Digital Integrated Protection Relay

User Manual

K-PAM 10 Series

KyongBo

KyongBo Electric Co., Ltd.

Digital Integrated Protection Relay

K-PAM 10 Series

K-PAM 10 Series 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, busses, generators, solar power, ESS, and wind power generators. In addition, among 6 types of relays, the user can select a suitable relay for the need. You can check the fundamental and harmonic of the system in real time through the measurement function, and all functions can use USB and RS-485 communication to change settings, change control, check status and measurement.

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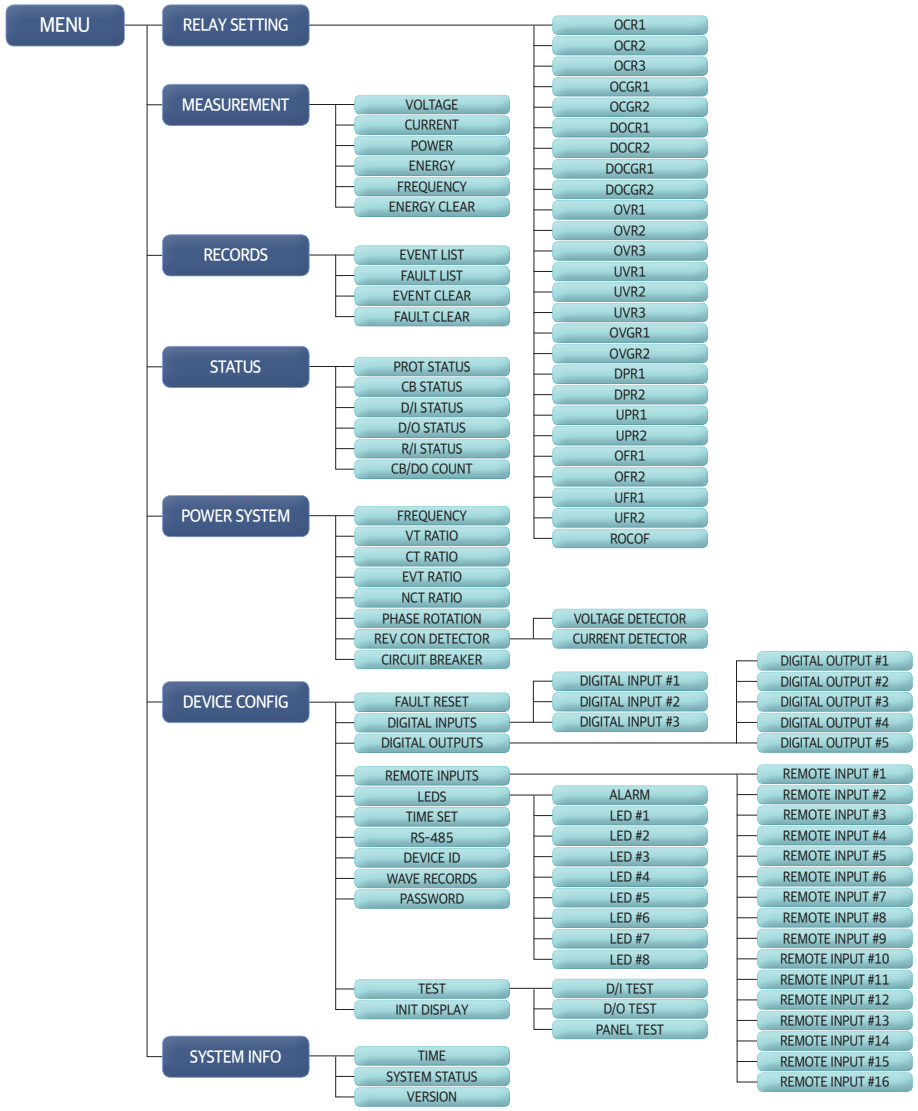
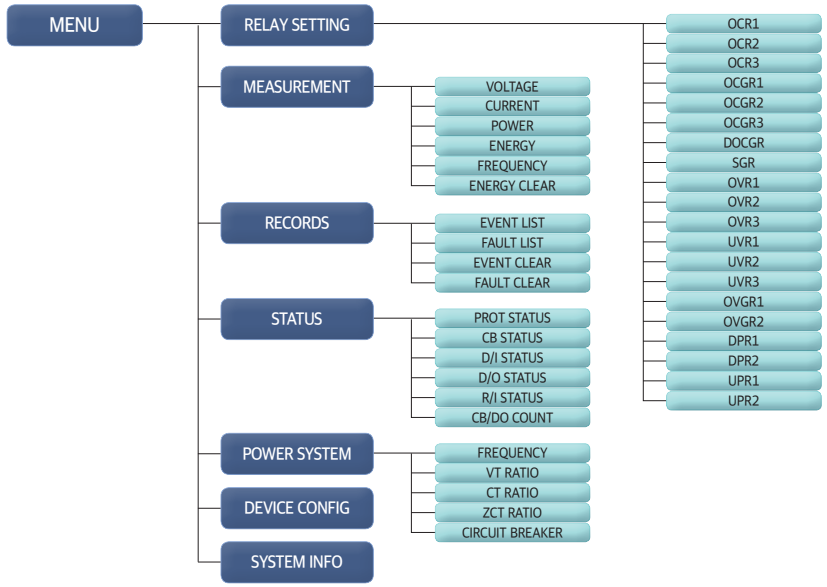
K-PAM 10Series Menu Configuration

■ DG10

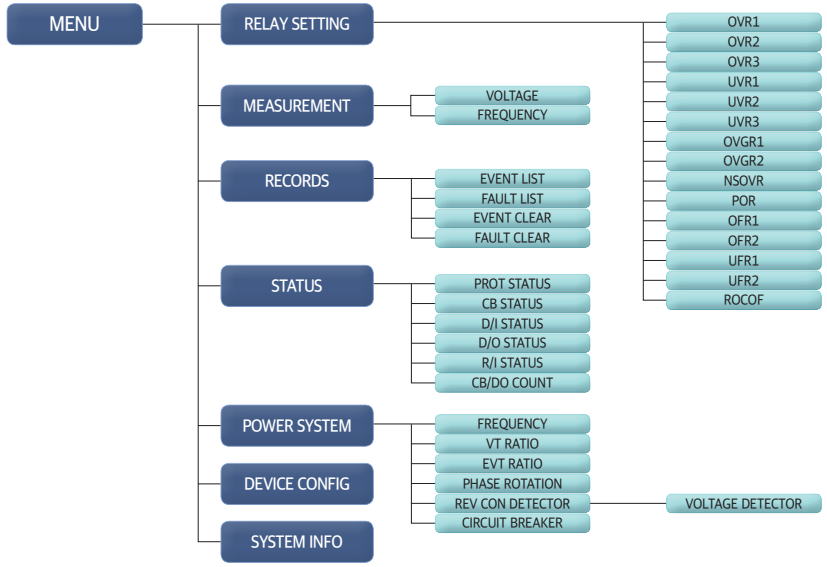


※ DEVICE CONFIG and SYSTEM INFO are common to 10 Series.

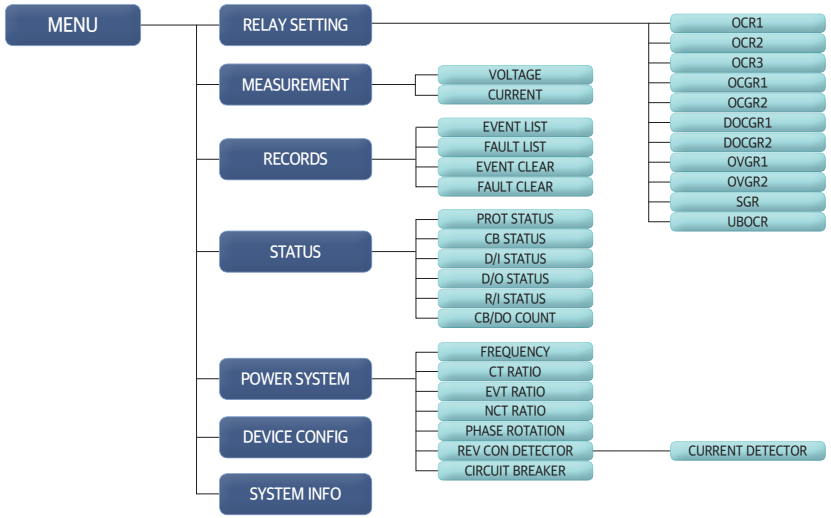
■ S10



■ V10



■ F10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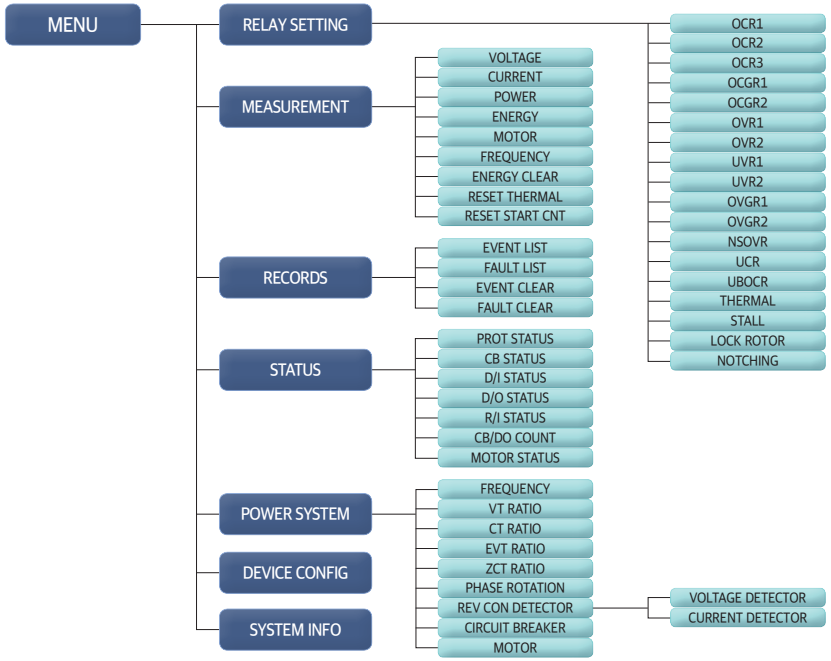
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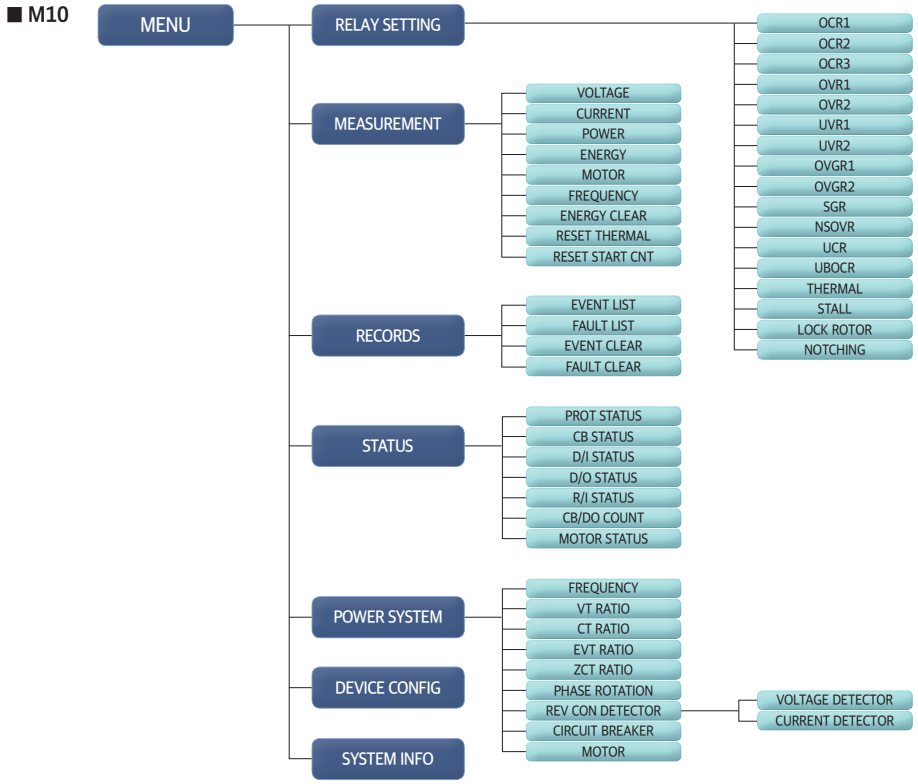
■ M10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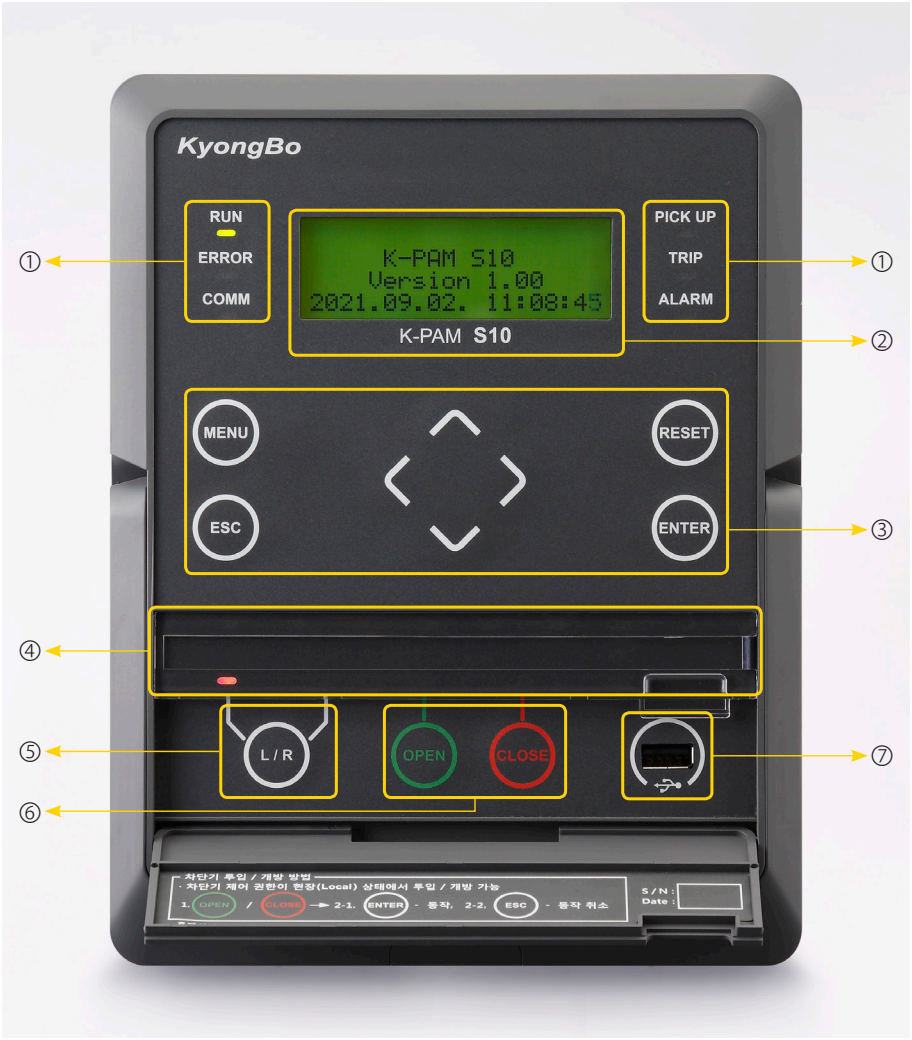
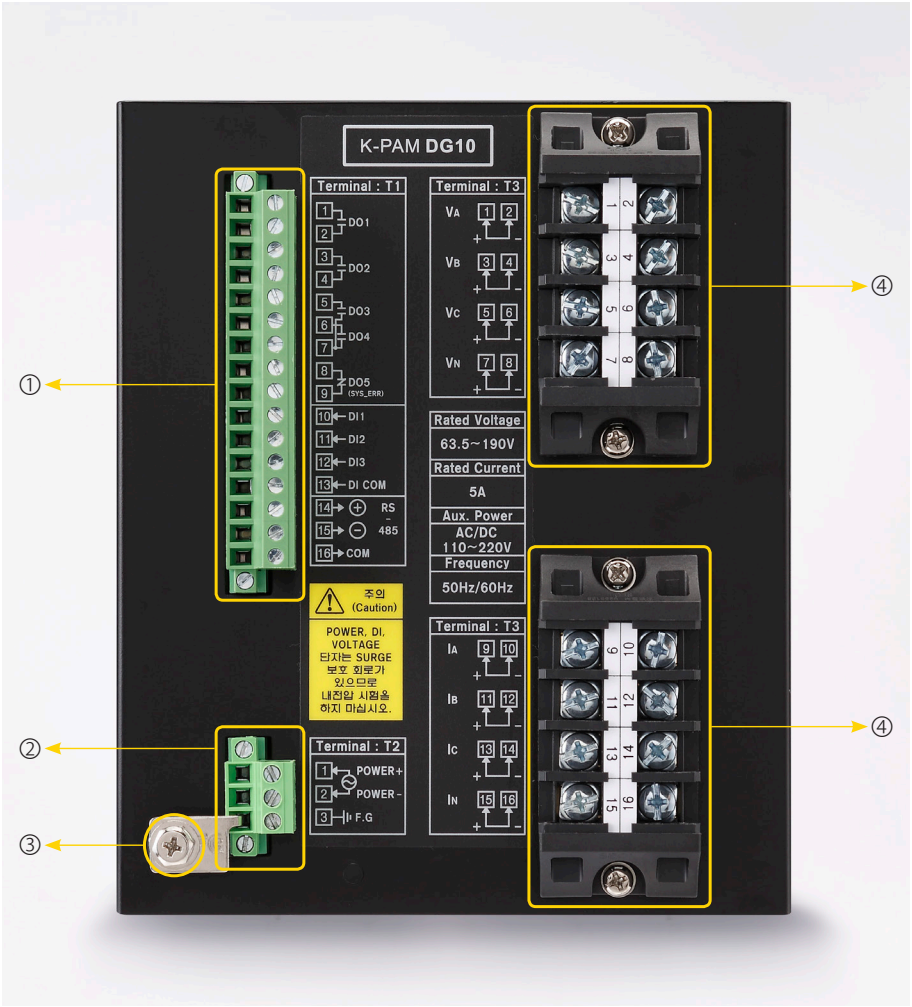
Front exterior



① Status LED
② 4x20 Character LCD
③ Button
④ Custom LED
⑤ Local/Remote Control Button
⑥ CB Close/Open Control Button
⑦ USB-A Type Port

Num	Category	Description
①	Status LED	• **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 • **COMM (YELLOW)** – Blinks when communication with PC is in progress • **PICK UP (YELLOW)** – Lights up when the protection relay element is PICK-UP • **TRIP (RED)** – Lights up when the protection relay element TRIP • **ALARM (YELLOW)** – Lights up when operation after connecting the protection relay element
②	4x20 Character LCD	• Screen Display
③	Button	**(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 screen **ESC Key** – Used to cancel setting when setting is in progress or to cancel test in progress **RESET Key** – Generally used when reset protection elements OP, LED, and D/O **ENTER Key** – Used to save setting changes or to execute control.
④	Custom LED	• Use of LED desired by the user through setting of relay protection element operation, etc.
⑤	Local/Remote Contol Button	• L/R Key (LOCAL/REMOTE Key) – Used when selecting control operation between Local and Remote
⑥	CB Close/Open Control Button	**OPEN Key** – Used when CB is OPEN **CLOSE Key** – Used when CB is CLOSE
⑦	USB-A Type Port	• USB port for connecting relay management software

Rear exterior



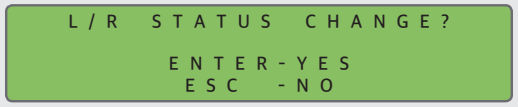
① Input/Output contact terminal, RS-485 Communication Terminal
② Aux Power Input Terminal
③ Frame Ground
④ CT / ZCT / VT Terminal

Num	Category	Pin Number			Description
①	Input/Output Contact Terminal RS-485 Terminal	T1	1	1a_NO	• For Close CB • Contact Capacity : AC 250V 16A / DC 125V 30A
			2	1_COM	
			3	2a_NO	• For Open CB • Contact Capacity : AC 250V 16A / DC 125V 30A
			4	2_COM	
			5	3a_NO	• For Alarm • Contact Capacity : AC 250V 5A / DC 125V 10A
			6	4a_NO	
			7	3_4_COM	
			8	5b_NC	• For System Error • Contact Capacity : AC 250V 5A / DC 125V 1
			9	5_COM	
			10	DI 1	• User defined Input Contact
			11	DI 2	
			12	DI 3	
			13	DI COM	
			14	RS-485 +	• Serial RS-485 communication terminal for communication with the host system
			15	RS-485 -	
			16	COM	
②	Aux Power Input Terminal	T2	1	+	• Relay Aux Power Input (AC/DC 110V ~ 220V)
			2	-	
③	Frame Ground	T2	3	F.G	• Enclosure ground connection
④	CT/ZCT/VT Terminal	T3	1	V_A+	• 3Phase VT Input
			2	V_A-	
			3	V_B+	
			4	V_B-	
			5	V_C+	
			6	V_C-	
			7	V_N+	• EVT Input
			8	V_N-	
			9	I_A+	• 3Phase CT Input
			10	I_A-	
			11	I_B+	
			12	I_B-	
			13	Ic+	
			14	Ic-	
			15	In+	• Neutral NCT Input
			16	In-	

※ The CT / ZCT / VT input terminals in ④ based on K-PAM DG10. Please refer to the wiring for each product.

CB Control Method

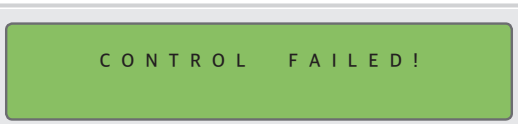
① When controlling in the field, set the control authority to LOCAL.



If the front LOCAL/REMOTE LED is lit as REMOTE, pressing the L/R key switches to the control authority change screen, pressing the ENTER key changes it to LOCAL, and pressing the ESC key cancels the change. (Front CB control operation impossible in REMOTE state)

② If you press the CB control button OPEN or CLOSE KEY in the LOCAL state, it is converted to the window to select whether to open/close, press the ENTER key to activate the CB control, and press the ESC key to cancel the CB control.

③ If the CB status has not changed, the CB change failure screen appears.



④ If the relay control authority is REMOTE or control is not possible due to the condition of the CB, the CB control impossible screen appears.

If you want to control the CB remotely, the relay control authority must be set to Remote and the CB can be controlled through RS-485 communication.

Power System Setting Method

① ①Press MENU(MENU) KEY on the initial screen

② Move the '5.POWER SYSTEM' using the UP(^) and DOWN(v) KEY and input the RIGHT (>)Key.

Category		Setting Range	Description
Frequency		50Hz, 60Hz	Line Frequency Setting
VT RATIO	WIRING	WYE, DELTA	Wiring Setting
	PRIMARY	0.11 ~ 650.00kV (0.01kV STEP)	VT Primary Rating Setting
	SECONDARY	63.0 ~ 220.0V (0.1V STEP)	VT Secondary Rating Setting
CT RATIO	PRIMARY	1 ~ 50000 A (1A STEP)	CT Primary Rating Setting
	SECONDARY	1, 5 A	CT Secondary Rating Setting
EVT RATIO	PRIMARY	0.11 ~ 650.00kV (0.01kV STEP)	EVT Primary Rating Setting
	SECONDARY	63.0 ~ 191.0V (0.1V STEP)	EVT Secondary Rating Setting
NCT RATIO	PRIMARY	1 ~ 50000 A (1A STEP)	NCT Primary Rating Setting
	SECONDARY	1, 5 A	NCT Secondary Rating Setting
PHASE ROTATION	VT ROTATION	ABC, ACB	Voltage Phase Setting
	CT ROTATION	ABC, ACB	Current Phase Setting
REVERSE CON DETECTOR		-	Reverse Connection Detector Setting
CIRCUIT BREAKER		-	CB Setting

※ The setting category may be different for each product, so please refer to the user manual for each product for details.

Protection Relay Element Setting Method

① Press the MENU(MENU) key on the initial screen
② Use the UP (^) and DOWN (v) keys to select '1. RELAY SETTING' category, then input RIGHT (>) Key.
③ Use UP (^), DOWN (v) KEY to select the protection relay element to be set and then input the RIGHT (>) Key.

▶ OCR Setting Method

① After selecting 'OCR1 (50/51)' in Protection Relay Element Setting Method ③, press the RIGHT (>) Key to enter the setting screen.
② Use the UP (^), DOWN (v) KEY to move the category you want to set, and then enter the ENTER (ENTER) KEY to pop up the password input screen. (initial password 0000)
③ Use the UP (^), DOWN (v) KEY to change the setting value and then input ENTER (ENTER) KEY.
④ After completing the setting, input the LEFT (<) KEY to check whether the setting has been changed.
When ENTER (ENTER) KEY is input, the setting is saved, and when ESC (ESC) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
ALGORITHM	PHASOR, RMS	Relay calculation method setting
PICKUP	0.02 ~ 20.00pu (0.01pu STEP)	Pickup setting
MODE	INST, DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	IEC_NI, ... IEEE_MI	Inverse curve setting
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting
BLOCK	NONE, ... R/I16	Protection blocking condition setting
DO1-CB OPN	DISABLED, ENABLED	DO1 setting
DO2-CB CLS	DISABLED, ENABLED	DO2 setting
DO3	DISABLED, ENABLED	DO3 setting
DO4	DISABLED, ENABLED	DO4 setting
LED	NONE, ALARM, LED#1 ~ #8	LED setting
EVENT	DISABLED, OP, PKP+OP, OP+RST, ALL	EVENT record setting

- Among the OCR setting methods, BLOCK ~ EVENT setting category are the same setting category for all protection elements.

▶ OCGR Setting Method

① After selecting 'OCGR (50N/51N)' in Protection Relay Element Setting Method ③, press the RIGHT (>) Key to enter the setting screen.
② Use the UP (^), DOWN (v) KEY to move the category you want to set, and then enter the ENTER (ENTER) KEY to pop up the password input screen. (initial password 0000)
③ Use the UP (^), DOWN (v) KEY to change the setting value and then input ENTER (ENTER) KEY.
④ After completing the setting, input the LEFT (<) KEY to check whether the setting has been changed.
When ENTER (ENTER) KEY is input, the setting is saved, and when ESC (ESC) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
ALGORITHM	PHASOR, RMS	Relay calculation method setting
SOURCE	3I0, NCT	Zero sequence current source setting 3I0 : Internal calculation NCT : N phase current
PICKUP	0.02 ~ 20.00pu (0.01pu STEP)	Pickup setting
MODE	INST, DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	IEC_NI, ... IEEE_MI	Inverse curve setting (12ea)
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting
I1 RESTRAINT	DISABLED, ENABED	Setting whether to use the current restraint function ※ Excluding single phase relay

▶ DOCR Setting Method

① After selecting 'DOCR (67)' in Protection Relay Element Setting Method ③, press the RIGHT ( ) Key to enter the setting screen.

② 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)

③ Use the UP ( ), DOWN ( ) KEY to change the setting value and then input ENTER ( ) KEY.

④ After completing the setting, input the LEFT ( ) KEY to check whether the setting has been changed.

When ENTER ( ) KEY is input, the setting is saved, and when ESC ( ) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
PICKUP	0.02 ~ 20.00pu (0.01pu STEP)	Pickup setting
BLOCK VOLT	0.02 ~ 1.30pu (0.01pu STEP)	Minimum operating voltage setting
RCA	0 ~ 359° (1° STEP)	Reference phase angle setting
DIRECTION	FORWARD, REVERSE	Operation direction setting
MODE	INST, DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	IEC_NI, ... IEEE_MI	Inverse curve setting (12ea)
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting

▶ DOCGR Setting Method

① After selecting 'DOCGR (67N)' in Protection Relay Element Setting Method ③, press the RIGHT ( ) Key to enter the setting screen.

② 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)

③ Use the UP ( ), DOWN ( ) KEY to change the setting value and then input ENTER ( ) KEY.

④ After completing the setting, input the LEFT ( ) KEY to check whether the setting has been changed.

When ENTER ( ) KEY is input, the setting is saved, and when ESC ( ) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
CURR SRC	3I0, NCT	Zero sequence current source setting 3I0 : Internal calculation NCT : N phase current
PICKUP	0.02 ~ 20.00pu (0.01pu STEP)	Pickup setting
POL VOLT SRC	3V0, EVT	Zero sequence voltage source setting 3V0 : Internal calculation EVT : N phase current
BLOCK VOLT	0.10 ~ 1.50pu (0.01pu STEP)	Minimum operating voltage setting
RCA	0 ~ 359° (1° STEP)	Reference phase angle setting
OLA	30 ~ 87° (1° STEP)	Operation phase angle setting
DIRECTION	FORWARD, REVERSE	Operation direction setting
MODE	INST, DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	IEC_NI, ... IEEE_MI	Inverse curve setting (12ea)
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting
I1 RESTRAINT	0.000 ~ 0.500 (0.001 STEP)	Current restraint constant setting ※ Excluding single phase relay

▶ UVR Setting Method

① After selecting 'UVR (27)' in Protection Relay Element Setting Method ③, press the RIGHT ( ) Key to enter the setting screen.

② 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)

③ Use the UP ( ), DOWN ( ) KEY to change the setting value and then input ENTER ( ) KEY.

④ After completing the setting, input the LEFT ( ) KEY to check whether the setting has been changed.
When ENTER ( ) KEY is input, the setting is saved, and when ESC ( ) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
PICKUP	0.20 ~ 1.30pu (0.01pu STEP)	Pickup setting
BLOCK VOLT	0.00 ~ 1.60pu (0.01pu STEP)	Minimum operating voltage setting
AUTO RESET	DISABLED, ENABLED	Auto Reset Setting
MODE	INST, DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	IEC_NI, ... IEEE_MI	Inverse curve setting
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting

▶ DPR Setting Method

① After selecting 'DPR (32P/Q)' in Protection Relay Element Setting Method ③, press the RIGHT ( ) Key to enter the setting screen.

② 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)

③ Use the UP ( ), DOWN ( ) KEY to change the setting value and then input ENTER ( ) KEY.

④ After completing the setting, input the LEFT ( ) KEY to check whether the setting has been changed.
When ENTER ( ) KEY is input, the setting is saved, and when ESC ( ) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
SOURCE	1P, 1Q, 3P, 3Q	Operation Element Setting ※ Single phase relay : 1P, 1Q
DIRECTION	NONE, FORWARD, REVERSE	Operation direction setting
PICKUP	0.01 ~ 1.50pu (0.01pu STEP)	Pickup setting
MODE	DT, INV	Operation mode setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
CURVE	OPR INV1, OPR INV2, RePR INV	Inverse curve setting(3ea)
LEVER	0.01 ~ 10.00 (0.01 STEP)	Inverse lever setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting

▶ DPR Setting Example

- Generally, about 20% of the generated electricity is applied.
- When the power generation capacity is 100kW, EVT 380V / 190V, CT 1000/5A
  Power generation capacity ÷ VT ratio ÷ CT ratio × 0.2 ⇒ 100kW ÷ 2 ÷ 200 × 0.2 = 50W
  1pu: 190V × 5A = 950W, 50W ÷ 950W ≒ 0.05pu

▶ UFR Setting Method

① After selecting 'UFR (81U)' in Protection Relay Element Setting Method ③, press the RIGHT ( ) Key to enter the setting screen.

② 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)

③ Use the UP ( ), DOWN ( ) KEY to change the setting value and then input ENTER ( ) KEY.

④ After completing the setting, input the LEFT ( ) KEY to check whether the setting has been changed.

When ENTER ( ) KEY is input, the setting is saved, and when ESC ( ) KEY is input, the setting is canceled.

Category	Setting Range	Description
FUNCTION	DISABLED, ENABLED	Setting whether to use the function
ID NAME	8 ASCII Characters	Protection element name setting
PICKUP	47.00 ~ 65.00Hz (0.01Hz STEP)	Operation frequency setting
BLOCK VOLT	0.02 ~ 1.30pu (0.01pu STEP)	Minimum operating voltage setting
TIME DELAY	0.04 ~ 60.00s (0.01s STEP)	Operation delay time setting
RESET DLY	0.00 ~ 60.00s (0.01s STEP)	Reset delay time setting

Contact Output Test Method

① Press the MENU( ) key on the initial screen

② Use the UP ( ) and DOWN ( ) keys to move the '6.DEVICE CONFIG' category, and then press the RIGHT ( ) Key.

③ Use the UP ( ) and DOWN ( ) keys to move the '11.TEST' category, and then press the RIGHT ( ) Key.

④ Use the UP ( ) and DOWN ( ) keys to move the '2.D/O TEST' 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 input.

LCD SCREEN

```
        D/O    TEST        1/2
⇒ 1.D/O   #1 : Off
  2.D/O   #2 : Off
  3.D/O   #3 : Off
```

```
        D/O    TEST        2/2
  4.D/O   #4 : Off
  5.D/O   #5 : Off
```

TEST Method

(1) In the D/O TEST screen, press the UP( ), DOWN( ) keys and press the ENTER( ) key at the position of the contact to be tested, the contact will change from Off to On and the contact will be output.

When the ESC( ) key is pressed, the output contact is reset.

(2) If you press the UP( ) or DOWN( ) KEY, you can select another digital output.

In this state, if you press the LEFT ( ) KEY, all the contacts will return to original state and come out of the screen.

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

①Check 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 '4.STATUS' category, and then press the RIGHT ( ) Key.
- Use the UP ( ) and DOWN ( ) keys to move the '1.PROT STATUS category, and when RIGHT ( ) Key is input, the following screen is displayed.

LCD Screen	Screen Description
PROT STATUS : PKP : OP 1.OCR1 : : 2.OCGR1 : : 3.DOCGR : :	Protection element not operating
PROT STATUS : PKP : OP 1.OCR1 : ABC : 2.OCGR1 : : 3.DOCGR : :	Over current (OCR1) element fault occurred and the current higher than the set value is maintained but does not operate. (The output contact is not operate)
PROT STATUS : PKP : OP 1.OCR1 : ABC : ABC 2.OCGR1 : : 3.DOCGR : :	Over current (OCR1) 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.
PROT STATUS : PKP : OP 1.OCR1 : : ABC 2.OCGR1 : : 3.DOCGR : :	Over current (OCR1) element fault occurred and the output contact operated, but the fault current disappeared.

③ Log Check

- Event Record Check

LCD Screen	Screen Description
EVENT 009 / 512 210706 10:22:32.081 OCR1 OP	- Save up to 512 EVENT occurrence information - Displays power ON/OFF, protection element operation status, digital input/output status, CB control, set value change, etc.

- 사고기록 및 사고파형 확인

LCD Screen	Screen Description
FAULT 01/32 (WAVE) 210706 10:22:32.081 OCR1 OP DURATION: 0.04s	- Save up to 32 FAULT occurrence information - Displays the PICK-UP, OPERATE, RELEASE, operation time, fundamental wave (voltage, current, etc.) magnitude, phase, frequency, etc. - Save up to 4 fault waveform (64 Cycles, 1.06 sec) Check it by uploading it on-site or from a remote location through KBIED_MNE.

How to check measurement after field intallation

① After installing the product in the field, check the measured value when receiving power to check the normal state.

② Press the MENU(MENU) KEY on the initial screen.

③ Use the UP (^), DOWN (v) key to select '2. MEASUREMENT' and then input the RIGHT (>) Key.

④ Use the UP (^) and DOWN (v) keys to select '1. VOLTAGE' and input the RIGHT (>) Key to check the voltage measurement.

⑤ Use UP (^), DOWN (v) KEY to check other measurements.

LCD Screen

```
      MEASUREMENT        1/1
⇒ 1.VOLTAGE
  2.CURRENT
  3.POWER
```

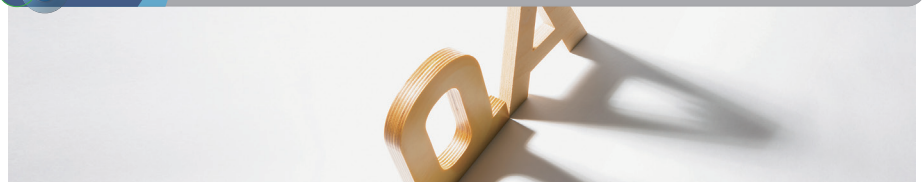
```
          VOLTAGE          1/2
Va : 110.000 V ∠ 0.0
Vb : 110.000 V ∠ 240.0
Vc : 110.000 V ∠ 120.0
```

```
          CURRENT          1/2
Ia :  1.200 A ∠  30.0
Ib :  1.200 A ∠ 270.0
Ic :  1.200 A ∠ 150.0
```

CAUTION

- 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 case of F10 without voltage A phase, current A phase is the phase reference)
- 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.

FAQ



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

- If you go to the UVR setting item, there is a BLOCK VOLT setting.

  This category sets the minimum operating voltage at which UVR operates. For example, if the BLOCK VOLT setting is 0.20pu and the PICKUP setting is 0.8pu, it does not operate when the voltage is below 0.2pu and only operate at a voltage between 0.2pu and 0.8pu.

  Check the settings and change them according to the site conditions.

(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, MIN V1 : 80V, the test applied voltage and frequency are 1 ÷ 0 6 ≒ 0.016[Hz], and the 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?

- When entering the setting category of the protection element and setting the DO1~DO4 setting category to ENABLED, if the protection element operates, the contact set to ENABLED can be output.

(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 measured 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.

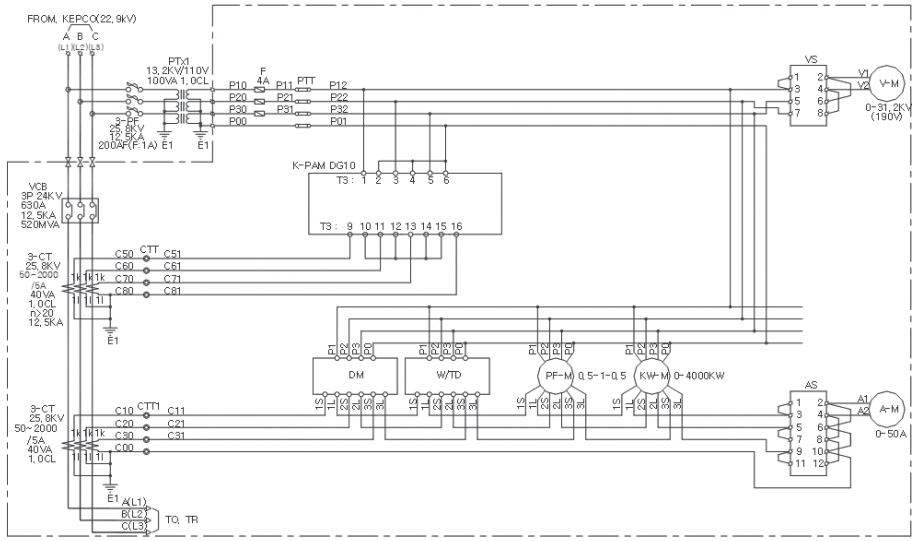
(7) During solar power generation, the power value displayed by the relay and the power value displayed by the inverter are different.

- Move to the menu / POWER SYSTEM category and check the VT, CT 1st and 2nd ratios to see if the settings are different from the inverter settings.

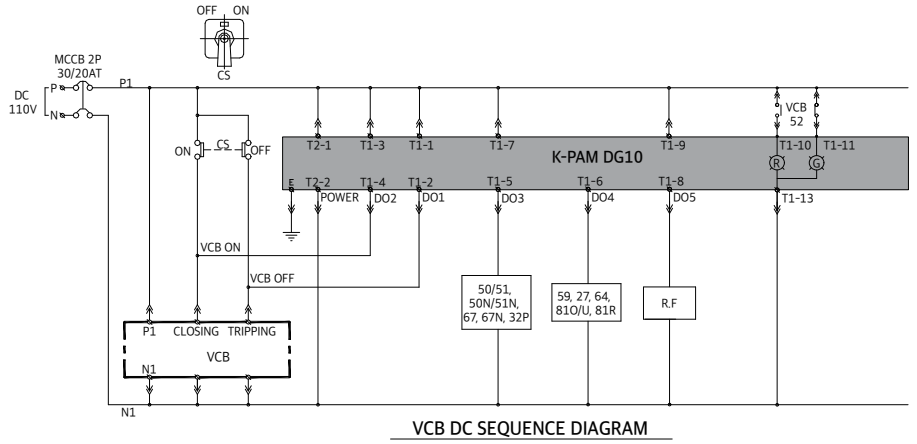
  Since the values of voltage and current applied to the product are internally calculated with the values set above and displayed as the primary value, you must check the settings and change them when they are set to different settings.

K-PAM 10Series Control Circuit Diagram

■ K-PAM DG10 AC Sequence (example drawing)



■ K-PAM DG10 VCB DC Sequence (example drawing)

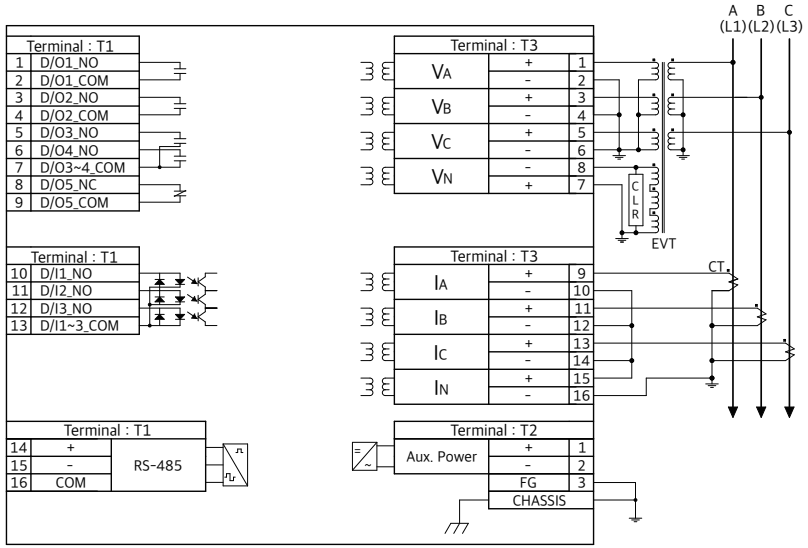


VCB DC SEQUENCE DIAGRAM

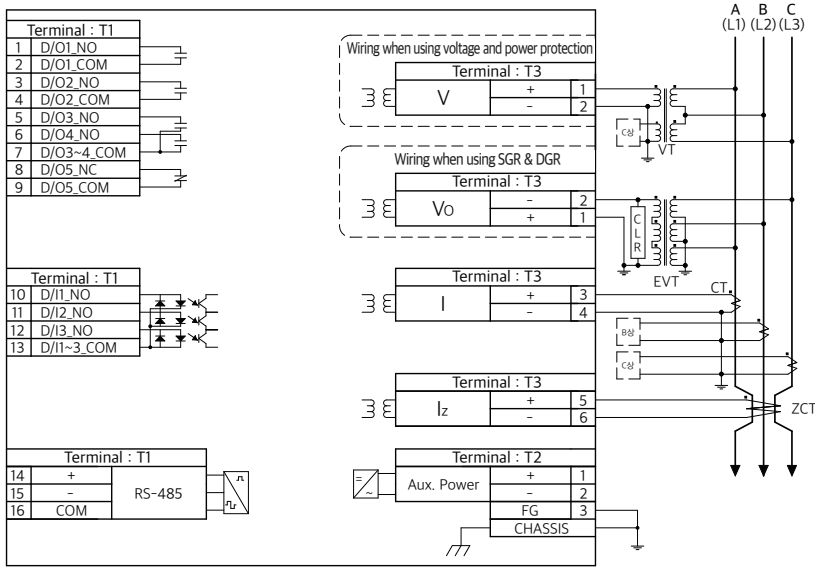
※ For each product, the D/O, D/I, RS485, and control power terminals are the same, but the current/voltage input terminals are different. Check the wiring diagram before wiring.

K-PAM 10Series External Wiring

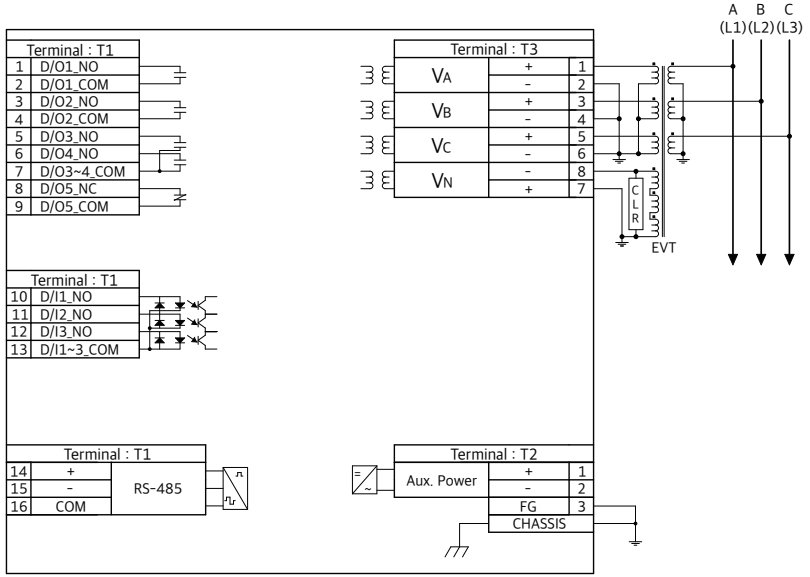
■ DG10



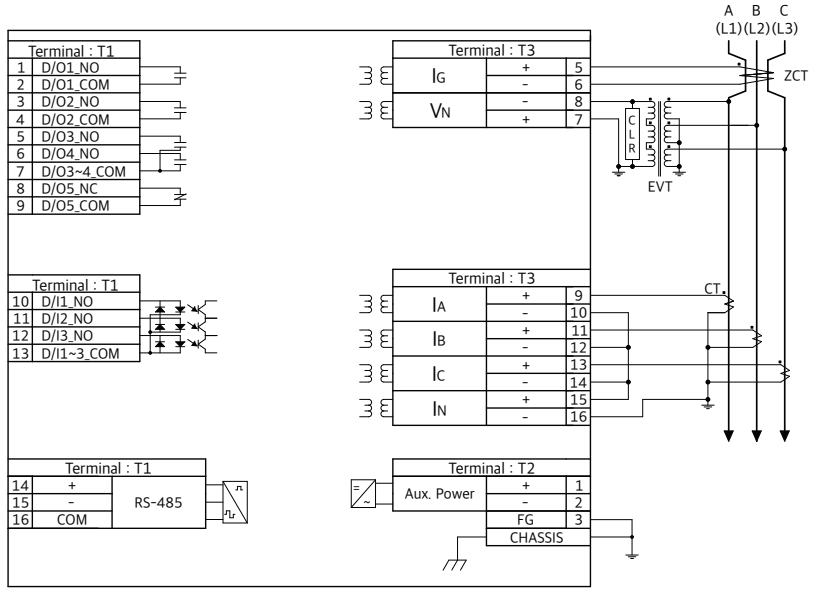
■ S10



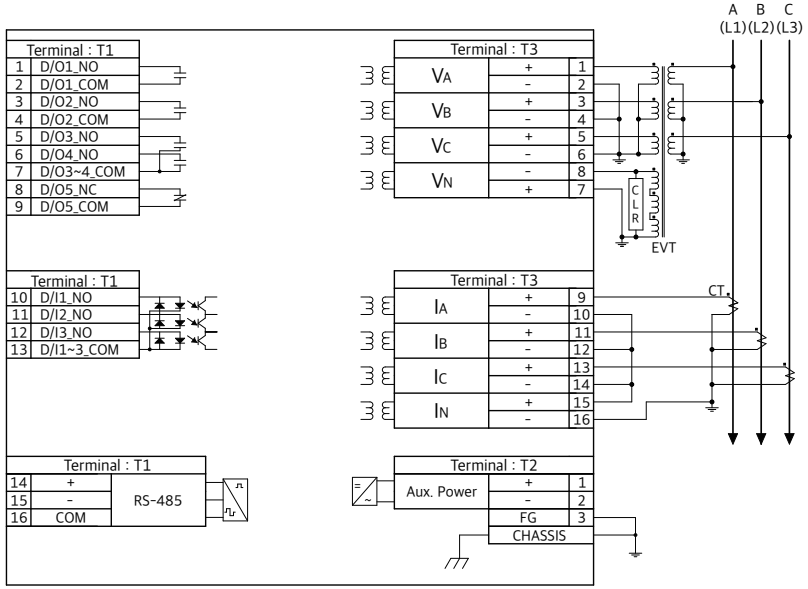
■ V10



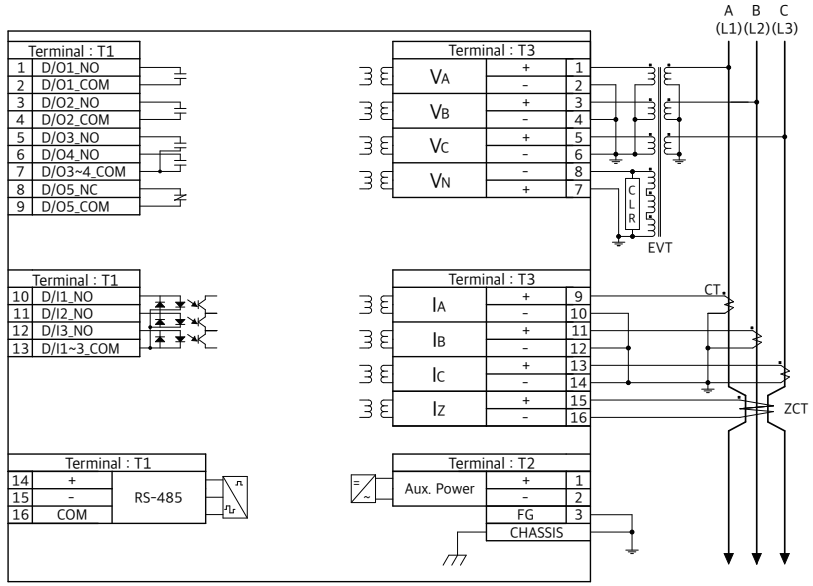
■ F10



■ **M11**

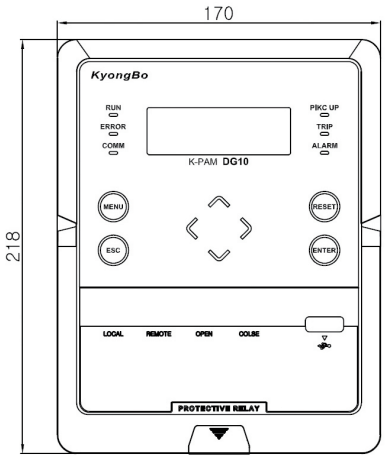


■ **M10**

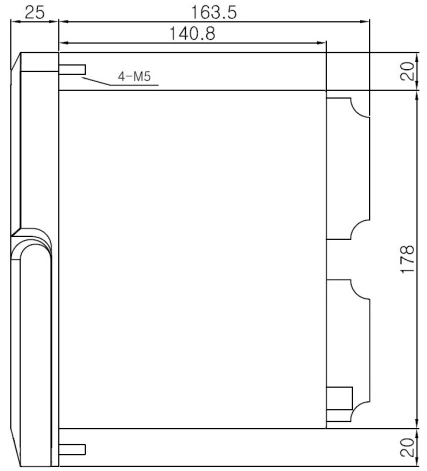


K-PAM 10Series Dimensions

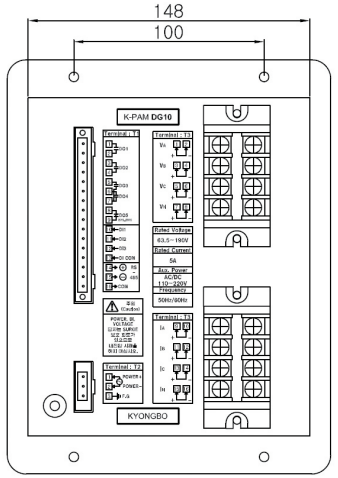
● **Front**



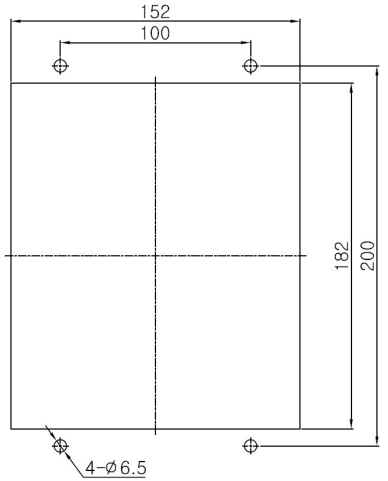
● **Side**



● **Rear**

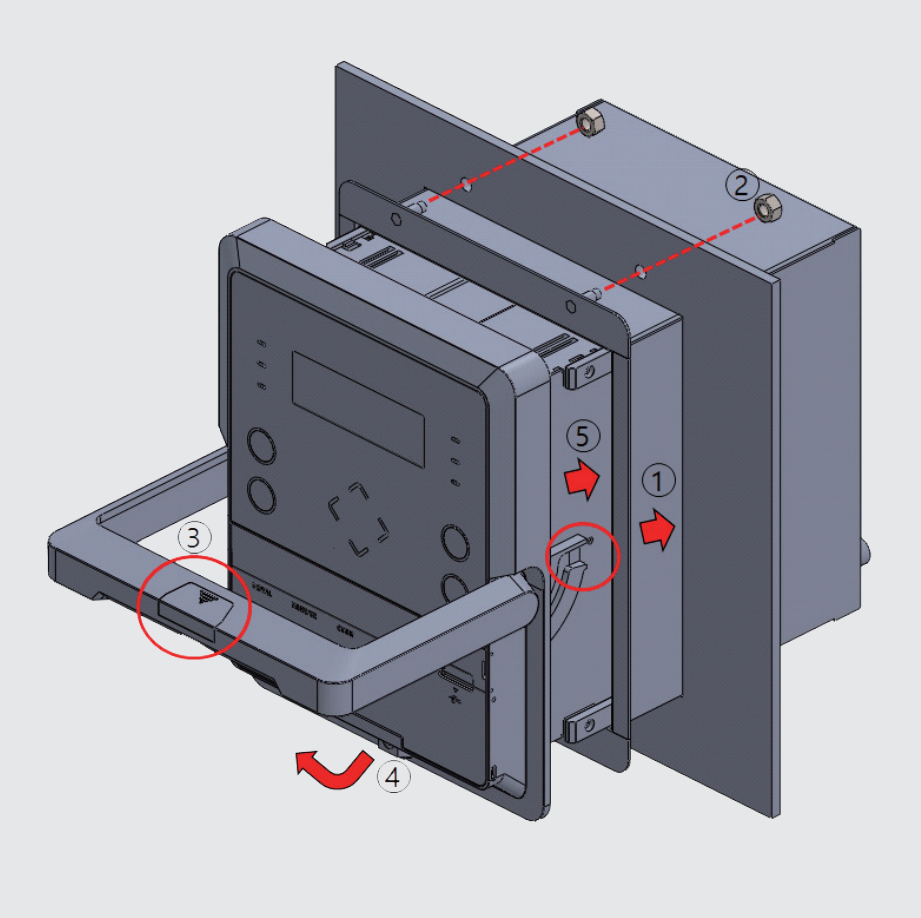


● **Panel Dimensions**



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

K-PAM 10Series 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 and T2 on the back of the product before withdrawing.

Kyongbo Electric Co., Ltd.

04792
5, Seongsuil-ro 12ga-gil, Seongdong-gu,
Seoul, Republic of Korea

Tel : 02)465-1133~7 Fax : 02)465-1333
E-mail : webmaster@kyongbo.co.kr
Website : http://www.kyongbo.co.kr

A/S
02)465-1133
(extension 102)

Digital Integrated Protection Relay

User Manual

K-PAM 10 Series

KyongBo

KyongBo Electric Co., Ltd.