

Digital Integrated Protection Relay

User Manual

K-PAM 5500 Series



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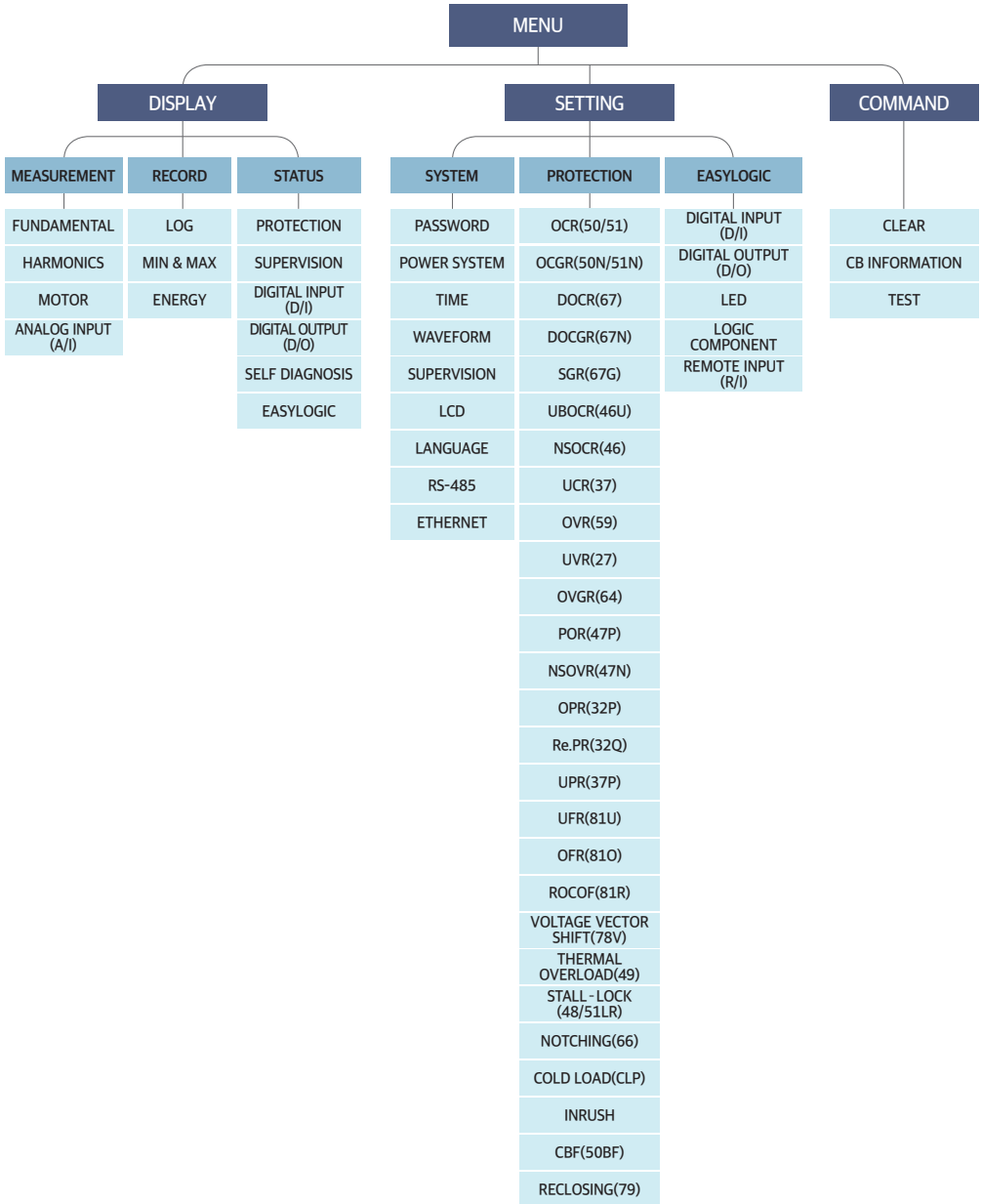
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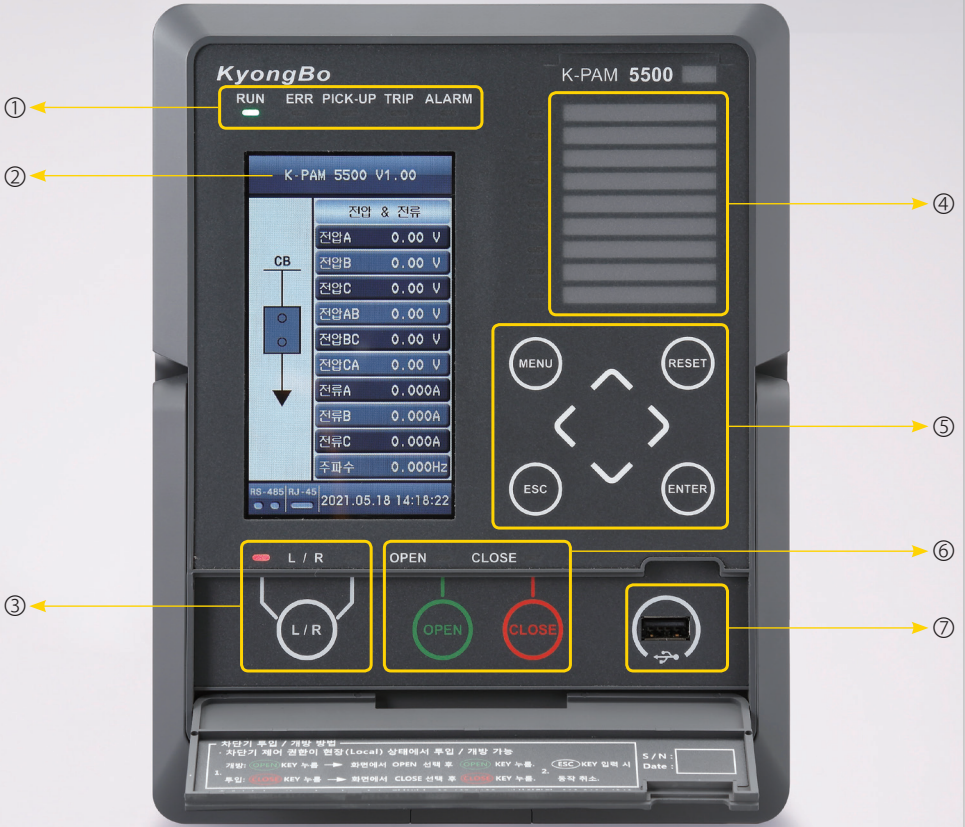
Digital Integrated Protection Relay

K-PAM 5500 Series

K-PAM 5500 is a multi-functional digital Integrated protection relay that provides high-precision measurement and reliable protection relay function for power supply and distribution facilities. Various protection elements and measuring elements can be used to protect not only distribution feeders, but also motors, Bus, generators, solar power, ESS, and wind power generators. In addition, various protection functions can be performed with 28 types and 60 protection elements, and the system can be monitored in detail using 10 supervision functions and various recording functions. You can check the fundamental and harmonic of the system in real time through the measurement function, and all functions can use USB, RS-485 and Ethernet communication to enable setting change, logic change, check status and measurement.













Front exterior



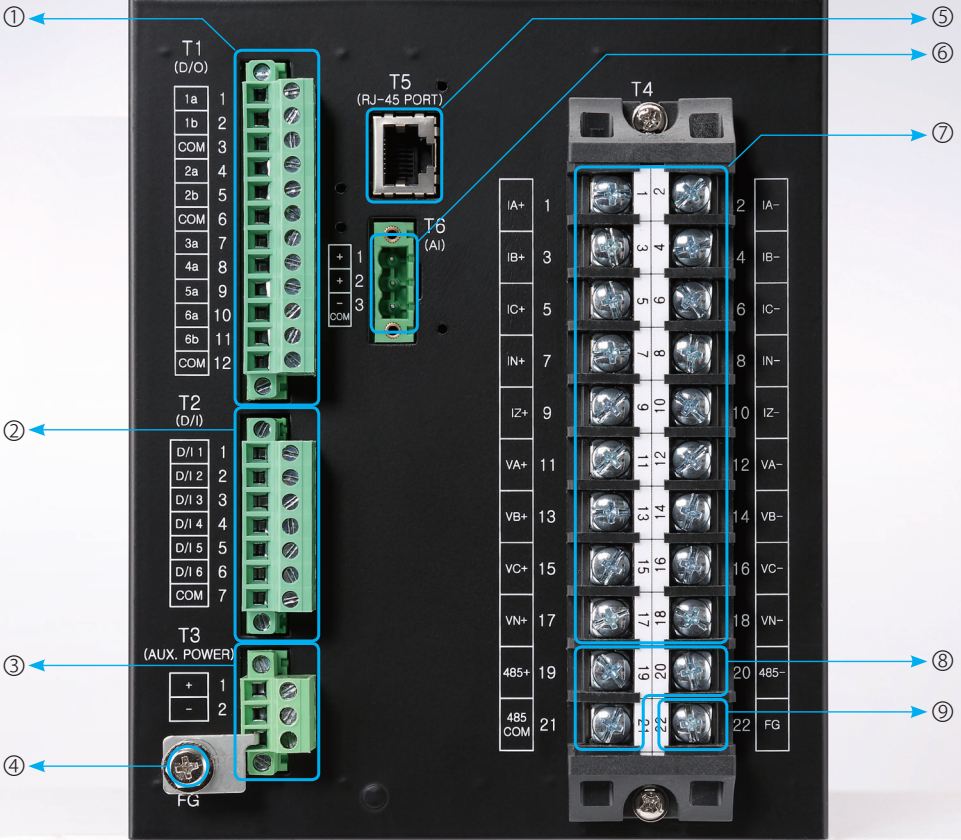
- ① Status LED
- ② TFT-LCD
- ③ Local/Remote Control Button

- ④ Custom LED
- ⑤ Button

- ⑥ CB Close/Open Control Button
- ⑦ USB-A Type Port

Num	Category	Description
①	Status LED	<ul style="list-style-type: none"> • RUN (GREEN) - Lights up when the relay is running • ERROR (RED) - Lights up when an error occurs as a result of the relay system self-diagnosis • PICK UP (YELLOW) - Lights up when the protection relay element is PICK-UP • TRIP (RED) - Lights up when the protection relay element is TRIP • ALARM (YELLOW) - Lights up when conditions are satisfied by connecting logic
②	TFT-LCD	<ul style="list-style-type: none"> • Screen Display
③	Local/Remote Control Button	<ul style="list-style-type: none"> • L/R Key (LOCAL / REMOTE Key) - Used when selecting control operation between Local and Remote
④	Custom LED	<ul style="list-style-type: none"> • Use of LED desired by the user through setting of relay protection element operation, etc.
⑤	Button	<ul style="list-style-type: none">  (UP Key) - Used to move upwards in a menu category or screen, increase a number when setting, or change a setting  (Down Key) - Used to move down on a menu category or screen, decrease a number when setting, or change a setting  (Right Key) - Used to move from the menu to the upper menu or to the right when setting  (Left Key) - Used to move from menu to sub-menu, or to move to the left when setting  MENU Key - Used to enter the main menu from the initial screen  ESC Key - Used to cancel setting when setting is in progress or to cancel test in progress  RESET Key - Displayed as Annunciator Reset when connecting to Logic - Generally used when reset protection elements OP, LED, and D/O  ENTER Key - Used to save setting changes or to execute control.
⑥	CB Close/Open Control Button	<ul style="list-style-type: none">  OPEN Key - Used when opening CB  CLOSE Key - Used when closing CB
⑦	USB-A Type Port	<ul style="list-style-type: none"> • USB port for connecting relay management software

Rear exterior





- ① Output contact terminal (For CB Trip/Alarm)
- ② Input contact terminal
- ③ Aux Power Input Terminal
- ④ Frame Ground
- ⑤ Ethernet TP(RJ-45) Port





- ⑥ Analog Input(DC4~20mA) Terminal
- ⑦ CT/ZCT/VT Input Terminal
- ⑧ RS-485 Terminal
- ⑨ Frame Ground

Num	Category	Pin Number		Description				
①	Output Contact Terminal (For CB Trip/Alarm)	T1	1	1a_NO	• For Close CB • Contact Capacity : AC 250V 16A / DC 125V 30A			
			2	1b_NC				
			3	1_COM				
						4	2a_NO	• For Open CB • Contact Capacity : AC 250V 16A / DC 125V 30A
						5	2b_NC	
						6	2_COM	
						7	3a_NO	• For Alarm • Contact Capacity : AC 250V 5A / DC 125V 10A
						8	4a_NO	
						9	5a_NO	
						10	6a_NO	• For System Error
						11	6b_NC	• Contact Capacity : AC 250V 5A / DC 125V 10A
						12	3~6_COM	• 3~6 Output Contact Common Terminal
②	Input Contact Terminal	T2	1	D/I 1	• Input contact for breaker closing state			
			2	D/I 2	• Input contact for breaker open state			
			3	D/I 3	• User defined Input Contact			
			4	D/I 4				
			5	D/I 5				
			6	D/I 6				
					7	COM	• Input Contact Common Terminal	
③	Aux Power Input Terminal	T3	1	+	• Relay Aux Power Input (AC/DC 110V ~ 220V)			
			2	-				
④	Frame Ground	T3	3	Aux. FG	• Enclosure ground connection			
⑤	Ethernet TP(RJ-45)	T5	-	-	• Modbus TCP (Option)			
⑥	Analog Input Terminal	T6	1	A/I #1	• DC 4~20mA Input Terminal (Option)			
			2	A/I #2				
			3	COM				
⑦	CT/ZCT/VT Input Terminal	T4	1	IA+	• 3Phase CT Input			
			2	IA-				
			3	IB+				
			4	IB-				
			5	IC+				
			6	IC-				
			7	IN+	• NCT Input			
			8	IN-	• ZCT Input			
			9	IZ+				
			10	IZ-				
			11	VA+	• 3Phase VT Input			
			12	VA-				
			13	VB+				
			14	VB-				
			15	VC+				
			16	VC-				
			17	VN+	• EVT Input			
			18	VN-				
⑧	RS-485 Terminal	T4	19	+	• Serial RS-485 communication terminal for communication with the host system			
			20	-				
			21	COM				
⑨	Frame Ground	T4	22	FG	• Enclosure ground connection			

CB Control Method






① When controlling in the field, set the control authority to LOCAL.

<div style="border: 1px solid black; padding: 10px;"> <p>LOCAL/REMOTE</p> <p>SELECT LOCAL or REMOTE PUSH L/R KEY AGAIN</p> <p>REMOTE LOCAL</p> </div>	<p>If the LOCAL/REMOTE LED on the front panel is lit as REMOTE, press the  KEY to select LOCAL and then press the  KEY again to change to LOCAL. (Front CB control operation impossible in REMOTE state)</p>
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② If you press the breaker control button  or  KEY in LOCAL state, a window to select whether to open/close will open, and after selecting, press the  or  KEY again to execute the control.

<div style="border: 1px solid black; padding: 10px;"> <p>CB OPEN</p> <p>SELECT OPEN or CANCEL PUSH OPEN KEY AGAIN</p> <p>OPEN CANCEL</p> </div>	<div style="border: 1px solid black; padding: 10px;"> <p>CB CLOSE</p> <p>SELECT CLOSE or CANCEL PUSH CLOSE KEY AGAIN</p> <p>CLOSE CANCEL</p> </div>
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③ Check the front LCD breaker status display when the control is successful.









Control	LCD DISPLAY	Description	
CB	INTERMEDIATE		CB OPERATING STATUS (52a INPUT : 0, 52b INPUT : 0)
	OPEN		CB OPEN STATUS (52a INPUT : 0, 52b INPUT : 1)
	CLOSE		CB CLOSE STATUS (52a INPUT : 1, 52b INPUT : 0)
	BAD		CB BAD STATUS (52a INPUT : 1, 52b INPUT : 1 or 52a, 52b input setting error)
	DISABLED		CB DISABLED setting status

Power System Setting Method












- ① Press MENU () KEY on the initial screen
- ② Move the 'SETTING' using the UP (), and DOWN () KEY and press the RIGHT () Key.
- ③ After moving to the 'SYSTEM' category, press the RIGHT () Key.
- ④ After moving to the 'POWER SYSTEM' category, press the RIGHT () Key.
- ⑤ After moving to the 'GENERAL' category, press the RIGHT () Key.

LCD Display	Category	Description
	FREQUENCY	Line Frequency Setting - Setting Range : 50Hz, 60Hz
	WIRING	Wiring Setting - Setting Range : 3P4W, 3P3W
	PHS VT PRI	PT Primary Rating Setting - Setting Range : 0.01 ~ 350.00kV
	PHS VT SEC	PT Secondary Rating Setting - Setting Range : 50.0 ~ 250.0V
	GND VT PRI	EVT Primary Rating Setting - Setting Range : 0.01 ~ 350.00kV
	GND VT SEC	EVT Secondary Rating Setting - Setting Range : 50.0 ~ 250.0V
	PHS CT PRI	CT Primary Rating Setting - Setting Range : 5 ~ 50000
	GND CT PRI	NCT Primary Rating Setting - Setting Range : 5 ~ 50000
	VT PHS ROT	Voltage Phase Setting - Setting Range : ABC, ACB
	CT PHS ROT	Current Phase Setting - Setting Range : ABC, ACB
	MEASUREMENT	Measurement Display Setting - Setting Range : Primary, Secondary


Protection Relay Element Setting Method

- ① Press the MENU () key on the initial screen
- ② Use the UP () and DOWN () keys to select 'SETTING' category, then press the RIGHT () Key.
- ③ After moving to the 'PROTECTIVE RELAY' category, press the RIGHT () Key.
- ④ Use UP (), DOWN () KEY to select the protection relay element to be set and then press the RIGHT () Key.












■ IOCR Setting Method

- ① After selecting 'OCR (50/51)' in Protection Relay Element Setting Method ④, press the RIGHT () Key.
- ② Select 'IOCR1' or 'IOCR2' by using UP () and DOWN () keys and press the RIGHT () key to enter the setting screen.
- ③ Use the UP (), DOWN () KEY to move the category you want to set, and then enter the ENTER () KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (), DOWN () KEY to change the setting value and then press the ENTER () KEY.
- ⑤ After completing the setting, press the LEFT () KEY to check whether the setting has been changed.


After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	PICK-UP	Current Pick-up Setting - Setting Range : 0.50 ~ 100.00A (0.01A STEP)
	MODE	INST/DT Setting - Setting Range : INST, DT
	TIME DELAY	Operation Delay Time Setting - Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ TOCGR Setting Method

- ① After selecting 'OCGR (50N/51N)' in Protection Relay Element Setting Method ④, press the RIGHT () Key.
- ② Select 'TOCGR1' or 'TOCGR2' by using UP () and DOWN () keys and press the RIGHT () key to enter the setting screen.
- ③ Use the UP (), DOWN () KEY to move the category you want to set, and then enter the ENTER () KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (), DOWN () KEY to change the setting value and then press the ENTER () KEY.
- ⑤ After completing the setting, press the LEFT () KEY to check whether the setting has been changed.


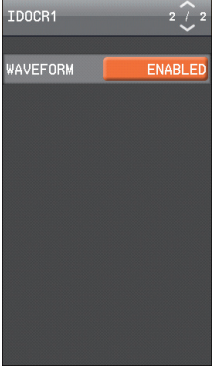
After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	PICK-UP	Current Pick-up Setting - Setting Range : 0.10 ~ 100.00A (0.01A STEP)
	CURVE	DT/ INVERSE Setting - Setting Range : 15 others including IEC_NI
	TIME DELAY	Operation Delay Time Setting - Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	LEVER	Inverse Time Lever Setting - Setting Range : 0.01 ~ 10.00 (0.01 STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ IDOCR Setting Method

- ① After selecting 'DOCR (67)' in Protection Relay Element Setting Method ④, press the RIGHT (➡) Key.
- ② Select 'IDOCR1' or 'IDOCR2' by using UP (⬆) and DOWN (⬇) keys and press the RIGHT (➡) key to enter the setting screen.
- ③ Use the UP (⬆), DOWN (⬇) KEY to move the category you want to set, and then enter the ENTER (Ⓜ) KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (⬆), DOWN (⬇) KEY to change the setting value and then press the ENTER (Ⓜ) KEY.
- ⑤ After completing the setting, press the LEFT (⬅) KEY to check whether the setting has been changed.



After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function Setting Range : ENABLED, DISABLED
	DIRECTION	Operation Direction Setting Setting Range : Forward, Reverse
	PICK-UP	Current Pick-up Setting Setting Range : 0.50 ~ 100.00A (0.01A STEP)
	RCA	Reference Phase Angle Setting - Setting Range : 0 ~ 359° (1° STEP)
	MODE	INST/DT Setting Setting Range : INST, DT
	TIME DELAY	Operation Delay Time Setting Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	VT LOSS BLK	Setting whether to use the voltage loss block function Setting Range : ENABLED, DISABLED
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ TDOCGR Setting Method

- ① After selecting 'DOCGR (67N)' in Protection Relay Element Setting Method ④, press the RIGHT (➤) Key.
- ② Select 'TDOCGR1' or 'TDOCGR2' by using UP (⬆) and DOWN (⬇) keys and press the RIGHT (➤) key to enter the setting screen.
- ③ Use the UP (⬆), DOWN (⬇) KEY to move the category you want to set, and then enter the ENTER (Ⓜ) KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (⬆), DOWN (⬇) KEY to change the setting value and then press the ENTER (Ⓜ) KEY.
- ⑤ After completing the setting, press the LEFT (⬅) KEY to check whether the setting has been changed.


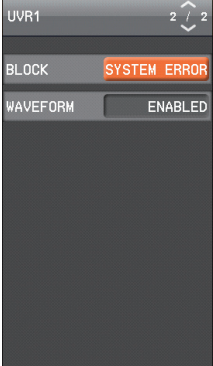
After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	DIRECTION	Operation Direction Setting - Setting Range : Forward, Reverse
	PICK-UP	Current Pick-up Setting - Setting Range : 0.10 ~ 100.00A (0.01A STEP)
	POLARIZING	Reference Polarity Setting - Setting Range : VOLT, CURR, VOLT+CURR
	VOLT_SRC	Input Voltage Source Setting - Setting Range : 3V0, VG
	BLOCK VOLT	Minimum Operating Voltage Setting - Setting Range : 5 ~ 170V (1V STEP)
	RCA	Reference Phase Angle Setting - Setting Range : 0 ~ 359° (1° STEP)
	CURVE	DT/INVERSE Setting - Setting Range : 15 others including IEC_NI
	TIME_DELAY	Operation Delay Time Setting - Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	LEVER	Inverse Time Lever Setting - Setting Range : 0.01 ~ 10.00 (0.01 STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ UVR Setting Method

- ① After selecting 'UVR (27)' in Protection Relay Element Setting Method ④, press the RIGHT (➡) Key.
- ② Select 'UVR1' or 'UVR2' by using UP (⬆) and DOWN (⬇) keys and press the RIGHT (➡) key to enter the setting screen.
- ③ Use the UP (⬆), DOWN (⬇) KEY to move the category you want to set, and then enter the ENTER (Ⓜ) KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (⬆), DOWN (⬇) KEY to change the setting value and then press the ENTER (Ⓜ) KEY.
- ⑤ After completing the setting, press the LEFT (⬅) KEY to check whether the setting has been changed.


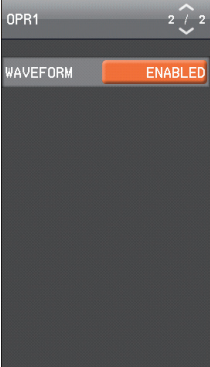
After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	OP MODE	Operation Mode Setting - Setting Range : EACH PHASE, 3PHASE
	PICK-UP	Voltage Pick-up Setting - Setting Range : 5 ~ 170V (1V STEP)
	CURVE	DT/INVERSE Setting - Setting Range : DT, INV
	TIME DELAY	Operation Delay Time Setting - Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	LEVER	Inverse Time Lever Setting - Setting Range : 0.01 ~ 10.00 (0.01 STEP)
	DEAD BLOCK	Set whether or not to use the minimum operating voltage - Setting Range : ENABLED, DISABLED
	DEAD VOLT	Minimum Operating Voltage Setting - Setting Range : 5 ~ 170V (1V STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ OPR Setting Method

- ① After selecting 'OPR (32P)' in Protection Relay Element Setting Method ④, press the RIGHT (➡) Key.
- ② Select 'OPR1' or 'OPR2' by using UP (⬆) and DOWN (⬇) keys and press the RIGHT (➡) key to enter the setting screen.
- ③ Use the UP (⬆), DOWN (⬇) KEY to move the category you want to set, and then enter the ENTER (⏎) KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (⬆), DOWN (⬇) KEY to change the setting value and then press the ENTER (⏎) KEY.
- ⑤ After completing the setting, press the LEFT (⬅) KEY to check whether the setting has been changed.

After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	SOURCE	Single Phase or 3Phase Setting - Setting Range : 1PHASE, 3PHASE
	DIRECTION	Operation Direction Setting - Setting Range : NONE, FORWARD, REVERSE
	PICK-UP	Power Pick-up Setting - Setting Range : 3 ~ 1500W (1W STEP)
	CURVE	DT/INVERSE Setting - Setting Range : DT, INV1, INV2
	TIME DELAY	Operation Delay Time Setting - Setting Range : 0.04 ~ 60.00s (0.01s STEP)
	LEVER	Inverse Time Lever Setting - Setting Range : 0.01 ~ 10.00 (0.01 STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

■ OPR Setting Example

- Generally, about 20% of the generated electricity is applied.


- When the power generation capacity is 100kW, $EVT \frac{380}{\sqrt{3}} / \frac{190}{\sqrt{3}}$, CT 1000/5A

$$\text{Power generation capacity} \div \text{VT ratio} \div \text{CT ratio} \times 0.2 \Rightarrow 100\text{kW} \div 2 \div 200 \times 0.2 = 50\text{W}$$







■ UFR Setting Method

- ① After selecting 'UFR (81U)' in Protection Relay Element Setting Method ④, press the RIGHT (➡) Key.
- ② Select 'UFR1', 'UFR2', 'UFR3', 'UFR4' by using UP (⬆) and DOWN (⬇) keys and press the RIGHT (➡) key to enter the setting screen.
- ③ Use the UP (⬆), DOWN (⬇) KEY to move the category you want to set, and then enter the ENTER (Ⓜ) KEY to pop up the password input screen. (initial password 0000)
- ④ Use the UP (⬆), DOWN (⬇) KEY to change the setting value and then press the ENTER (Ⓜ) KEY.
- ⑤ After completing the setting, press the LEFT (⬅) KEY to check whether the setting has been changed.

After selecting 'Yes' or 'No', the setting is completed when the ENTER key is pressed.

LCD Display	Category	Description
	FUNCTION	Whether to use the function - Setting Range : ENABLED, DISABLED
	PICK-UP	Frequency Pick-up Setting - Setting Range : 40.00 ~ 70.00Hz (0.01Hz STEP)
	BLOCK VOLT	Minimum Operating Voltage Setting - Setting Range : 20 ~ 170V (1V STEP)
	TIME DELAY	Operation Delay Time Setting - Setting Range : 0.07 ~ 180.00s (0.01s STEP)
	BLOCK	Protection Blocking Condition Setting - Setting Range : EASYLOGIC OPERAND
	WAVEFORM	Whether to Record Waveforms - Setting Range : ENABLED, DISABLED

Contact Output Test Method

- ① Press the MENU () key on the initial screen
- ② Use the UP () and DOWN () keys to move the 'COMMAND' category, and then press the RIGHT () Key.
- ③ Move the 'TEST' category, and then press the RIGHT () Key.
- ④ Move the 'DIGITAL OUTPUT(D/O)' category, and then press the RIGHT () Key.










After the password input screen pops up (Initial password 0000), enter the digital output TEST screen when ENTER KEY is pressed.


- ※ D/O#06 is changed NO contact to "b" contact, NC contact to "a" contact when there is no abnormality in the protection relay and auxiliary power input status. When entering the TEST screen, the contact returns to the same state as when there is no power.

LCD Display



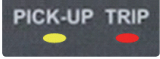
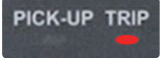
TEST Method

- (1) On the digital output screen, press the UP () and DOWN () keys to select the digital output to test and press the ENTER () key to select the corresponding digital output ()
- (2) When the UP () or DOWN () KEY is pressed, the corresponding digital output is displayed as closed () or open () and output or reset.
- (3) If you press the ESC () key, you can keep the selected digital output and select another digital output.











In this state, when LEFT () KEY is pressed, all contacts return to their original state and exit from the screen.

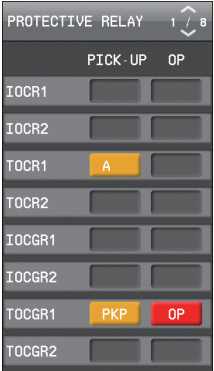




 How to check when the operation of the protection element (In case of fault)

① Check the Front

Fault is being held	
The protection element is in operation, but the fault has reset.	

② Check the protection relay element status window

- Press the MENU () key on the initial screen
- Use the UP () and DOWN () keys to move the 'DISPLAY' category, and then press the RIGHT () Key.
- Use the UP () and DOWN () keys to move the 'STATUS' category, and then press the RIGHT () Key.
- Use the UP () and DOWN () keys to move the 'PROTECTIVE RELAY' category, and when RIGHT () Key is input, the following screen is displayed.

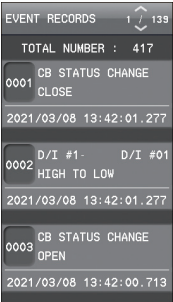
LCD Display	Display Description	
		TOCGR1 element not operating
		TOCGR1 element fault occurred and the current higher than the set value is maintained but does not operate. (The output contact is not operate)
		TOCGR1 element fault occurred and the current higher than the set value is maintained, so the protection element is in operation and the output contact is in operation.
		TOCGR1 element fault occurred and the output contact operated, but the fault current disappeared.

※ Through EASYLOGIC, it is possible to set whether to maintain or reset the contact after fault recovery.

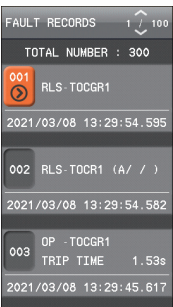
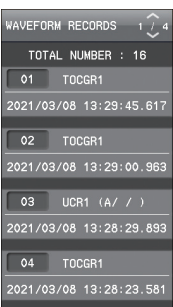
The output contact factory value is maintained even if an fault release, and the output contact is reset when the front RESET KEY is pressed.

③ LOG Check










- Event Record Check

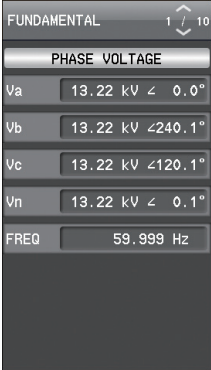
LCD Display	Display Description
	<ul style="list-style-type: none"> - Save up to 1024 EVENT occurrence information - Displays power ON/OFF, protection element operation status, digital input/output status, CB control, set value change, event / fault / waveform record delete, MIN&MAX CLEAR, CB counter, etc.

- Fault Record & Waveform Record

LCD Display	Display Description
	<ul style="list-style-type: none"> - Save up to 300 FAULT occurrence information - Displays the PICK-UP, OPERATE, RELEASE, operation time, fundamental wave (voltage, current, sequence voltage, current etc.) value, phase, frequency, etc.
	<ul style="list-style-type: none"> - Save up to 16 Fault Waveform - 32Sample, 2Sec (120Cycle, 60Hz) - Check it by uploading it on-site or from a remote location through KBIED_MNE. - Displays voltage/current value, phase, waveform, digital input/output status, protection relay element status, harmonic (fundamental and 2nd to 15th harmonics), THD, etc.

How to check measurement after field installation

- ① After installing the product in the field, check the measured value when receiving power to check the normal state.
- ② Press the MENU () KEY on the initial screen.
- ③ Use the UP (), DOWN () key to select 'DISPLAY' and then input the RIGHT () Key.
- ④ Use the UP () and DOWN () keys to select 'FUNDAMENTAL' and input the RIGHT () Key to check the voltage measurement.
- ⑤ Use UP (), DOWN () KEY to check other measurements.

LCD Display	Display Description & CAUTION
	<ul style="list-style-type: none"> • Check measurement in order of 'Phase voltage', 'Line-to-line & Sequence voltage', 'Current', 'Power factor', 'Active power', 'Reactive power', 'Apparent power', 'Voltage Unbalance', 'Current Unbalance', 'Load Rate&Thermal'. • In a normal case, the magnitude of voltage and current may be different, and the phase should be displayed with a value similar to the example shown above for normal wiring. • A phase voltage is the standard for phase display, and the magnitude of voltage/current/power indicates the primary value to which RATIO is applied. • In the case of a directional element, since it operates with the magnitude and phase of voltage and current, malfunction or non-operation may occur if it is not in the normal phase. • If the measured value is out of phase, check the primary wiring and the VT, CT secondary wiring.

Frequently Asked Questions

(1) Although the circuit breaker is open, UVR contact output is not operating.

- If you go to the UVR setting category, there is a DEAD BLOCK setting. Check the settings and change them according to the site conditions.

- **DEAD BLOCK ENABLED** : At the voltage below DEAD VOLT, when the relay power is turned on or after reset, the UVR element does not operate.
It operates when a UVR occurs after the voltage rises above the DEAD VOLT set value.
- **DEAD BLOCK DISABLED** : It has the same operating characteristics as inductive relays and maintains the operating state at under voltage.

(2) Does frequency measure all three-phase voltages?

- Frequency measurement is the frequency of A-phase voltage.

(3) dF/dT(81R) test does not operate even if the applied frequency is raised or lowered a lot

- When setting dF/dT to +1.0Hz, 0.3 sec, Block volt : 80V, the test applied voltage and frequency are $1 \div 60 \approx 0.016[\text{Hz}]$, and apply a frequency changed by 0.02Hz or more per at least 1 cycle is about 20 cycles (about 0.3 sec) for voltage A. At this time, the voltage should be at least 80V.

(4) How can the user directly change the contact settings?

- The relay can be used by changing the LED and contact configuration by the user through internal logic (LOGIC).
When changing contacts or LEDs, you can connect to a PC using the PC software (KBIED_MNE) provided on our website and refer to the user manual posted on the website for how to use the program.
Protection element setting and system setting, etc. can be set at the front of the relay.

(5) When the relay is installed on the panel and tested, the measured value is displayed less than the applied current.

- Please refer to the install/withdraw method in this user's manual.
Since the enclosure and relay are drawn out, normal measurement may not be possible if the enclosure is installed incorrectly.

(6) Normally during solar power generation, the measured current of the relay and the measured current with a clamp meter are different.

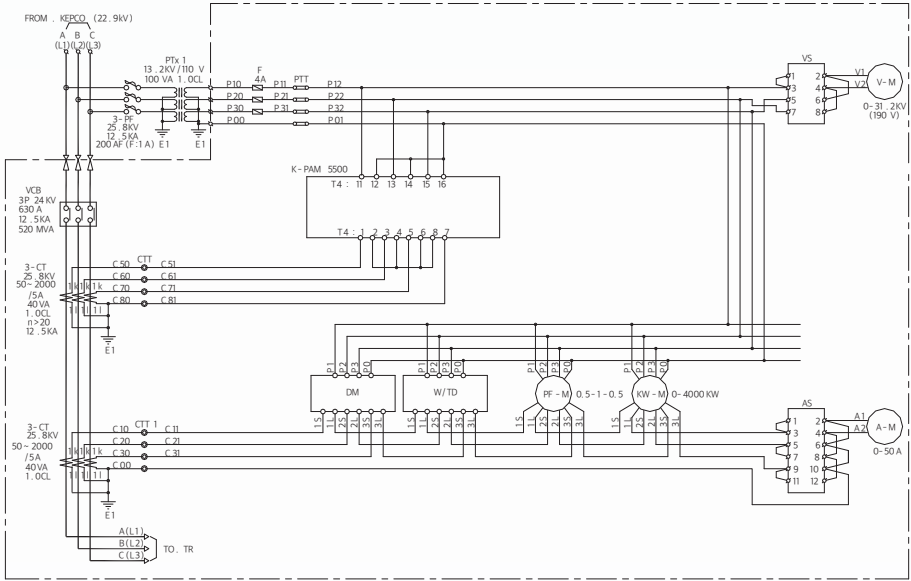
- The digital relay measures and displays only the fundamental wave excluding the harmonic content. However, most general clamp meters and multimeters measure values including harmonic content, which may result in different measured values between products.

(7) During solar power generation, the power value displayed by the relay and the power value displayed by the inverter are different.

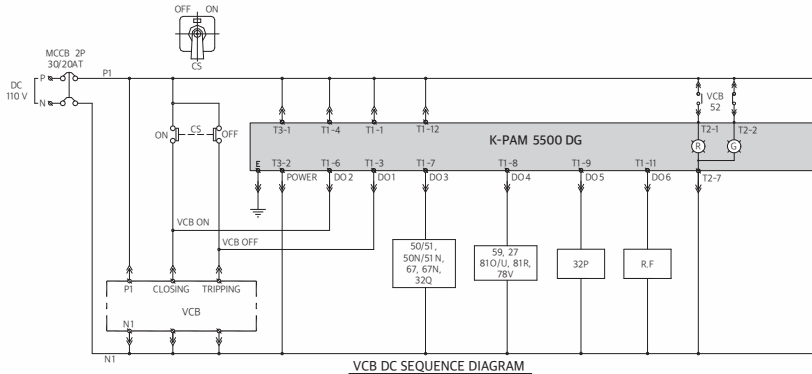
- Move to the MENU / SETTING / SYSTEM / POWER SYSTEM / GENERAL category and check the VT, CT 1st and 2nd ratios to see if the settings are different from the inverter settings.
Since the values of voltage and current applied to the product are internally calculated with the values set above and displayed as the primary value, you must check the settings and change them when they are set to different settings.

K-PAM 5500 Control Circuit Diagram

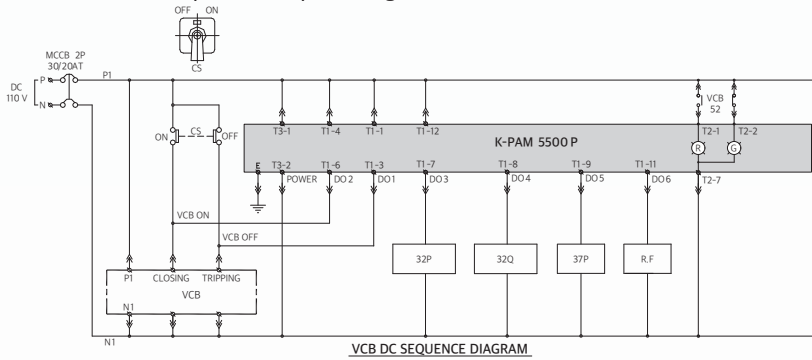
• K-PAM 5500 AC Sequence (example drawing)



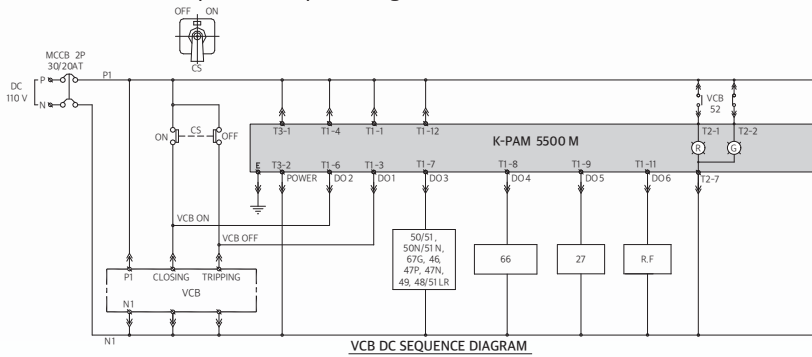
• K-PAM 5500 DG VCB DC Sequence (example drawing)



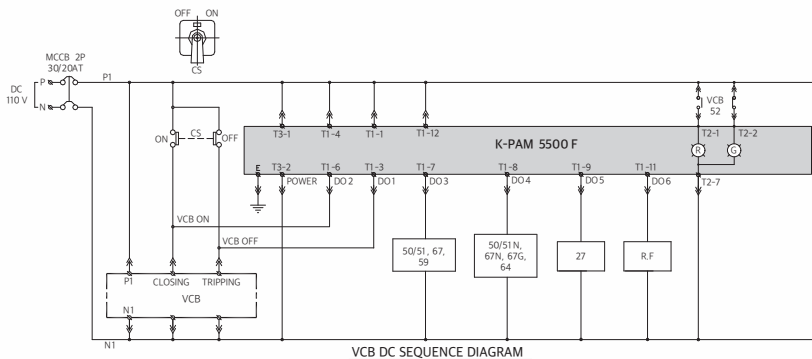
• K-PAM 5500 P VCB DC Sequence (example drawing)



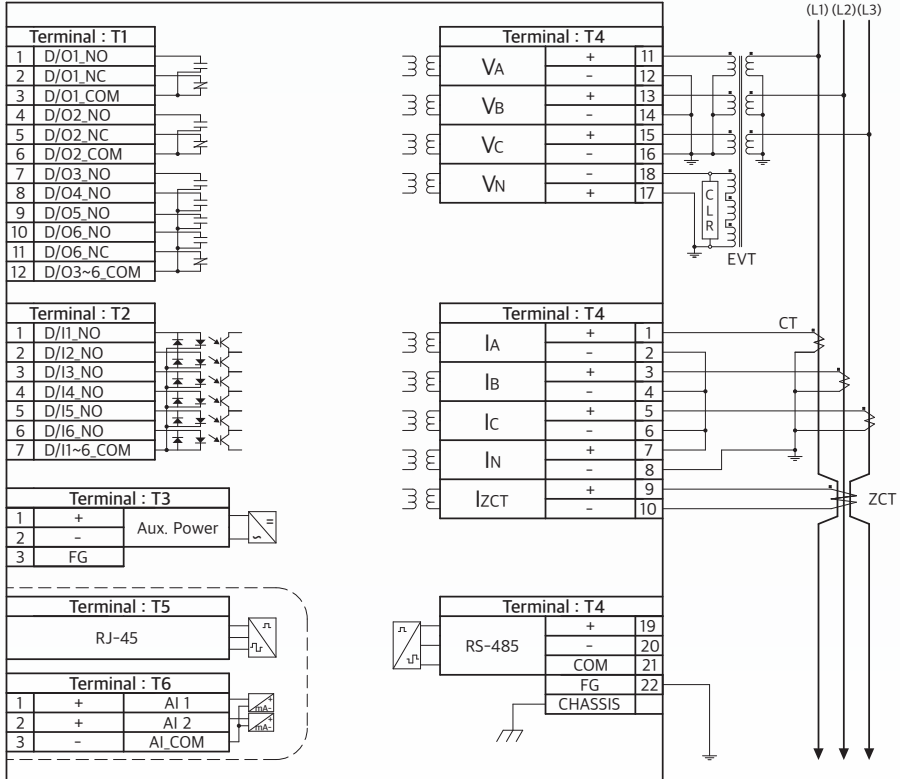
• K-PAM 5500 M VCB DC Sequencing (example drawing)



• K-PAM 5500 F VCB DC Sequence (example drawing)

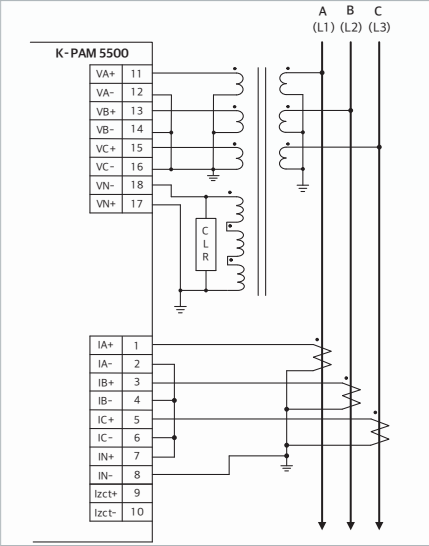


K-PAM 5500 External Wiring

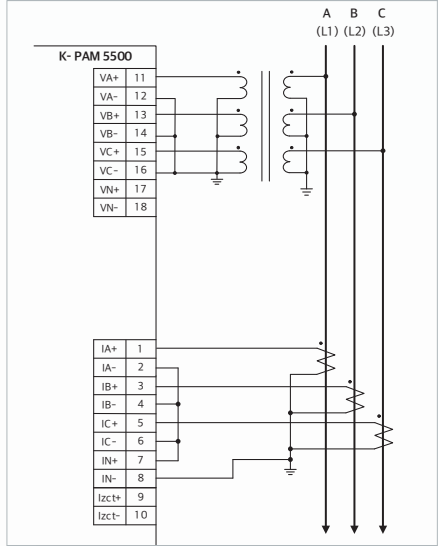


- D/O#06 is changed NO contact to "b" contact, NC contact to "a" contact when there is no abnormality in the protection relay and auxiliary power input status.
- Terminal : T5, Terminal : T6 is option specification

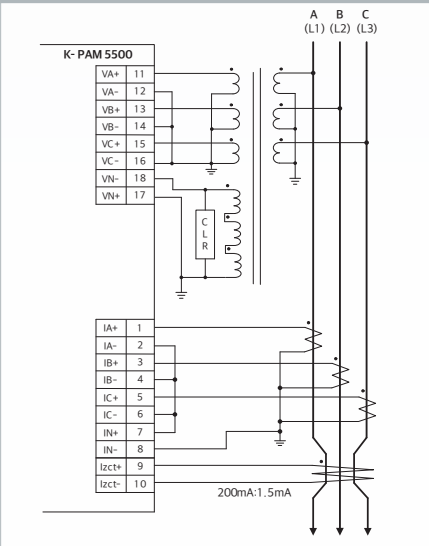
3P4W System : 3CT/3VT/EVT



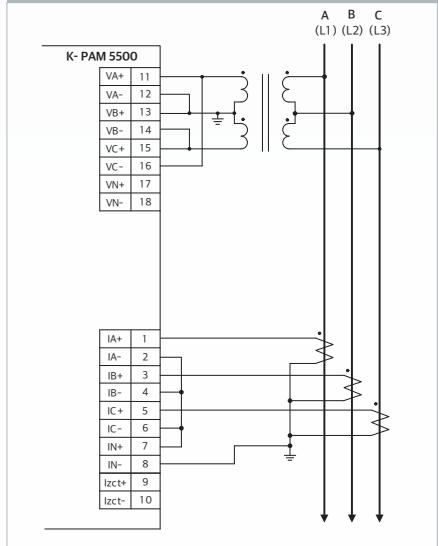
3P4W System : 3CT/3VT



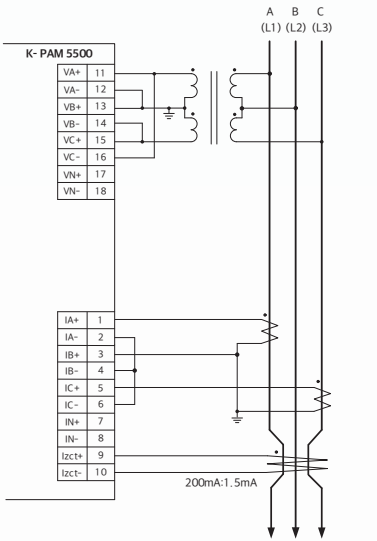
3P3W System : 3CT/ZCT/3VT/EVT



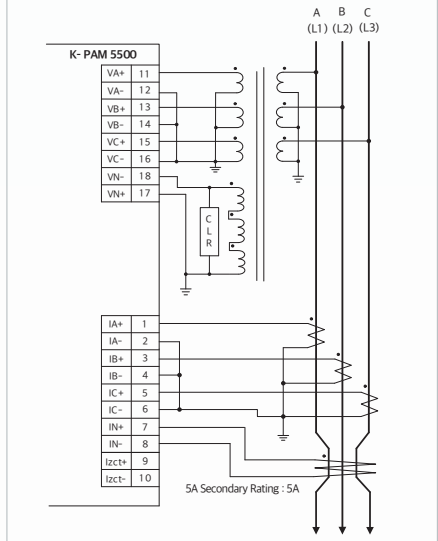
3P3W System : 3CT/2VT



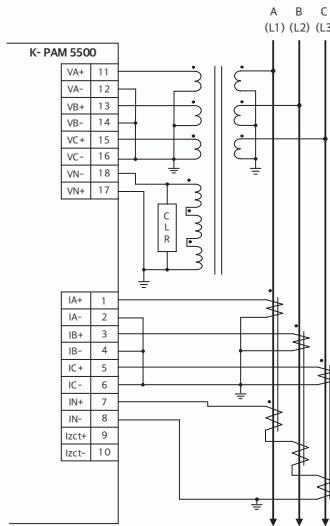
3P3W System : 2CT/ZCT/2VT



3P3W Resistance Grounding System : GROUND CT use

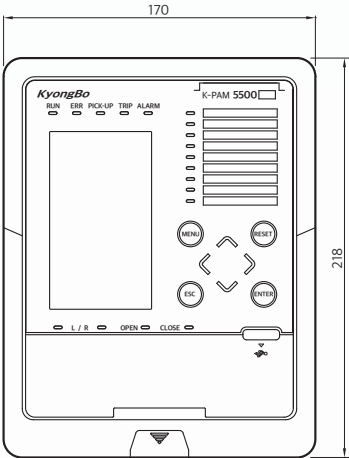


3P3W Resistance Grounding System : 3-Wire CT with 3CT Y connection

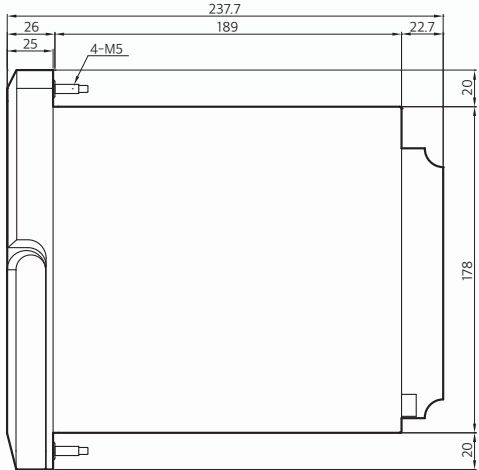


K-PAM 5500 Dimensions

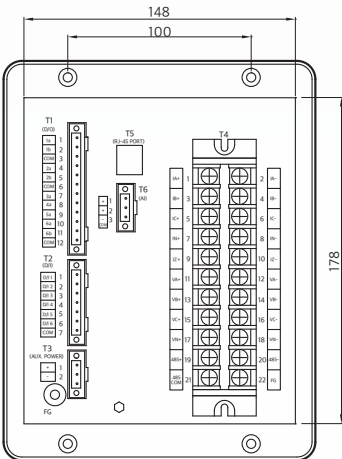
● Front



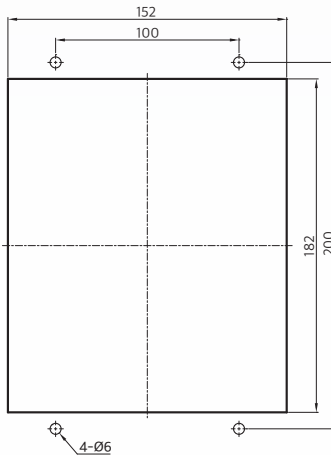
● Side



● Rear

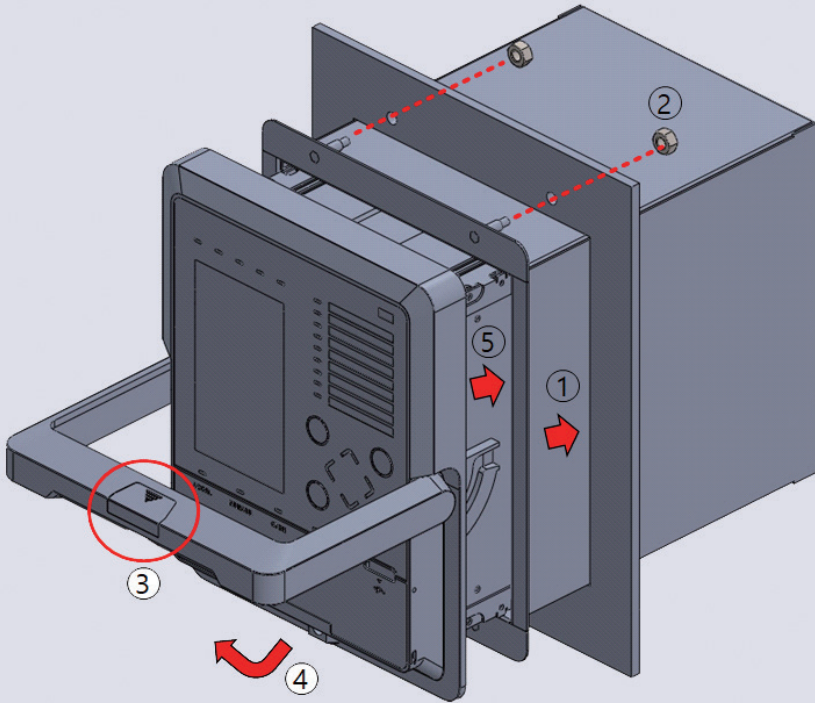


● Panel Dimensions



- Can replace GD Series, GDR Series, Induction Relay, K-PAM F300 without additional panel processing.

K-PAM 5500 Install/withdraw Method



• Install/withdraw Method

- ① Attach the enclosure to the panel cut to fit the product.
- ② Assemble by tightening the enclosed nuts to the four bolts on the corners of the enclosure mounted on the panel.
- ③ Remove the handle cover of the product, loosen the screw, raise the handle vertically as shown in ④, and attach it to the enclosure.
- ⑤ After inserting the product into the enclosure, lower the handle so that the assembly and the enclosure are in close contact. After tightening the screw loosened in ③, assemble the handle cover.
When withdrawing a product, you can withdraw the product by proceeding in the reverse order of the above. Before withdrawing, remove the connectors connected to T1, T2 and T3 on the back of the product before withdrawing.



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Digital Integrated Protection Relay

User Manual

K-PAM 5500 Series



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