

# Protective Relays

## DUT

### General information

#### Protective relays DUT

##### ■ Features

- The DUT series digital type protective relays have been developed to replace the conventional induction type, rectifier type, and static type DQ series relays.
- The DUT series relay has a single protection function incorporating with a 16-bit CPU and output circuit.
- Six kinds of protective relays such as OCR, OCGR, OVR, OVGR, UVR, and DGR are available.
- The operation of overcurrent relay can be selected from 6 kinds of inverse time-lag characteristics and independent time-lag characteristics.
- They continuously monitor the CPU and the power supply, and are activated when a defective condition is detected.
- The mass has been reduced by using molded plastic resin for the relay-case and the front cover of the relay.
- Forced operation function can be executed by switching, which facilitates sequence checking. Forced reset function facilitates periodical inspection.
- They have the same mounting size as the previous DQ series relays, making replacement easy. Note, however, that the terminal numbers and terminal locations of the digital type relay are different from those of the previous type relays. The digital type relay needs an auxiliary energizing source. DQ series replacement relays having



- the same terminal arrangement with DQ series relays are available.
- The internal element of the relays can be drawn-out from the relay case. At this time the CT circuit is automatically short-circuited and inspection is easy, so inspection is simple.
- The setting modes can be set by operating the setting control switches on the front panel while checking the value on the setting indicator (7 segments) and the LED.
- Immunity to square wave impulse, radio frequency interference, and electrostatic discharge noise immunity comply with B-402 (Digital Protective Relays and Protective Equipment) (Types DUT□□N, DUT□□M only).

##### ■ Type number nomenclature

<p><b>Basic type</b> DUT: Single function type digital relay</p> <p><b>Construction</b> U: Unit standard structure type, DC auxiliary energizing source A: Unit standard structure type, AC auxiliary energizing source R: DQ series replacement type, DC auxiliary energizing source B: DQ series replacement type, AC auxiliary energizing source T: Testing tool</p> <p><b>Name of Function</b> A: Overcurrent relay (OCR) D: Ground directional relay (DGR) E: Ground overcurrent relay (OCGR) G: Ground overvoltage relay (OVGR) U: Undervoltage relay (UVR) V: Overvoltage relay (OVR)</p> <p><b>Characteristics</b> H: Inverse time-lag T: Independent time-lag N: Inverse time-lag (Noise immunity conforming to standard of B-402) M: Independent time-lag (Noise immunity conforming to standard of B-402)</p> <p><b>No. of input</b> A: One input B: Two inputs C: Three inputs</p> <p><b>Output duration and operation display hold function</b> S: Slow reset (1s), Display hold function: Provided K: Instantaneous reset (0.2s), Display hold function: Provided A: Instantaneous reset (0.2s), Display hold function: Not provided</p>	<p><b>Example</b>    <b>DUT U A H A S - 2 5 CC C</b></p>	<p><b>Auxiliary energizing source</b> C: 100V DC    J: 100V AC 50Hz    R: 200V AC 50Hz D: 110V DC    K: 100V AC 60Hz    S: 200V AC 60Hz E: 125V DC    L: 110V AC 50Hz    T: 220V AC 50Hz F: 200V DC    M: 110V AC 60Hz    U: 220V AC 60Hz G: 220V DC    N: 127V AC 50Hz    V: 250V AC 50Hz H: 250V DC    P: 127V AC 60Hz    W: 250V AC 60Hz</p> <p><b>Rating and setting range</b> • Overcurrent relay DUT□A CC: rated current 5A, inverse time-lag 1-6A, instantaneous 5-40A DD: rated current 5A, inverse time-lag 2-12A, instantaneous 10-80A CE: rated current 5A, independent time-lag 1-6A DE: rated current 5A, independent time-lag 2-12A HH: rated current 1A, inverse time-lag 0.2-1.2A, instantaneous 1-8A JJ: rated current 1A, inverse time-lag 0.4-2.4A, instantaneous 2-16A HK: rated current 1A, independent time-lag 0.2-1.2A JK: rated current 1A, independent time-lag 0.4-2.4A • Ground overcurrent relay DUT□E AA: rated current 5A, inverse time-lag 0.1-0.8A, instantaneous 0.5-4A BB: rated current 5A, inverse time-lag 0.5-4A, instantaneous 2.5-20A AE: rated current 5A, independent time-lag 0.1-0.8A BE: rated current 5A, independent time-lag 0.5-4A FF: rated current 1A, inverse time-lag 0.02-1.16A, instantaneous 0.1-0.8A GG: rated current 1A, inverse time-lag 0.1-0.8A, instantaneous 0.5-4A FK: rated current 1A, independent time-lag 0.02-0.16A GK: rated current 1A, independent time-lag 0.1-0.8A • Overvoltage relay DUT□V GD: rated voltage 110V, operation setting 60-150V • Ground overvoltage relay DUT□G GA: rated voltage 110V, operation setting 5-50V DA: rated voltage 190V, operation setting 5-50V • Undervoltage relay DUT□U JG: rated voltage 63.5V, operation setting 10-60V GH: rated voltage 110V, operation setting 15-100V • Ground directional relay DUT□D AA: zero-sequence voltage (3Vo) 110V, operate current 1-10mA AB: zero-sequence voltage (3Vo) 190V, operate current 1-10mA BA: zero-sequence voltage (3Vo) 110V, operate current 10-100mA BB: zero-sequence voltage (3Vo) 190V, operate current 10-100mA</p> <p><b>Rated frequency</b> 5: 50Hz 6: 60Hz</p> <p><b>Development order</b></p>
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■ Specifications, DUT□E

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name			Detection of ground fault (mainly resistance grounded line system), ground overcurrent relay						
Construction	No. of inputs	Auxiliary energizing source	★Type						
Unit standard structure type	1	DC	DUTUEHAS-2	DUTUEHAK-2	DUTUEHAA-2	DUTUETAS-2	DUTUETAK-2	DUTUETAA-2	
		AC	DUTAEHAS-2	DUTAEHAK-2	DUTAEHAA-2	DUTAETAS-2	DUTAETAK-2	DUTAETAA-2	
DQ series replacement type *1	1	DC	DUTREHAS-2	DUTREHAK-2	DUTREHAA-2	DUTRETAS-2	DUTRETAK-2	DUTRETAA-2	
		AC	DUTBEHAS-2	DUTBEHAK-2	DUTBEHAA-2	DUTBETAS-2	DUTBETAK-2	DUTBETAA-2	
Unit standard structure type (B-402)	1	DC	DUTUENAS-2	DUTUENAK-2	DUTUENAA-2	DUTUEMAS-2	DUTUEMAK-2	DUTUEMAA-2	
		AC	DUTAENAS-2	DUTAENAK-2	DUTAENAA-2	DUTUAMAS-2	DUTAEMAK-2	DUTAEMAA-2	
Ratings	★Frequency (Hz)		50, 60						
	★Current AC (A)		1, 5						
	Element		Inverse time-lag		Instantaneous		Independent time-lag		
	Setting range *2	★ Setting value	1A	0.02 - 0.16 (0.01) - L		0.1 - 0.8 (0.01) - L		0.02 - 0.16 (0.01) - L	
				0.1 - 0.8 (0.01) - L		0.5 - 4 (0.1) - L		0.1 - 0.8 (0.01) - L	
		AC (A)	5A	0.1 - 0.8 (0.01) - L		0.5 - 4 (0.1) - L		0.1 - 0.8 (0.01) - L	
				0.5 - 4 (0.1) - L		2.5 - 20 (0.1) - L		0.5 - 4 (0.1) - L	
	Time setting		n = 0.5 - 50 (n = 0.5)		0-3s (0.1s) *3		0-3s (0.1s) *3		
	Output duration *4 (s)		1	0.2	0.2	1	0.2	0.2	
	Rated burden (VA)		0.4						
Continuous withstand current		100% of rated value							
Auxiliary energizing source*5	★ Voltage (V)	DC	100, 110, 125, 200, 220, 250						
		AC	100, 110, 127, 200, 220, 250 50/60Hz						
	Rated burden	DC	100, 110, 125V rated: 6.5W 200, 220, 250V rated: 8.5W						
		AC	100, 110, 127V rated: 15VA 200, 220, 250V rated: 20VA						
Operation indicators	Display hold function *10		With	With	-	With	With	-	
	DC auxiliary energizing source		LED: Time lag x 1, Instantaneous x 1			LED: Operation x 1			
	AC auxiliary energizing source		LED: Time lag x 1, Instantaneous x 1 Magnetic inversion: Time lag x 1, Instantaneous x 1		LED: Time lag x 1, Instantaneous x 1		LED: Operation x 1 Magnetic inversion: Operation x 1		LED: Operation x 1
Contacts	Arrangement		Trip: Time-lag 1NO, Instantaneous: 1NO, Alarm: 1NC, External output: 1NO			Trip: 1NO, Alarm: 1NC External output: 1NO			
	Limiting making capacity (A)		15 (at resistive load, 0.5s, 110V DC)						
	Continuous current carrying capacity (A)		5						
	Limiting breaking capacity DC (VA)		10 (at inductive load, L/R=0.04, 110V DC)						
Characteristics	Element		Inverse time-lag		Instantaneous		Independent time-lag		
	Operate time		*6		*6, *7		*6, *8		
	Operate value accuracy (%)		*9		±5		*9		
	f2 locking function (f2/f1) (%)		-		15 or more		15 or more		
	Holding factor (%)		5						
Mass (kg)			2						
Previous relay type			DQAJA1HH	DQAJA1HB	DQAJA1HA	DQARA1HH	DQARA1HB	DQARA1HA	

Note: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch. The "L" indicates the setting is locked.

\*3 Zero represents instantaneous operate time (80ms max.).

\*4 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*5 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

\*6 See the operate time characteristics on page 12/69.

\*7 ±5% of max. time setting, or for min. time setting, 80ms max. when 200% input current of operate setting value.

\*8 ±5% of max. time setting, or for min. time setting, 80ms max. when 300% input current of operate setting value.

\*9 ±5% in accuracy guaranteed setting range (three times min. of min. operate setting value to max. operate setting value), ±15% for outside the accuracy guaranteed setting range.

\*10 If "S" or "K" is selected for the 8th digit of the code symbols, both LED and magnetic inversion operation indicators are provided with a display hold function.

If "A" is selected, the LED indicator has no display hold function.

### ■ Specifications, DUT□A

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name			Detection of overload, short-circuit and ground fault of directly grounded line system, overcurrent relay					
Construction	No. of inputs	Auxiliary energizing source	Type					
Unit standard structure type	1	DC	DUTUAHAS-2	DUTUAHAK-2	DUTUAHAA-2	DUTUATAS-2	DUTUATAK-2	DUTUATAA-2
DQ series replacement type *1	1	AC	DUTAahas-2	DUTAahak-2	DUTAahaa-2	DUTAatas-2	DUTAatak-2	DUTAataa-2
		DC	DUTRAHAS-2	DUTRAHAK-2	DUTRAHAA-2	DUTRAHAS-2	DUTRATAK-2	DUTRATAA-2
Unit standard structure type	2	DC	DUTUAHBS-2	DUTUAHBK-2	—	DUTUATBS-2	DUTUATBK-2	—
		AC	DUTAahBS-2	DUTAahBK-2	—	DUTAATBS-2	DUTAATBK-2	—
Unit standard structure type	3	DC	DUTUAHCS-2	DUTUAHCK-2	—	DUTUATCS-2	DUTUATCK-2	—
		AC	DUTAahCS-2	DUTAahCK-2	—	DUTAATCS-2	DUTAATCK-2	—
Unit standard structure type (B-402)	1	DC	DUTUANAS-2	DUTUANAK-2	DUTUANAA-2	DUTUAMAS-2	DUTUAMAK-2	DUTUAMAA-2
		AC	DUTAANAS-2	DUTAANAK-2	DUTAANAA-2	DUTAAMAS-2	DUTAAMAK-2	DUTAAMAA-2
Ratings	★Frequency (Hz)		50, 60					
	★Current AC (A)		1, 5					
	Element		Inverse time-lag	Instantaneous	Independent time-lag			
	Setting range *2	★Setting value AC (A)	1A	0.2 – 1.2 (0.1) - L	1 – 8 (0.1) - L	0.2 – 1.2 (0.1) - L		
			5A	0.4 – 2.4 (0.1) - L	2 – 16 (0.1) - L	0.4 – 2.4 (0.1) - L		
	Time setting	n	0.5 – 50 (n = 0.5)	0-3s (0.1s) *5	1 – 6 (0.1) - L			
			2 – 12 (0.1) - L	10 – 80 (0.1) - L	2 – 12 (0.1) - L			
	Output duration *3 (s)		1	0.2	0.2	1	0.2	0.2
	Rated burden (VA)		0.4					
	Continuous withstand current		100% of rated value					
Auxiliary energizing source *4	★Voltage (V)	DC	100, 110, 125, 200, 220, 250					
		AC	100, 110, 127, 200, 220, 250 50/60Hz					
Rated burden *4	Rated burden	DC	100, 110, 125V rated: 6.5W 200, 220, 250V rated: 8.5W					
		AC	100, 110, 127V rated: 15VA 200, 220, 250V rated: 20VA					
Operation indicators *11	Display hold function *12		With	With	—	With	With	—
	DC auxiliary energizing source		LED: Time lag x 1, Instantaneous x 1			LED: Operation x 1		
	AC auxiliary energizing source	1 input	LED: Time lag x 1, Instantaneous x 1 Magnetic inversion: Time lag x 1, Instantaneous x 1			LED: Operation x 1 Magnetic inversion: Operation x 1		
		2 inputs	LED: Time lag x 1, Instantaneous x 1 Magnetic inversion: Phase display x 2, Instantaneous x 1			LED: Operation x 1 Magnetic inversion: Phase display x 2		
3 inputs		LED: Time lag x 1, Instantaneous x 1 Magnetic inversion: Phase display x 3, Instantaneous x 1			LED: Operation x 1 Magnetic inversion: Phase display x 3			
Contacts	Arrangement		Trip: Time-lag 1NO, Instantaneous: 1NO, Alarm: 1NC, External output: 1NO			Trip: 1NO, Alarm: 1NC External output: 1NO		
	Limiting making capacity (A)		15 (at resistive load, 0.5s, 110V DC)					
	Continuous current carrying capacity (A)		5					
Characteristics	Limiting breaking capacity DC (VA)		10 (at inductive load, L/R=0.04, 110V DC)					
	Element		Inverse time-lag	Instantaneous	Independent time-lag			
	Operate time		*7	*7, *8	*7, *9			
	Operate value accuracy (%)		*10	±5	*10			
f2 locking function (f2/f1) (%)		—						
Holding factor (%)		5						
Mass (kg)	2							
Previous relay type	1 input	DQAJB1, C1, D1HJ	DQAJB1, C1, D1HC	DQAJB1HA	DQARA1HH, DQAWA2	DQARA1HB, DQAWA2	DQARA1HA, DQAWA2	
	2 inputs, 3 inputs	DQAJB1, C1, D1HH	DQAJB1, C1, D1HB	DQAJD1HA	(C2, E2, F1, J2) HH, G	(C2, E2, F1, J2) HB, D	(C2, E2, F1, J2) HA, N	
		—		DQAWG1P□				

Notes: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch. The "L" indicates the setting is locked.

\*3 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*4 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

\*5 Zero represents instantaneous operate time (40ms max.).

\*6 Zero represents instantaneous operate time (50ms max.).

\*7 See the operate time characteristics on page 12/69.

\*8 ±5% of max. time setting, or for min. time setting, 40ms max. when 200% input current of operate setting value.

\*9 ±5% of max. time setting, or for min. time setting, 50ms max. when 300% input current of operate setting value.

\*10 ±5% in accuracy guaranteed setting range (1.5 times min. of min. operate setting value to max. operate setting value), ±10% for outside the accuracy guaranteed setting range.

\*11 Display by phase (R, S and T) is as follows.

DC auxiliary energizing source: Numbers 1 and 3 appear on the setting display (7 segments) when the number of inputs is 2 ("2" is not displayed for (S) phase), and 1, 2, and 3 appear when the number of inputs is 3.

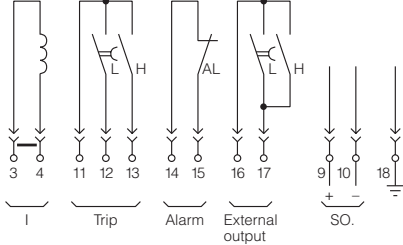
AC auxiliary energizing source: Numeric values that appear on the setting display (7 segments) are the same as the case of a DC auxiliary energizing source. Characters "R" and "T" appear on the magnetic inversion operation indicator when the number of inputs is 2 ((S) phase is not displayed), and "R", "(S)" and "T" appear when the number of inputs is 3.

\*12 If "S" or "K" is selected for the 8th digit of the code symbol, both LED and magnetic inversion operation indicators are provided with a display hold function.

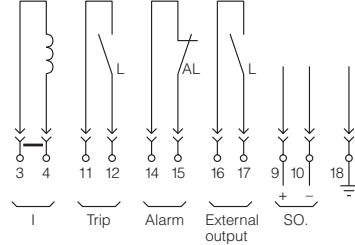
If "A" is selected, the LED indicator has no display hold function.

## ■ Connection diagrams

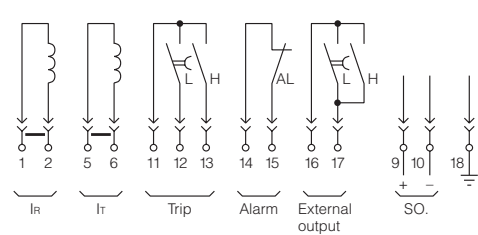
DUTUEHA□-2, DUTAEGA□-2    DUTUENA□-2, DUTAENA□-2  
DUTUAHA□-2, DUTAAHA□-2    DUTUANA□-2, DUTAANA□-2



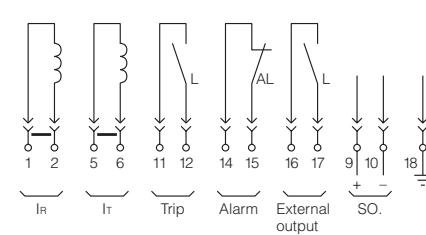
DUTUETA□-2, DUTAETA□-2    DUTUEMA□-2, DUTAEMA□-2  
DUTUATA□-2, DUTAATA□-2    DUTUAMA□-2, DUTAAMA□-2



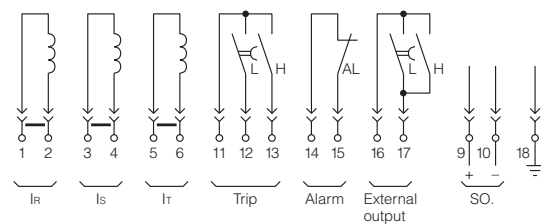
DUTUAHB□-2, DUTAAHB□-2



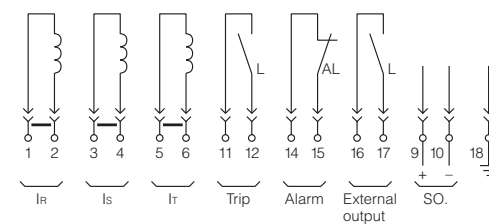
DUTUATB□-2, DUTAATB□-2



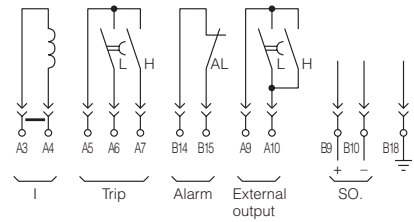
DUTUAHC□-2, DUTAAHC□-2



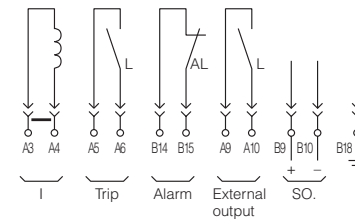
DUTUATC□-2, DUTAATC□-2



DUTREHA□-2, DUTBEHA□-2  
DUTRAHA□-2, DUTBAHA□-2



DUTRETA□-2, DUTBETA□-2  
DUTRATA□-2, DUTBATA□-2

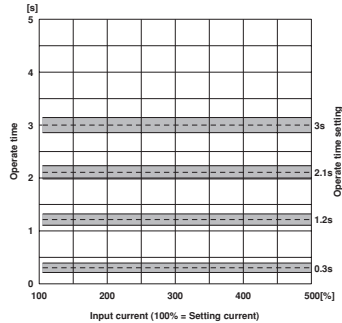


## ■ Characteristic diagrams]

Operate time characteristics

Instantaneous element

DUT□□H□□-2, DUT□□N□□-2

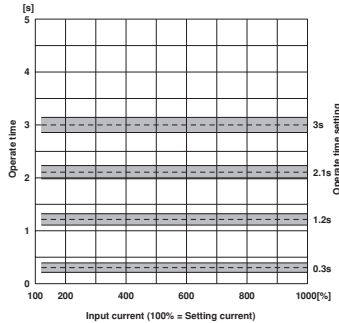


Operate time accuracy		
Input current	200%	
Setting value		Accuracy ε [%] (operate time range)
operate	time setting [s]	
All current setting	3.0	±5 (2.850 to 3.150s)
	2.1	±4.3 (1.971 to 2.229s)
	1.2	±3.5 (1.095 to 1.305s)
	0.3	±2.8 (0.216 to 0.384s)

Remark : Operate time in the state where operate time setting is 0s.  
Ground overcurrent relay : 80ms max.  
Overcurrent relay : 40ms max.

Independent time-lag element

DUT□□T□□-2, DUT□□M□□-2



Operate time accuracy		
Input current	300%	
Setting value		Accuracy ε [%] (operate time range)
operate	time setting [s]	
All current setting	3.0	±5 (2.850 to 3.150s)
	2.1	±4.3 (1.971 to 2.229s)
	1.2	±3.5 (1.095 to 1.305s)
	0.3	±2.8 (0.216 to 0.384s)

Remark : Operate time in the state where operate time setting is 0s.  
Ground overcurrent relay : 80ms max.  
Overcurrent relay : 50ms max.

Notes

\*1 : Operate time accuracy ε (%)

$$\text{When "n" } \leq 10$$

$$\epsilon = \frac{T_n - \frac{n}{10} \times T_{10}}{T_{10}} \times 100 (\%)$$

$$\text{When "n" } > 10$$

$$\epsilon = \frac{T_n - \frac{n}{10} \times T_{10}}{\frac{n}{10} \times T_{10}} \times 100 (\%)$$

$T_{10}$  : Nominal operate time at reference operate time setting "n" = 10

$T_n$  : Actual operate time at operate time setting "n"

Where

$$n = \frac{\text{Operate time setting}}{\text{Reference operate time setting}} \times 10$$

\*2 : FAccuracy of items marked "\*" (See the next page.) is ±100ms when the value "ε · T<sub>10</sub>" given in the above equation "ε" is smaller than 100ms.

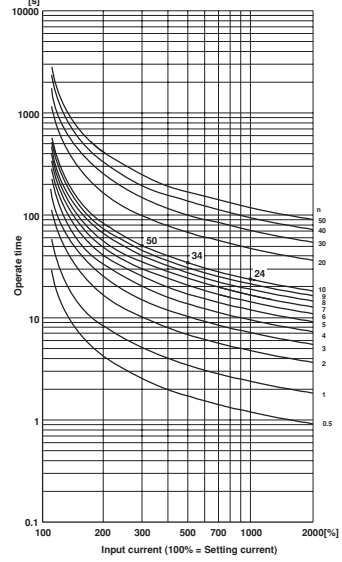
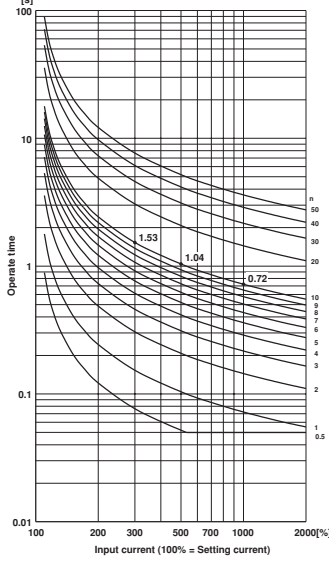
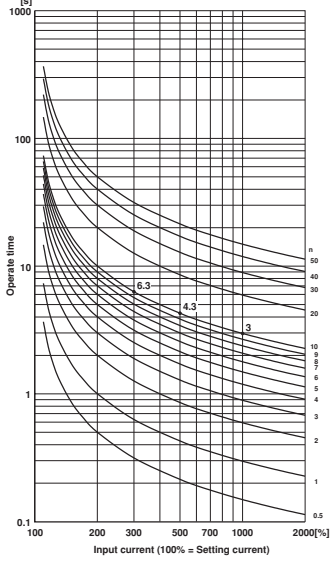
## ■ Characteristic diagrams (Operate time characteristics)

• Inverse time-lag element DUT□□H□□-2, DUT□□□□-2

Normal inverse time-lag (code: C1)

Short inverse time-lag (code: C2)

Long inverse time-lag (code: C3)



Operate time accuracy : Refer to \*1 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	31.5	±12	—	—	15	±7	
operate time "n"	10	6.3 ±12	4.3 ±7	3 ±7	7	4.41 ±10	2.1 ±6
Accuracy guaranteed setting range	within	4	2.52 ±8	—	—	1.2 ±5	
	outside	1	0.63 ±6	—	—	0.3 ±4	
	within	50	31.5 ±18	—	—	15 ±10	
	outside	10	6.3 ±18	4.3 ±10	3 ±10	7	4.41 ±15
within	4	2.52 ±12	—	—	1.2 ±7		
outside	1	0.63 ±9	—	—	0.3 ±6		

Operate time accuracy : Refer to \*1 and \*2 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	7.65	±12	—	—	3.6	±7	
operate time "n"	10	1.53 ±12	1.04 ±7*	0.72 ±7*	7	1.071 ±10	0.504 ±6*
Accuracy guaranteed setting range	within	4	0.612 ±8	—	—	0.288 ±5*	
	outside	1	0.153 ±6*	—	—	0.072 ±4*	
	within	50	7.65 ±18	—	—	3.6 ±10	
	outside	10	1.53 ±18	1.04 ±10	0.72 ±10*	7	1.071 ±15
within	4	0.612 ±12	—	—	0.288 ±7*		
outside	1	0.153 ±9	—	—	0.072 ±6*		

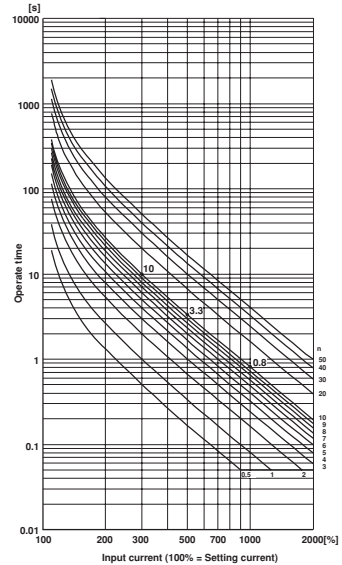
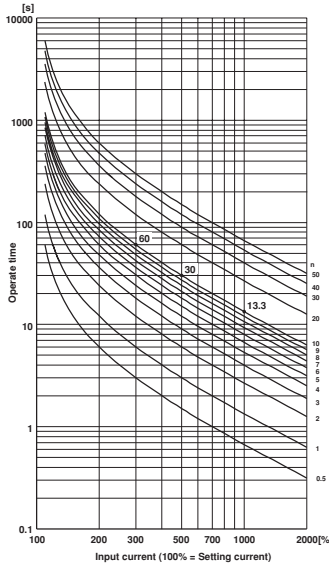
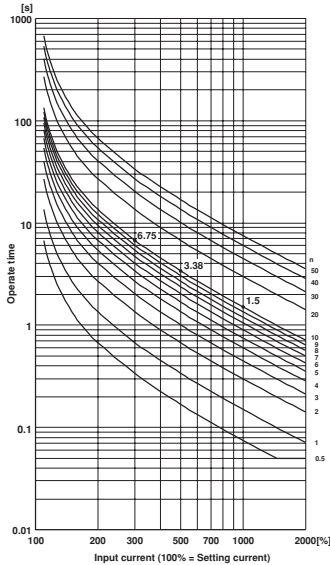
Operate time accuracy : Refer to \*1 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	250	±12	—	—	120	±7	
operate time "n"	10	50 ±10	34 ±7	24 ±7	7	35 ±8	16.8 ±6
Accuracy guaranteed setting range	within	4	20 ±8	—	—	9.6 ±5	
	outside	1	5 ±18	—	—	2.4 ±4	
	within	50	250 ±18	—	—	120 ±10	
	outside	10	50 ±15	34 ±10	24 ±10	7	35 ±12
within	4	20 ±9	—	—	9.6 ±7		
outside	1	5 ±9	—	—	2.4 ±6		

Very inverse time-lag (code: C4)

Strong very inverse time-lag (code: C5)

Extremely inverse time-lag (code: C6)



Operate time accuracy : Refer to \*1 and \*2 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	33.75	±12	—	—	7.5	±7	
operate time "n"	10	6.75 ±12	3.38 ±7	1.5 ±7	7	4.725 ±10	1.05 ±6*
Accuracy guaranteed setting range	within	4	2.7 ±8	—	—	0.6 ±5*	
	outside	1	0.675 ±6	—	—	0.15 ±4*	
	within	50	33.75 ±18	—	—	7.5 ±10	
	outside	10	6.75 ±18	3.38 ±10	1.5 ±10	7	4.725 ±15
within	4	2.7 ±12	—	—	0.6 ±7		
outside	1	0.675 ±9	—	—	0.15 ±6*		

Operate time accuracy : Refer to \*1 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	300	±12	—	—	66.5	±7	
operate time "n"	10	60 ±12	30 ±7	13.3 ±7	7	42 ±10	9.31 ±6
Accuracy guaranteed setting range	within	4	24 ±8	—	—	5.32 ±5	
	outside	1	6 ±16	—	—	1.33 ±4	
	within	50	300 ±18	—	—	66.5 ±10	
	outside	10	60 ±18	30 ±10	13.3 ±10	7	42 ±15
within	4	24 ±12	—	—	5.32 ±7		
outside	1	6 ±9	—	—	1.33 ±6		

Operate time accuracy : Refer to \*1 and \*2 on page 12/70.

Input current	300%		500%		1000%		
	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	Time [s]	Accuracy [%]	
Setting value	50	±12	—	—	4	±7	
operate time "n"	10	10 ±12	3.3 ±7	0.8 ±7*	7	7 ±10	0.56 ±6*
Accuracy guaranteed setting range	within	4	4 ±8	—	—	0.32 ±5*	
	outside	1	1 ±16	—	—	0.08 ±4*	
	within	50	50 ±18	—	—	4 ±10	
	outside	10	10 ±18	3.3 ±10	0.8 ±10*	7	7 ±15
within	4	4 ±12	—	—	0.32 ±7*		
outside	1	1 ±9	—	—	0.08 ±6*		

■ Specifications, DUT□G

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name		Detection of ground overvoltage, ground overvoltage relay						
Construction	Auxiliary energizing source	★Type						
Unit standard structure type	DC	DUTUGHAS-2	DUTUGHAK-2	DUTUGHAA-2	DUTUGTAS-2	DUTUGTAK-2	DUTUGTAA-2	
	AC	DUTAGHAS-2	DUTAGHAK-2	DUTAGHAA-2	DUTAGTAS-2	DUTAGTAK-2	DUTAGTAA-2	
DQ series replacement type *1	DC	DUTRGHAS-2	DUTRGHAK-2	DUTRGHAA-2	DUTRGTAS-2	DUTRGTAK-2	DUTRGTAA-2	
	AC	DUTBGHAS-2	DUTBGHAK-2	DUTBGHAA-2	DUTBGTAS-2	DUTBGTAK-2	DUTBGTAA-2	
Unit standard structure type (B-402)	DC	DUTUGNAS-2	DUTUGNAK-2	DUTUGNAA-2	DUTUGMAS-2	DUTUGMAK-2	DUTUGMAA-2	
	AC	DUTAGNAS-2	DUTAGNAK-2	DUTAGNAA-2	DUTAGMAS-2	DUTAGMAK-2	DUTAGMAA-2	
Ratings	★Frequency (Hz)	50, 60						
	★Voltage (one input) AC (V)	110, 190						
	Element	Inverse time-lag			Independent time-lag			
	Setting range *2	★Setting value AC (A)	5 - 50 (1)					
		Time setting	n = 0.5 - 50 (n = 0.5)			0-30s (0.1s) *3		
	Output duration *4 (s)	1	0.2	0.2	1	0.2	0.2	
	Rated burden (VA)	0.8						
	Continuous withstand voltage	130% of rated value						
	Auxiliary energizing source *5	★Voltage (V)	DC	100, 110, 125, 200, 220, 250				
			AC	100, 110, 127, 200, 220, 250 50/60Hz				
Rated burden		DC	100, 110, 125V rated: 6.5W 200, 220, 250V rated: 8.5W					
		AC	100, 110, 127V rated: 15VA 200, 220, 250V rated: 20VA					
Operation indicators	Display hold function *7	With	With	–	With	With	–	
	Auxiliary energizing source	DC	LED: Operation x 1		LED: Operation x 1	LED: Operation x 1	LED: Operation x 1	
		AC	LED: Operation x 1 Magnetic inversion: Operation x 1		LED: Operation x 1	LED: Operation x 1 Magnetic inversion: Operation x 1	LED: Operation x 1	
Contacts	Arrangement	Trip: 1NO, Alarm: 1NC, External output: 1NO						
	Limiting making capacity (A)	15 (at resistive load, 0.5s, 110V DC)						
	Continuous current carrying capacity (A)	5						
	Limiting breaking capacity DC (VA)	10 (at inductive load, L/R=0.04, 110V DC)						
Characteristics	Operate time	See page 12/75.						
	Operate value accuracy (%)	*6						
	Holding factor (%)	5						
Mass (kg)	2							
Previous relay type	DQVJA1HH	DQVJA1HB	DQVJA1HA	DQVRA1HH, DQVWA2 (F1) HH, G	DQVRA1HB, DQVWA2 (F1) HB, D	DQVRA1HA, DQVWA2 (F1) HA, N		

Notes: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch.

\*3 Zero represents instantaneous operate time (70ms max.).

\*4 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*5 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

\*6 ±5% in accuracy guaranteed setting range, ±15% for outside the accuracy guaranteed setting range. 10 to 50V for accuracy guaranteed setting range, 5 to 10V below for outside the accuracy guaranteed setting range

\*7 If "S" or "K" is selected for the 8th digit of the code symbol, both LED and magnetic inversion operation indicators are provided with a display hold function.

If "A" is selected, the LED indicator has no display hold function.

# Protective Relays

## DUT□V

### ■ Specifications, DUT□V

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name		Detection of overvoltage, overvoltage relay						
Construction	Auxiliary energizing source	★Type						
Unit standard structure type	DC	DUTUVHAS-2	DUTUVHAK-2	DUTUVHAA-2	DUTUVTAS-2	DUTUVTAK-2	DUTUVTAA-2	
DQ series replacement type *1	AC	DUTAVHAS-2	DUTAVHAK-2	DUTAVHAA-2	DUTAVTAS-2	DUTAVTAK-2	DUTAVTAA-2	
	DC	DUTRVHAS-2	DUTRVHAK-2	DUTRVHAA-2	DUTRVTAS-2	DUTRVTAK-2	DUTRVTAA-2	
	AC	DUTBVHAS-2	DUTBVHAK-2	DUTBVHAA-2	DUTBVTAS-2	DUTBVTAK-2	DUTBVTAA-2	
Unit standard structure type (B-402)	DC	DUTUVNAS-2	DUTUVNAK-2	DUTUVNAA-2	DUTUVMAS-2	DUTUVMAK-2	DUTUVMAA-2	
	AC	DUTAVNAS-2	DUTAVNAK-2	DUTAVNAA-2	DUTAVMAS-2	DUTAVMAK-2	DUTAVMAA-2	
Ratings	★Frequency (Hz)	50, 60						
	★Voltage (one input) AC (V)	110						
	Element	Inverse time-lag			Independent time-lag			
	Setting range *2	★Setting value AC (A) 60 - 150 (1)						
		Time setting n = 0.5 - 50 (n = 0.5)			0-30s (0.1s) *3			
	Output duration *4 (s)	1	0.2	0.2	1	0.2	0.2	
	Rated burden (VA)	0.8						
	Continuous withstand voltage	300% of rated value						
	Auxiliary energizing source *5	★Voltage (V)	DC	100, 110, 125, 200, 220, 250				
			AC	100, 110, 127, 200, 220, 250 50/60Hz				
Rated burden		DC	100, 110, 125V rated: 6.5W 200, 220, 250V rated: 8.5W					
	AC	100, 110, 127V rated: 15VA 200, 220, 250V rated: 20VA						
Operation indicators	Display hold function *6	With	With	-	With	With	-	
	Auxiliary energizing source	DC	LED: Operation x 1		LED: Operation x 1	LED: Operation x 1	LED: Operation x 1	
		AC	Magnetic inversion: Operation x 1		Magnetic inversion: Operation x 1	Magnetic inversion: Operation x 1	Magnetic inversion: Operation x 1	
Contacts	Arrangement	Trip: 1NO, Alarm: 1NC, External output: 1NO						
	Limiting making capacity (A)	15 (at resistive load, 0.5s, 110V DC)						
	Continuous current carrying capacity (A)	5						
	Limiting breaking capacity DC (VA)	10 (at inductive load, L/R=0.04, 110V DC)						
Characteristics	Operate time	See page 12/75.						
	Operate value accuracy (%)	±5						
	Holding factor (%)	5						
Mass (kg)	2							
Previous relay type	DQVJC1HH	DQVJC1HB	DQVJC1HA	DQVRA1HH, DQVWA2 (F1) HH, G	DQVRA1HB, DQVWA2 (F1) HB, D	DQVRA1HA, DQVWA2 (F1) HA, N		

Notes: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch.

\*3 Zero represents instantaneous operate time (70ms max.).

\*4 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*5 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

\*6 If "S" or "K" is selected for the 8th digit of the code symbol, both LED and magnetic inversion operation indicators are provided with a display hold function. If "A" is selected, the LED indicator has no display hold function.

■ Specifications, DUT□U

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name		Detection of undervoltage, undervoltage relay						
Construction	Auxiliary energizing source	★Type						
Unit standard structure type	DC	DUTUUHAS-2	DUTUUHAK-2	DUTUUHAA-2	DUTUUTAS-2	DUTUUTAK-2	DUTUUTAA-2	
	AC	DUTAUHAS-2	DUTAUHAK-2	DUTAUHAA-2	DUTAUTAS-2	DUTAUTAK-2	DUTAUTAA-2	
DQ series replacement type *1	DC	DUTRUHAS-2	DUTRUHAK-2	DUTRUHAA-2	DUTRUTAS-2	DUTRUTAK-2	DUTRUTAA-2	
	AC	DUTBUHAS-2	DUTBUHAK-2	DUTBUHAA-2	DUTBUTAS-2	DUTBUTAK-2	DUTBUTAA-2	
Unit standard structure type (B-402)	DC	DUTUUNAS-2	DUTUUNAK-2	DUTUUNAA-2	DUTUUMAS-2	DUTUUMAK-2	DUTUUMAA-2	
	AC	DUTAUNAS-2	DUTAUNAK-2	DUTAUNAA-2	DUTAUMAS-2	DUTAUMAK-2	DUTAUMAA-2	
Ratings	★Frequency (Hz)		50, 60					
	★Voltage (one input) AC (V)		63.5, 110					
	Element		Inverse time-lag			Independent time-lag		
	Setting range *2	★Setting value AC (A)	63.5V rated: 10–60 (1) 110V rated: 15–100 (1)					
		Time setting	n = 0.5 – 50 (n = 0.5)			0–30s (0.1s) *3		
	Output duration *4 (s)		1	0.2	0.2	1	0.2	0.2
	Rated burden (VA)		0.8					
	Continuous withstand voltage		130% of rated value					
	Auxiliary energizing source *5	★Voltage (V)	DC	100, 110, 125, 200, 220, 250				
			AC	100, 110, 127, 200, 220, 250 50/60Hz				
Rated burden		DC	100, 110, 125V rated: 6.5W 200, 220, 250V rated: 8.5W					
		AC	100, 110, 127V rated: 15VA 200, 220, 250V rated: 20VA					
Operation indicators	Display hold function *6		With	With	–	With	With	–
	Auxiliary energizing source	DC	LED: Operation x 1					
		AC	LED: Operation x 1, Magnetic inversion: Operation x 1		LED: Operation x 1	LED: Operation x 1, Magnetic inversion: Operation x 1		LED: Operation x 1
Contacts	Arrangement		Trip: 1NO, Alarm: 1NC, External output: 1NO					
	Limiting making capacity (A)		15 (at resistive load, 0.5s, 110V DC)					
	Continuous current carrying capacity (A)		5					
	Limiting breaking capacity DC (VA)		10 (at inductive load, L/R=0.04, 110V DC)					
Characteristics	Operate time		See page 12/75.					
	Operate value accuracy (%)		±5					
	Holding factor (%)		5					
Mass (kg)		2						
Previous relay type		DQVJD1HH	DQVJD1HB	DQVJD1HA	DQVRB1HH, DQVWB2HH, G	DQVRB1HB, DQVWB2HB, D	DQVRB1HA, DQVWB2HA, N	

Notes: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch.

\*3 Zero represents instantaneous operate time (70ms max.).

\*4 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*5 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

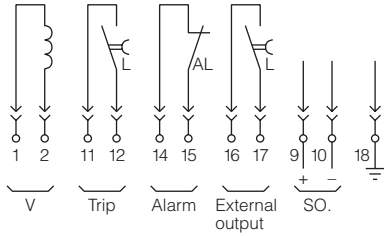
\*6 If "S" or "K" is selected for the 8th digit of the code symbol, both LED and magnetic inversion operation indicators are provided with a display hold function. If "A" is selected, the LED indicator has no display hold function.

# Protective Relays

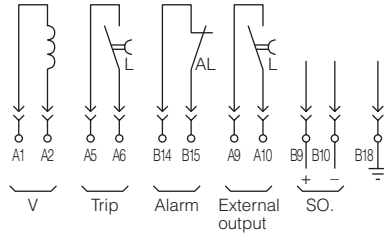
## DUT□G, DUT□V, DUT□U

### ■ Connection diagrams

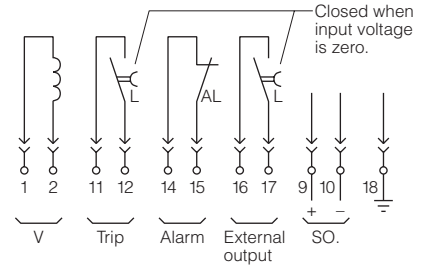
DUTUGH□-2, DUTAGH□-2  
 DUTUGN□-2, DUTAGN□-2  
 DUTUVH□-2, DUTAVH□-2  
 DUTUVN□-2, DUTAVN□-2



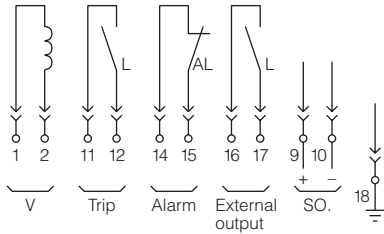
DUTRGH□-2, DUTBGH□-2  
 DUTRVH□-2, DUTBVH□-2



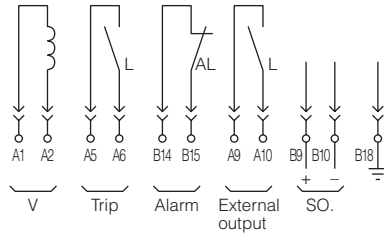
DUTUUH□-2, DUTAUH□-2  
 DUTUUN□-2, DUTAUUN□-2



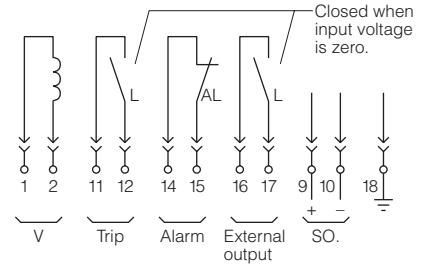
DUTUGT□-2, DUTAGT□-2  
 DUTUGM□-2, DUTAGM□-2  
 DUTUVT□-2, DUTAVT□-2  
 DUTUVM□-2, DUTAVM□-2



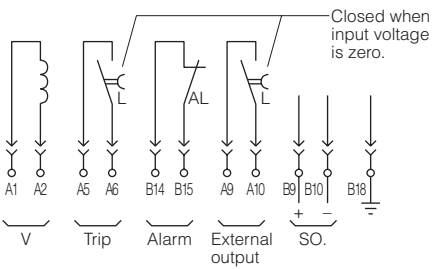
DUTRGT□-2, DUTBGT□-2  
 DUTRVT□-2, DUTBVT□-2



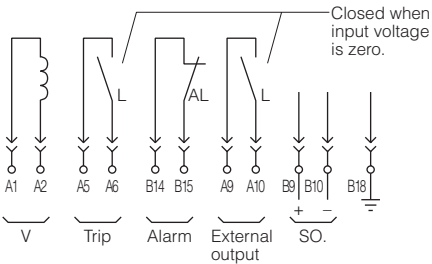
DUTUUT□-2, DUTAUT□-2  
 DUTUUM□-2, DUTAUUM□-2



DUTRUH□-2, DUTBUH□-2

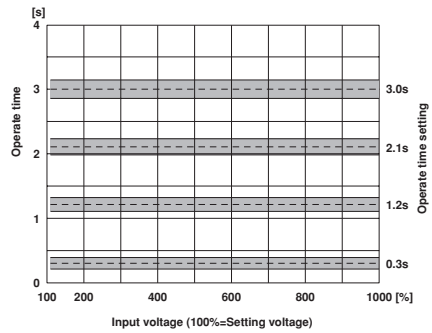


DUTRUT□-2, DUTBUT□-2



## ■ Characteristic diagrams (Operate time characteristics)

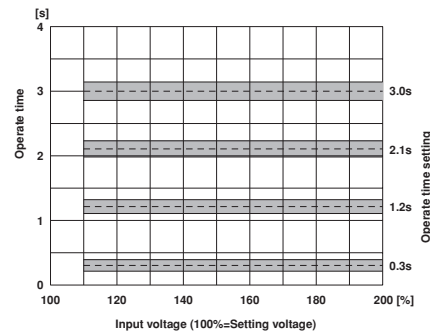
- Independent time-lag element
- Ground overvoltage relay DUT□□GTA□□-2, DUT□GMA□□-2



Input voltage	time setting	150%
Setting value	time setting [s]	Accuracy ε [%] (operate time range)
All voltage setting	3.0	±5 (2.850 to 3.150s)
	2.1	±4.3 (1.971 to 2.229s)
	1.2	±3.5 (1.095 to 1.305s)
	0.3	±2.8 (0.216 to 0.384s)

Remark : Operate time is 70ms maximum in the state where operate time setting is 0s.

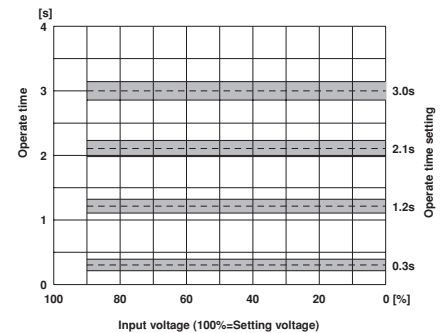
- Overvoltage relay DUT□VTA□-2, DUT□VMA□-2



Input voltage	time setting	120%
Setting value	time setting [s]	Accuracy ε [%] (operate time range)
All voltage setting	3.0	±5 (2.850 to 3.150s)
	2.1	±4.3 (1.971 to 2.229s)
	1.2	±3.5 (1.095 to 1.305s)
	0.3	±2.8 (0.216 to 0.384s)

Remark : Operate time is 70ms maximum in the state where operate time setting is 0s.

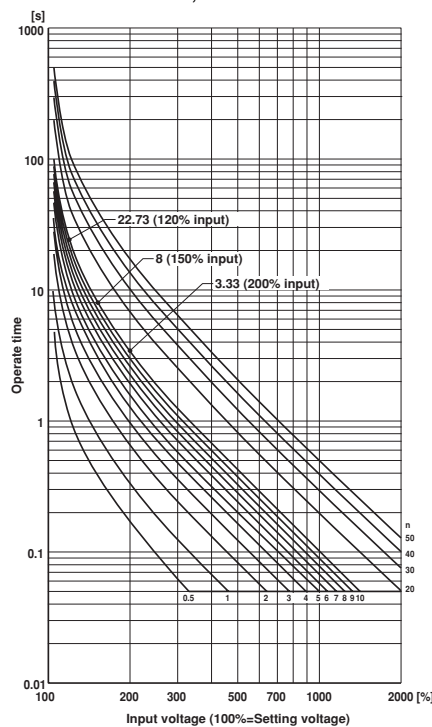
- Undervoltage relay DUT□UTA□-2, DUT□UMA□-2



Input voltage	time setting	70%
Setting value	time setting [s]	Accuracy ε [%] (operate time range)
All voltage setting	3.0	±5 (2.850 to 3.150s)
	2.1	±4.3 (1.971 to 2.229s)
	1.2	±3.5 (1.095 to 1.305s)
	0.3	±2.8 (0.216 to 0.384s)

Remark : Operate time is 70ms maximum in the state where operate time setting is 0s.

- Inverse time-lag element
- Ground overvoltage relay DUT□GHA□-2, DUT□GNA□-2



Input current	120%	150%	200%					
Setting value	Time [s]	Accuracy ε [%]	Time [s]	Accuracy ε [%]	Time [s]	Accuracy ε [%]		
Accuracy guaranteed setting range	within	n=10	22.73	±20	8	±15	3.33	±10
		n=7	--	--	5.6	±12	2.331	±9
		n=4	--	--	3.2	±9	1.332	±8
		n=1	--	--	0.8	±6	0.333	±6
		n=10	22.73	±30	8	±23	3.33	±15
	outside	n=7	--	--	5.6	±18	2.331	±14
		n=4	--	--	3.2	±14	1.332	±12
		n=1	--	--	0.8	±9	0.333	±9

Note \*1 : Operate time accuracy ε[%]

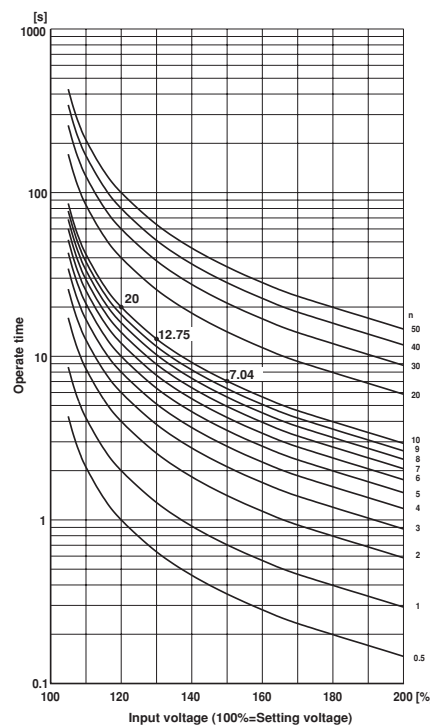
When "n" ≤ 10

$$\epsilon = \frac{T_n - \frac{n}{10} \times T_{10}}{T_{10}} \times 100 (\%)$$

When "n" > 10

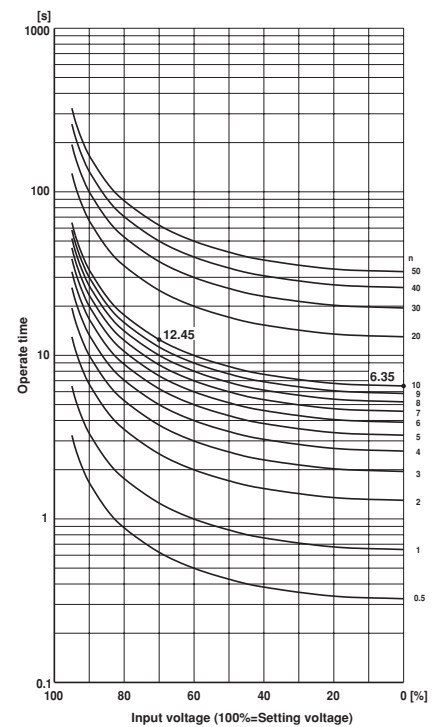
$$\epsilon = \frac{T_n - \frac{n}{10} \times T_{10}}{\frac{n}{10} \times T_{10}} \times 100 (\%)$$

- Overvoltage relay DUT□VHA□-2, DUT□VNA□-2



Input current	120%	130%	150%				
Setting value	Time [s]	Accuracy ε [%]	Time [s]	Accuracy ε [%]	Time [s]	Accuracy ε [%]	
All voltage setting	n=10	20	±20	12.75	±18	7.04	±15
	n=7	14	±16	--	--	4.928	±12
	n=4	8	±11	--	--	2.816	±9
	n=1	2	±6	--	--	0.704	±6

- Undervoltage relay DUT□UHA□-2, DUT□UNA□-2



Input current	70%	0%			
Setting value	Time [s]	Accuracy ε [%]	Time [s]	Accuracy ε [%]	
All voltage setting	n=10	12.45	±20	6.35	±10
	n=7	8.715	±16	4.445	±9
	n=4	4.98	±11	2.54	±8
	n=1	1.245	±6	0.635	±6

T<sub>10</sub> : Nominal operate time at reference operate time setting "n" = 10

T<sub>n</sub> : Actual operate time at operate time setting "n"

Where

$$n = \frac{\text{Operate time setting}}{\text{Reference operate time setting}} \times 10$$

# Protective Relays

## DUT□D

### ■ Specifications, DUT□D

Items marked with ★ should be specified when ordering. See page 12/66 for the 10<sup>th</sup> digit or later of type number.

Application and name		Selective ground fault detection of non-grounded or resistance grounded distribution line, ground directional relay						
Construction		★Type						
Unit standard structure type		DUTUDTBS-3	DUTUDTBK-3	DUTUDTBA-3	DUTADTBS-3	DUTADTBK-3	DUTADTBA-3	
DQ series replacement type *1 *7		DUTRDTBS-3	DUTRDTBK-3	DUTRDTBA-3	DUTBDTBS-3	DUTBDTBK-3	DUTBDTBA-3	
Ratings	★Frequency (Hz)	50, 60						
	★Zero-sequence voltage AC (V)	3V <sub>0</sub> = 110, 190						
	★Zero-sequence current *6 AC (A)	3I <sub>0</sub> = 2						
	Setting range *2	★Operate voltage (V)	5–30 (1)					
		★Operate current (mA)	1–10 (0.5), 10–100 (1)					
		★Max. sensitivity phase angle θ (°)	45–75 (1)					
		★Operate time (s)	0–3 (0.1), [Zero is instantaneous (0.2±0.05)]					
	Output duration *3 (s)	1	0.2	0.2	1	0.2	0.2	
	Burden (VA)	Voltage circuit: 1VA, rated Current circuit Operate current value at 1 of power-factor: 1–10mA is 2.7Ω burden. 10–100mA is 0.27Ω burden.						
	Continuous withstand input (% of rating)	Voltage circuit: 115, current circuit: 100						
Auxiliary energizing source *4	★Voltage (V)	DC100, 110, 125, 200, 220, 250			AC100, 110, 127, 200, 220, 250 50, 60Hz			
	Rated burden	DC100, 110, 125V rated : 6.5W DC200, 220, 250V rated : 8.5W			AC100, 110, 127V rated : 15VA AC200, 220, 250V rated : 20VA			
Operation indicators	Display hold function *8	With	With	–	With	With	–	
	Operation indicators	LED: Operation x 1			LED: Operation x 1, Magnetic inversion: Operation x 1		LED: Operation x 1	
Contacts	Arrangement	Trip: 1NO, Alarm: 1NC, External output: 1NO						
	Limiting making capacity (A)	15 (at resistive load, 0.5s, 110V DC)						
	Continuous current carrying capacity (A)	5						
	Limiting breaking capacity DC (VA)	10 (at inductive load, L/R=0.04, 110V DC)						
Characteristics	Influenced by phase angle *5 (under 30% of rated voltage)	Operate phase angle is (θ+80)±5° leading max., (θ+280)±5° lagging max., under 1000% of operate current setting. Max. sensitivity phase angle (θ) is ±5° max. of setting value.						
	Influenced by voltage-current *5 (under 30% of rated voltage)	Operate current accuracy is ±10% max. of setting value under max. sensitivity phase angle.						
	Accuracy	Operate voltage (%)	±10					
		Operate current (%)	±10					
		Max. sensitivity phase angle θ (°)	±5 (under 30% of rated voltage. 1000% of operate current setting)					
		Operate time (s)	(operate time setting value + 0.2) ±0.35 (under operate time setting value = 0.3 to 3)					
	Resetting time (s)	1	0.2	0.2	1	0.2	0.2	
Holding factor (%)	20							
Mass (kg)	2							
Previous relay type	DQWJA1HH DQWPA□HH DQWPF□HH DQWPA□HG DQWPF□HG	DQWJA1HB DQWPA□HB DQWPF□HB DQWPA□HD DQWPF□HD	DQWJA1HA DQWPA□HA DQWPF□HA DQWPA□HN DQWPF□HN	DQWPA□HH DQWPF□HH	DQWPA□HB DQWPF□HB	DQWPA□HA DQWPF□HA		

Notes: \*1 DQ series replacement type relay has the same terminal arrangement with DQ series relay. DQ series replacement type relay with a panel mounting adapter that has the same depth with DQ series relay, is also available. For details, contact FUJI.

\*2 The value in parentheses indicates the pitch.

\*3 The output duration of 1s is used in the case of the circuit breaker tripping, and that of 0.2s is used on other occasions.

\*4 Power interruption guarantee time of AC auxiliary energizing source is 2s. However, it may exceed 2s depending on input or operating conditions.

\*5 See the characteristic diagrams on page 12/77

\*6 Zero-sequence current (3I<sub>0</sub>) flowing into secondary side of zero-sequence current transformer (ZCT).

Use ZCT complying with L-class (200/1.5mA, Z=10Ω, pf=0.5) defined by JEC 1201.

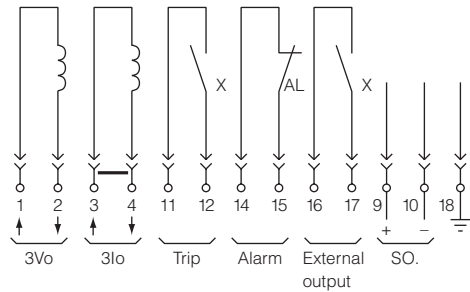
\*7 Noise immunity per B-402 (Digital Protective Relays and Protective Equipment)

\*8 If "S" or "K" is selected for the 8th digit of the code symbol, both LED and magnetic inversion operation indicators are provided with a display hold function.

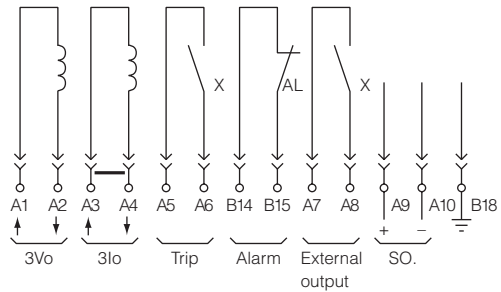
If "A" is selected, the LED indicator has no display hold function.

■ Connection diagrams

DUTUDTB□-3, DUTADTB□-3

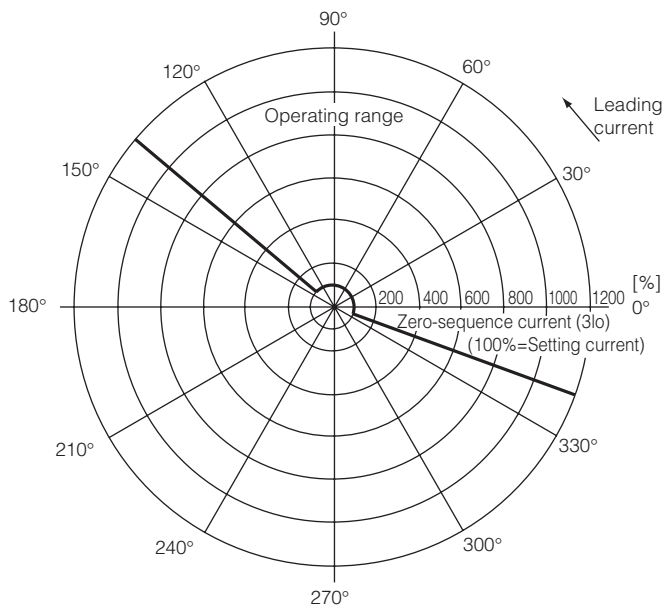


DUTURDTB□-3, DUTBDTB□-3



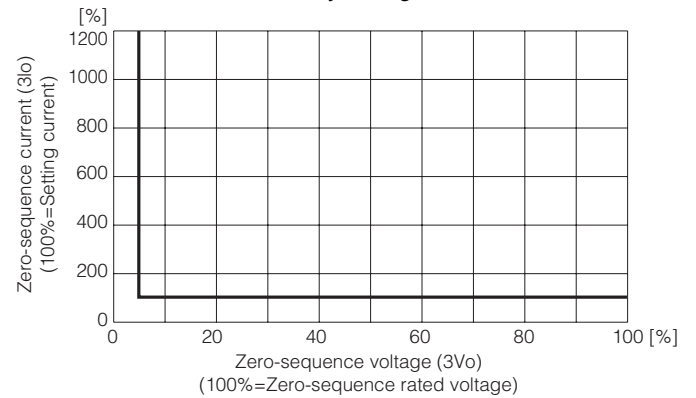
■ Characteristic diagrams

• Characteristics influenced by phase angle



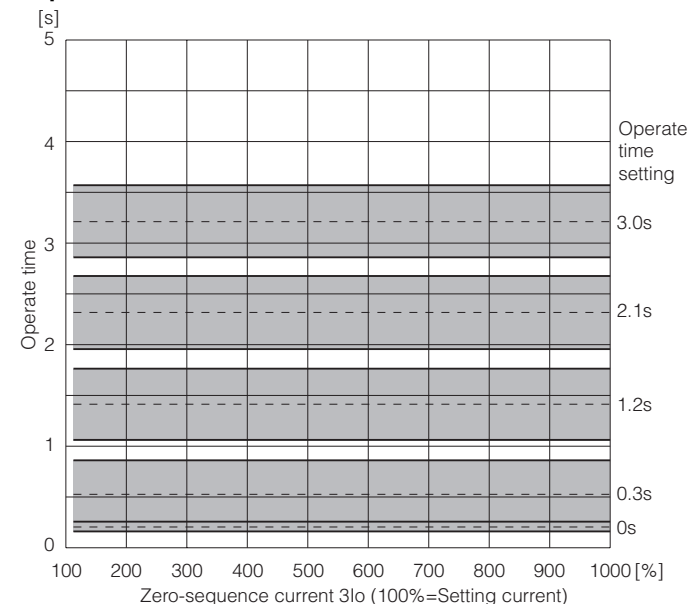
Zero-sequence voltage 3Vo=30% of rated voltage  
Max. sensitivity phase angle  $\theta=60^\circ$  (leading current)

• Characteristics influenced by voltage-current



- Zero-sequence rated voltage 3Vo : 100%=110V
- Max. sensitivity phase angle between zero-sequence input voltage and current  $\theta$  is constant.
- Operate voltage setting : 5V (equivalent to 4.5%)
- Operate current setting : 100%=1.5mA

■ Operate time characteristics



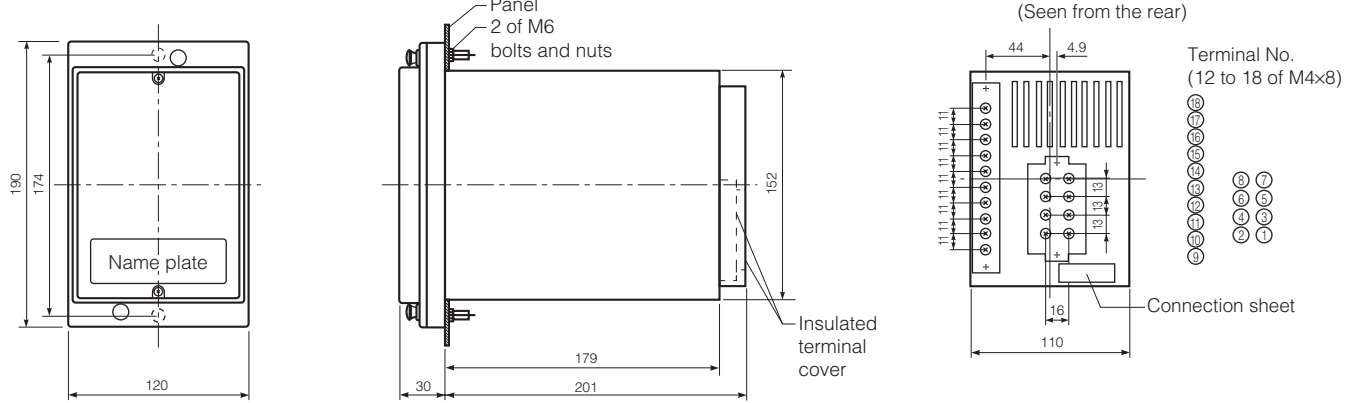
Operate time accuracy

Zero-sequence voltage 3Vo		100% of rated voltage	
Zero-sequence current 3Io		1000% of setting current	
Setting value		Operate time [s]	Accuracy $\epsilon$ [s] (Operate time range)
Operate	Time setting [s]		
All voltage, current setting	3.0	3.2	$\pm 0.35$ (2.85 to 3.55)
	2.1	2.3	$\pm 0.35$ (1.95 to 2.65)
	1.2	1.4	$\pm 0.35$ (1.05 to 1.75)
	0.3	0.5	$\pm 0.35$ (0.15 to 0.85)
	0	0.2	$\pm 0.05$ (0.15 to 0.25)

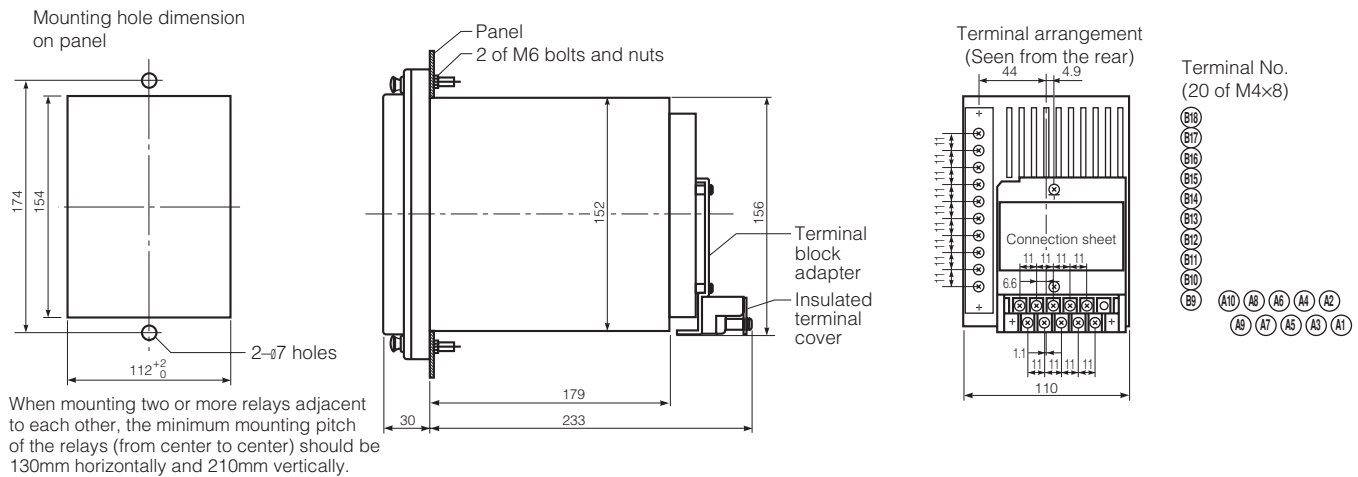
# Protective Relays DUT

## ■ Dimensions, mm

- Unit standard structure type, DUTU, DUTA

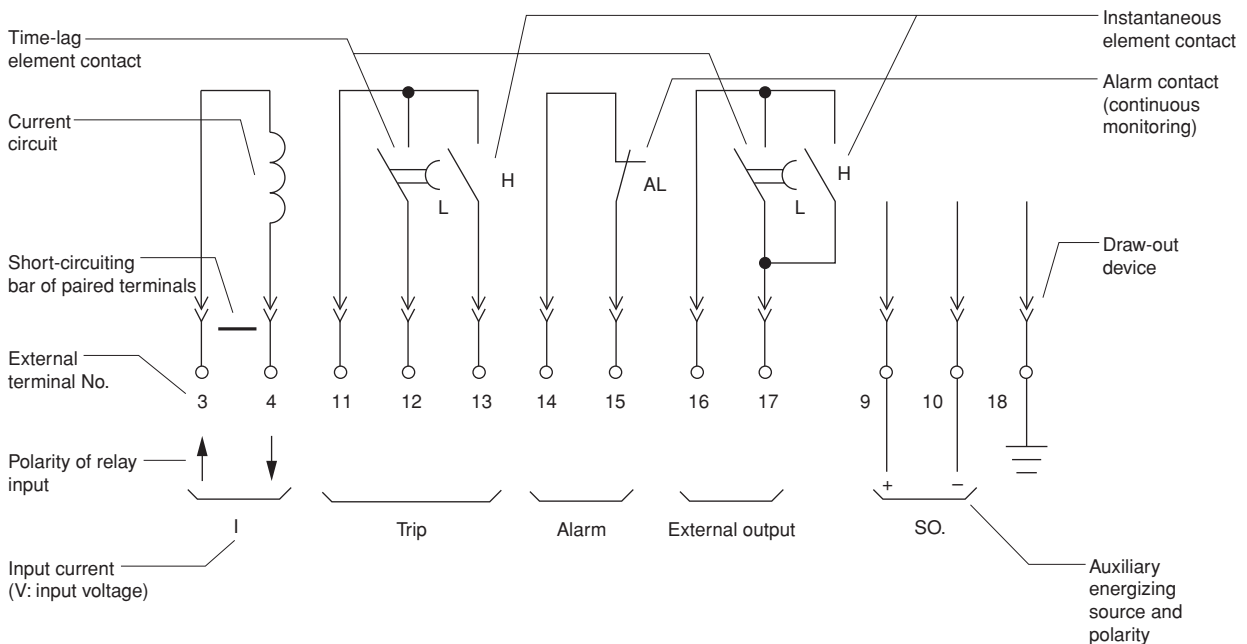


- DQ series replacement type, DUTR, DUTB



## ■ Symbols (conforming to JIS C-0301)

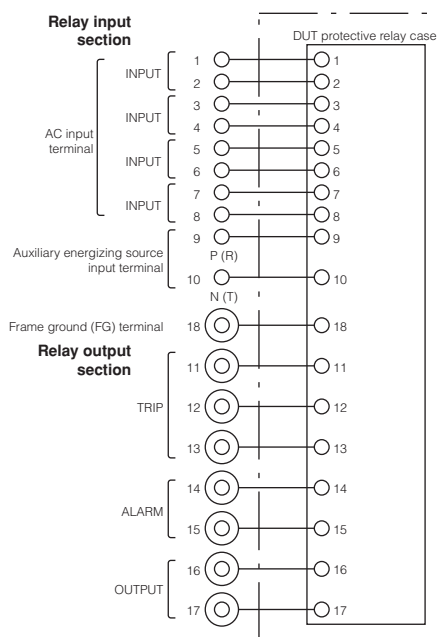
### Explanatory diagram





Application	Test of DUT series protective relay	
Principle and name	Testing tool	
Type	<b>DUTT1</b>	
Ratings	Voltage and current	250V AC 5A, 250V DC 0.25A
	Continuous withstand input	100% of relay rated input
Input terminal	1) AC input terminal: 1–2, 3–4, 5–6, 7–8 2) Auxiliary energizing source input terminal: 9–10 3) Frame ground terminal: 18 *The terminal numbers above are as same as those of input terminals of DUT series protective relays.	
Output terminal	1) Trip output terminal: 11–12–13 2) External output terminal: 16–17 3) Continuous monitoring (alarm) output terminal: 14–15 *The terminal numbers above are as same as those of output terminals of DUT series protective relays.	
Mass	7.1kg	

### Connection diagram DUTT1



### Dimensions, mm DUTT1

