

Functions of electronic trip relay (ETR) parts

< Functions >

① ERR. LED, Contact alarm output

When any abnormality or setting failure is found in ETR, the LED alerts the operators to the abnormal status. When the power type is P3 to P5, contact output is given between [513] and [574] on the control circuit terminal block.

- ETR function (Microprocessor, H/W)
- Mis-setting of INST. /MCR dial (P.19)
- Internal wiring of breaker related to ETR

② RUN LED (ETR)

This LED indicates that ETR is functional. When control power is applied or approx. 10% of current flows into the main circuit, the internal circuit will start, and the LED will light.

③ RUN LED (Optional setting module)

This LED indicates that the optional setting module is functional.

When the control power is applied or approx. 10% of the main circuit current flows, the LED will light.

④ Trip indicator (LED and contact alarm output)

The LED indicates the tripping or pre-alarm status. When the power supply type is P3 to P5, contact output is given between [513] (common) and [524], [534], [544] and [554] on the control circuit terminal block.

When the current exceeds pre-alarm current setting (I_p), the PAL LED will blink. When the LTD time ($1/2$ of T_L) is passed, the PAL LED will light and output the contact.

⑤ TAL LED and contact output [Option]

The ETR temperature detector is made functional by fitting a TAL sensor.

When the power type is P3 to P5, output is given between [513] and [564] on the control circuit terminal block. When the temperature drops, the output will be reset. To retain the output, take measures with an external sequence.

⑥ MCR (Making current release) [Option]

Only when the breaker is turned on (from the off state), it has the INST function. After it is turned on, the INST function will be disabled. If you specify the use of MCR when placing an order, the MCR switch will be incorporated in the main body. MCR will be functional by setting the INST setting dial of ETR to the MCR side.

⑦ Reset button

The trip indicator (LED and contact alarm output) can be reset by pressing the "RESET" button on the front panel of ETR or short-circuiting [RS1] and [RS2] on the control circuit terminal block.

(P1 and P2 types are not provided with the function to reset the indication from the control circuit terminal block.) A function is provided to temporarily lock LTD and STD when the INST function is tested with the field test device. (See the breaker tester instruction manual.)

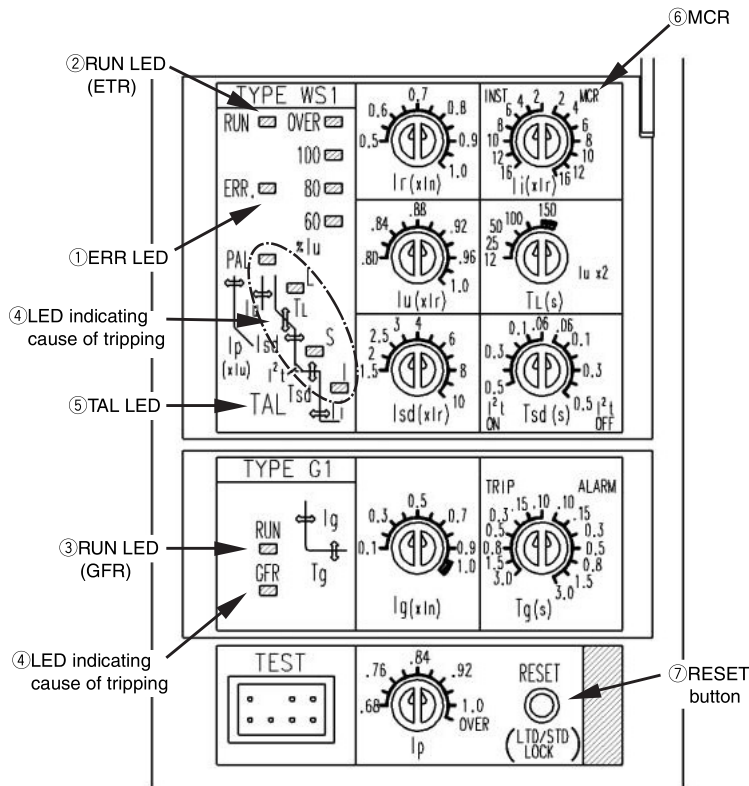


Fig. 20-1

As for the extended measuring functions, display and interface unit, see the separate instruction manual.

< Load current LED >

The current value which is used as the reference of the load current indication LED, varies depending on the ETR types and characteristics setting.

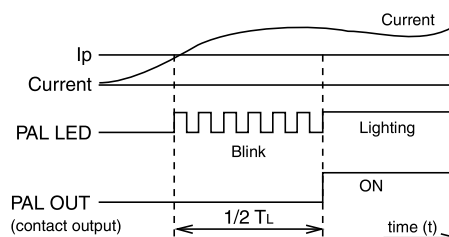
Table 21-1

Usage	ETR type	Base current of LED indication	Load current LED indication
General use	WS (WS1) (WS2)	I _u Uninterrupted current	OVER ■ 100 ■ 80 ■ 60 ■ %I _u
Generator protection use	WM (WM1) (WM2)	I _L LTD pick-up current	100 ■ 80 ■ 60 ■ 40 ■ %I _L
Special purpose use	WB (WB1) (WB2)	I _r Rated current	OVER ■ 100 ■ 80 ■ 60 ■ %I _r

Note: When the "OVER" of WS type and the "100%" of LED are lighting, the current value is over LTD pick-up current.
The breaker carries out trip operation after specified time.

< Pre-alarm function >

When the current exceeds pre-alarm current setting (I_p), the PAL LED will blink. When the LTD time (1/2 of T_L) is passed, the PAL LED will light and output the contact.



< Power supply >

Power supply is required for the trip indicator (LED, alarm contact output), the measurement extension module, the display (LCD), etc. Over-current tripping, function when there is no control power supply, it operates with the energy of internal CT.

Table 21-2 Ratings of the power supply and output contacts

Power type	Rated voltage	Alarm output contacts
P1	100-240V AC-DC	-
P2	24-60V DC	-
P3	100-240V AC 100-125V DC	6-contacts
P4	24-60V DC	6-contacts
P5	100-240V DC	6-contacts (SSR)

Table 21-3 Alarm contact capacity (Power type P3 and P4)

	Voltage (V)	Resistive load cos φ=1.0		Inductive load cos φ=0.4 L/R=0.7	
		Resistive load	Inductive load	Resistive load	Inductive load
AC	240	1A	0.5A		
	120	1A	1A		
DC	125	0.1A	0.05A		
	30	1A	1A		

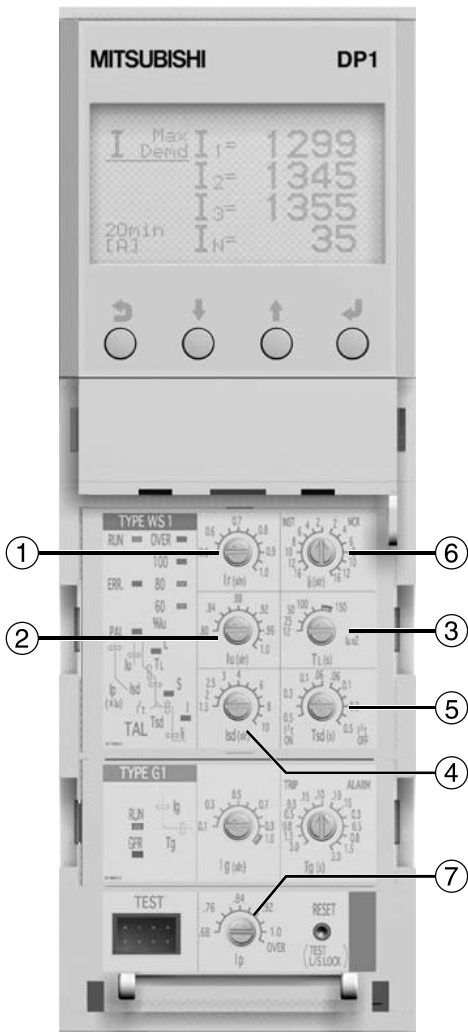
Table 21-4 Contact capacity (Power type P5)

	Voltage (V)	Current	Peak current	max. ON resistance	
				Resistive load	Inductive load
AC	240	0.1A	0.3A	5Ω	
	120	0.1A	0.3A	5Ω	
DC	240	0.1A	0.3A	5Ω	
	30	0.1A	0.3A	5Ω	

CAUTION

In case of power type P3 or P4, the alarm contact output relay is high sensitive relay. Therefore may occur a chattering noise (approximately 1 ms) by ON/OFF operation of the breaker. Please adopt a time constant filter of several ms, or sampling double reading, or the like.

Characteristics setting of type WS relay



Note: The figure includes the optional G1 setting module, display and MCR.

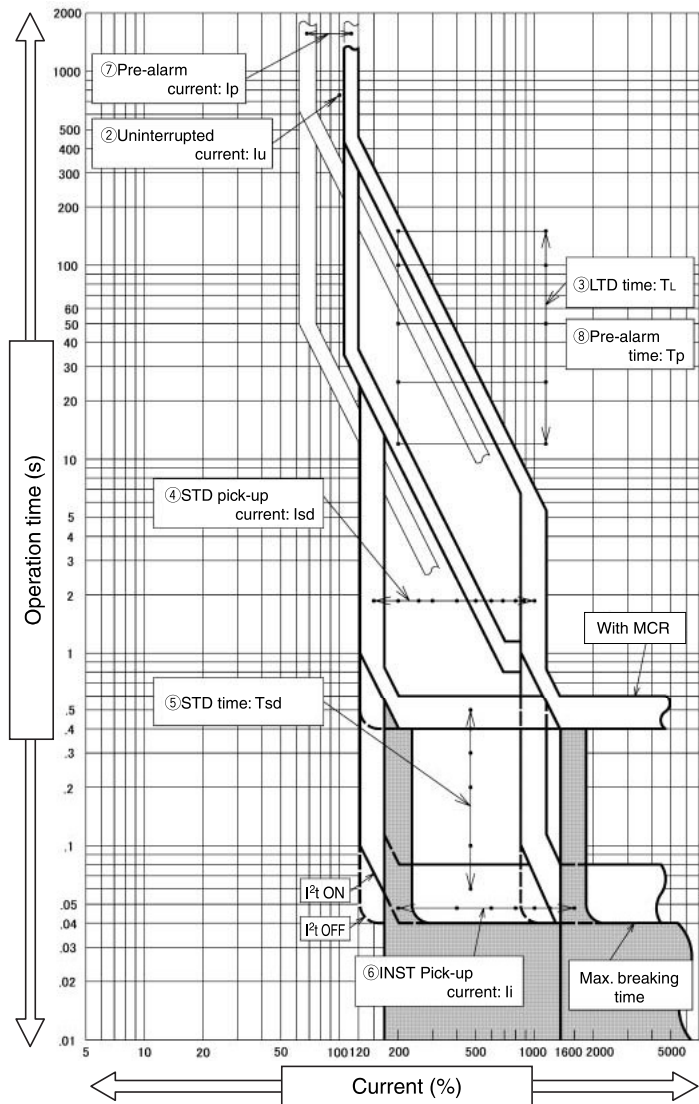


Table 22

No.	Setting items	Mark	Adjustable setting range		Accuracy	Setting for shipment
			AE630-SW to AE1600-SW AE2000-SW to AE3200-SW	AE2000-SWA AE4000-SWA		
①	Rated current	I _r	0.5 to 1.0 (in 0.05 steps) × I _n (CT rating)		—	1.0
②	Uninterrupted current	I _u	0.8 to 1.0 × I _r (0.02 steps), Pick-up current: 1.15 × I _u		1.05 × I _u ...Non pick-up 1.25 × I _u ...Pick-up	1.0
③	LTD time	T _L	12-25-50-100-150s at I _u × 2		±20%	150
④	STD pick-up current	I _{sd}	1.5-2-2.5-3-4-5-6-7-8-9-10 × I _r		±15%	10
⑤	STD time	T _{sd}	0.5-0.4-0.3-0.2-0.1-0.06-0.06-0.1-0.2-0.3-0.4-0.5s (I ₁ ^t ON) (I ₁ ^t OFF)		±20% 0.06...0.04-0.08s	0.5 (I ₁ ^t ON)
⑥	INST Pick-up current	I _i	16-12-10-8-6-4-2-2-4-6-8-10-12 × I _r (INST) (MCR) [WS1]	12-10-8-6-4-2-2-4-6-8-10-12 × I _r (INST) (MCR) [WS2]	±15%	WS1...16 (INST) WS2...12 (INST)
⑦	Pre-alarm current	I _p	I _u × 0.68 to 1.0 (0.04 steps)-OVER		±10%	OVER
⑧	Alarm time	T _p	1/2 T _L (after 1/2 T _L , PAL output contact turns on)		±20%	—

The table shows data obtained on the breakers provided with MCR (optional). For breakers without MCR, the setting position for MCR is not provided.

Relation of setting dial

