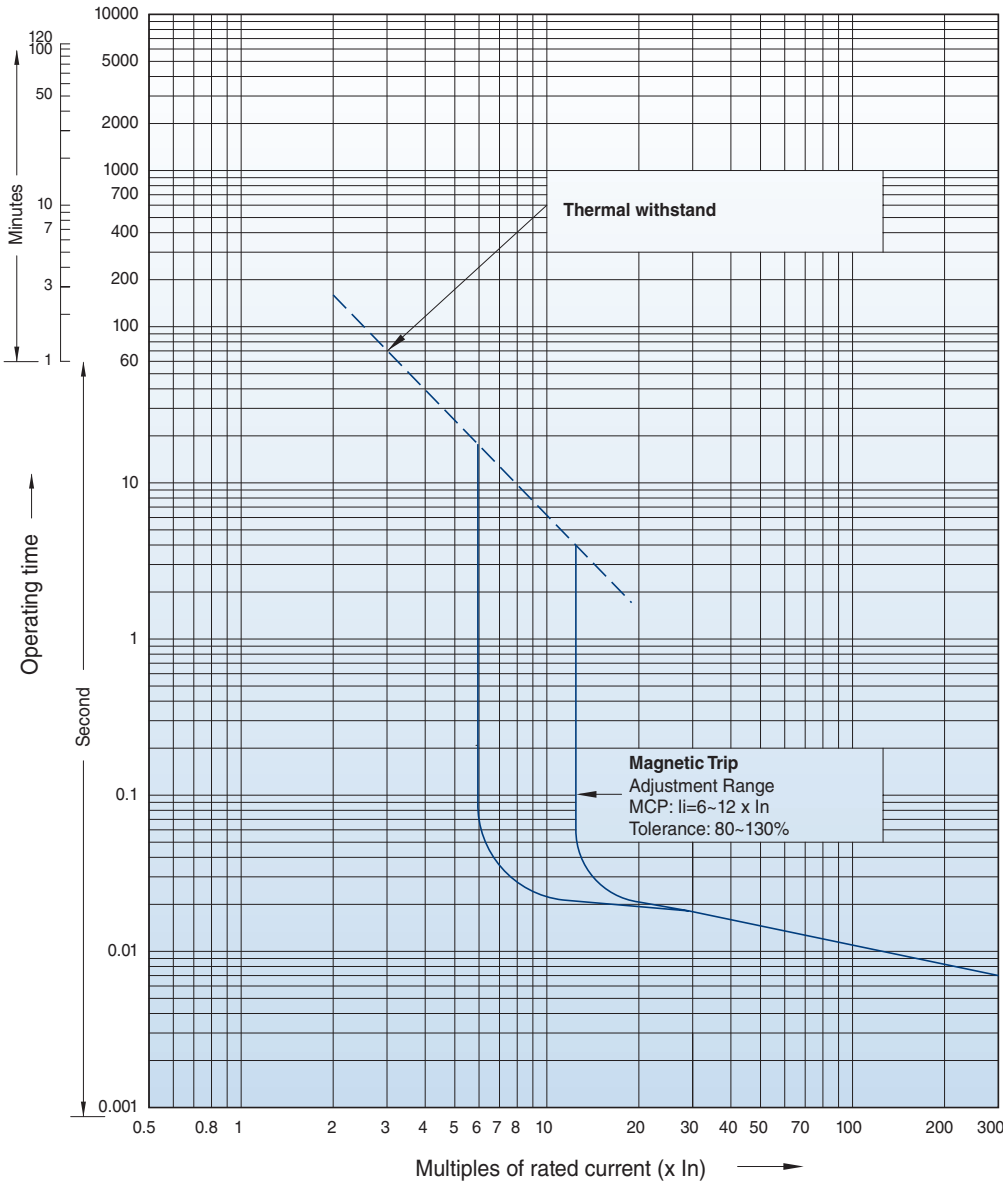


RATING UTS600	MCS (2P/3P)
	MAG TRIP (80%~130%) (10 x In)
600	6000A

UTS600 CHARACTERISTIC

This curve is to be used for application and coordination purposes only.
All time/current characteristic curve data is based on 40°C ambient cold start.

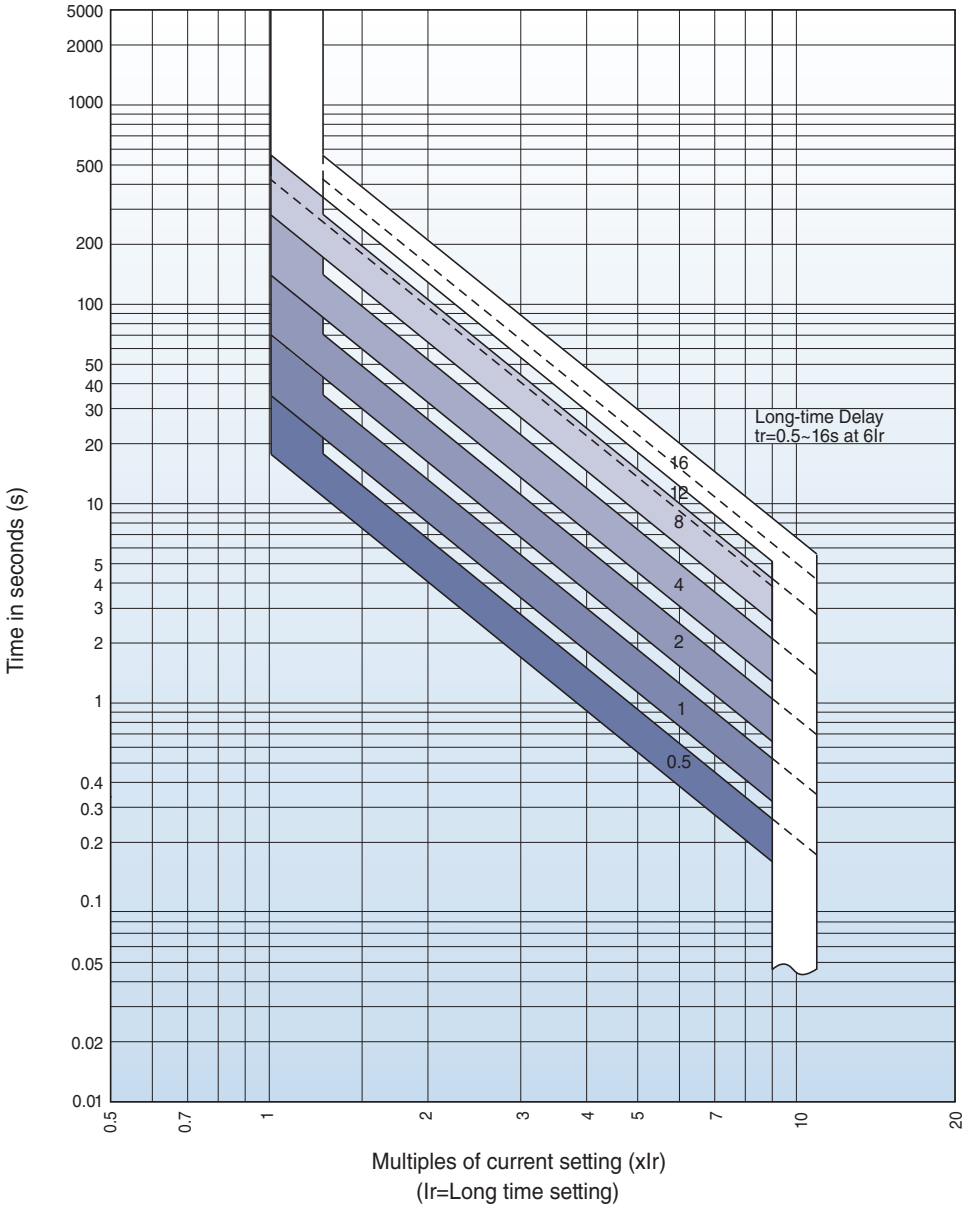
UTS600 MCP (500A)



RATING UTS600	MCP (3P)
	MAG TRIP (80%~130%) (6~12xIn)
500	3000~6000A

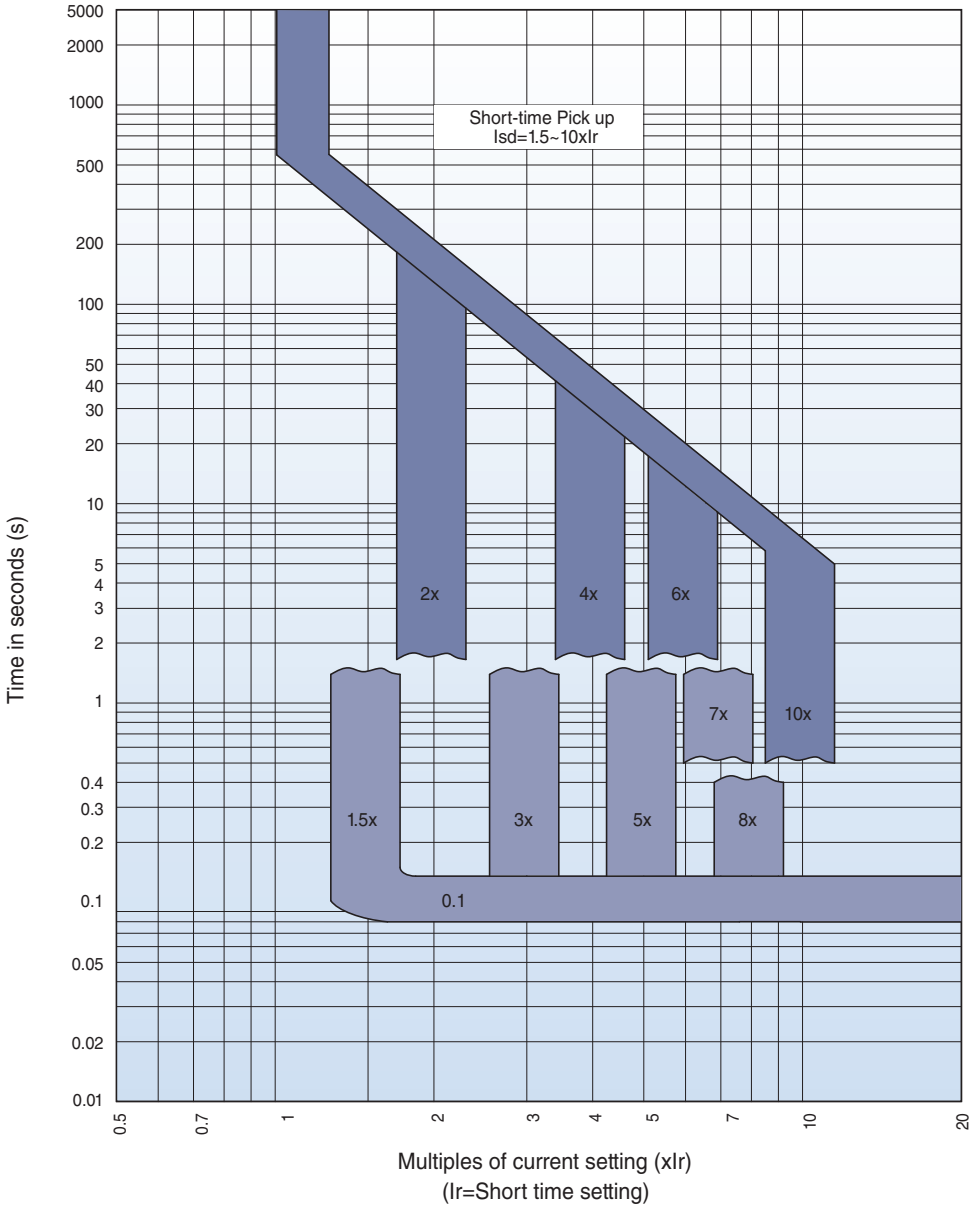
ELECTRONIC TRIP UNIT (ETS23, ETS33)

LONG TIME TRIP CURVE

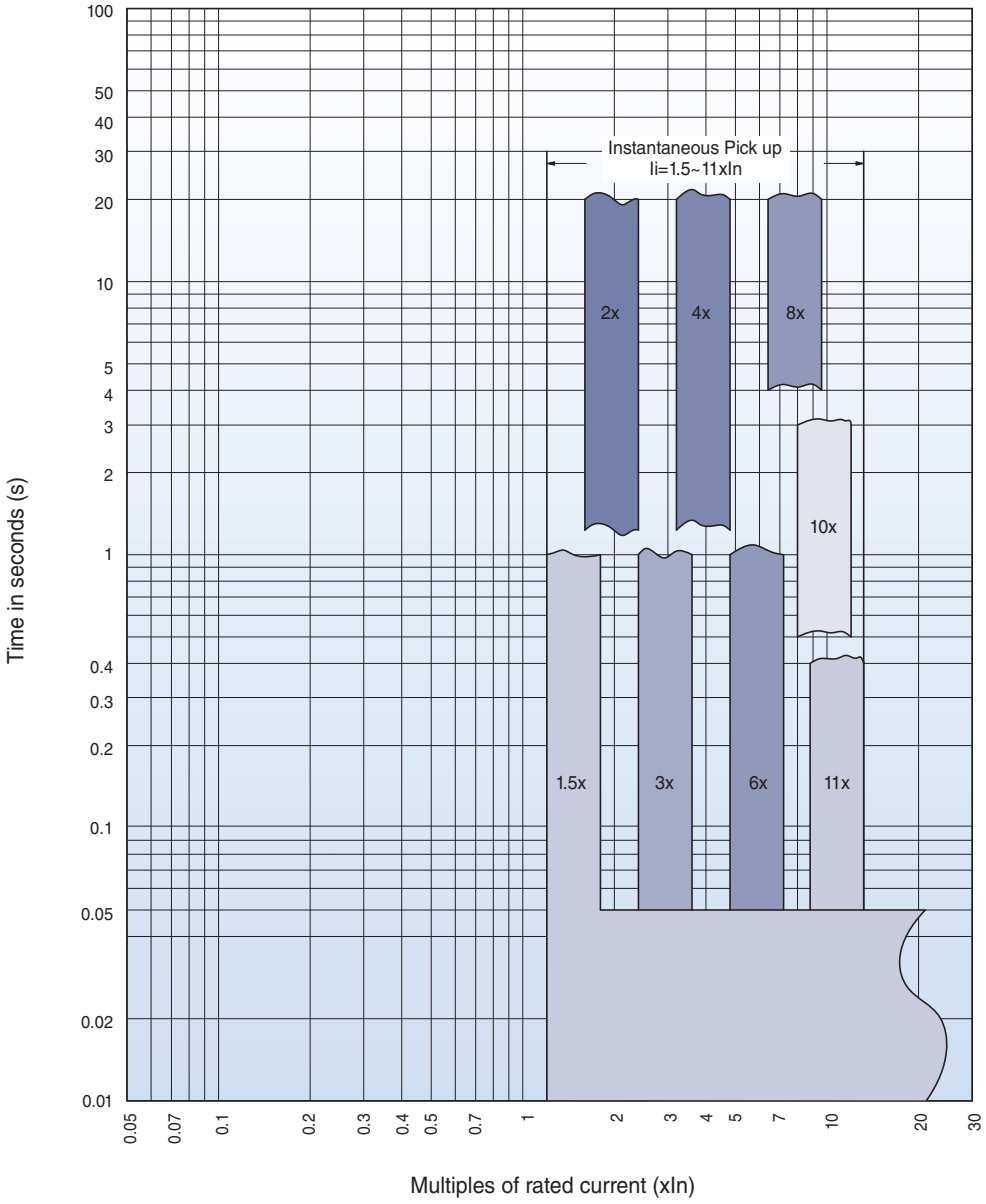


ELECTRONIC TRIP UNIT (ETS23, ETS33)

SHORT TIME TRIP CURVE

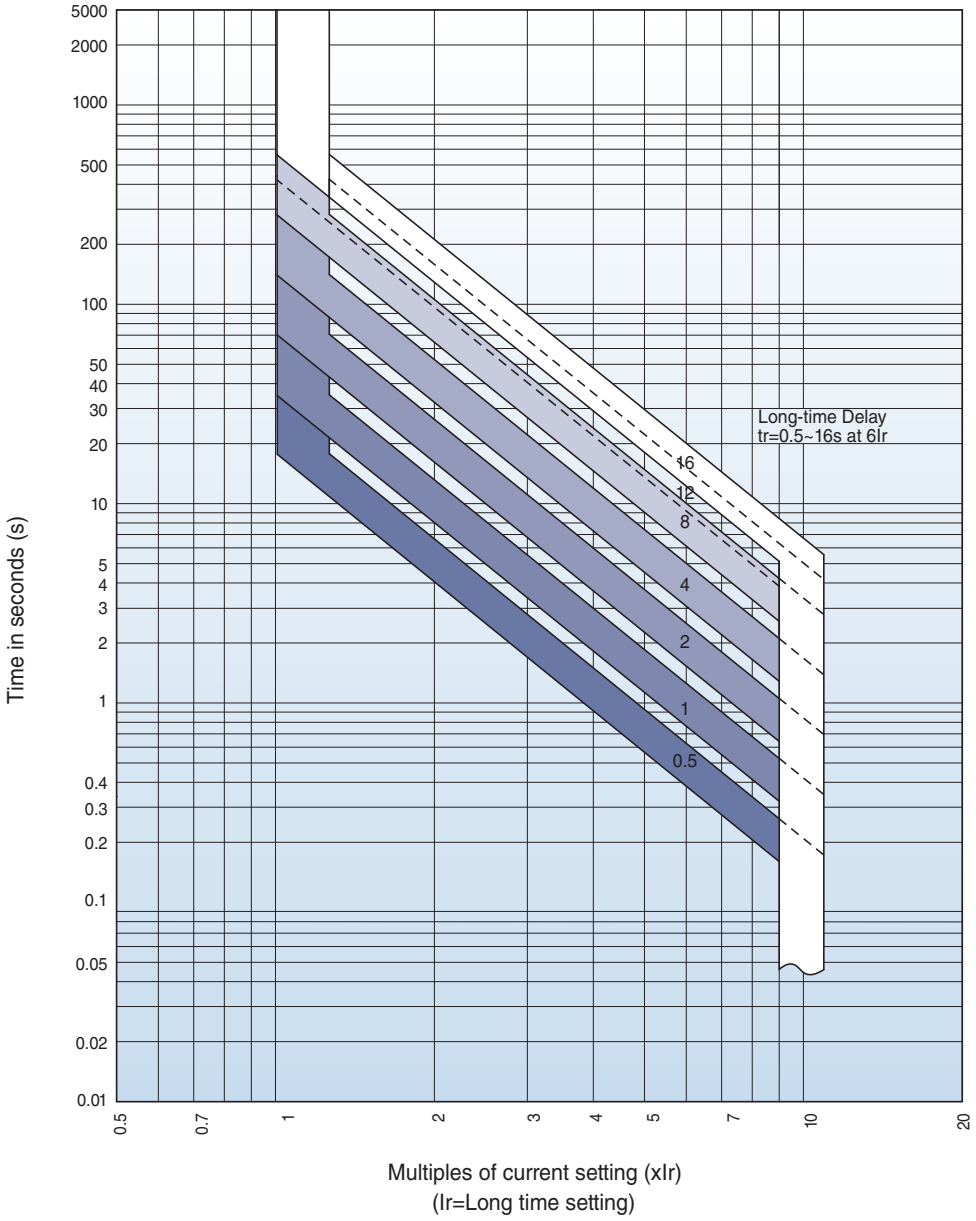


INSTANTANEOUS TRIP CURVE

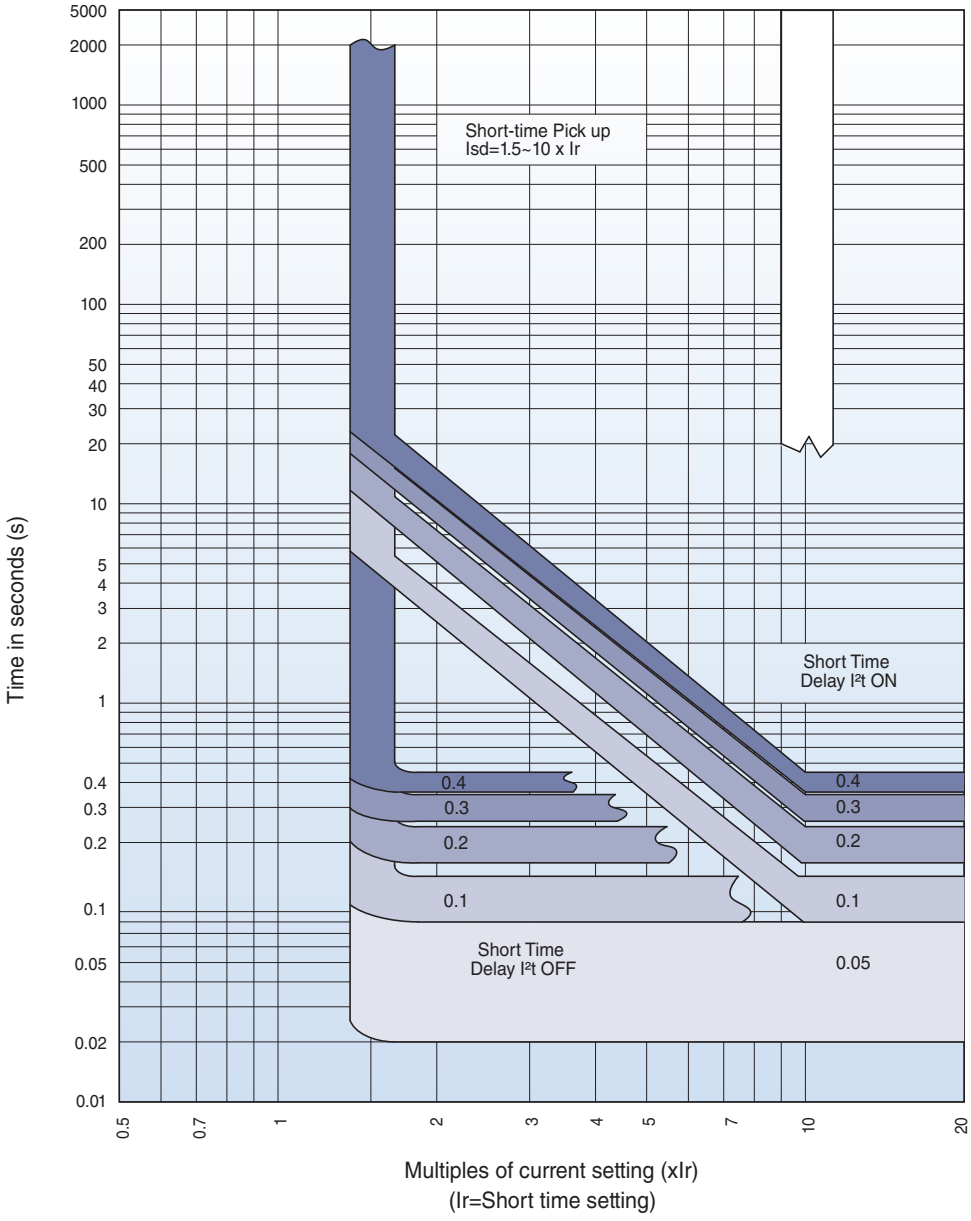


ELECTRONIC TRIP UNIT (ETM33)

LONG TIME TRIP CURVE

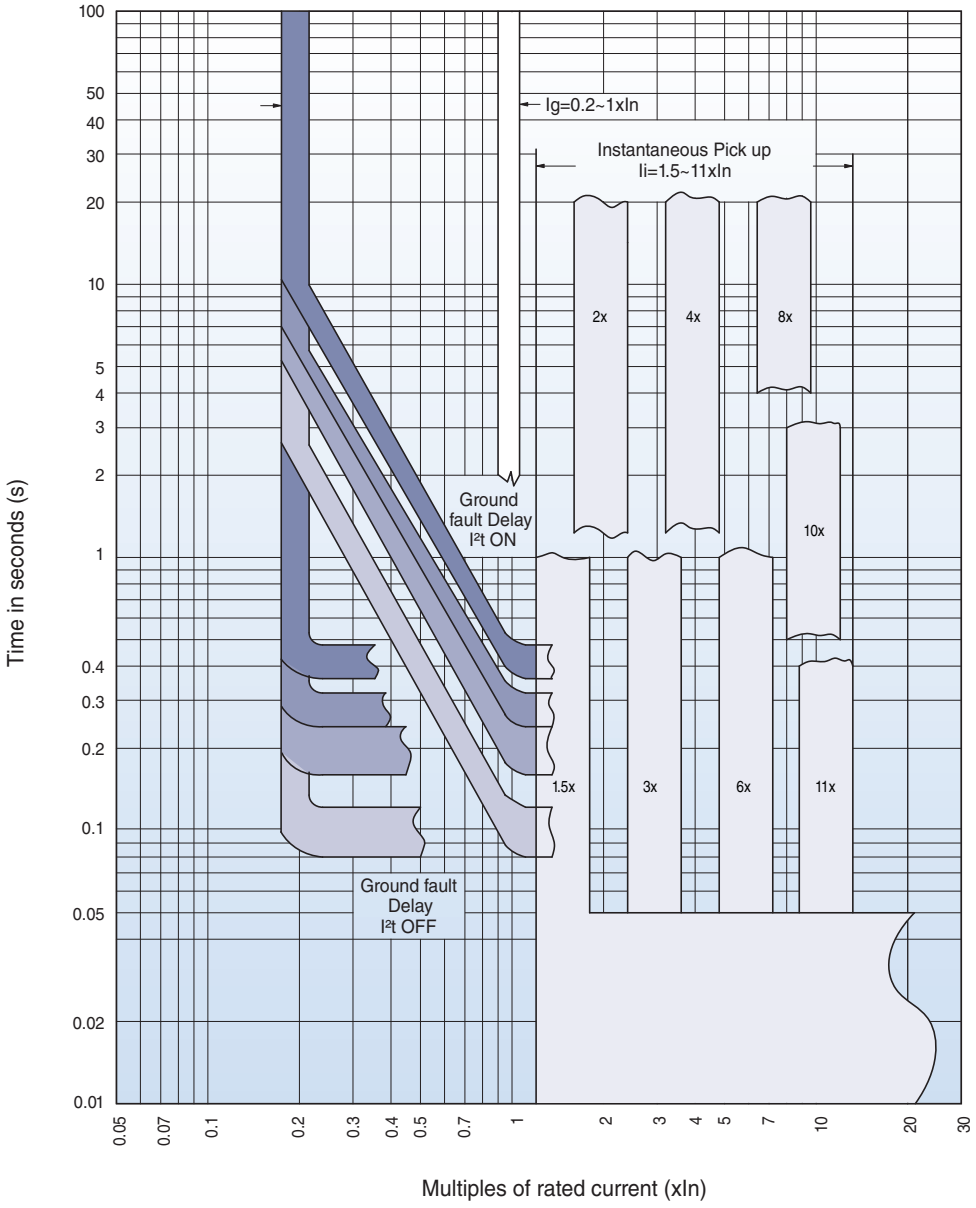


SHORT TIME TRIP CURVE



ELECTRONIC TRIP UNIT (ETM33)

INSTANTANEOUS AND GROUND FAULT CURVE

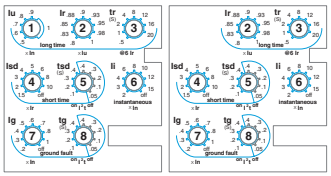


UTS800/UTS1200 CHARACTERISTIC TRIP CURVES

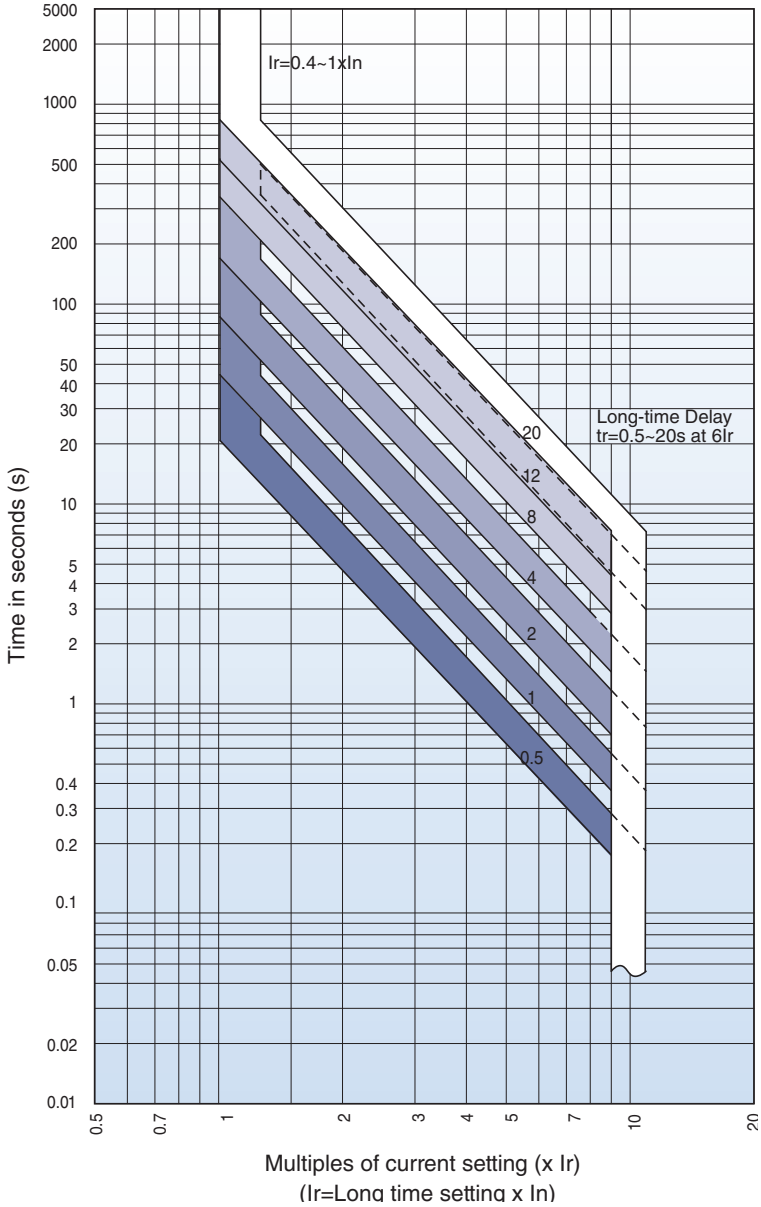
This curve is to be used for application and coordination purposes only.

LONG-TIME DELAY (400~1200A)

Long-time pickup 0.4~1 x Ir
and delay 0.5~20s



①, ②, ③ – Long-time setting

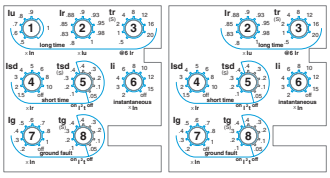


Notes :

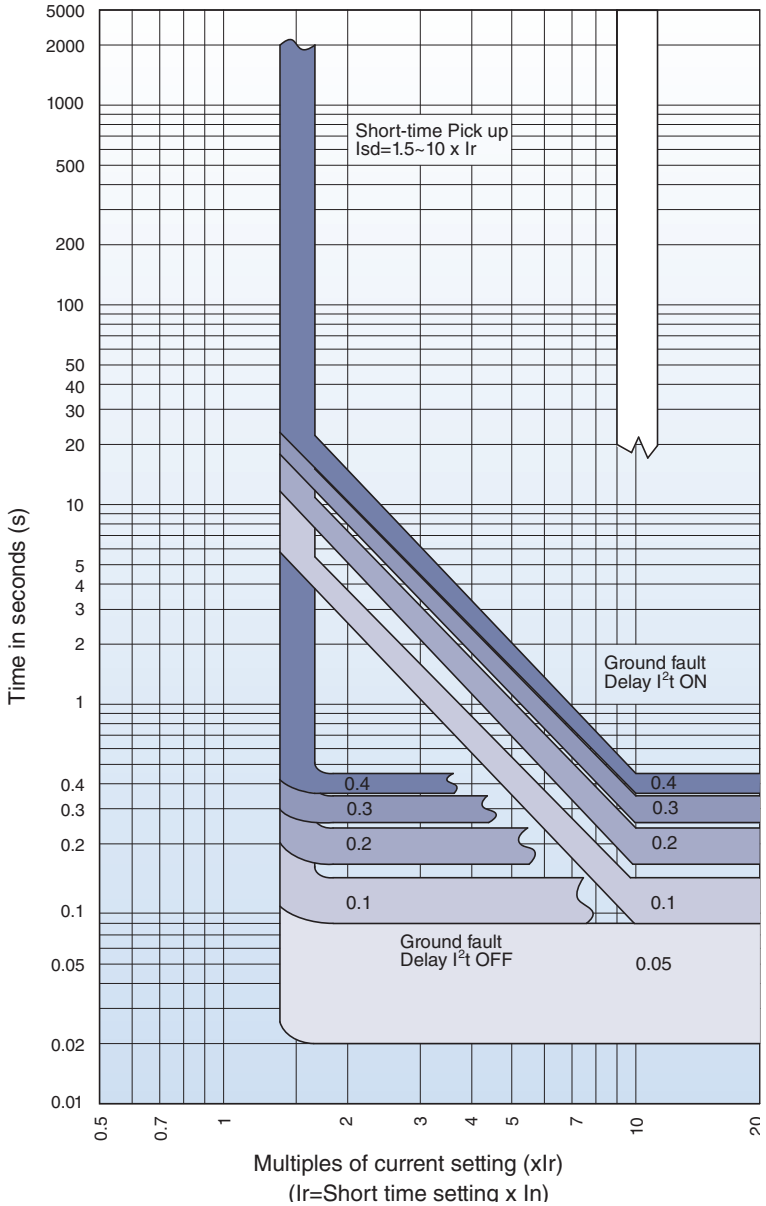
1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermal imaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.

SHORT-TIME DELAY (400~1200A)

Short-time pickup 1.5~10 x Ir
and delay 0.1~0.4s



④, ⑤ – Short-time setting

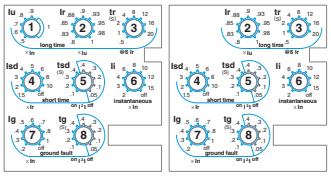


UTS800/UTS1200 CHARACTERISTIC TRIP CURVES

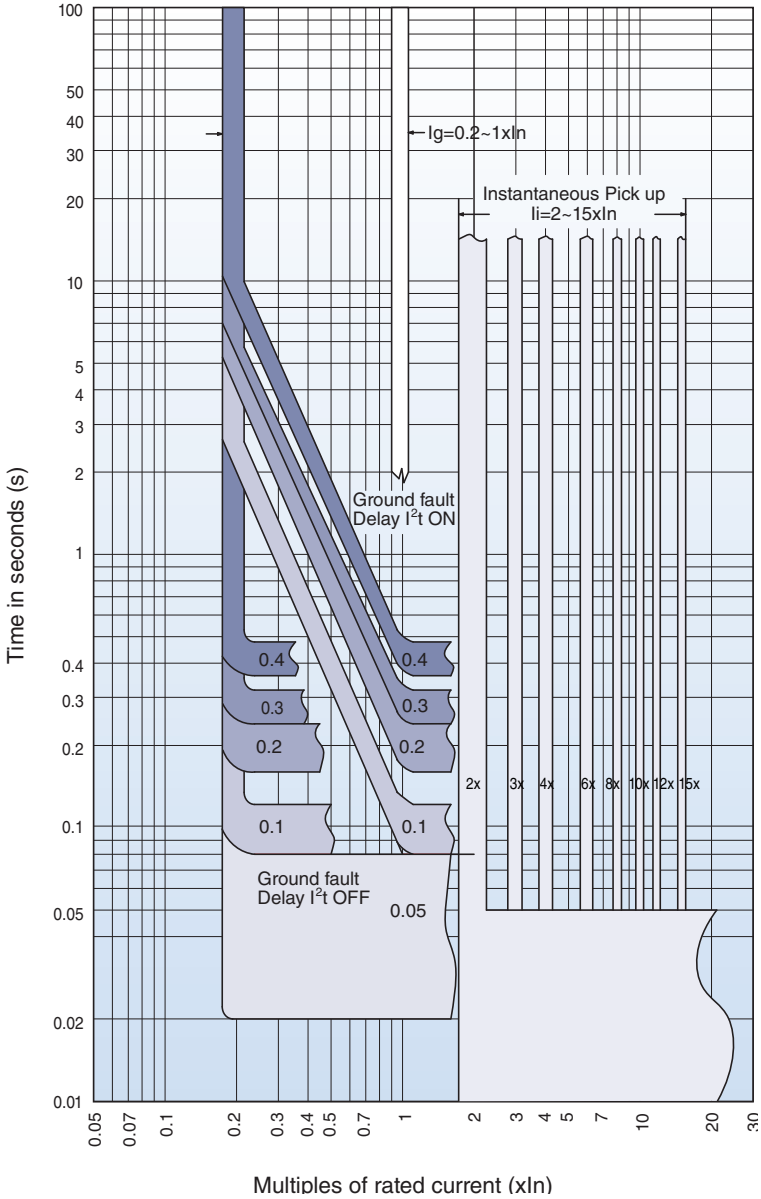
This curve is to be used for application and coordination purposes only.

INSTANTANEOUS AND GROUND FAULT (400~1200A)

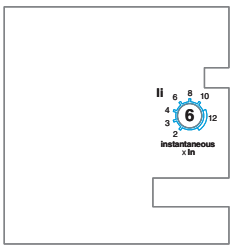
Instantaneous pickup 2~15 x In
and Ground fault pickup 0.2~1 x In
and delay 0.1~0.4s



⑥, ⑦, ⑧ - Instantaneous and
Ground fault setting

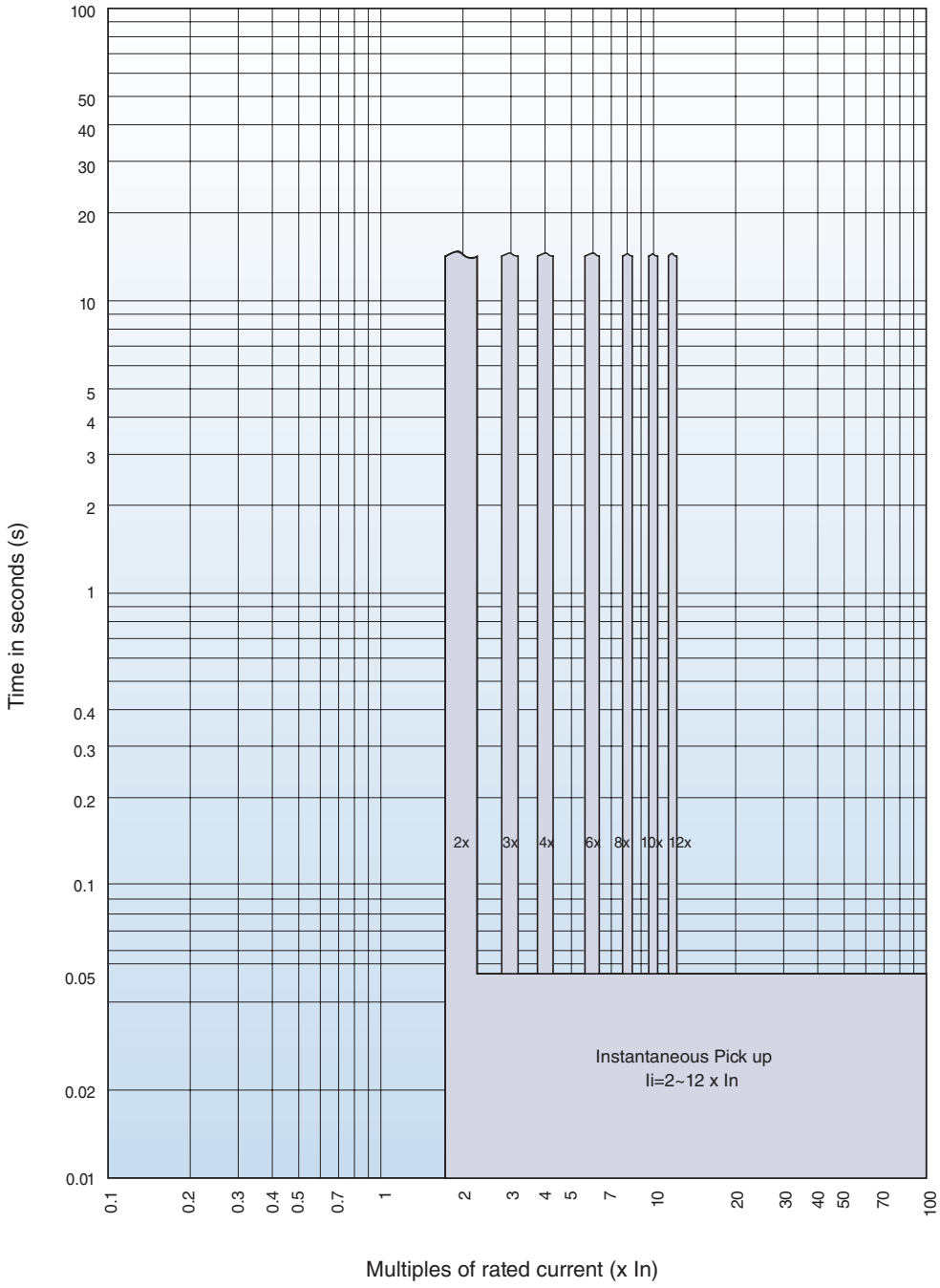


MCP: ADJUSTABLE INSTANTANEOUS TRIP CURVE (800A)



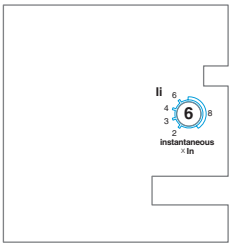
Instantaneous pickup
2~12 x In at 800A

INSTANTANEOUS PICKUP 2~12 X In AT 800A

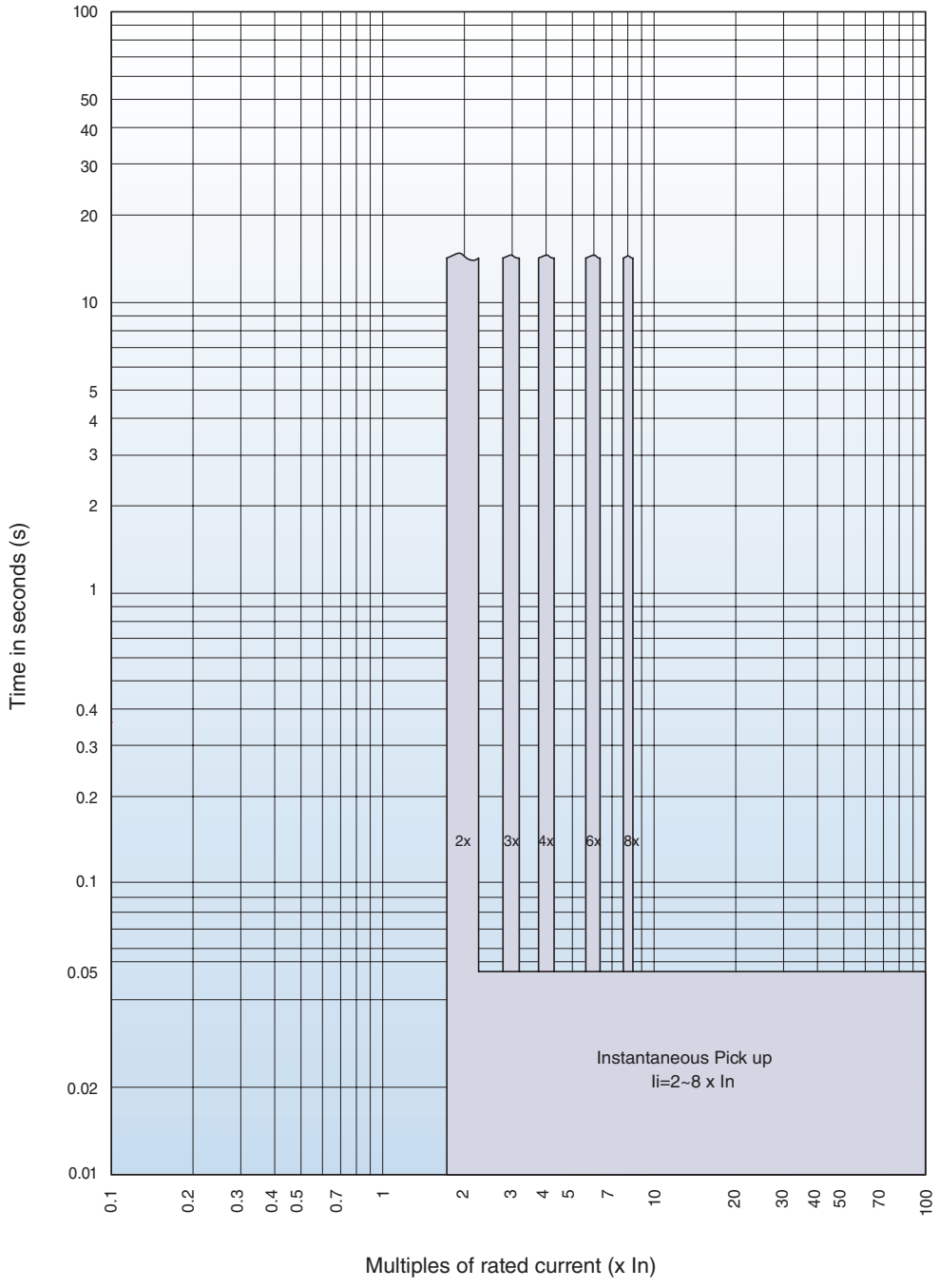


MCP: ADJUSTABLE INSTANTANEOUS TRIP CURVE (1200A)

INSTANTANEOUS PICKUP 2~8 X In AT 1200A

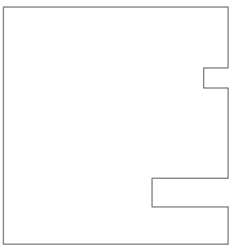


Instantaneous pickup
2~8 x In at 1200A

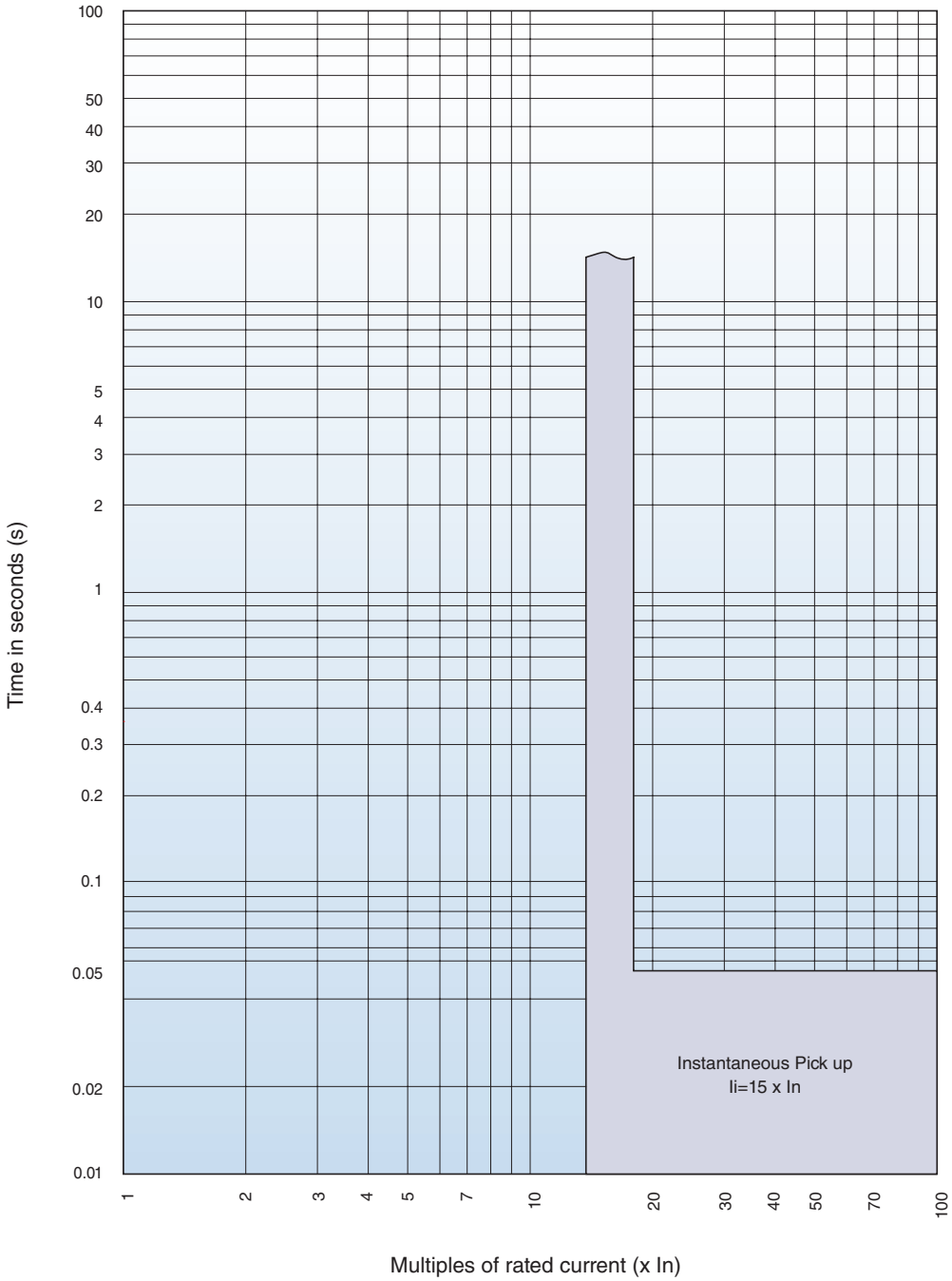


MCS: FIXED INSTANTANEOUS TRIP CURVE (800~1200A)

INSTANTANEOUS PICKUP 15 X In AT 800A, 1200A



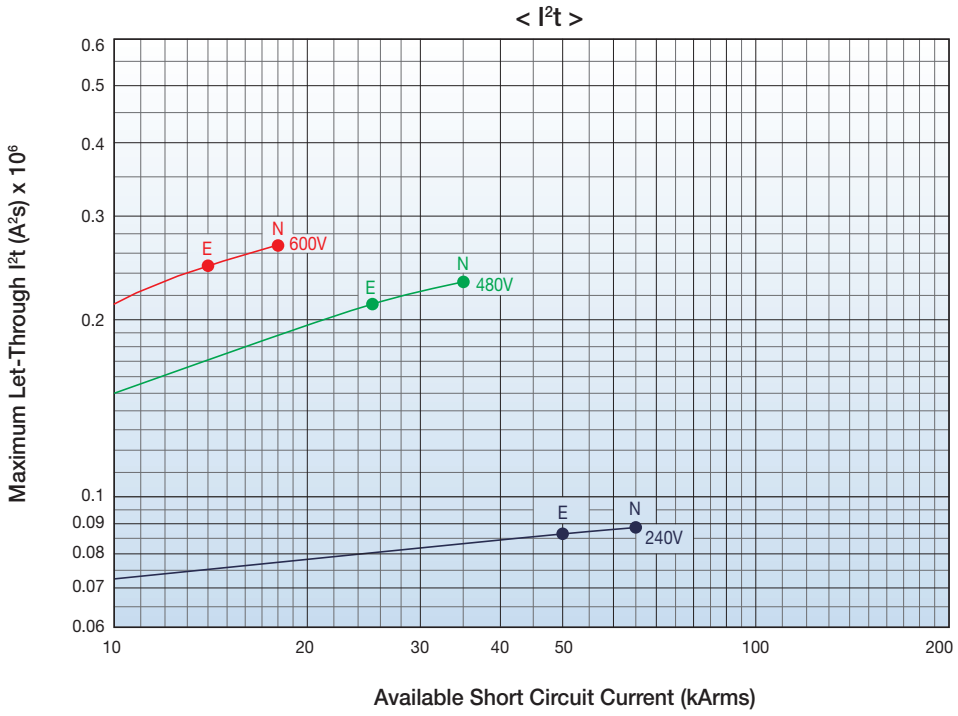
Instantaneous pickup
15 x In at 800A, 1200A



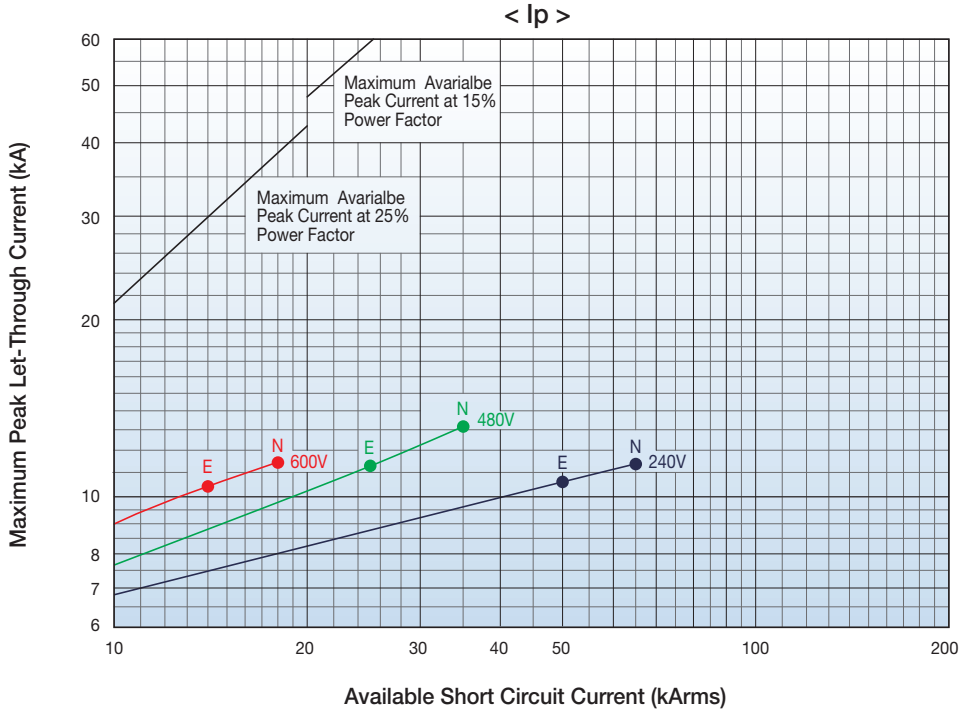
UTE100 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



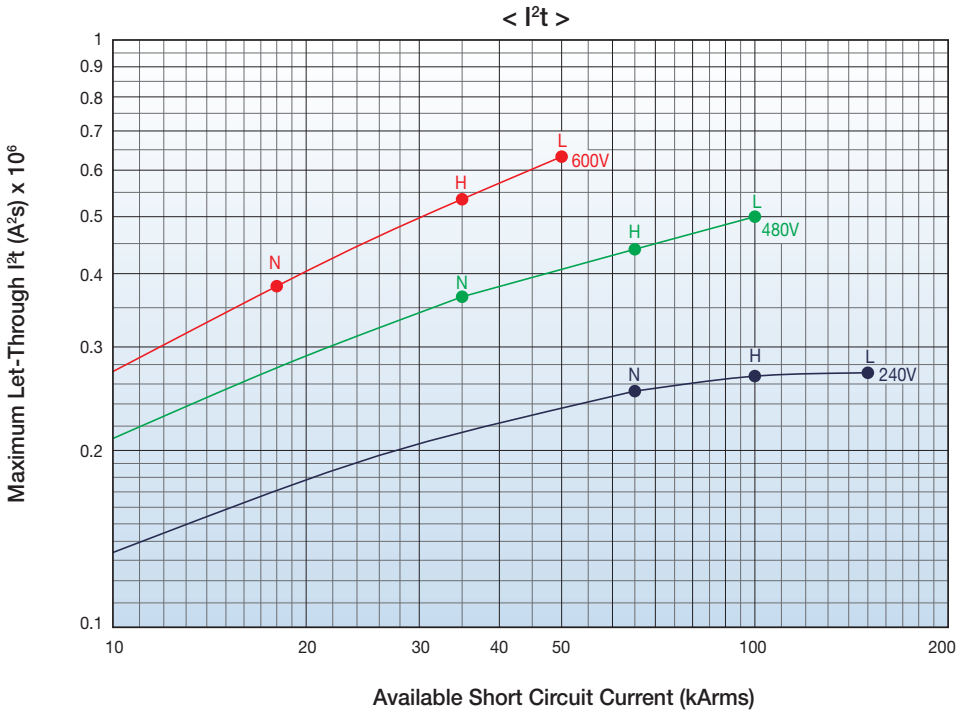
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



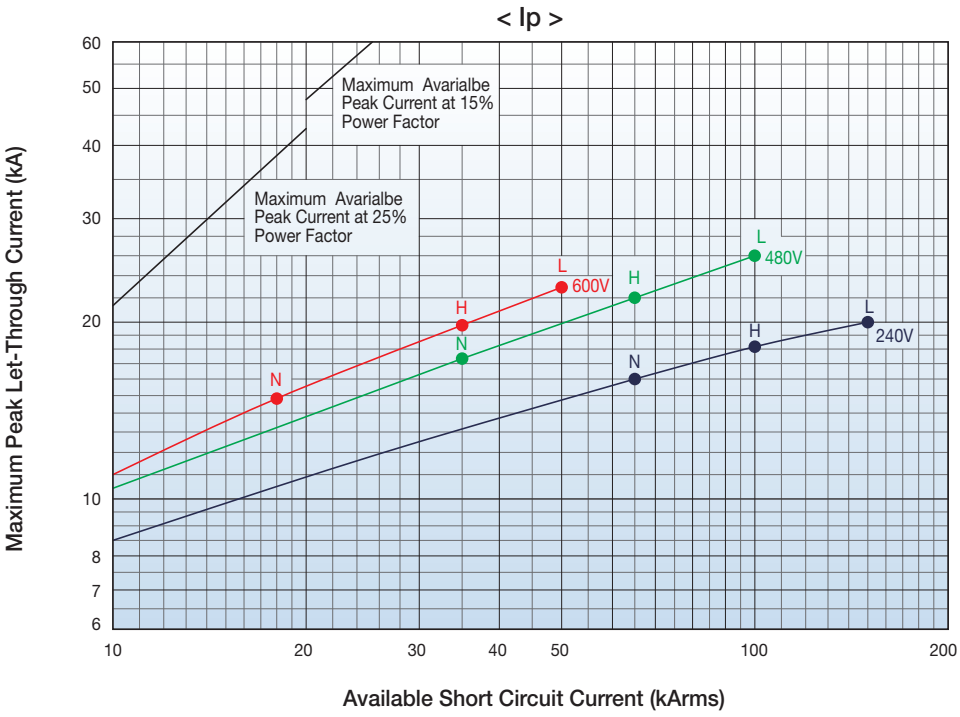
UTS150 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



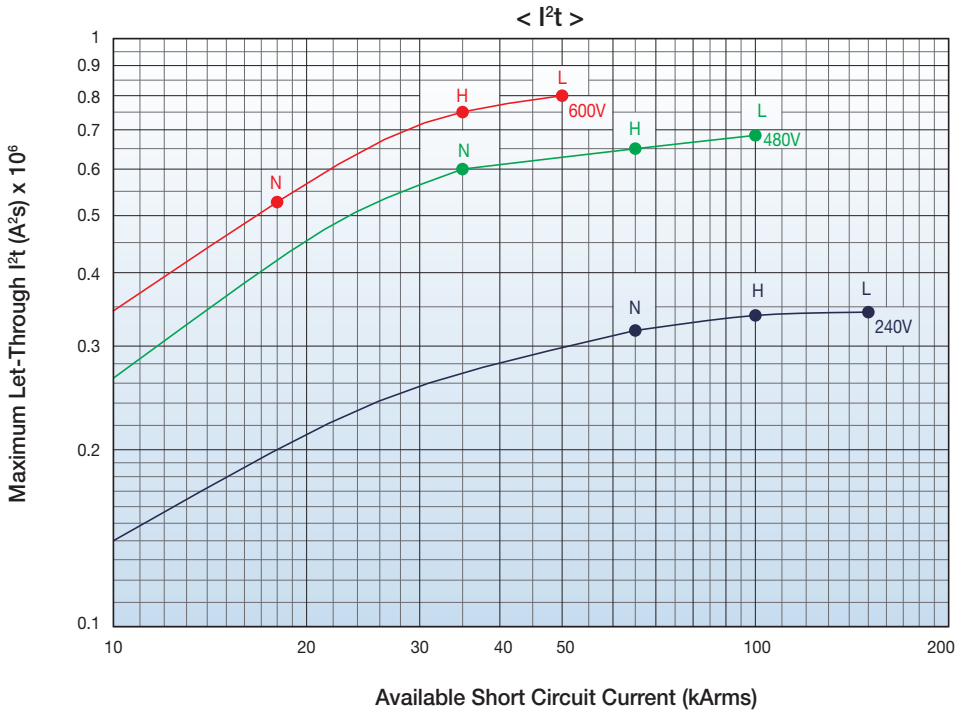
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



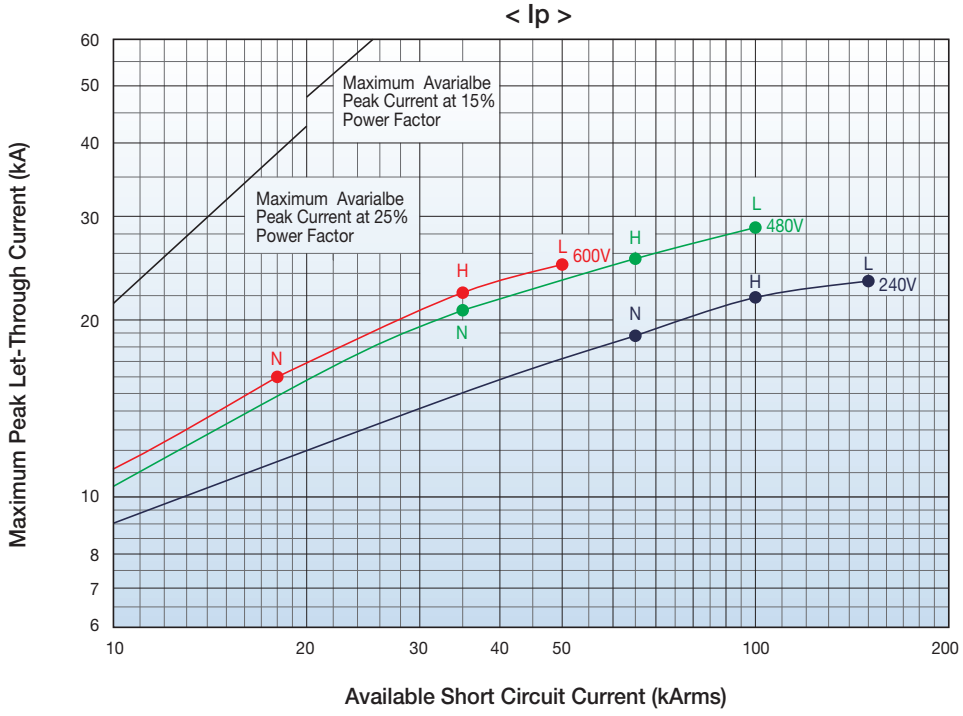
UTS250 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



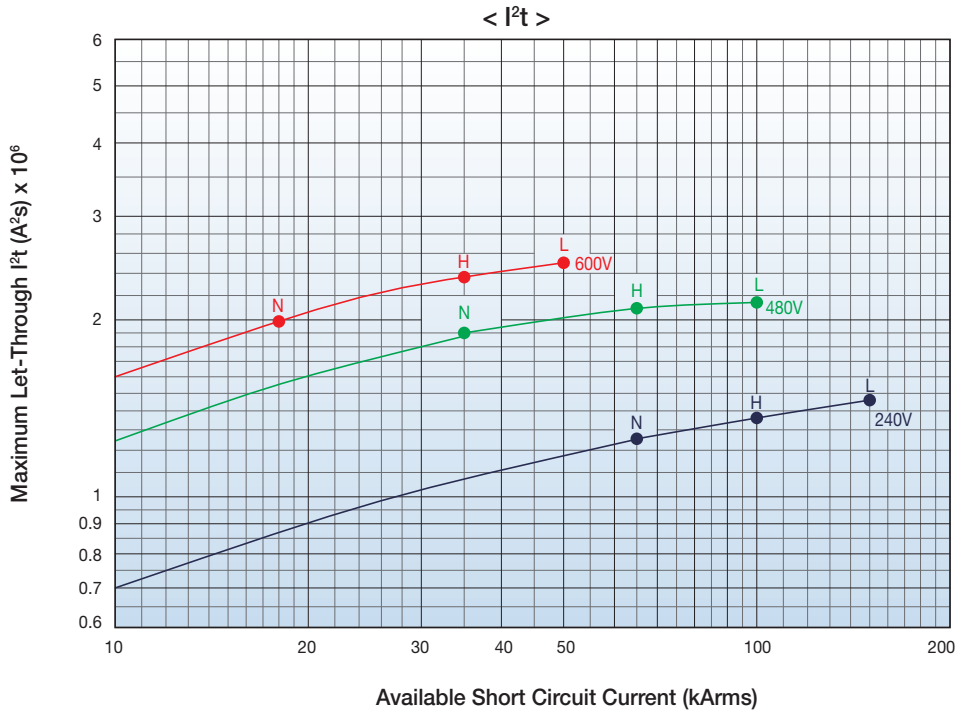
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



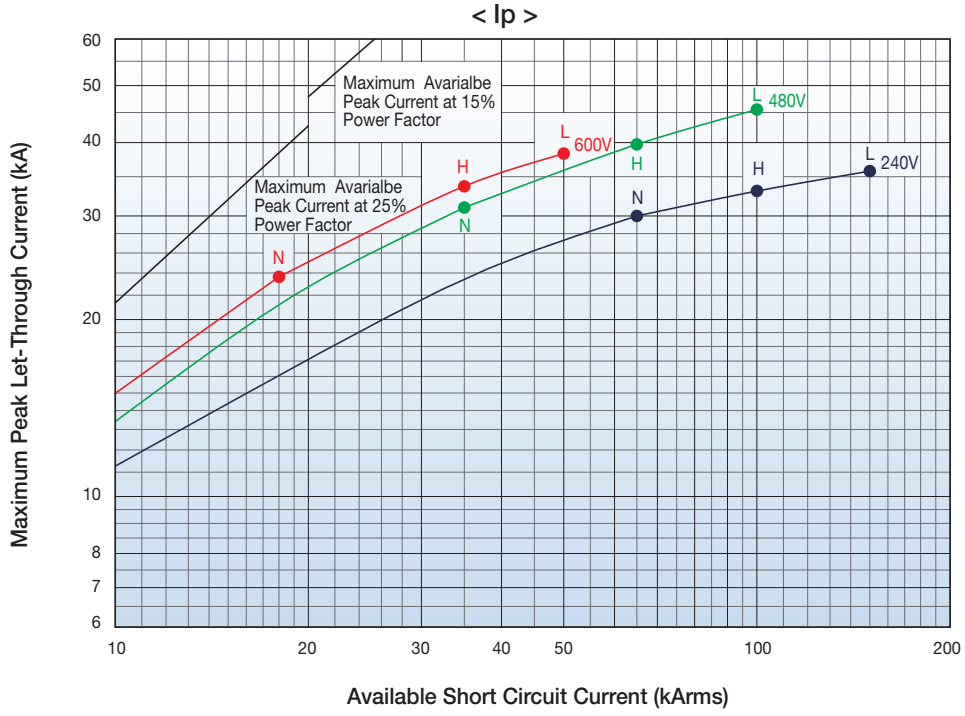
UTS400 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



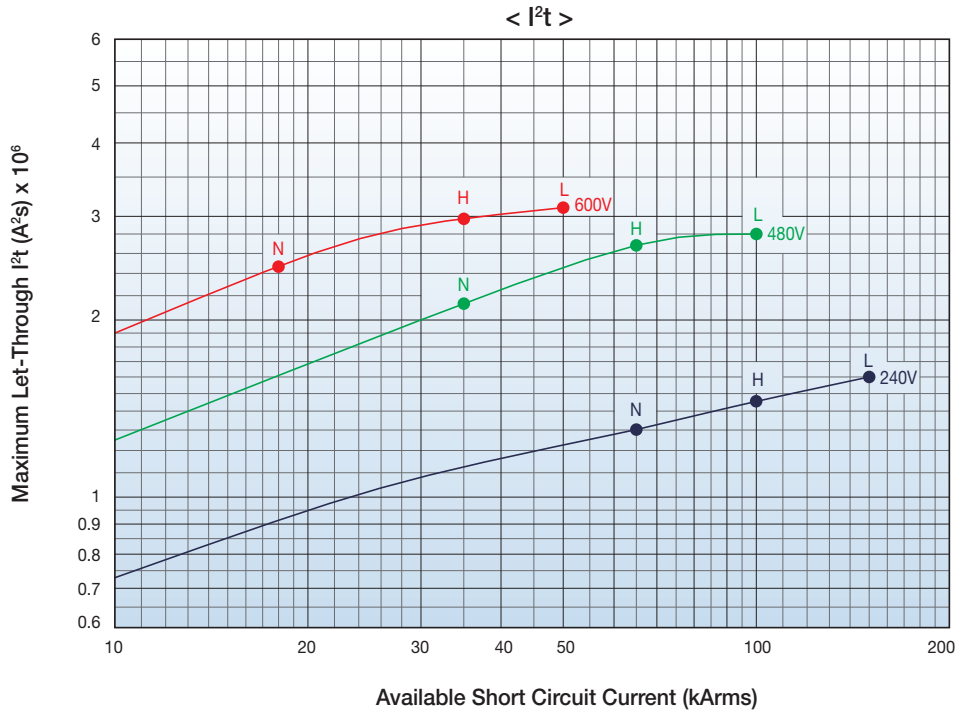
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



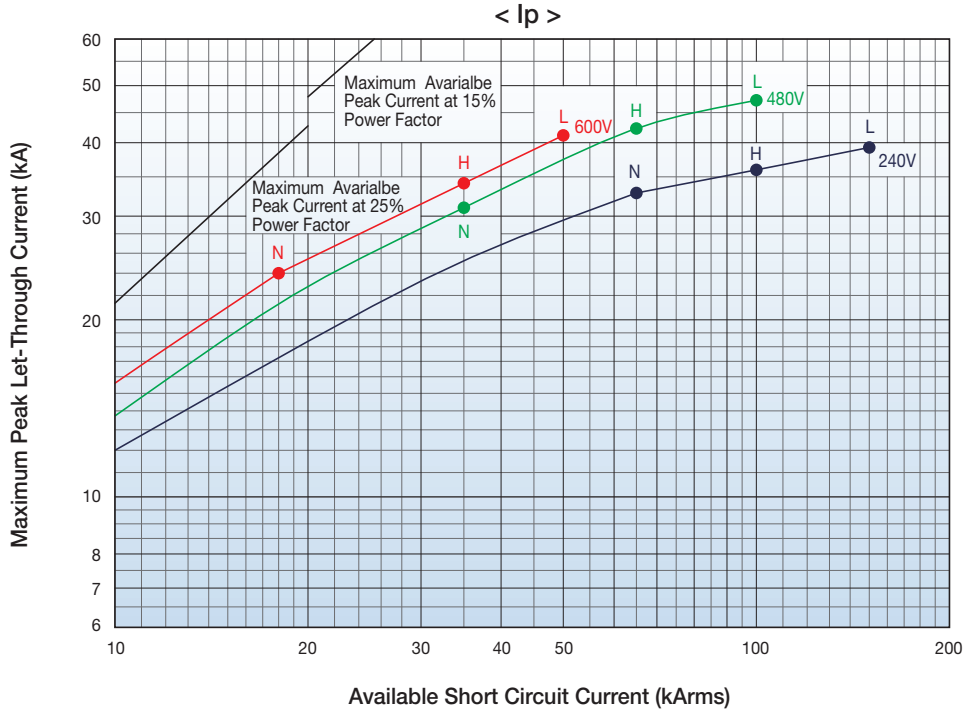
UTS600 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



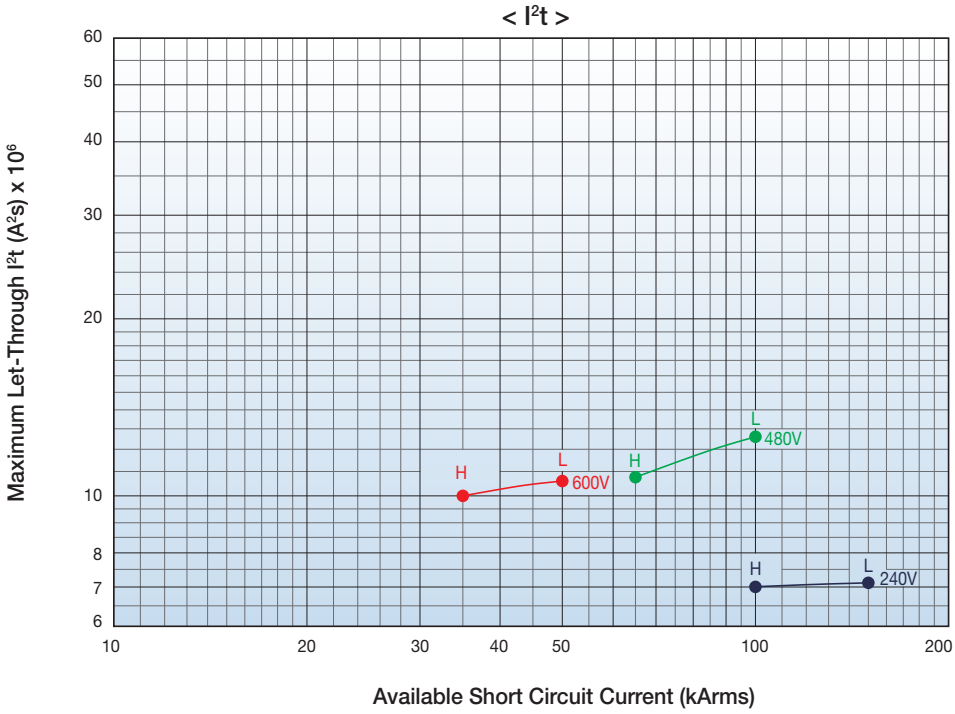
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



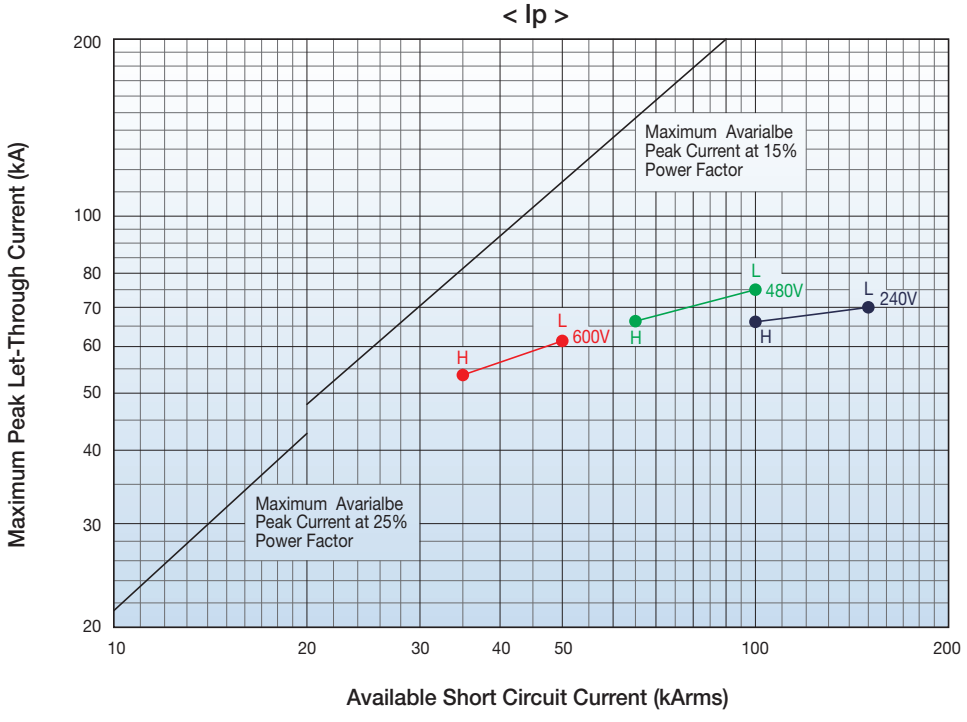
UTS800 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



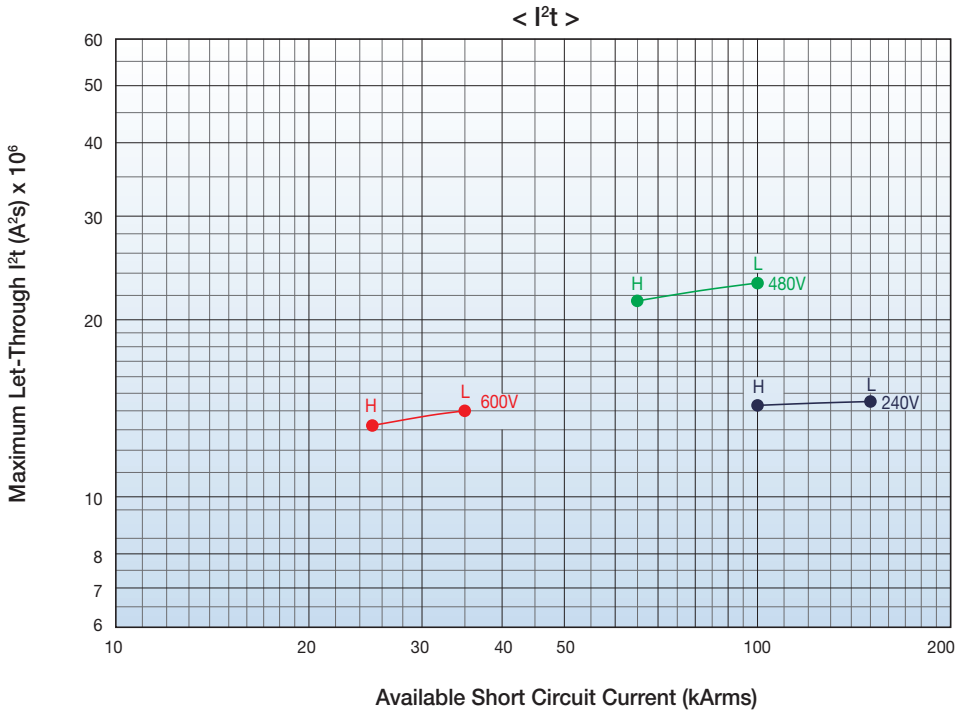
PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



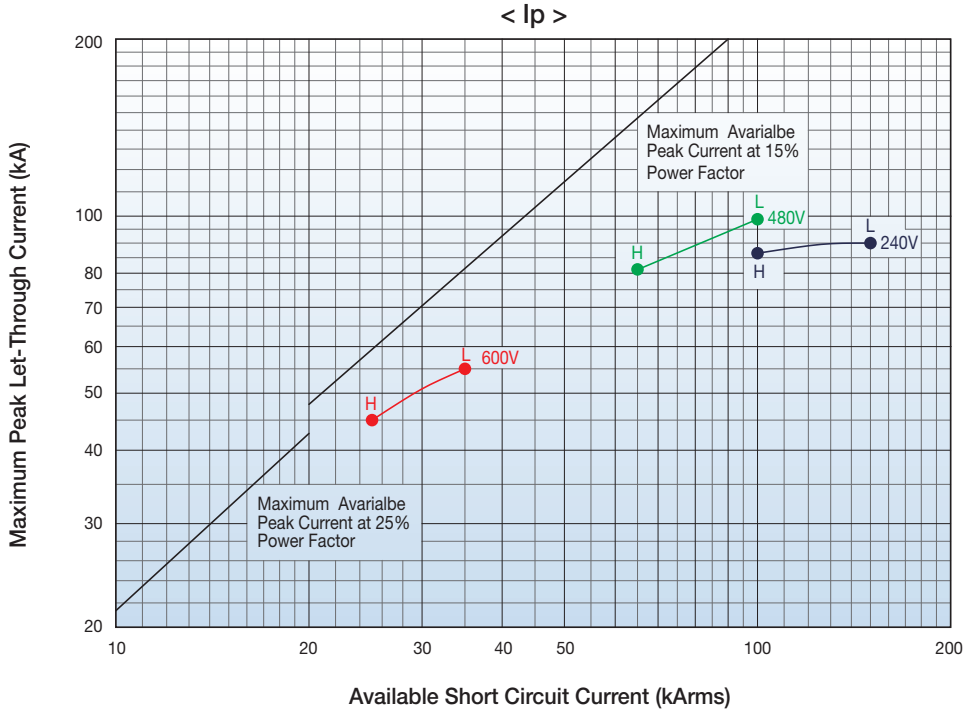
UTS1200 CHARACTERISTIC

Based on typical values obtained throughout the circuit breaker development and UL test programs.

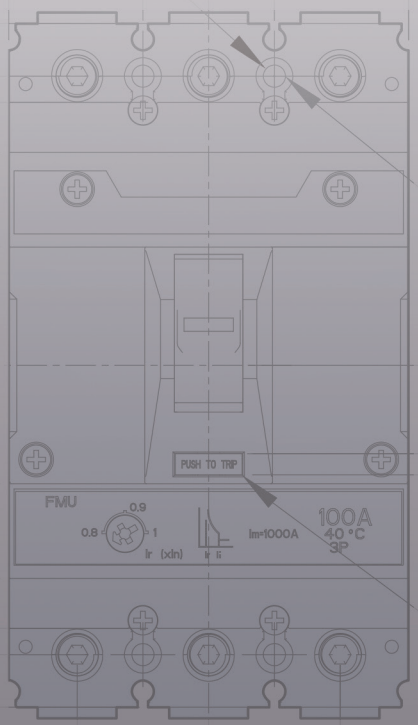
LET-THROUGH ENERGY I²t (240V, 480V AND 600V)



PEAK LET-THROUGH CURRENT Ip (240V, 480V AND 600V)



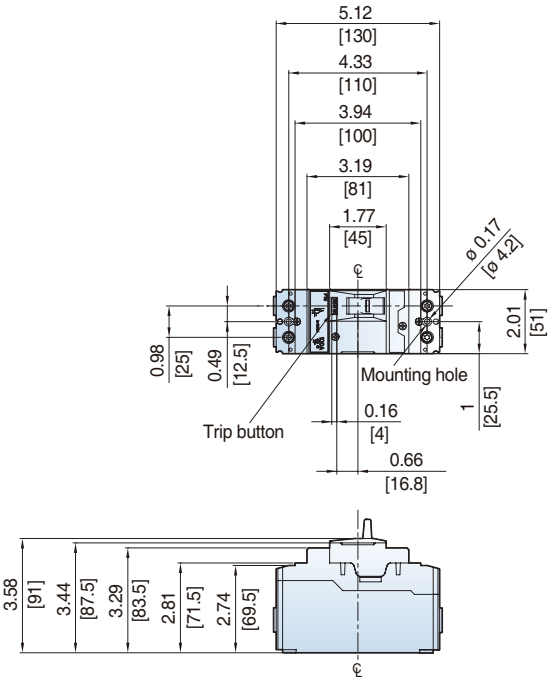
DIMENSIONS

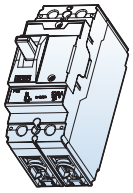


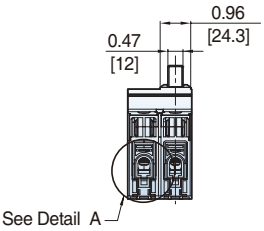
DIMENSIONS UTE100 CIRCUIT BREAKERS

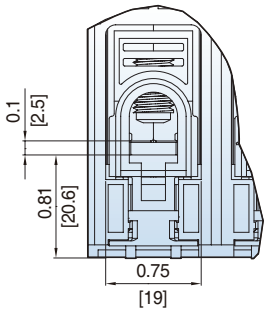
UTE100 2P Circuit Breaker [Lug type]

Dimension: inch[mm]



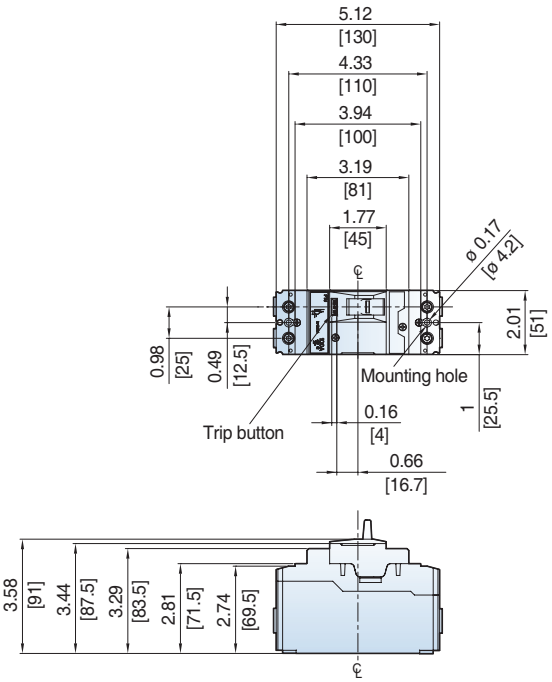


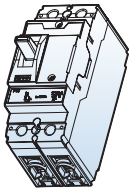


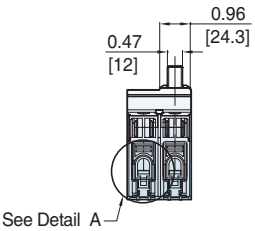


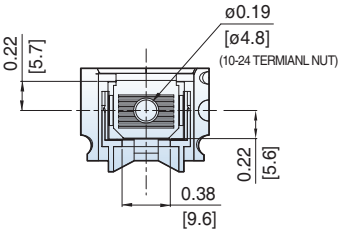
Detail A

UTE100 2P Circuit Breaker [Bolt-on Type]

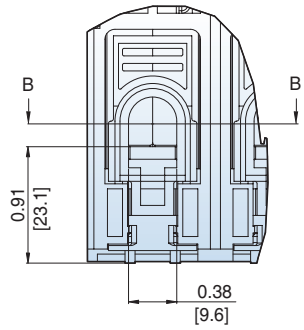








Section B-B

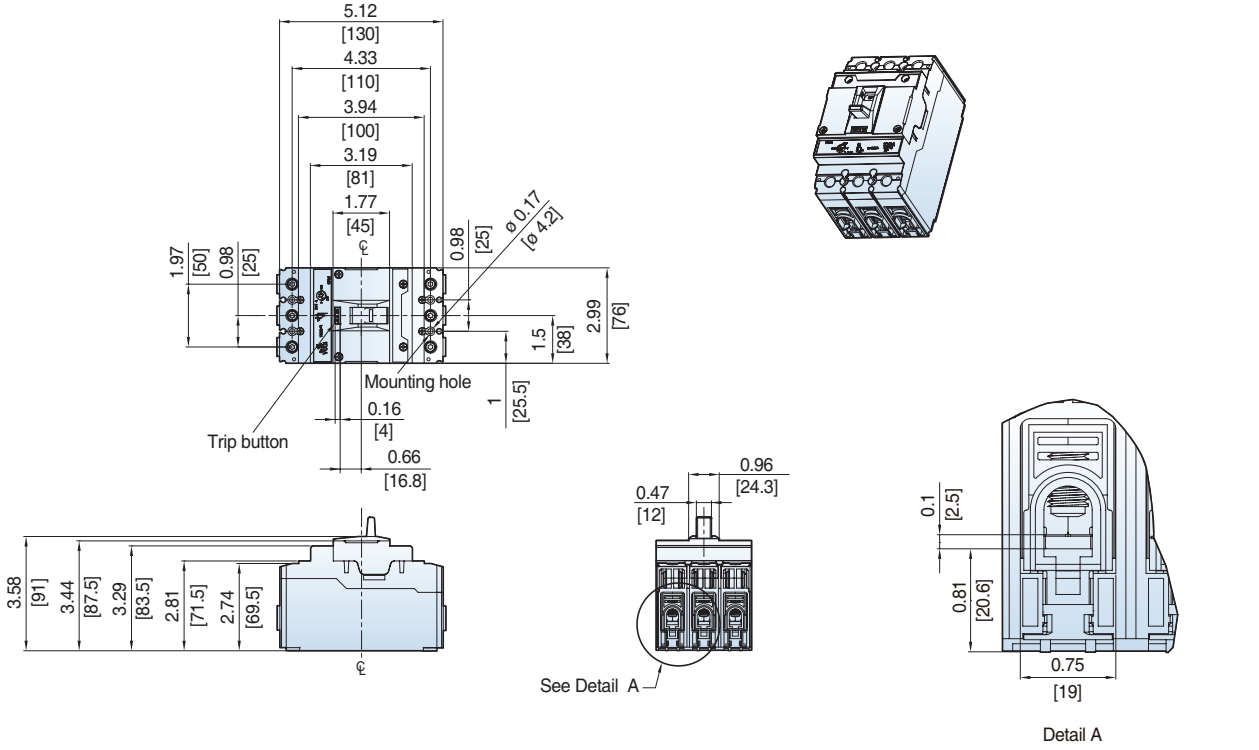


Detail A

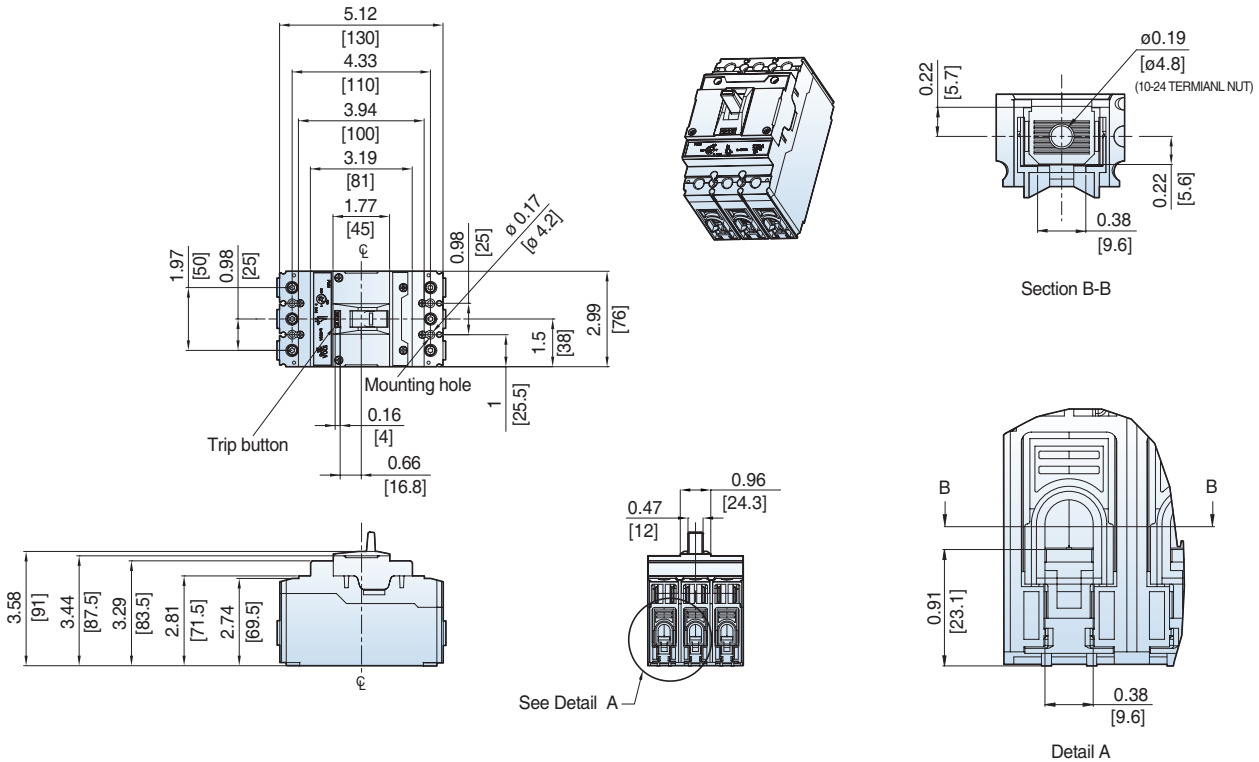
DIMENSIONS UTE100 CIRCUIT BREAKERS

UTE100 3P Circuit Breaker [Lug type]

Dimension: inch[mm]

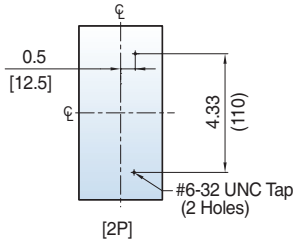


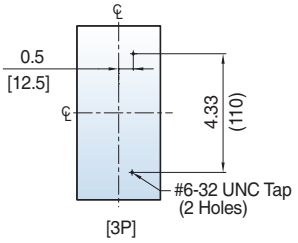
UTE100 3P Circuit Breaker [Bolt-on Type]



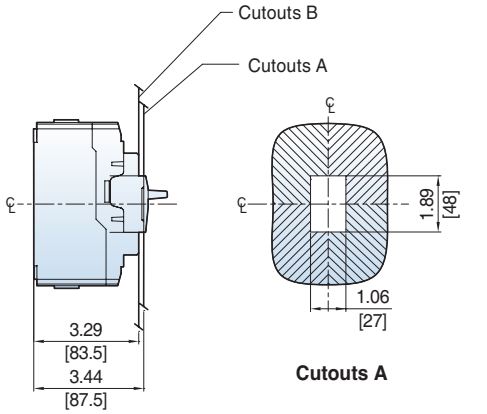
UTE100 Circuit Breakers Mounting

Dimension: inch[mm]

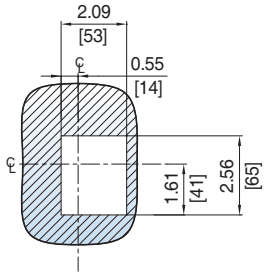




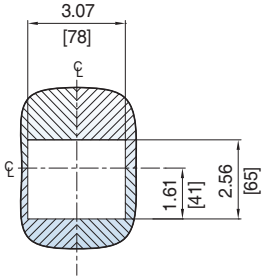
UTE100 Circuit Breakers Door Cutouts



Cutouts A

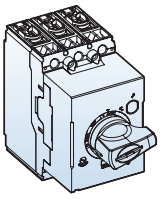


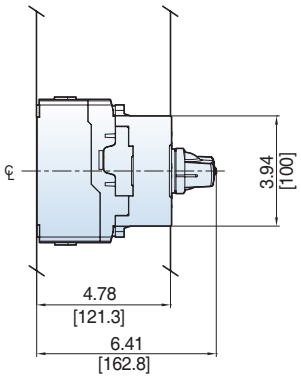
Cutouts B [2P]

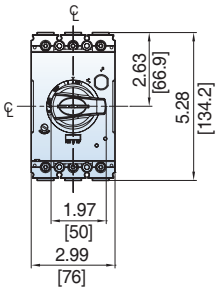


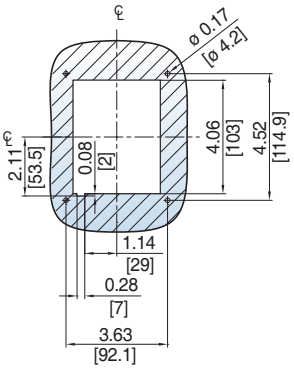
Cutouts B [3P]

UTE100 Directly Mounted Rotary Operating Handle [DH-0]

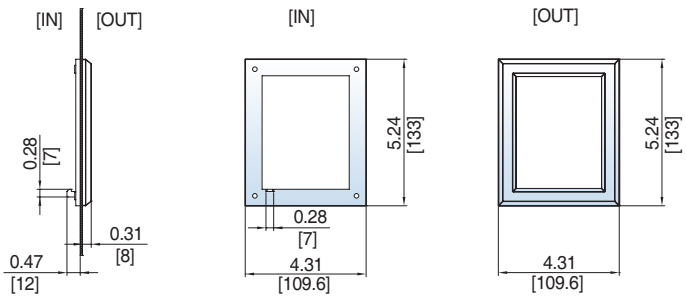








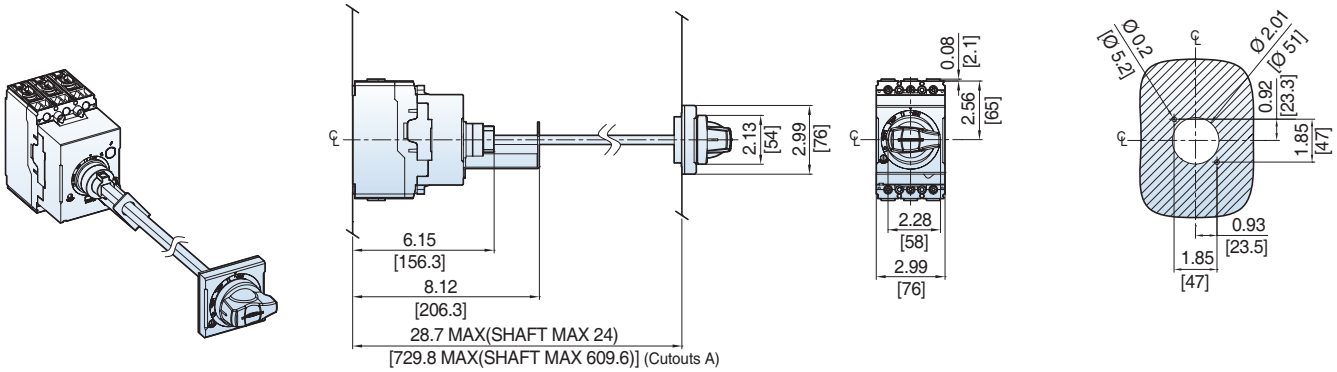
Cutouts A



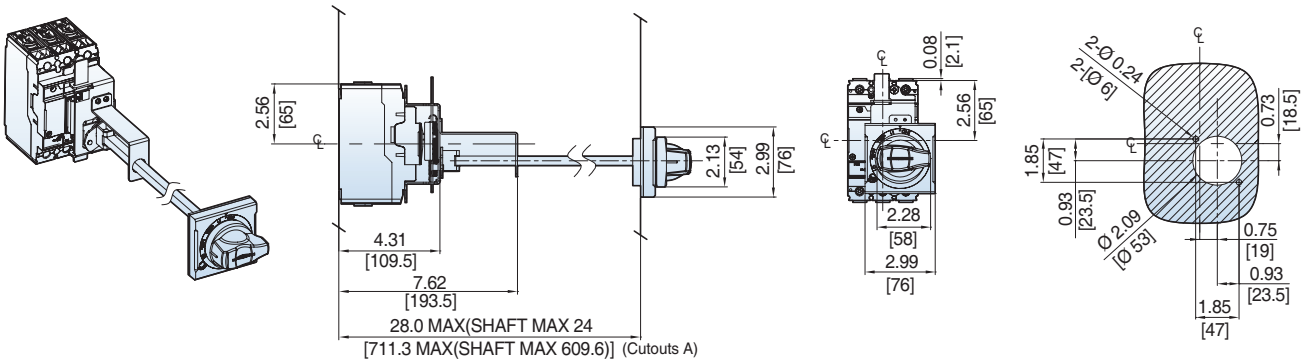
DIMENSIONS UTE100 CIRCUIT BREAKERS

UTE100 Door-Mounted Rotary Operating Handle [REH-0]

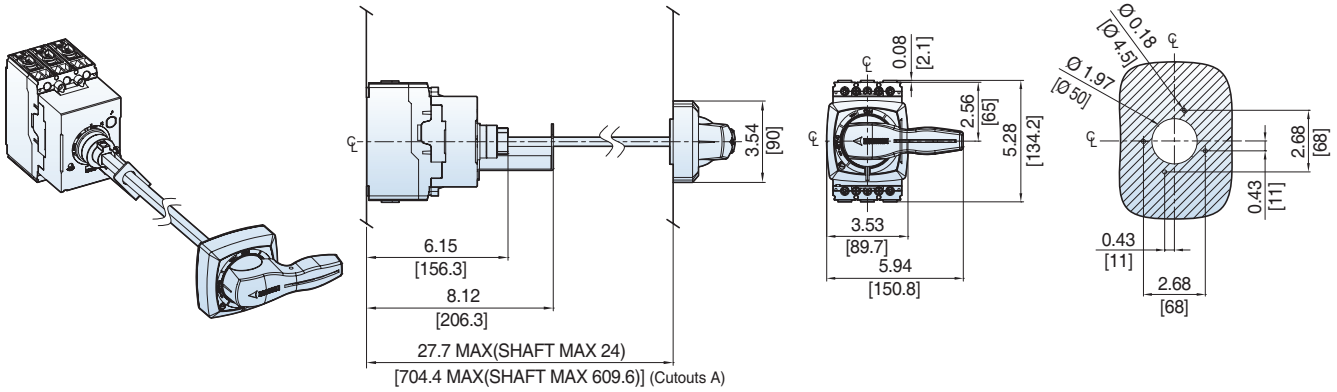
Dimension: inch[mm]



UTE100 Door-Mounted Rotary Operating Handle [REH-0C]

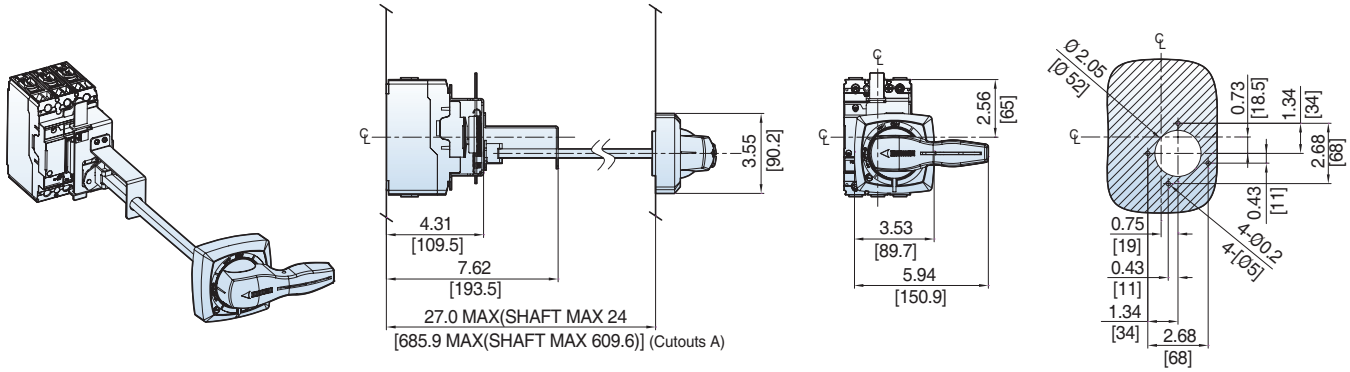


UTE100 NEMA Door-Mounted Rotary Operating Handle [EHU-0, EHV-0, EHX-0]

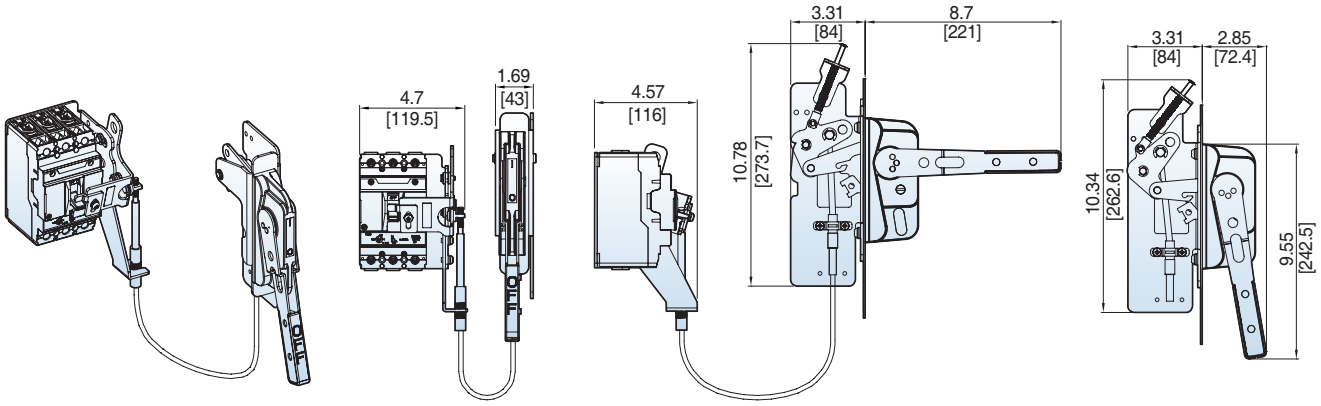


UTE100 NEMA Door-Mounted Rotary Operating Handle [EHU-0C, EHX-0C]

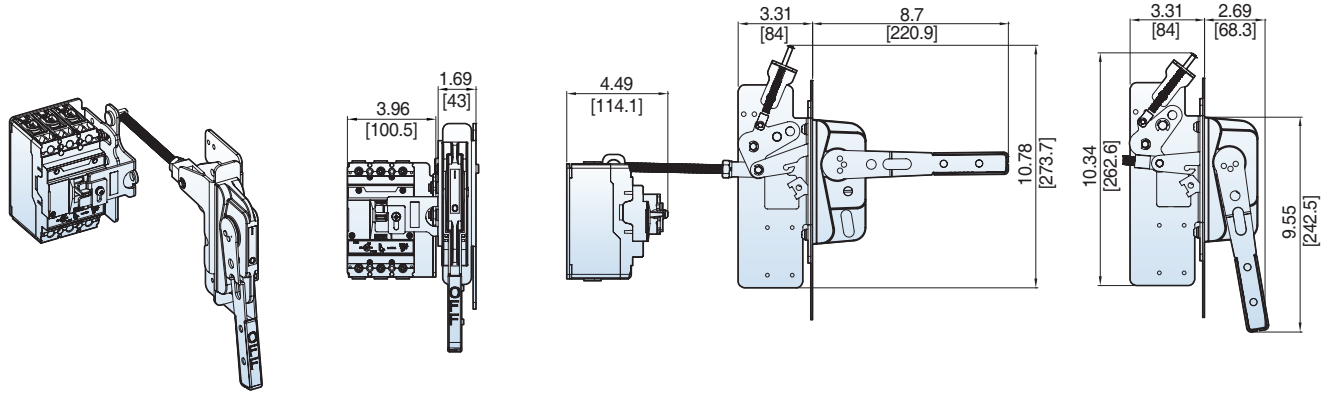
Dimension: inch[mm]



UTE100 Flange-Mounted Cable Operating Handle [COM-0 + FHU, X-S + Cable]



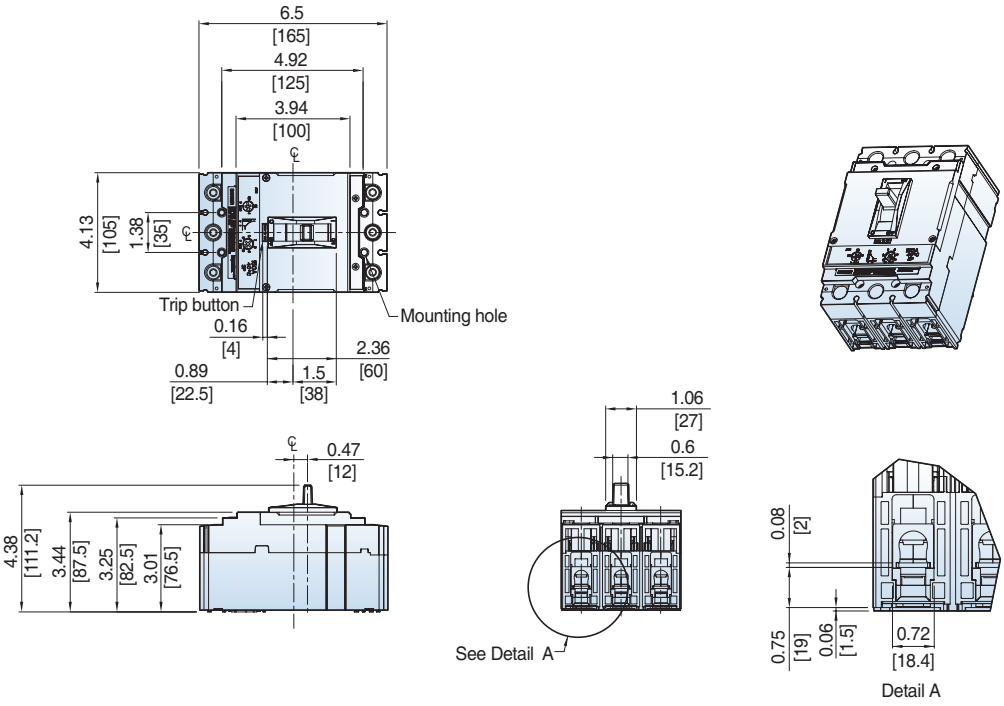
UTE100 Flange-Mounted Variable-Depth Operating Handle [VDM-0 + FHU, X-S]



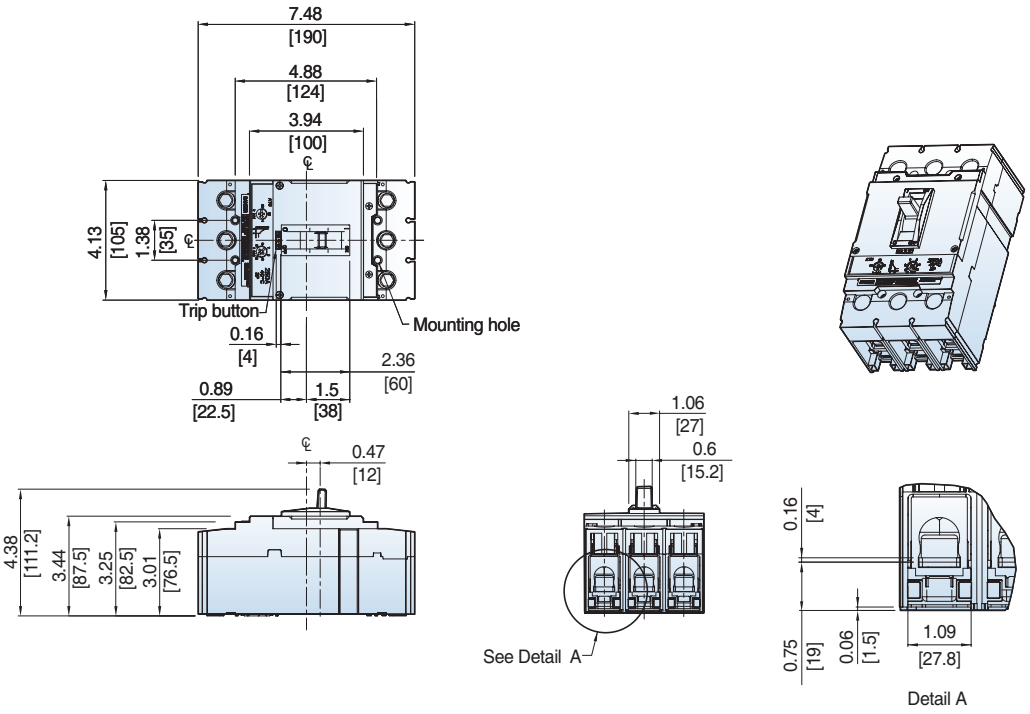
DIMENSIONS UTS150/250 CIRCUIT BREAKERS

UTS150 3P Circuit Breaker [Lug type]

Dimension: inch[mm]

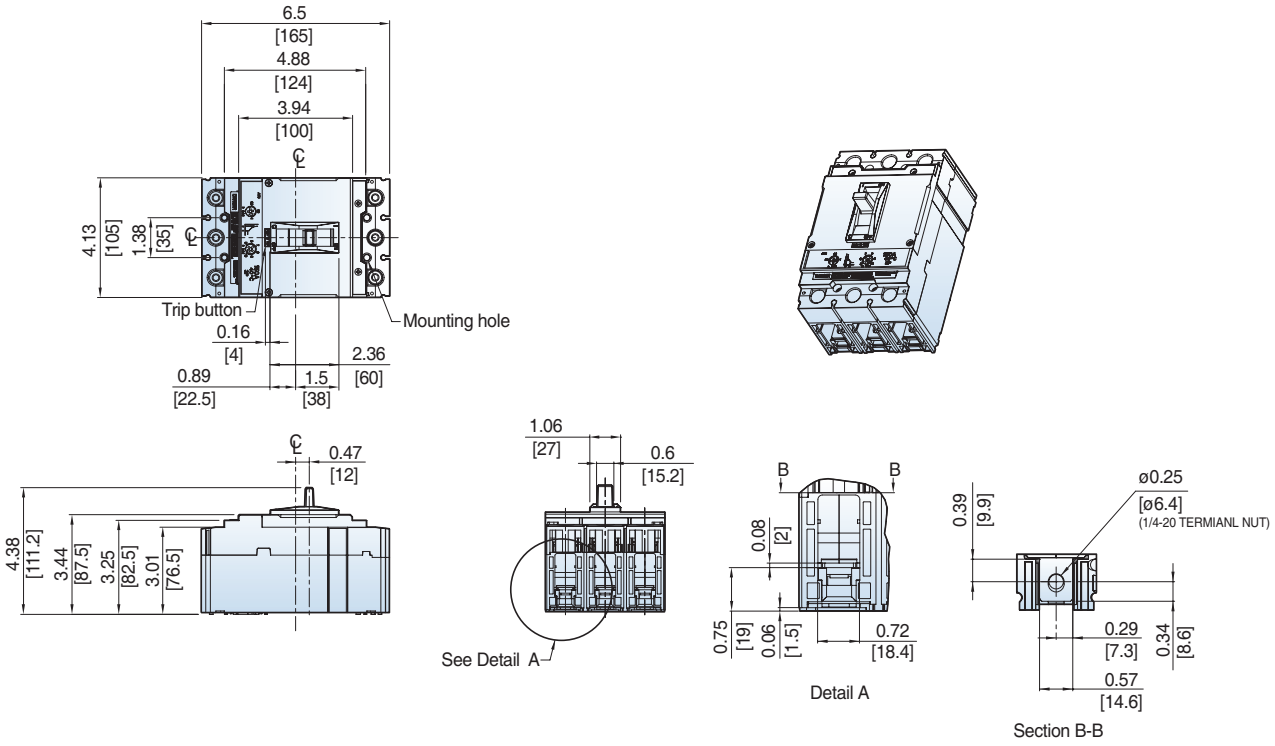


UTS250 3P Circuit Breaker [Lug type]

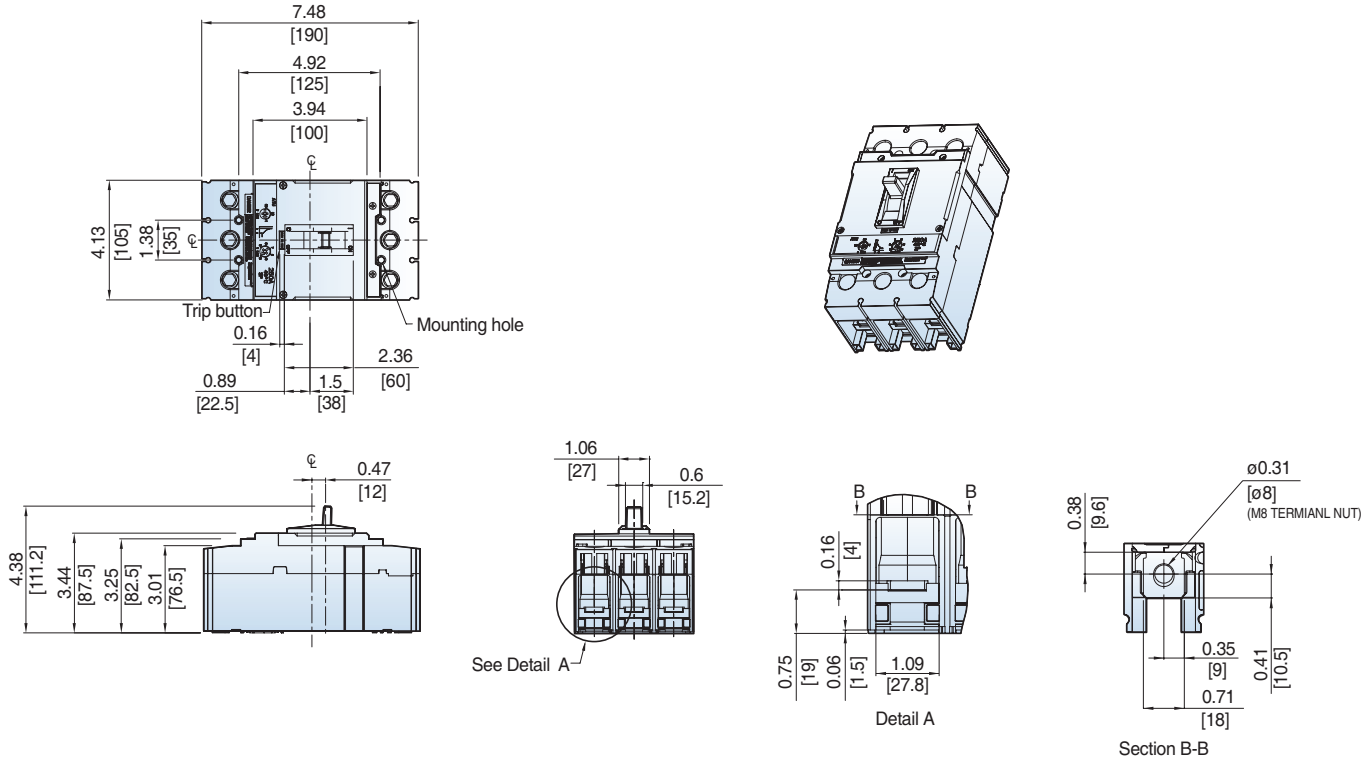


UTS150 3P Circuit Breaker [Bolt-on Type]

Dimension: inch[mm]



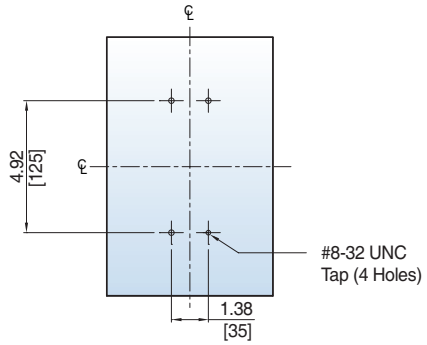
UTS250 3P Circuit Breaker [Bolt-on Type]



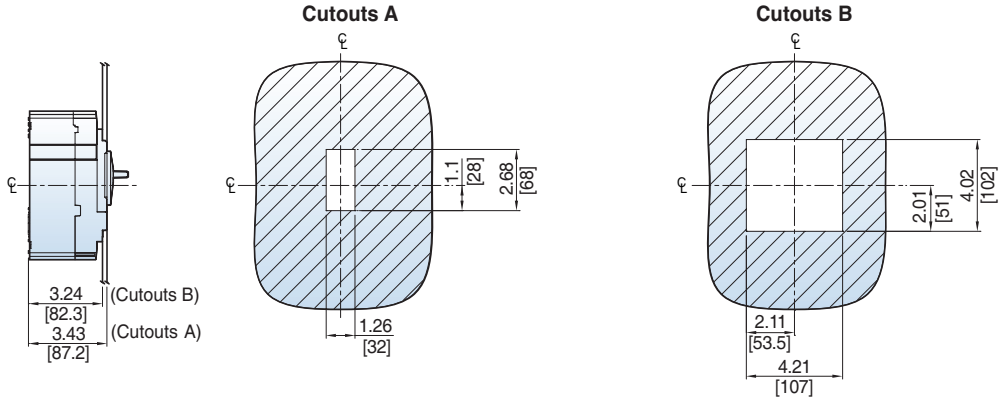
DIMENSIONS UTS150/250 CIRCUIT BREAKERS

UTS150/250 Circuit Breaker & Accessory Mounting

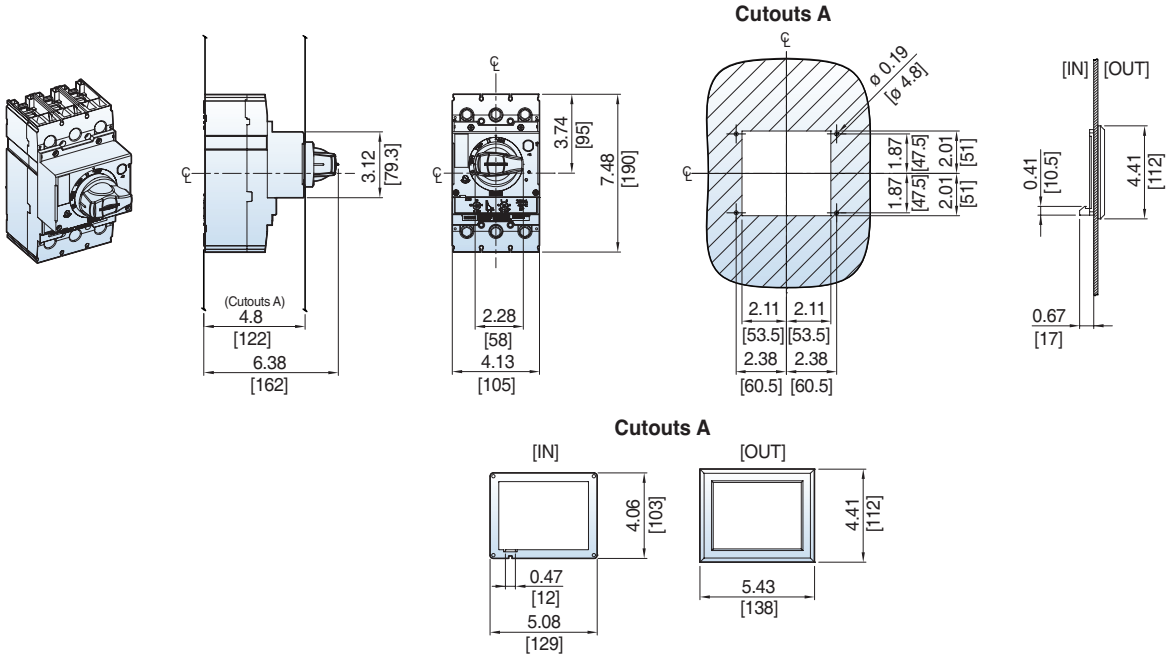
Dimension: inch[mm]



UTS150/250 Circuit Breaker Door Cutouts

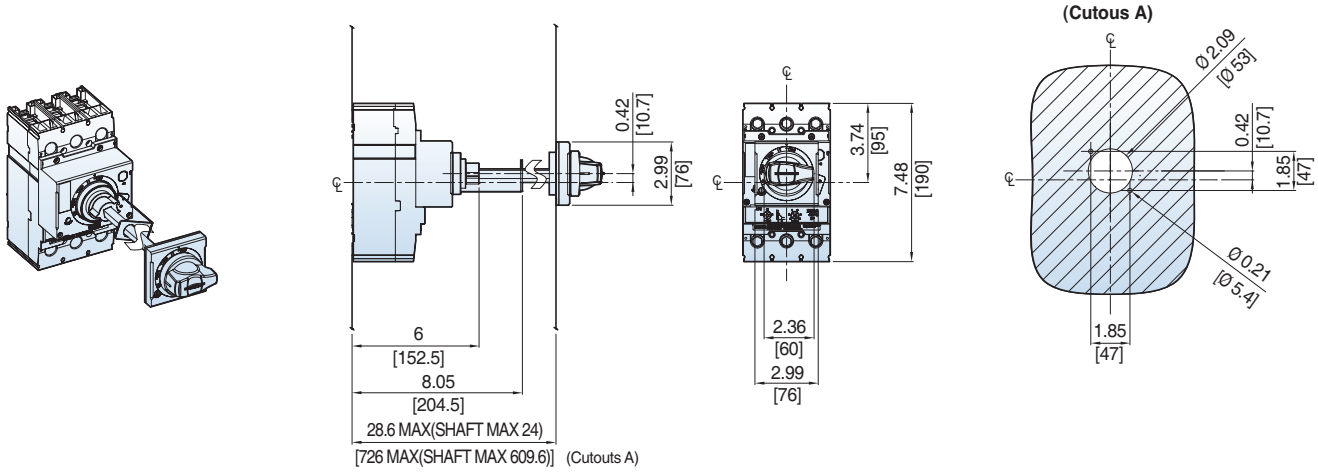


UTS150/250 Directly Mounted Rotary Operating Handle [DH-2]

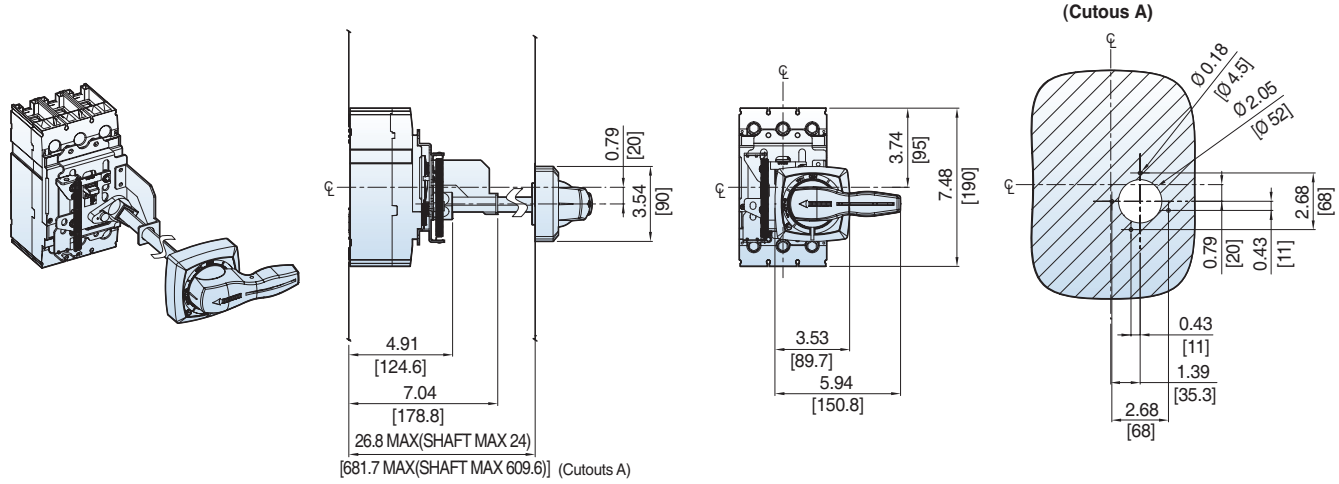


UTS150/250 Door-Mounted Rotary Operating Handle [REH-2]

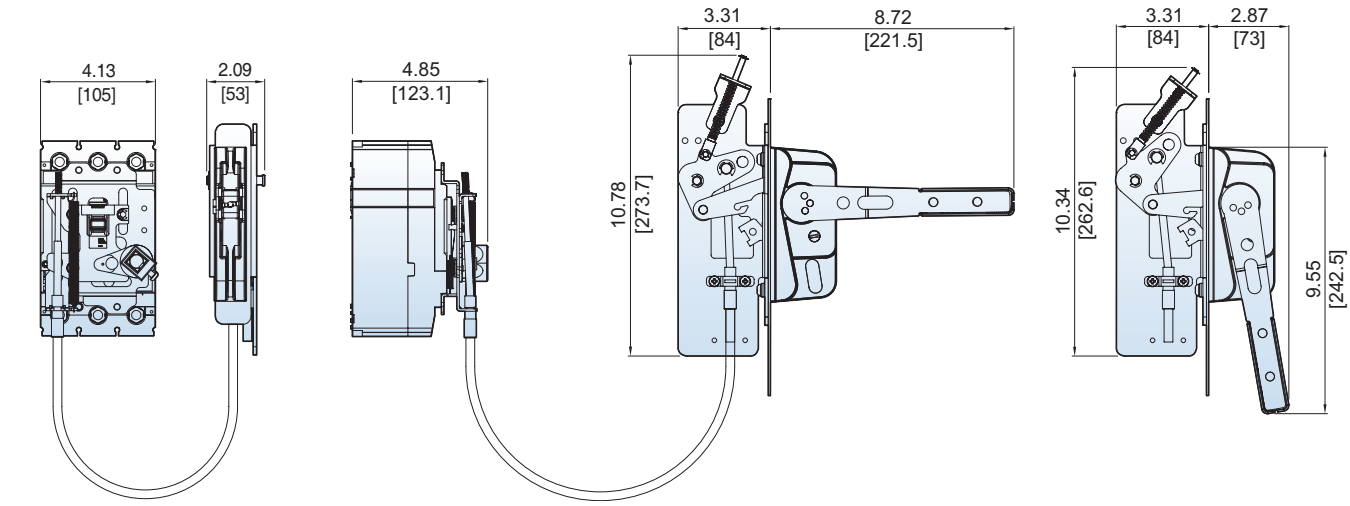
Dimension: inch[mm]



UTS150/250 NEMA Door-Mounted Rotary Operating Handle [EHU-2, EHV-2, EHX-2]



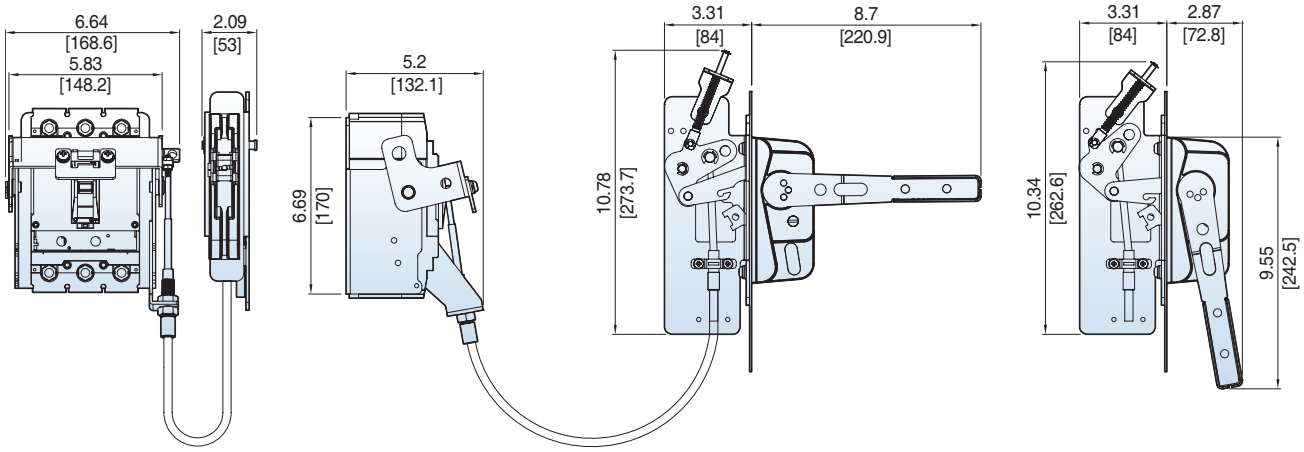
UTS150/250 Flange-Mounted Cable Operating Handle [FHU-2, FHX-2 Type]



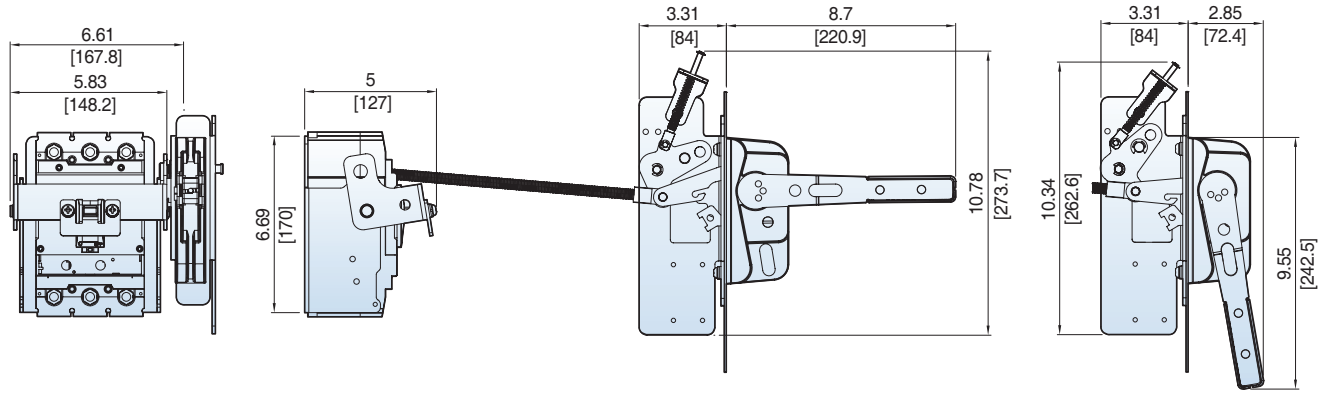
DIMENSIONS UTS150/250 CIRCUIT BREAKERS

UTS150/250 Flange-Mounted Cable Operating Handle [COM-2 + FHU, X-S + Cable]

Dimension: inch[mm]



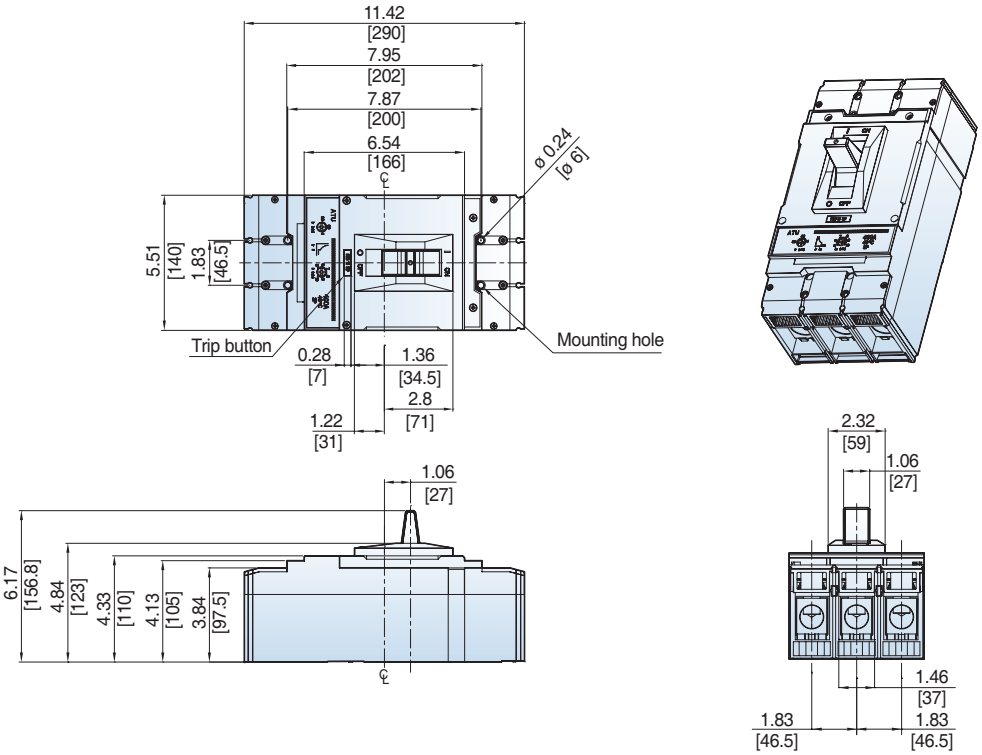
UTS150/250 Flange-Mounted Variable-Depth Operating Handle [VDM-2 + FHU, X-S]



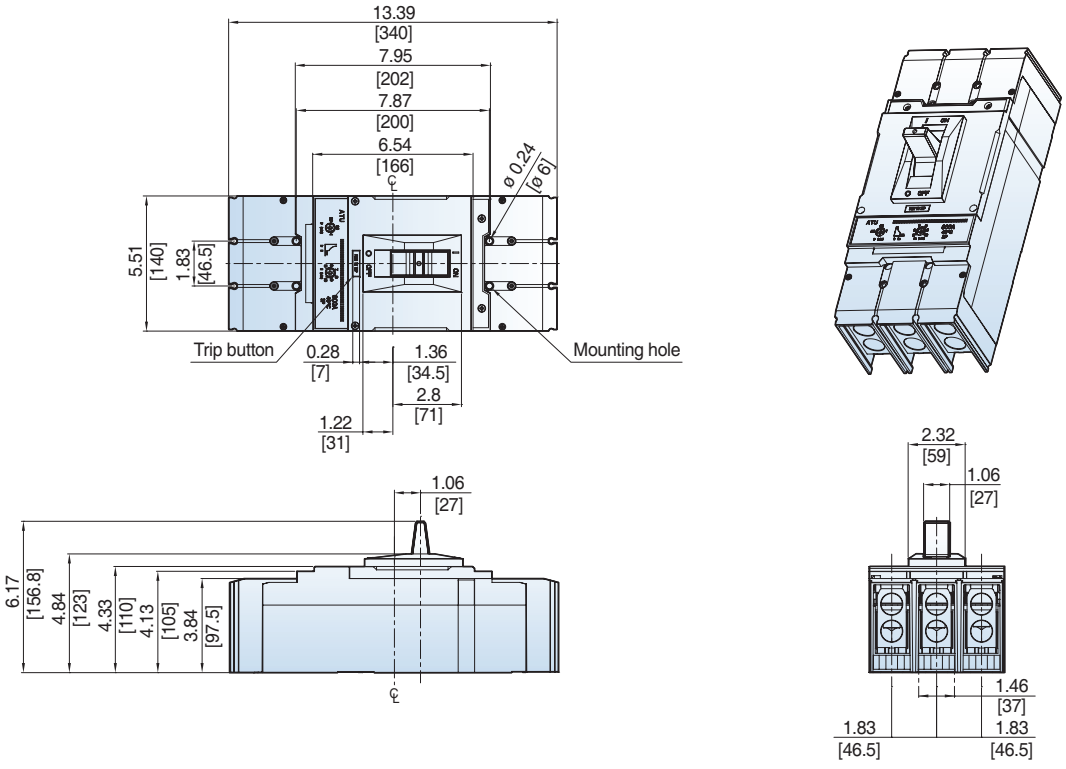
DIMENSIONS UTS400/600 CIRCUIT BREAKERS

UTS400 3P Circuit Breaker [Lug type]

Dimension: inch[mm]



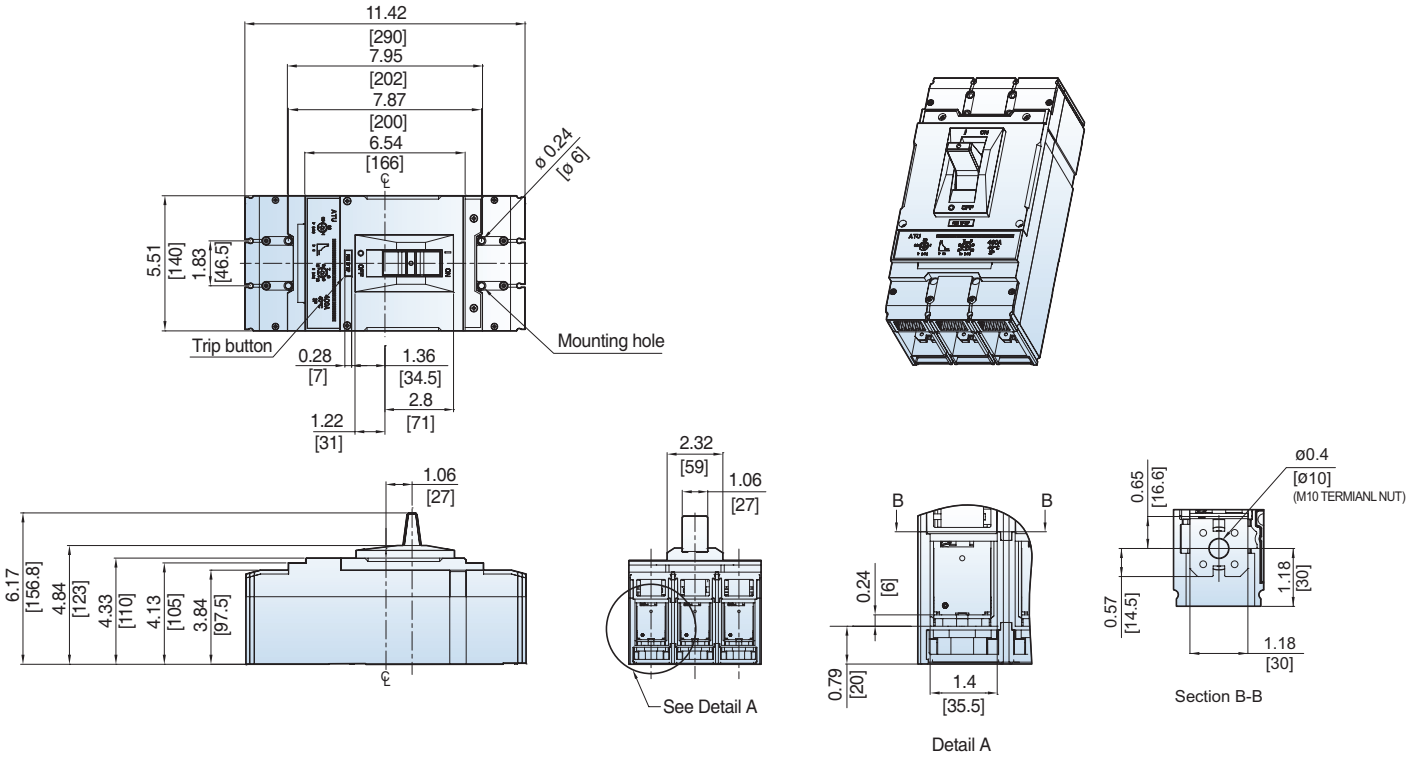
UTS600 3P Circuit Breaker [Lug type]



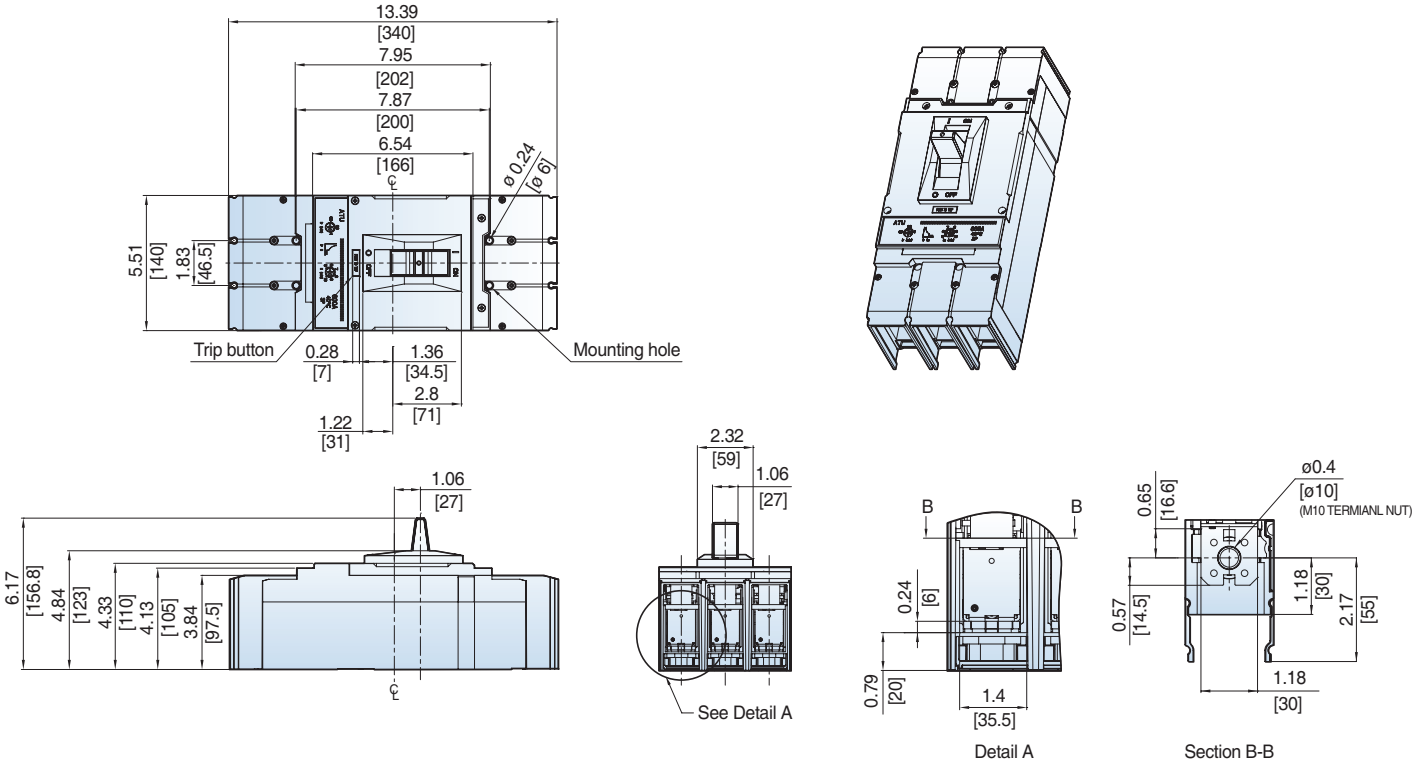
DIMENSIONS UTS400/600 CIRCUIT BREAKERS

UTS400 3P Circuit Breaker [Bolt-on Type]

Dimension: inch[mm]

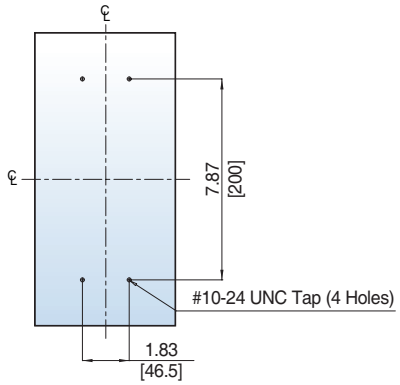


UTS600 3P Circuit Breaker [Bolt-on Type]

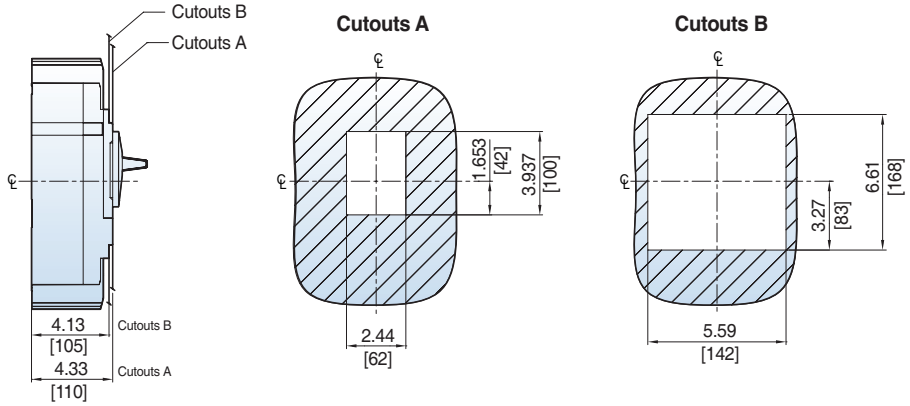


UTS400/600 Circuit Breaker Mounting

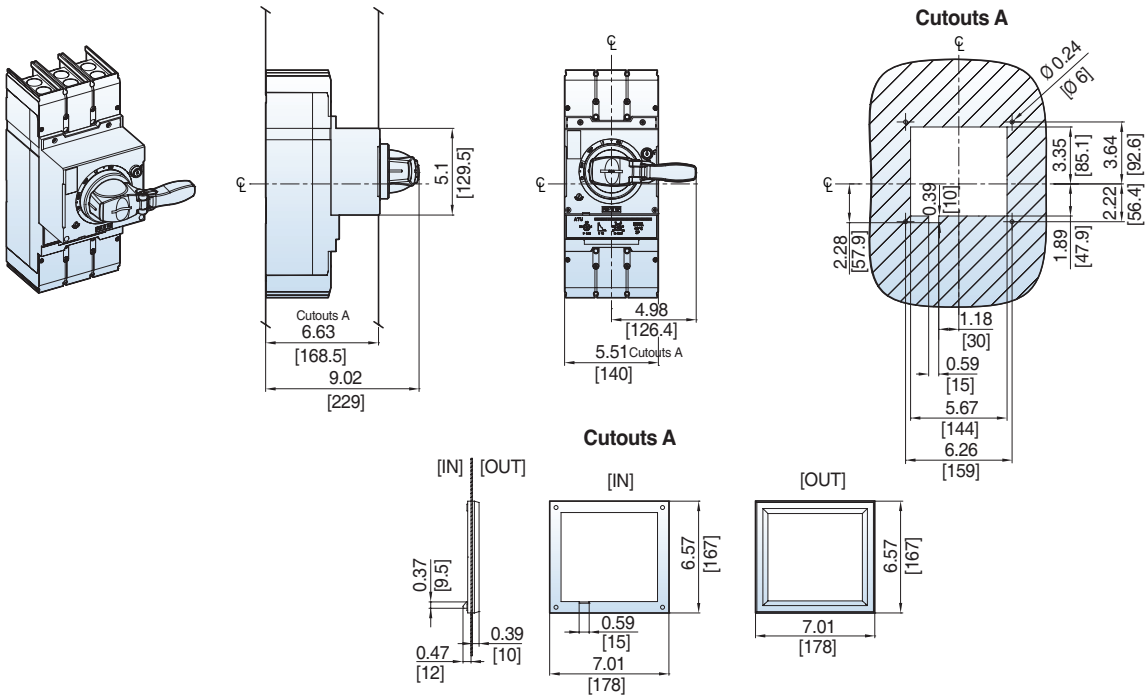
Dimension: inch[mm]



UTS400/600 Circuit Breaker Door Cutouts



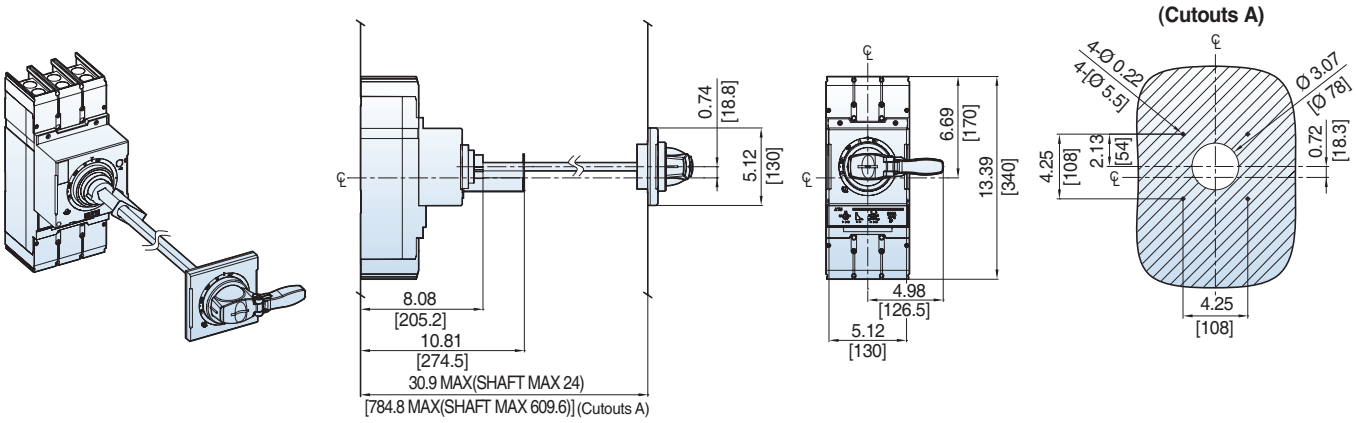
UTS400/600 Directly Mounted Rotary Operating Handle [DH-3]



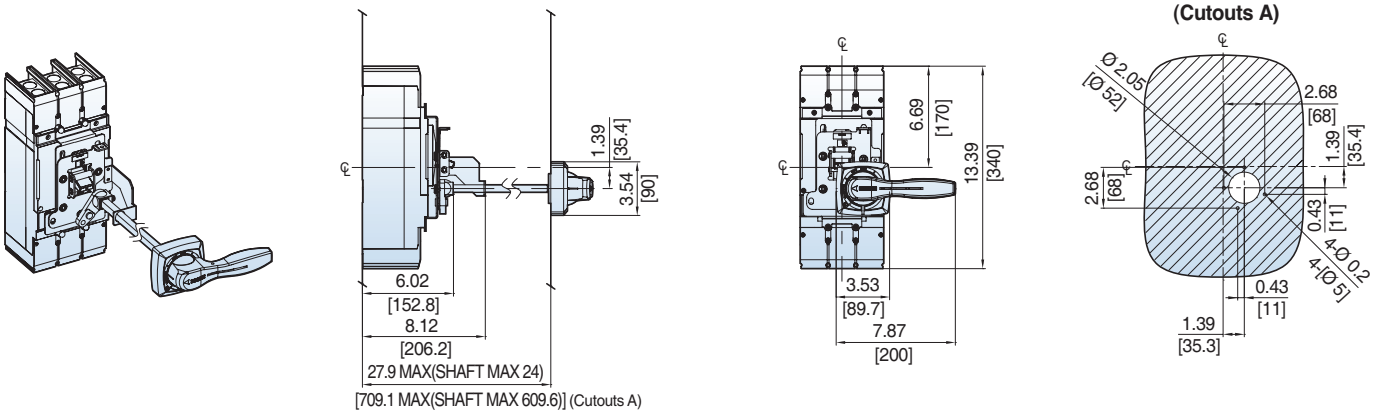
DIMENSIONS UTS400/600 CIRCUIT BREAKERS

UTS400/600 Door-Mounted Rotary Operating Handle [REH-3]

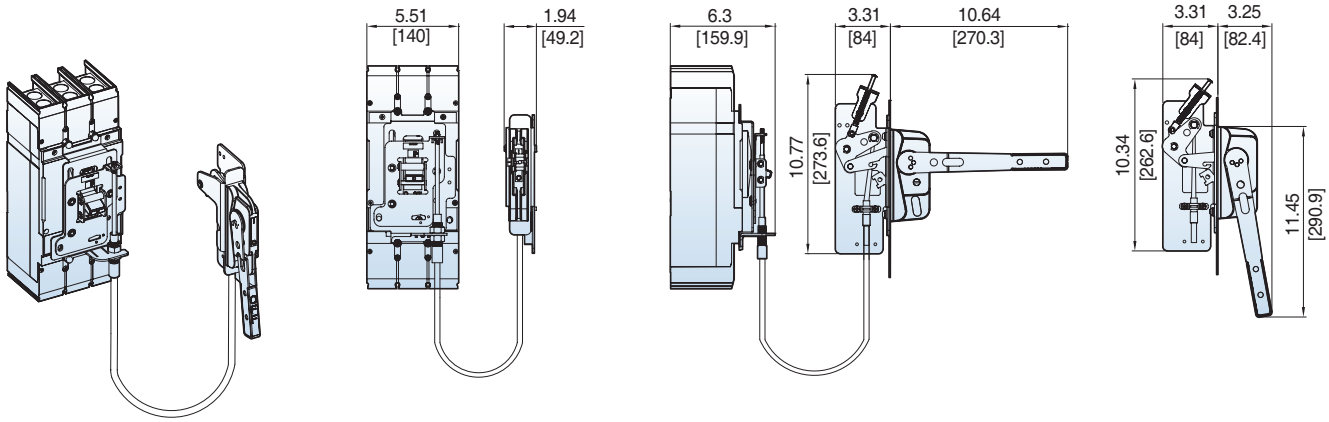
Dimension: inch[mm]



UTS400/600 NEMA Door-Mounted Rotary Operating Handle [EHU-3, EHV-3, EHX-3]

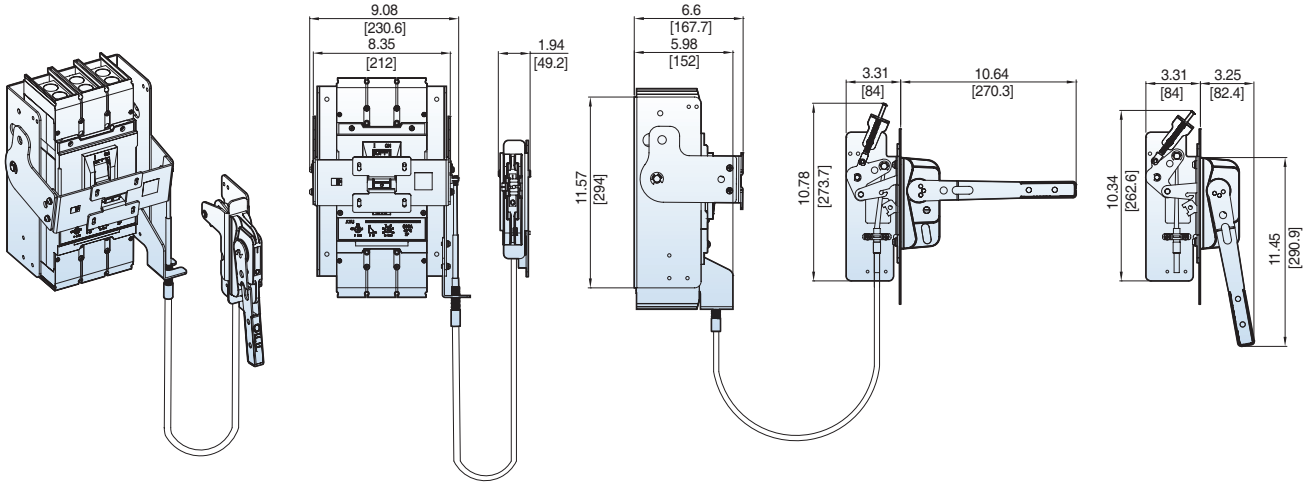


UTS400/600 Flange-Mounted Cable Operating Handle [FHU-3, FHX-3]

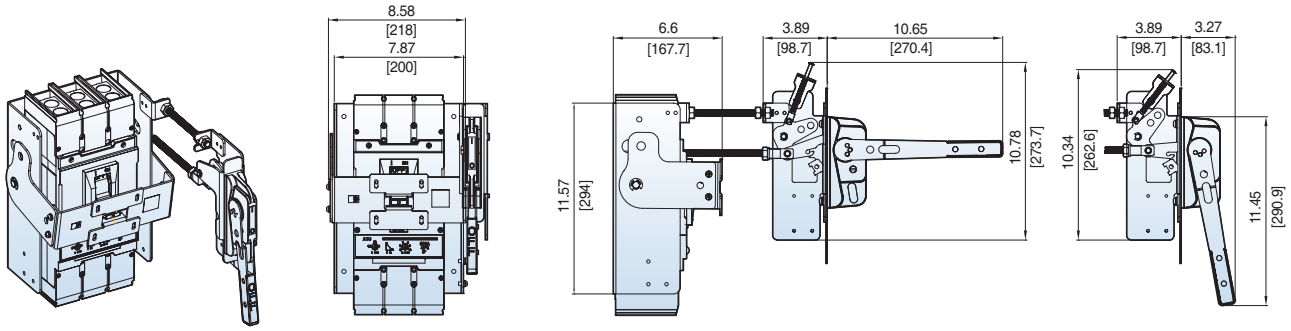


UTS400/600 Flange-Mounted Cable Operating Handle [COM-3 + FHU, X-L + Cable]

Dimension: inch[mm]



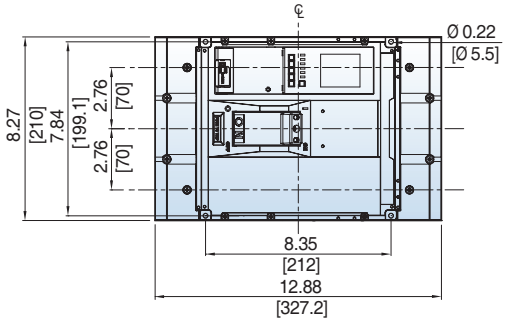
UTS400/600 Flange-Mounted Variable-Depth Operating Handle [VDM-3 +FHU, X-L]

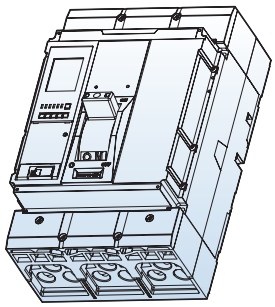


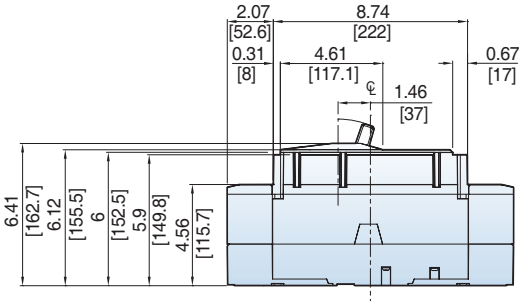
DIMENSIONS UTS800/1200 CIRCUIT BREAKERS

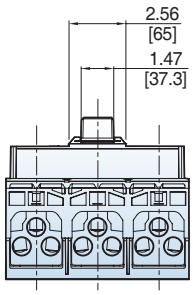
UTS800 3P Circuit Breaker [Lug type]

Dimension: inch[mm]

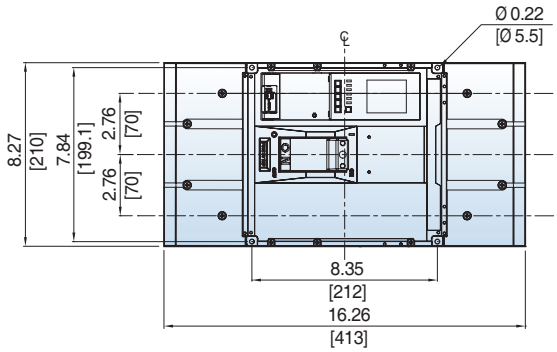


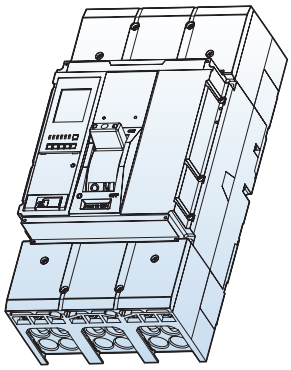


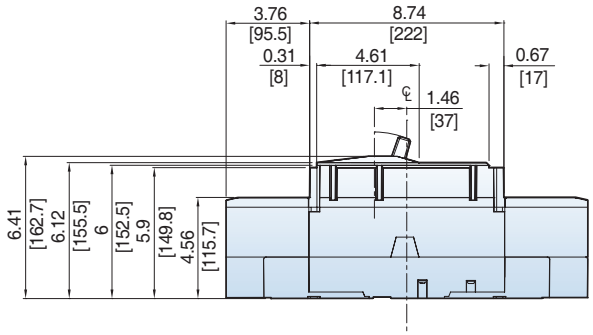


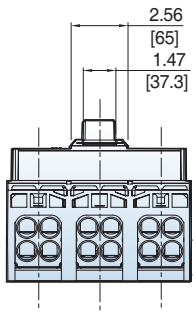


UTS1200 3P Circuit Breaker [Lug type]



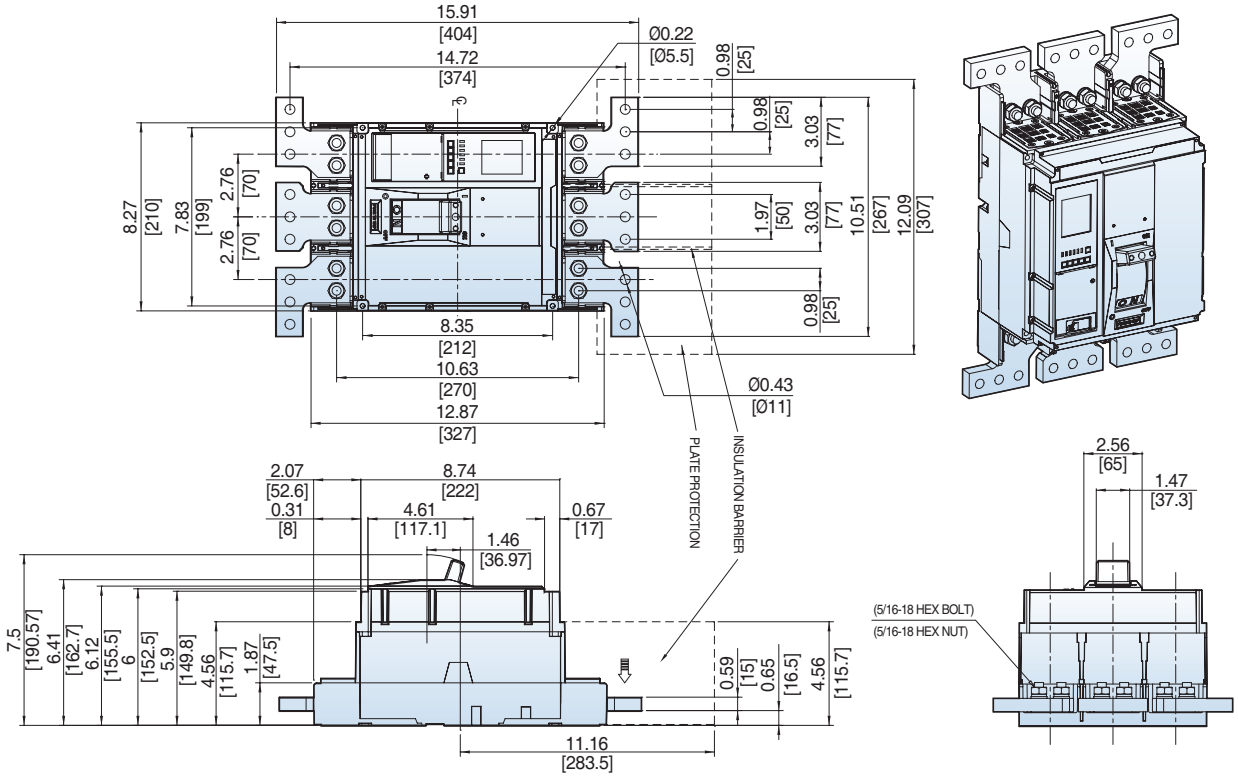




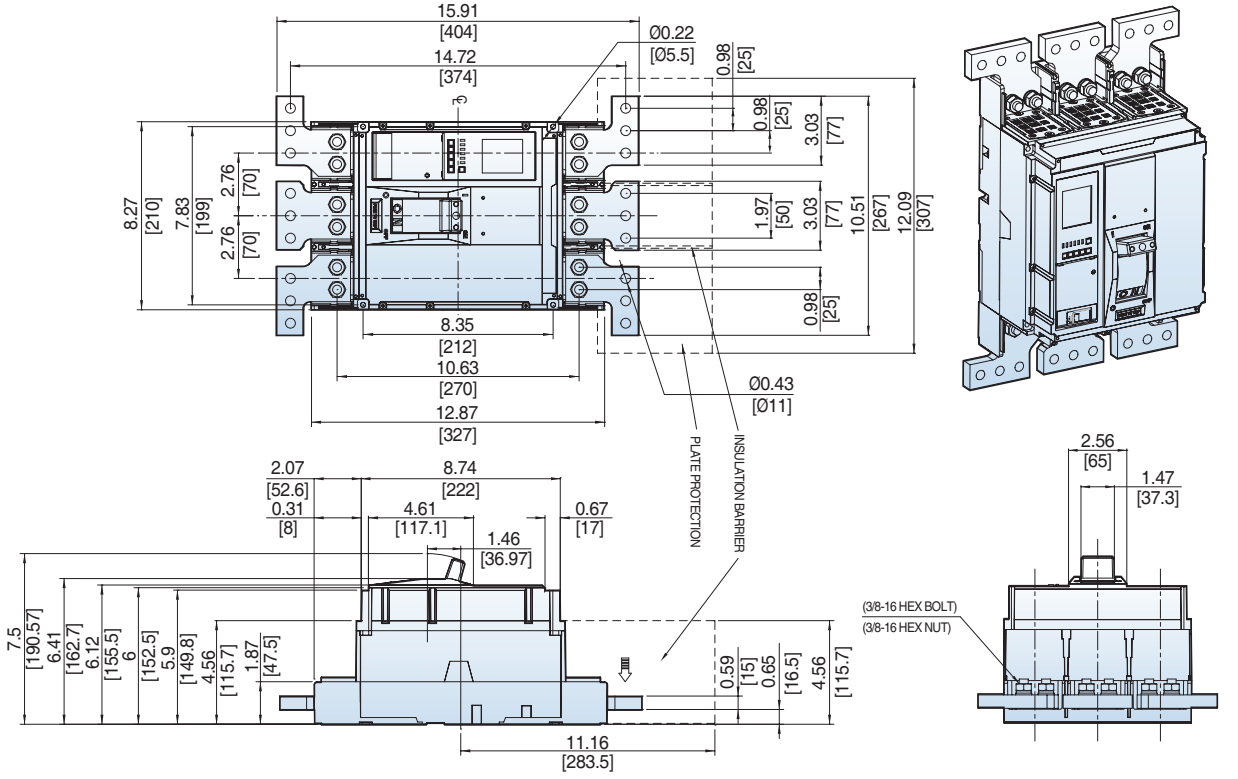


UTS800 3P Circuit Breaker [Bolt-on Type]

Dimension: inch[mm]



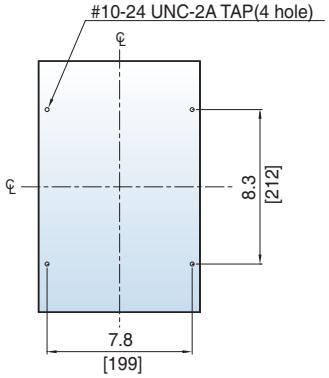
UTS1200 3P Circuit Breaker [Bolt-on Type]



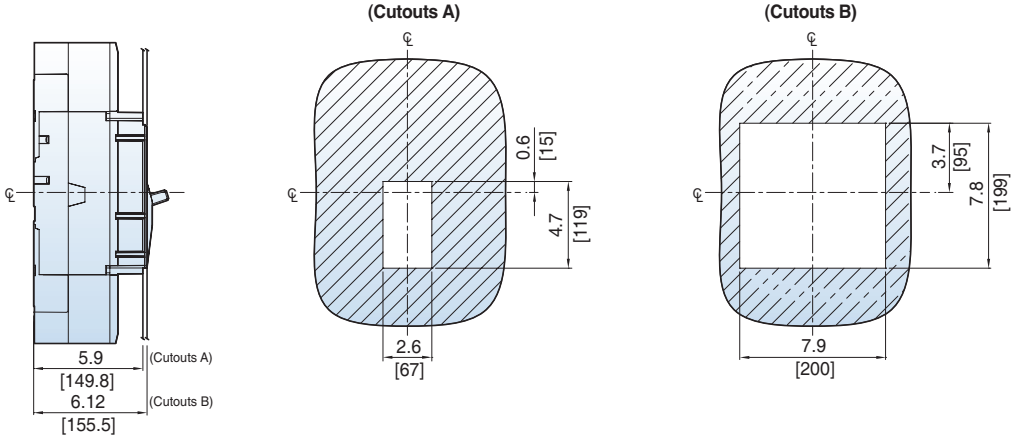
DIMENSIONS UTS800/1200 CIRCUIT BREAKERS

UTS800/1200 Circuit Breaker Mounting

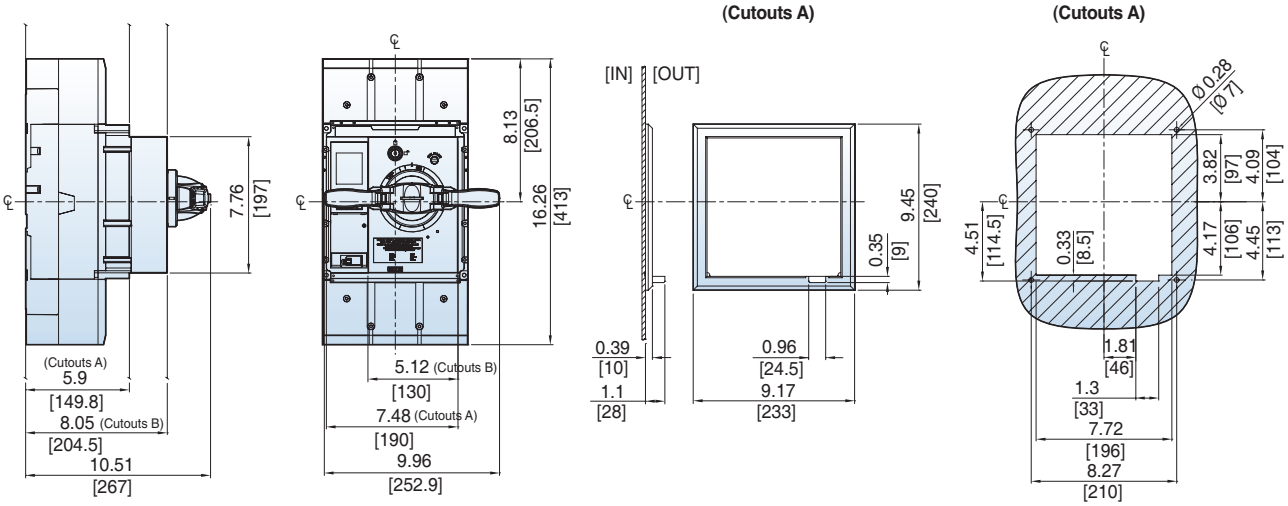
Dimension: inch[mm]



UTS800/1200 Circuit Breaker Door Cutouts

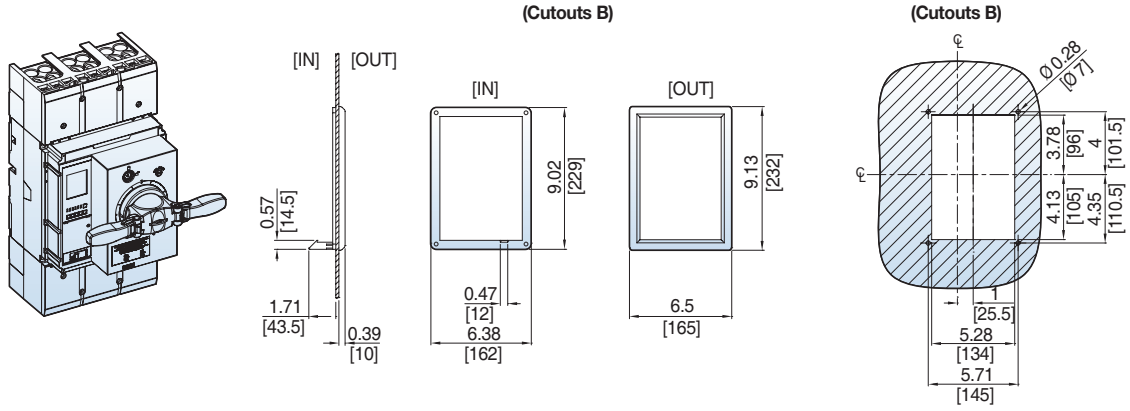


UTS800/1200 Directly Mounted Rotary Operating Handle [DH-5]

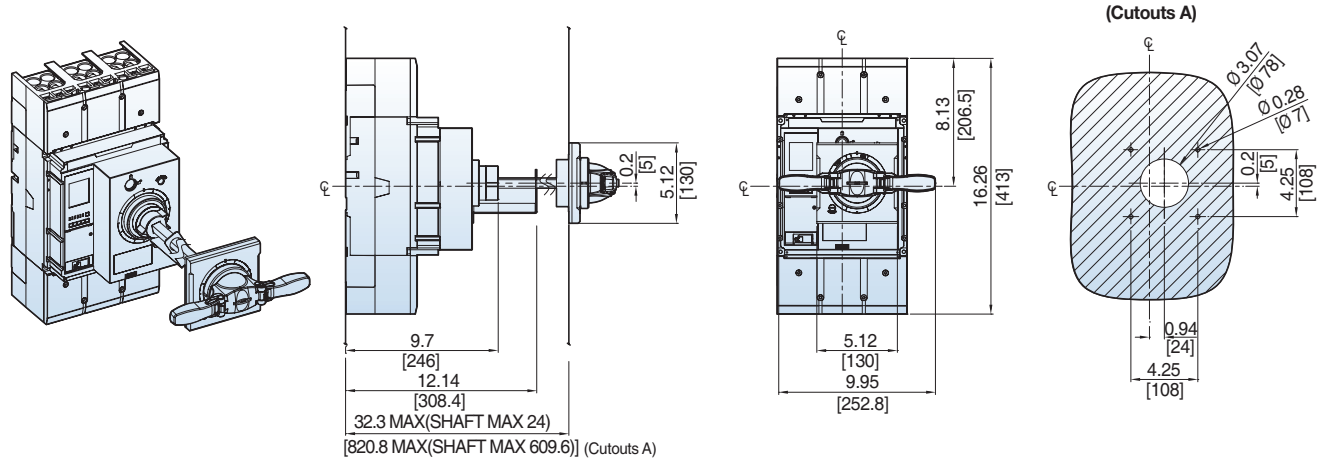


UTS800/1200 Directly Mounted Rotary Operating Handle [DH-5]

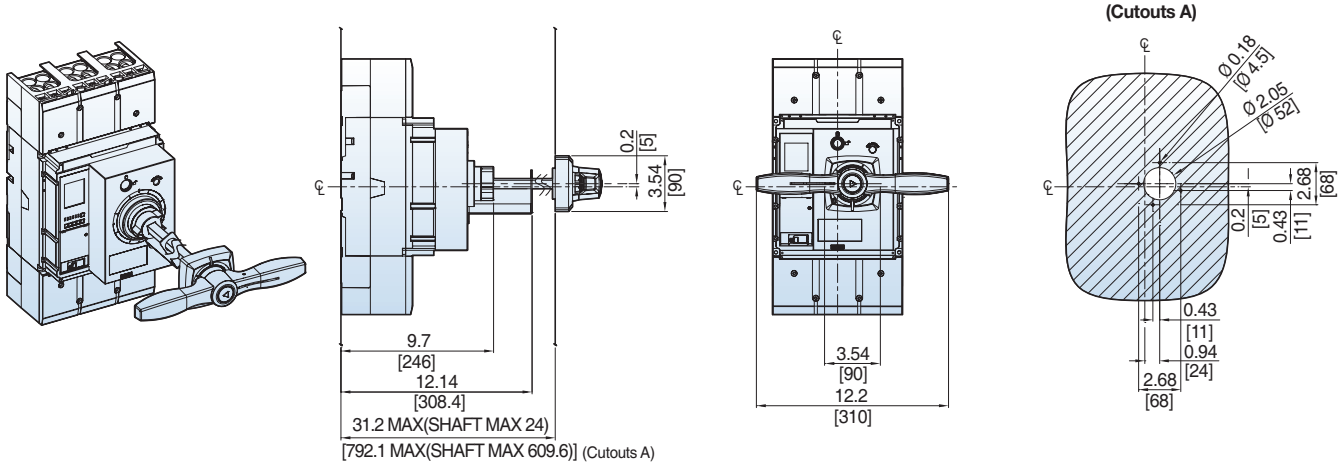
Dimension: inch[mm]



UTS800/1200 Door-Mounted Rotary Operating Handle [REH-5]



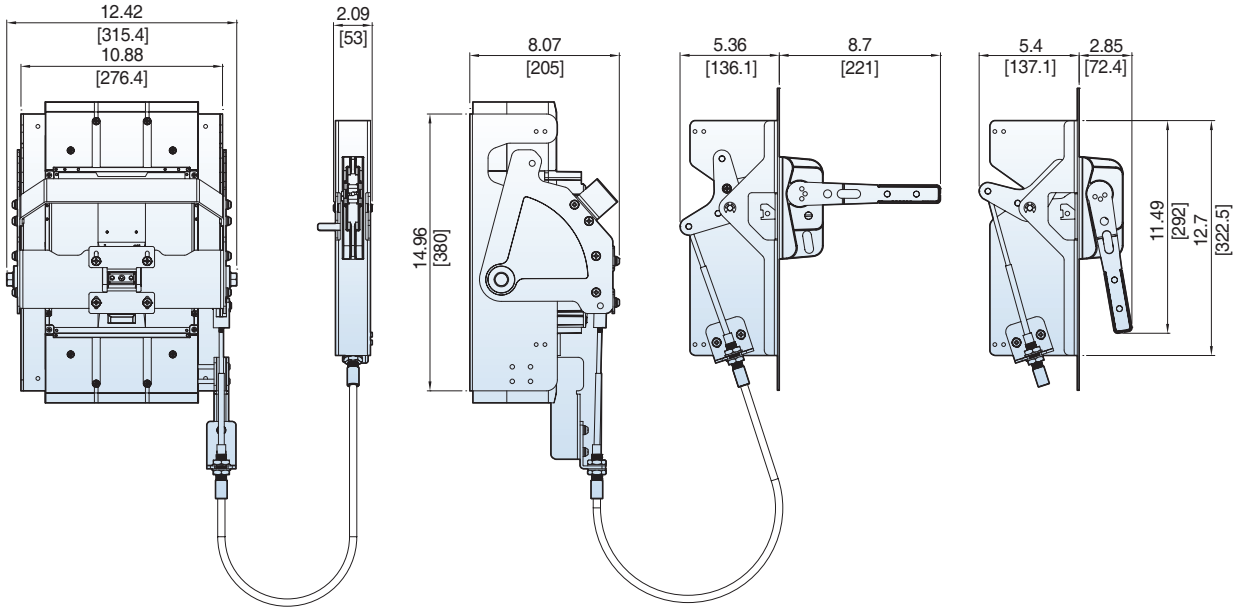
UTS800/1200 NEMA Door-Mounted Rotary Operating Handle [EHU-5, EHV-5, EHX-5]



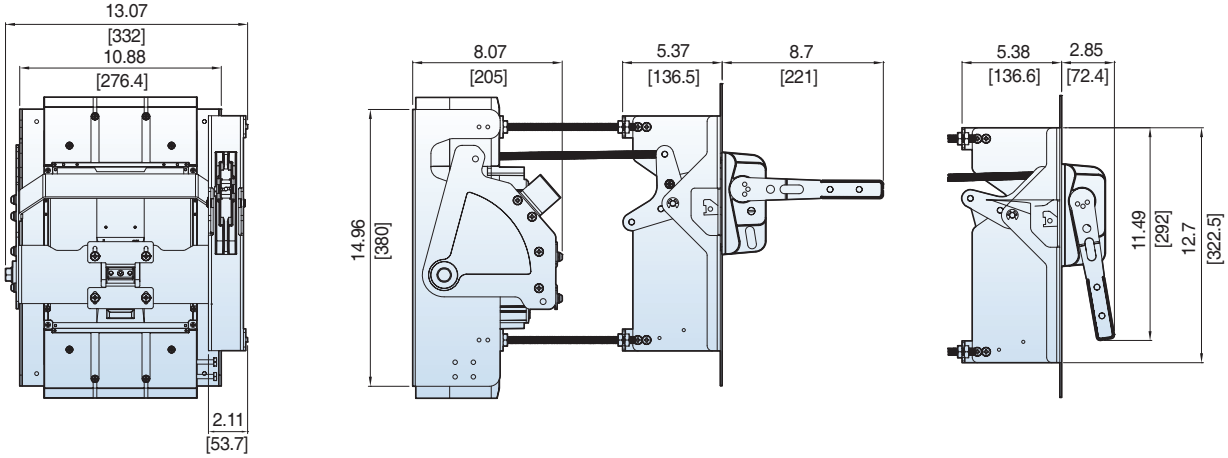
DIMENSIONS UTS800/1200 CIRCUIT BREAKERS

UTS800/1200 Flange-Mounted Cable Operating Handle [COM-5 + FHU, X-L + Cable]

Dimension: inch[mm]



UTS800/1200 Flange-Mounted Variable-Depth Operating Handle [VDM-5 + FHU, X-L]



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