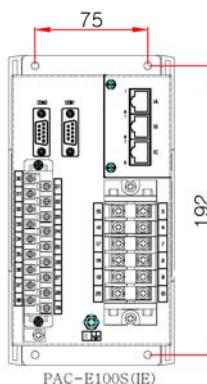
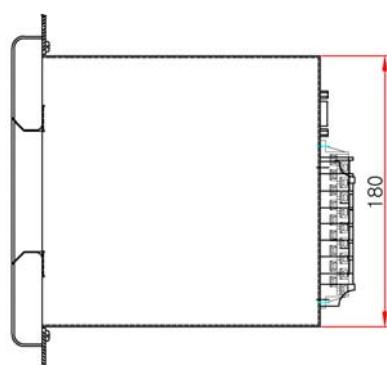
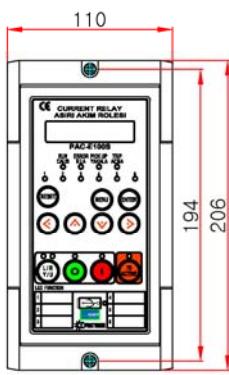
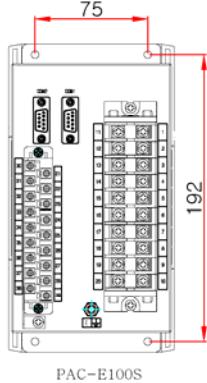
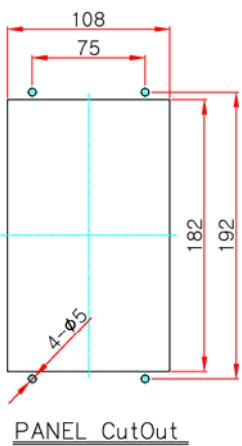
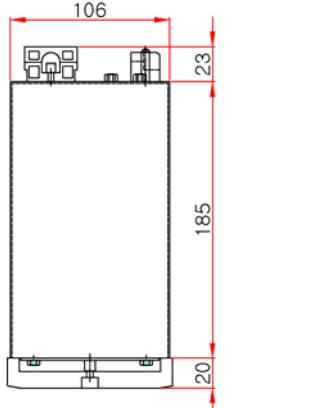


DIMENSIONED DRAWING

PAC- E100S(IE) QUICK INSTALLATION AND SETUP GUIDE

SAFETY CAUTIONS

Apply the rated power to the power terminal of the product.

Do the appropriate connections based on the wiring diagram.

Do not expose the product to direct sunlight, shock.

Do not touch the product with wet hands.

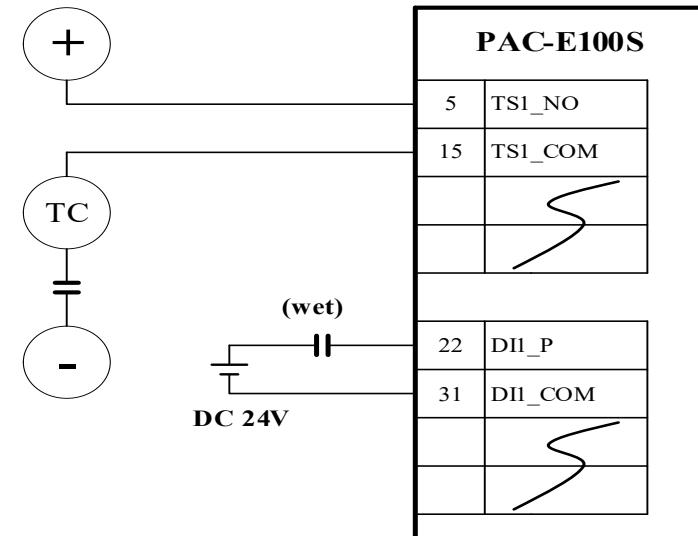
PAC-E100S, Overcurrent & Earth Fault Relay is a microprocessor-based numerical protection relay designed for the management and protection of a distribution feeder. If you want to take advantage of all the features, please refer to the user's manual. This guide is restricted within basic structure and connection information, key operation for menu handling.

BASIC OPERATION

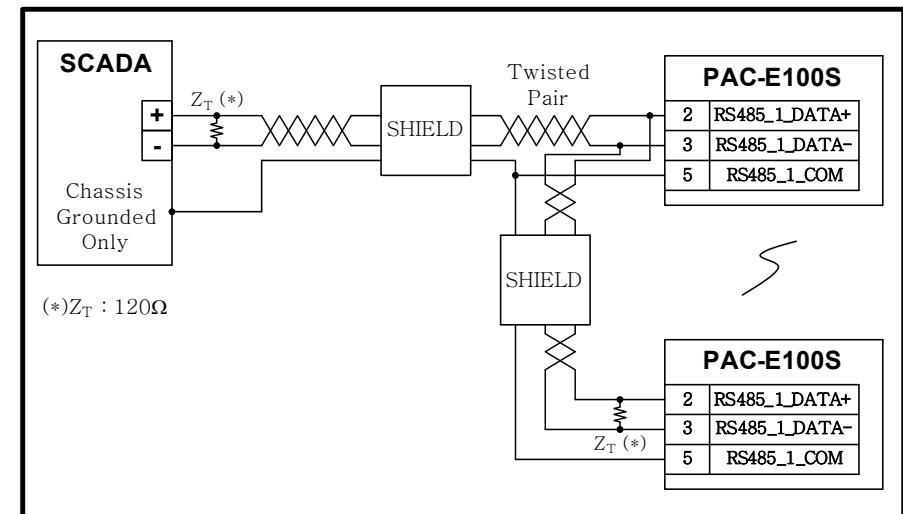
PAC-E100S overcurrent relay has an extremely easy menu structure. The menu movement is made with four arrow (**<**, **>**, **A**, **V**), MENU, ENT Keys. If MENU key is pressed on the top display, then main menus (DISPLAY, SETTING, COMMAND) is blinking and enter the selected menu by pressing ENT key. Within main menu, four arrow(**<**, **>**, **A**, **V**) keys are used to move the sub-menus.

In SETTING menu, the setting values on PAC-E100S can be viewed without password confirmation and edited after entering password. The item to be changed is selected by pressing **<**, **A**, **V** keys and **>** keys. Press **>** key, then the value of selected item is blinking. Select the setting value by pressing **A**, **V** and enter that by pressing ENT key. In case requesting the password, enter the password correctly through four arrow(**<**, **>**, **A**, **V**) keys and **>** key.(Default password are '0000'). Repeat above key operation to change multi-items. And for saving, enter 'YES' message at "SAVE SETTING CHANGED?" window.

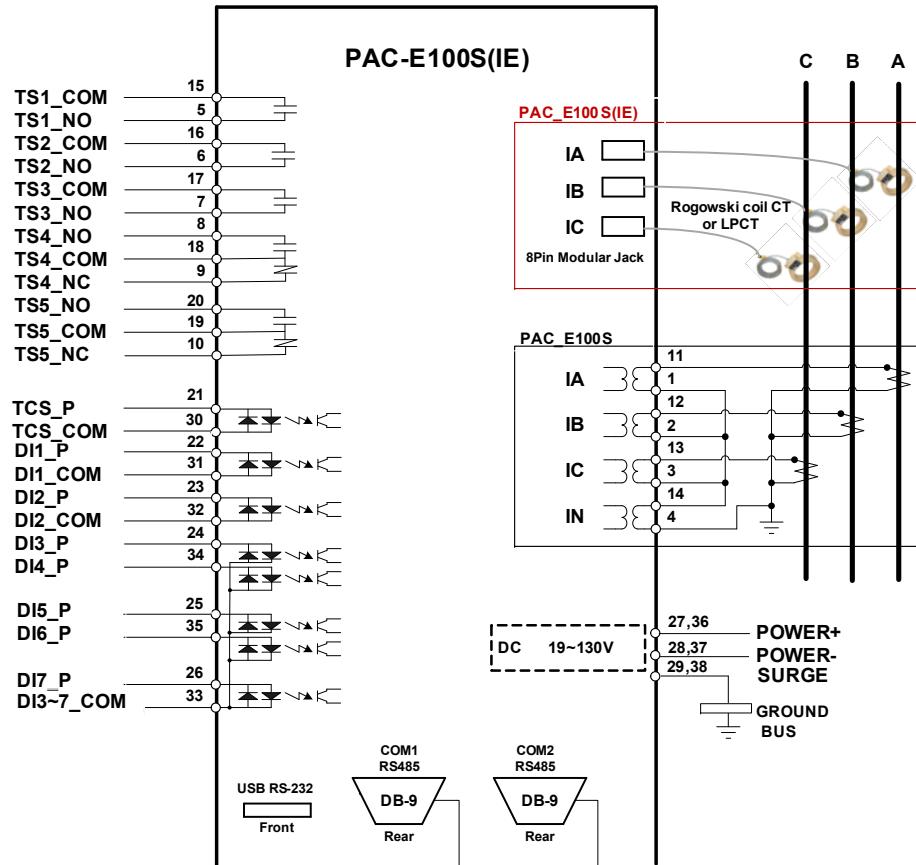
CONTACT INPUT/OUTPUT CONNECTION



RS-485 CONNECTION(for COM1 or COM2)



TYPICAL WIRING DIAGRAM



MENU TREE

Top IA,IB IC,IN And Active Setting Group-P#] Or Reclosing Counter(duri g reclosing in progress- R#])	DISPLAY	STATUS	CONTACT INPUT	CONT INI ~ Z
			CONTACT OUTPUT	CONT OUTI ~ 5
			USER LOGIC	USER LOGIC1~4
			SELF DIAGNOSIS	MEMORY, SETTING, AD CONVERTER, CALIBRATION, TRIP CIRCUIT, CB MONITOR
			COM	COMI ~2, Tx/Rx Counter display
		MEASURE	PROTECTION	IOC1(50_1), IOC2(50_2), TOC(51), IOCG1(50N_1), IOCG2(50N_2), TOCG(51N), THERMAL(49), UC(37), NSOC(46), AREL(79), CBFAIL(50BF), COLD LD, INRUSH
			CURR(IA), CURR(IB), CURR(IC), CURR(IN), SEQ(I0), SEQ(HI), SEQ(I2), THERMAL, FREQUENCY, TRIP COUNT, CB_MON%	
			RECORD	EVENT
			WAVEFORM	
			SYSTEM INFO	Version Display
		SETTING	SYSTEM	FREQUENCY, PHS CT RATIO, GND CT RATIO
			POWER SYSTEM	
			WAVEFORM	TYPE, TRIG.POS, TRIG.SRC
			CB CONTROL	TRIP PULSE, CLOSE PULSE
			TCS	FUNCTION, DELAY
			CB MONITOR	FUNCTION, LOW ka, LOW CNT, MID ka, MID CNT, HIGH ka, HIGH CNT, ALARM
			COM1	FUNCTION, SLAVE ADDR, BPS, PROTOCOL
			COM2	FUNCTION, SLAVE ADDR, BPS, PROTOCOL
			DNP3.0	TX DELAY, LINK CONFIRM, LINK RETRY, LINK TIMEOUT, SBO TIMEOUT, WR TIME INT, COLD RESTART
			CONTACT INPUT	CONT INI ~ Z
		PROTECTION1 PROTECTION2 PROTECTION3 PROTECTION4 **: Active setting group	CONTACT OUTPUT	CONT OUTI ~ 5
			LED	LOGIC, INPUTI~8, RESET TYPE, INPUT, DELAY
			USER LOGIC	LOGIC, INPUTI~8, RESET TYPE, INPUT, DELAY
			PASSWORD	1 ~ 4
			IOC1(50_1)	FUNCTION, PICKUP, DELAY, BLOCK
		COMMAND	IOC2(50_2)	FUNCTION, PICKUP, DELAY, BLOCK
			TOC(51)	FUNCTION, CURVE, PICKUP, MULTIPLIER, DT DELAY, BLOCK
			IOCG1(50N_1)	FUNCTION, PICKUP, DELAY, BLOCK
			IOCG2(50N_2)	FUNCTION, PICKUP, DELAY, BLOCK
			TOCG(51N)	FUNCTION, CURVE, PICKUP, MULTIPLIER, DT DELAY, BLOCK
		COMMAND	THERMAL(49)	FUNCTION, K-FACTOR, TIME CONS, ALARM, BLOCK
			CONT OUT TEST	FUNCTION, PICKUP, DELAY, BLOCK
			EVENT CLEAR	FUNCTION, PICKUP, DELAY, BLOCK
			WAVE CLEAR	FUNCTION, SHOT NUM, PRE CON,
			THERMAL CLEAR	START CON, PREPARE TIME, DISCRIM TIME, 1ST DLY TIME, 2ND DLY TIME, 3RD DLY TIME, 4TH DLY TIME, 5TH DLY TIME, BLOCK
			TRIP CNT EDIT	FUNCTION, TRIP RELAY, PICKUP, DELAY, BLOCK
			CB MON CLEAR	FUNCTION, PKP MUL, BLOCK
			CHANGE SG	FUNCTION, PICKUP, OP DELAY, RST DELAY, OC PKP MUL, BLOCK
			PANEL TEST	FUNCTION, I2/I1, MIN II, OP DELAY, RST DELAY, BLOCK

DISPLAY

DISPLAY menu display status of input and output contacts, self diagnosis, protection and logic, the measured values, records of events and waveforms, system information.

COMMAND

COMMAND menu have several useful command such as contact output test, event/waveform record clear, thermal clear, trip counter edit, CB monitoring value clear, setting group change and front panel test.

DISPLAY (ENT)

↓ STATUS ↔	↓ CONTAC INPUT ↔	↓ CONT IN1~7	OFF / ON
	↓ CONTACT OUTPUT ↔	↓ CONT OUT1~5	DEENERGIZED / ENERGIZED
	↓ USER LOGIC ↔	↓ USER LOGIC1~4	OFF / ON
	↓ SELF DIAGNOSIS ↔	↓ MEMORY	FAIL / OK
		↓ SETTING	FAIL / OK
		↓ AD CONVERTER	FAIL / OK
		↓ CALIBRATION	FAIL / OK
		↑ TRIP CIRCUIT	FAIL / OK
		↑ CB MONITOR	FAIL / OK
	↓ COM ↔	↓ COM1~2	TX/RX counter
	↓ PROTECTION ↔	↓ IOC1(50_1)	Pickup, Operation
		↓ IOC2(50_2)	Pickup, Operation
		↓ TOC(51)	Pickup, Operation
		↓ IOCG1(50N_1)	Pickup, Operation
		↓ IOCG2(50N_2)	Pickup, Operation
		↓ TOCG(51N)	Pickup, Operation
		↓ THERMAL(49)	Alarm, Operation
↓ MEASURE↔	↓ UC(37)	Pickup, Operation	
	↓ NSOC(46)	Pickup, Operation	
	↓ AREL(79)	Ready, In Progress, Fail	
	↓ CBFAIL(50BF)	Operation	
	↓ COLD LD(COLD LD)	Pickup, Operation	
	↓ INRUSH(I2/I)	Operation	
	↓ CURR(IA) ↓ CURR(IB) ↓ CURR(IC) ↓ CURR(IN)	Fundamental current RMS, Angle	
	↓ SEQ(I0) ↓ SEQ(I1) ↓ SEQ(I2)	Phase sequence current	
	↓ 2nd(IA) ↓ 2nd(IB) ↓ 2nd(IC)	2 nd harmonic current	

		↓ BLOCK	EasyLogic input
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(*) for 1A rated or E100S(IE), all value should be divided by 5

TERMINAL ARRANGEMENT

PAC-E100S			
No	Description	No	Description
30	TCS_COM	21	TCS_P
31	DI1_COM	22	DI1_P
32	DI2_COM	23	DI2_P
33	DI3~7_COM	24	DI3_P
34	DI4_P	25	DI5_P
35	DI6_P	26	DI7_P
36	PWR+	27	PWR+
37	PWR-	28	PWR-
38	SURGE	29	SURGE
11	IA+	1	IA-
12	IB+	2	IB-
13	IC+	3	IC-
14	IN+	4	IN-
15	TS1_COM	5	TS1_NO
16	TS2_COM	6	TS2_NO
17	TS3_COM	7	TS3_NO
18	TS4_COM	8	TS4_NO
19	TS5_COM	9	TS4_NC
20	TS5_NO	10	TS5_NC

*) No1~4, 11~14 are invalid in PAC-E100S(IE) model.

	↑ PICKUP	0.50~100.00A (0.05) (*)
	↓ MULTIPLIER	0.01 ~ 10.00 (0.01)
	↓ DELAY	0.00 ~ 300.00s (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↓ THERMAL(49)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ K-FACTOR	0.10 ~ 4.00 (0.01)
	↓ TIME CONST	1.0 ~ 999.9min (0.1)
	↓ ALARM	50 ~ 100% (1)
	↓ BLOCK	<i>EasyLogic input</i>
↓ UC(37)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ PICKUP	0.10~5.00A (0.05) (*)
	↓ DELAY	0.00 ~ 180.00s (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↓ NSOC(46)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ PICKUP	0.50~100.00A (0.05) (*)
	↓ DELAY	0.00 ~ 180.00s (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↓ AREL(79)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ SHOT NUM	1~5 (1)
	↓ PRE CON	<i>EasyLogic input</i>
	↓ START CON	<i>EasyLogic input</i>
	↓ PREPARE TIME	0.05~200.00s (0.01)
	↓ DISCRIM TIME	0.01~5.00s (0.01)
	↓ RECLAIM TIME	0.01~350.00s (0.01)
	↓ 1 st ~ 5 th DLY TIME	0.01~300.00s (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↓ CB FAIL(50BF)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ TRIP RELAY	TS1, TS2, TS3, TS4
	↓ PICKUP	0.50~5.00A (0.05)(*)
	↓ DELAY	0.00 ~ 60.00s (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↓ COLD LD(COLD_LD)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ PICKUP	0.50~2.50A (0.05)(*)
	↓ OP DELAY	0~18000 s (1)
	↓ RST DELAY	0~18000 s (1)
	↓ OC PKP MUL	1.00~10.00 (0.01)
	↓ BLOCK	<i>EasyLogic input</i>
↑ INRUSH(I2/I1)	↔ ↓ FUNCTION	DISABLE / ENABLE
	↓ I2/I1	10~100% (1)
	↓ MIN I1	0.50~2.50A (0.05)(*)
	↓ OP DELAY	0.00~60.00s (1)
	↓ RST DELAY	0.00~60.00s (1)

	↑ THERMAL	Thermal accumulation
	↑ FREQUENCY	
	↑ TRIP COUNTER	
	↓ CB MON%A ↓ CB MON%B ↓ CB MON%C	3 phase CB monitor accumulation %value
↓ RECORD ↔	↓ EVENT	Event list
	↓ WAVEFORM	Waveform list
↓ SYSTEM INFO. ↔	Firmware Version	
COMMAND (ENT)		
↓ CONT OUT TEST	↔ ↑CONT OUT1~5	↔ ↑ DEENERGIZED / ENERGIZED
↓ EVENT CLEAR	→	
↓ WAVE CLEAR	→	
↓ THERMAL CLEAR	→	
↓ TRIP CNT EDIT	→	↓ 0~65535
↓ CB MON CLEAR	→	
↓ CHANGE SG	→	↓ PROT1~PROT4
↓ PANEL TEST	→	

SETTING

SETTING menu have system and protection sub-menu. There are several system setting items such as power system, waveform, RTC, CB control, TCS, CB monitor, COM, contact input , contact output, LED, user logic and password and protection items such as IOC1(50_1), IOC2(50_2), TOC(51), IOCG1 (50N_1), IOCG2 (50N_2), TOCG (51N), THERMAL (49), UC(37), NSOC(46), AREL(79), CBF(50BF), COLD LD and INRUSH

SETTING(SYSTEM)

SETTING (ENT)	Function	Range (Step)
↓ SYSTEM ↔	↓ POWER SYSTEM ↔	↑ FREQUENCY 50/60 Hz
		↓ PHS CT RATIO E100S : 5~6000 : 5 (*)
		↓ GND CT RATIO E100S(IE) : 25~1600:22.5mV
	↓ WAVEFORM ↔	↑ TRIP RELAY CONT OUT1~4
		↓ TYPE 16*50/ 8*100/ 4*200
		↓ TRIG SRC <i>EasyLogic input</i>
		↓ TRIG POS 0~99%(1)

↑ CB CONTROL	↔	↑ TRIP PULSE	0.1 ~ 5.0s (0.1)
		↓ CLOSE PULSE	0.1 ~ 5.0s (0.1)
↑ TCS	↔	↑ FUNCTION	DISALBE / ENABLE
		↓ DELAY	0.00 ~ 300.00s (0.01)
↑ CB MONITOR	↔	↑ FUNCTION	DISALBE / ENABLE
		↓ LOW kA	0.00~650.00 kA(0.01)
		↓ LOW CNT	0~65000 (1)
		↓ MID kA	0.00~650.00 kA(0.01)
		↓ MID CNT	0~65000 (1)
		↓ HIGH kA	0.00~650.00 kA(0.01)
		↓ HIGH CNT	0~65000 (1)
		↓ ALARM	0.0~100.0%(0.1)
↑ COM1~2	↔	↑ FUNCTION	DISALBE / ENABLE
		↓ SLAVE ADDR	1 ~ 65534 (1)
		↓ BPS	300 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600
		↓ PROTOCOL	DNP3.0 / MODBUS / IEC870
↑ DNP3.0	↔	↑ TX DELAY	0 ~ 65000 (1)
		↓ LINK CONFIRM	NEVER / ALWAYS / SOMETIMES
		↓ LINK RETRY	0 ~ 5 (1)
		↓ LINK TIMEOUT	1 ~ 65000 (1)
		↓ SBO TIMEOUT	1 ~ 65000 (1)
		↓ WR TIME INT	0 ~ 65000 (1)
		↓ COLD RESTART	DISABLE / ENABLE
↑ CONTACT INPUT	↔	↑ CONT IN1~7	GENERAL_INPUT / CB_OPENED / CB_CLOSED / ANNUN_RESET / SG_SEL0 / SG_SEL1
↑ CONTACT OUTPUT / CONT OUT1~5	↔	↑ LOGIC	OR8 / HALF_OR8 / AND8 / HALF_AND8
↑ LED / LED1~6	↔	↑ INPUT1	<i>EasyLogic input</i>
		↑ INPUT2	<i>EasyLogic input</i>
		↑ INPUT3	<i>EasyLogic input</i>
		↑ INPUT4	<i>EasyLogic input</i>
		↑ INPUT5	<i>EasyLogic input</i>
		↑ INPUT6	<i>EasyLogic input</i>
		↑ INPUT7	<i>EasyLogic input</i>
		↑ INPUT8	<i>EasyLogic input</i>
↑ USER LOGIC / USER LOGIC1~6	↔	↑ RESET TYPE	SELF / MANUAL
		↑ RESET INPUT	<i>EasyLogic input</i>

	↔	↑ RESET DELAY	0.00 ~ 60.00s (0.01)
↓ PASSWORD	↔	NEW PASSWORD	0~9, 0~9, 0~9, 0~9 : ****

(*) for 1A rated, all value should be divided by 5

SETTING(PROTECTION)

SETTING (ENT)	Function	Range/Step
↑ PROTECTION 1~4	↔ ↑ IOC1(50_1) ↔ ↑ IOC2(50_2) ** : denote active setting group	↑ FUNCTION DISABLE / ENABLE ↑ PICKUP 0.50~100.00A (0.05) (*) ↑ DELAY 0.00 ~ 300.00s (0.01) ↑ BLOCK NO / YES ↑ FUNCTION DISABLE / ENABLE ↑ PICKUP 0.50~100.00A (0.05) (*) ↑ DELAY 0.00 ~ 300.00s (0.01) ↑ BLOCK <i>EasyLogic input</i>
	↔ ↑ TOC(51)	↑ FUNCTION DISABLE / ENABLE ↑ CURVE IEC_NI / IEC_VI / IEC_EI / IEC_LI / ANSI_I / ANSI_SI / ANSI_LI / ANSI_MI / ANSI_VI / ANSI_EI / ANSI_DI / KNI / KVI ↑ PICKUP 0.50~100.00A (0.05) (*) ↑ MULTIPLIER 0.01 ~ 10.00 (0.01) ↑ DELAY 0.00 ~ 300.00s (0.01) ↑ BLOCK <i>EasyLogic input</i>
	↔ ↑ IOCG1(50N_1)	↑ FUNCTION DISABLE / ENABLE ↑ PICKUP 0.50~100.00A (0.05) (*) ↑ DELAY 0.00 ~ 300.00s (0.01) ↑ BLOCK <i>EasyLogic input</i>
	↔ ↑ IOCG2(50N_2)	↑ FUNCTION DISABLE / ENABLE ↑ PICKUP 0.50~100.00A (0.05) (*) ↑ DELAY 0.00 ~ 300.00s (0.01) ↑ BLOCK <i>EasyLogic input</i>
	↔ ↑ TOCG(51N)	↑ FUNCTION DISABLE / ENABLE ↑ CURVE IEC_NI / IEC_VI / IEC_EI / IEC_LI / ANSI_I / ANSI_SI / ANSI_LI / ANSI_MI / ANSI_VI / ANSI_EI / ANSI_DI / KNI / KVI