

The right choice for ultimate yield!

LS ELECTRIC strives to maximize your profits in gratitude for choosing us as your partner.

Digital Protection Relay

GIPAM3000

GIPAM Series

User's Manual



Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for quick reference.

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The Best Choice for the Biggest Benefit

LS Electric is doing its best to present the best benefit to the people and business that choose our product.

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Safety caution

Please read carefully before putting the product into service for the proper operation of GIPAM3000.

- Please keep the safety caution to prevent any accident caused by using the products incorrectly.
- Safety caution is classified with caution and danger and indication of them as follows.



Caution

Not following the instruction may result in serious injury or even death



Danger

Not following the instruction may result in serious injury or property damage

- Symbols used in this manual indicate as follows.



This symbol is for warning the hazardousness under the specific condition.



This symbol is for warning the electric shocks or any accidents under the specific condition.

- This instruction shall be kept at a close place to GIPAM3000.



Caution

- Please do not operate, inspect or install by alone.
- Please do not wiring when applied with power or on the operation; It may result in electric shock.
- Please do not all the wiring operation with the live bus bar; it may result in electric shock or fire and property damage by charging voltage of current transformer.

- **Please connect ground wiring for safety.**

It may prevent electric shock.

F.G socket must be grounded on the proof case of the switchboard.

- **Please do not attempt to disassemble even when the power is being OFF.**

It may result in being impacted by electric shock as charging current remained in the product.

- **Please do not short circuit to the secondary side of the PT.**

It may cause fire.

- **Please do not wire or operate with wet hands.**

It may cause electric shock.

- **Please do not use any damaged cable.**

It may cause electric shock.

- **Please use the ring terminal type when wiring the cable.**

It may cause electric shock with bare wire.



Danger

■ Safety caution for installation & terminal wiring.

- **Apply the rated voltage to the power supply terminal of the product.**

It may result in damage of product or fire.

- **Please keep away product from screws, metals, water, or oil.**

It may result in fire.

- **Please keep the rated load and polarity of input & output contacts;**

It may result in product damage or fire.

- **While connecting to a port, check the number of the terminal before short.**

It may result in damage in the product or fire.

- **Assemble the cover of the terminal after disconnecting the terminal.**

- **Product must be installed and managed by a specialist.**

Otherwise, wrongly installed product may cause malfunction or accident.

- Use circuit breaker input/output auxiliary relay only.

If direct control is caused to a circuit breaker, inner RELAY flame may result.

- Turn the power OFF when changing the communication card.

All DO is reset when the power is turned OFF.

■ Checklist before supply of power

- Check the polarity and voltage in control power.
- Check if short exists in the input/output terminal.

■ Caution for storage and handling

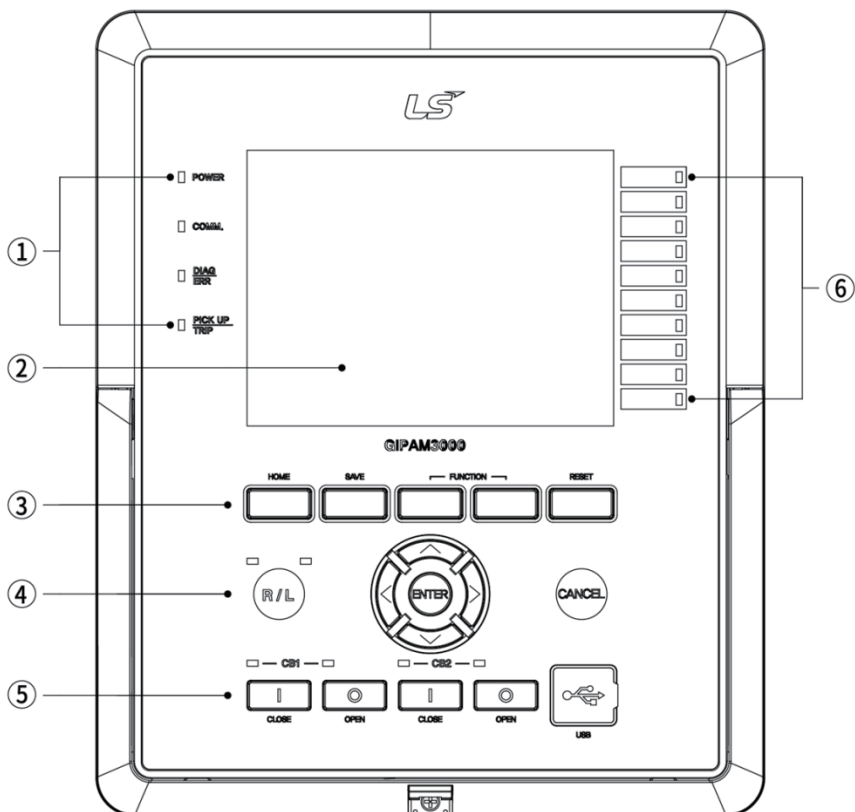
- Please store at a dry and clean place.
- Do not throw or put too much force on the product while handling.
- Do not load over 5 stories.

■ Caution for disposal

- Please dispose product according to the industrial waste regulation.

1. Outer Layout

1.1 Front-side Layout



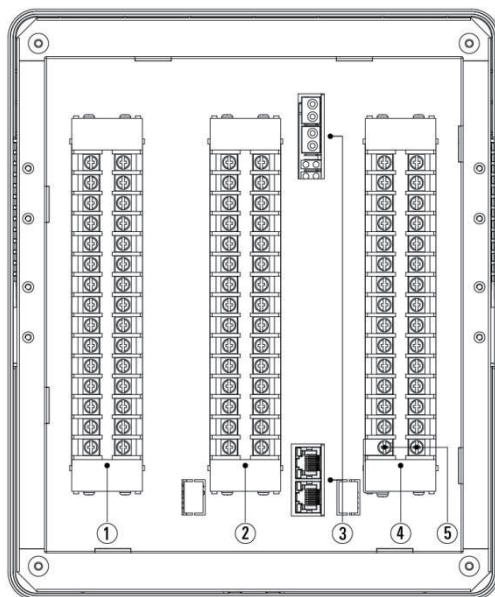
1. Outer Layout

1.1 Front-side Layout

No.	Name	Primary Function
1	Status LED	Power LED(Green): Lights up when the power is ON. Comm LED(Orange): Flashes during remote communication operation. DIAG/ERR LED(Red): Flashes or lights when a device error occurs. PICK-UP/TRIP LED(Red): Flashes when relay element PICK-UP, lights up when TRIP occurs.
2	TFT LCD Panel	Displays various setting menus, measurement, and device information. Through built-in touch screen, user can operate screens such as menu Setting and shift.
3	HOME/SAVE/FUNCTION/RESET KEY Button	HOME KEY: KEY Button to go to the initial menu. SAVE KEY: Save KEY Button according to Setting change. FUNCTION KEY: Go directly to the F1 and F2 Setting screen in "Device Setting – Function Key Setting". RESET KEY: KEY Button used to reset the relay status.
4	REMOTE/LOCAL/DIRECTION/CANCEL KEY Button	REMOTE / LOCAL status change KEY Button: Remote (green light), Local (red light). DIRECTION and ENTER KEY Button: KEY Button to move up/ down/ left/ right direction without touching LCD screen. CANCEL KEY Button: Setting change CANCEL KEY Button
5	Breaking operation and USB	CB1 CLOSE / OPEN Button KEY: Operation of breaker(1) ON or OFF KEY Button CB2 CLOSE / OPEN Button KEY: ON / OFF operation of breaker(2) KEY Button Circuit breaker CLOSE status: Red on Circuit breaker OPEN status: Green on) USB: USB port to connect PLC and remote manager (※ PLC S/W uses XG5000, and you can download it on our website.)
6	TRIP Assign LED	Displays relay element operation in accordance with the LED Setting. Setting root "Device Setting-LED Setting". (Relay element operation: LED on, relay element off: LED off

1. Outer Layout

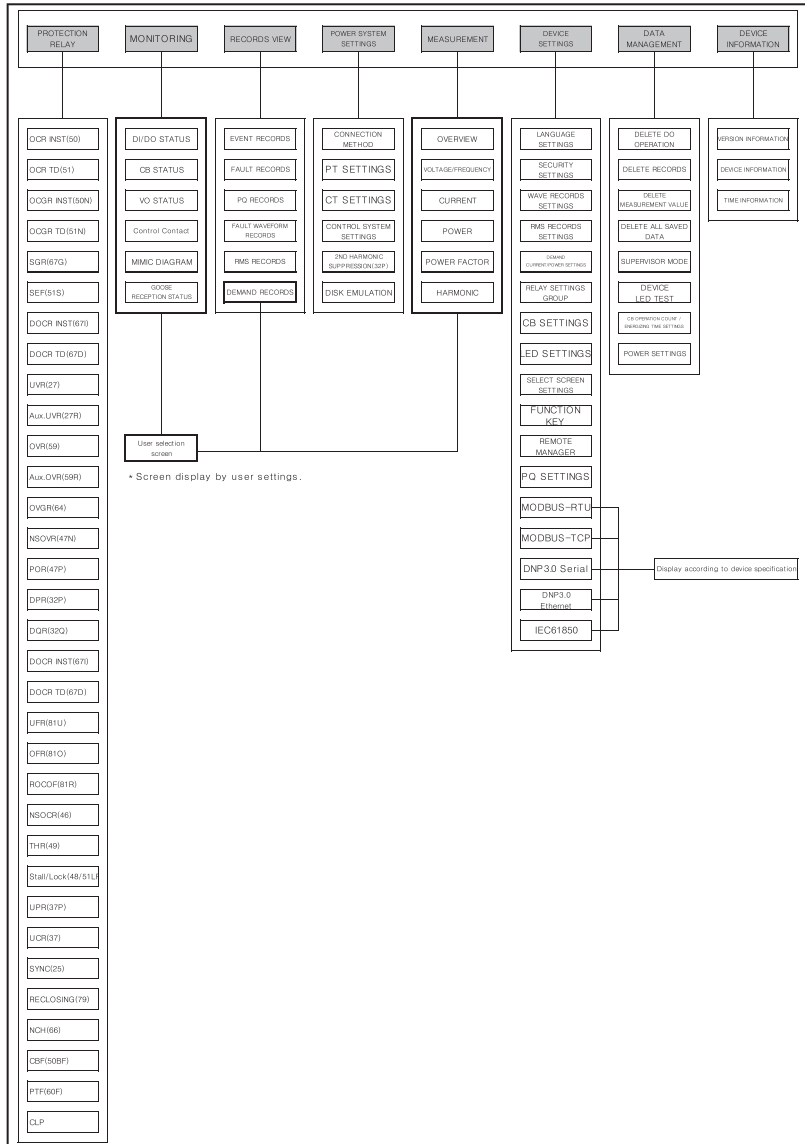
1.1 Back-side Layout



No.	Name	Primary Function
1	CT/PT Board(Basic)	5CT5PT module for FI Type and 11CT module for T Type are installed. Receives systematic current/voltage input(Basic)
2	DO Board(Basic)	DO module is installed. (Basic) DO for CB control: 4 Points, DO for signal: 17 Points
3	Communication Board (Option)	MODBUS, DNP, IEC61850 TCP/IP or OPTICAL Communication Module are installed. (Option)
4	DI & POWER Board(Basic)	DI and POWER Modules are installed. (Basic) DI: 20 Points
5	FG Terminal	Frame Ground terminal (Outer grounding terminal for connection) FG terminal must be grounded to the outer area of the switchboard panel. ※ FG(Frame Ground): To prevent any accidents from the outbreak of electrical faulty, FG, grounded to exterior of device and outer of the switchboard, allows the leaking current and the electrical noise to be discharged by grounding in order to decrease the electrical impact on the equipment.

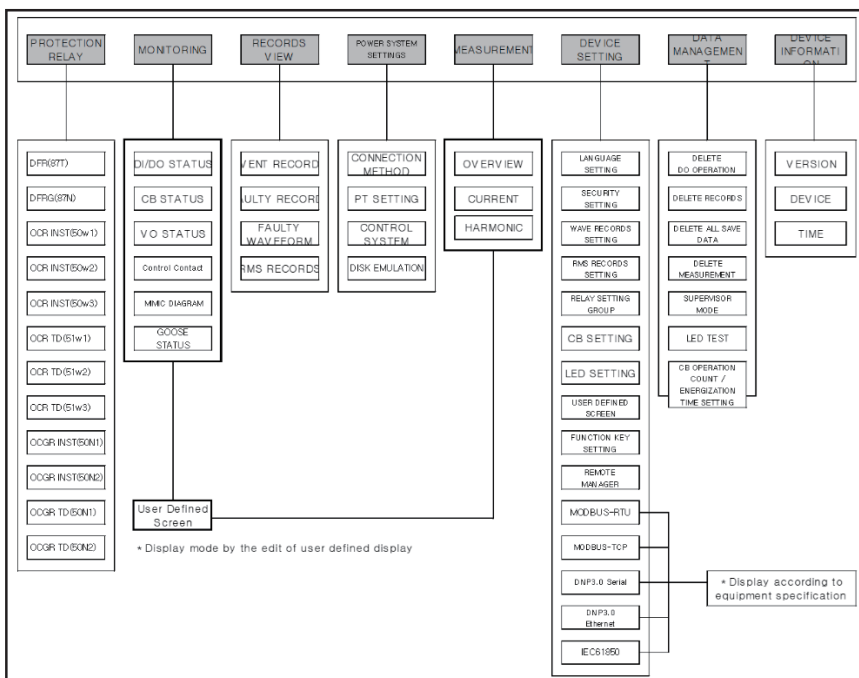
1. Outer Layout

1.3 Menu Layout – FI Type



1. Outer Layout

1.4 Menu Layout – T Type



2. Rated Values for the Product

2.1 Device rating

Measuring Contents		Specifications
Connection method		3P3W(2PT-D), 3P4W(3PT-Y)
Input contact	Frequency	50Hz, 60Hz (For 50Hz, please contact us separately)
	Voltage	PT: 110V (55V~125V) [Includes AUX PT]
		GPT: $V_n \times \sqrt{3}$ (V_n is the phase voltage / secondary rated voltage of transformer)
	Current	CT: 5A
		ZCT: 1.5mA
	Control power	AC/DC110V, DC125V
	Power consumption	Normal: 30W or less, Operating: 50W or less
	Input burden	PT: 0.5VA (Based on PT phase voltage)
		CT: 1.0VA
Digital Input voltage	Digital Input: AC/DC110V, DC125V	
Output contact	TRIP	AC 250V 16A / DC 30V 16A, Resistive Load
		AC 4000VA, DC480W
	ALARM	AC 250V 5A / DC 30V 5A, Resistive Load
		AC 1250VA, DC150W
Operating temperature		-25℃ ~ 60℃
Storage temp.		-40℃ ~ 70℃
Humidity rating		30% ~ 80% (Daily average)
Altitude		1000m max
Etc.		Install in a place free from abnormal vibration and impact
Application Standard		IEC 60255-26 KEMC 1120 IEC 61850-6, 7-1, 7-2, 7-3, 7-4 and 8-1

2. Rated Values for the Product

2.2 Measuring Specifications

Measuring Contents	Indications		Note
	Units	Range	
Voltage	V	0.0 ~ 9999.999 k	Voltage
Zero Phase Voltage	V	0.0 ~ 9999.999 k	Zero Phase Voltage
Bus Voltage	V	0.0 ~ 9999.999 k	Bus Voltage
Voltage Unbalanced Factor	%	0.0 ~ 300.00	Voltage Unbalanced Factor
Normal/Reversed Phase Voltage	V	0.0 ~ 9999.999 k	Normal/Reversed Phase Voltage
Current	A	0.0 ~ 999.999 k	Current
Zero Phase Current (Inct)	A	0.0 ~ 999.999 k	Zero Phase Current (Inct)
Zero Phase Current (Izct)	A	0.0 ~ 999.999	Zero Phase Current (Izct)
Normal/Reversed Phase Current	A	0.0 ~ 999.999 k	Normal/Reversed Phase Current
Thermal(%Q)	%	0.00 ~ 150.00	Thermal(%Q)
Phase	°	-180.0 ~ 180.0	Phase
Active Power	W	0.00 ~ 9999.999 M	Active Power
Reactive Power	VAr	0.00 ~ 9999.999 M	Reactive Power
Apparent Power	VA	0.00 ~ 9999.999 M	Apparent Power
Active Electric Energy	Wh	0.00 ~ 99999.999 M	Active Electric Energy
Reactive Electric Energy	VArh	0.00 ~ 99999.999 M	Reactive Electric Energy
Apparent Electric Energy	VAh	0.00 ~ 99999.999 M	Apparent Electric Energy
Frequency (Va)	Hz	35 ~ 78	Frequency (Va)
Frequency (Vaux)	Hz	35 ~ 78	Frequency (Vaux)
Power Factor(PF)	-	-1.000 ~ 1.000	Power Factor(PF)
Fundamental Power Factor (DPF)	-	-1.000 ~ 1.000	Fundamental Power Factor (DPF)
Voltage Harmonics	%	0.00 ~ 100.00	Voltage Harmonics
Current Harmonics	%	0.00 ~ 100.00	Current Harmonics
Active Power Demand	W	0.00 ~ 9999.999 M	Active Power Demand
Reactive Power Demand	VAr	0.00 ~ 9999.999 M	Reactive Power Demand
Current Demand	A	0.00 ~ 999.999 k	Current Demand

3. Relay Elements

GIPAM3000 RELAY SETTING

※ Set the relay element setting value **based on the operation value (A, V)** rather than the rating (In, Vn).

Ex) When $I_n = 5A$ / operation value $0.8I_n$, set the existing $0.8I_n$ to $4A$.

Protection relay	Operation type	Operation Value Setting / Variation, Operation time	Note
OCR Inst (50)	Instantaneous time Definite time	Setting: OFF, 5 ~ 150 A / 1A Operation time: 0, 0.05 ~ 60 s / 0.01 s (Instantaneous / Definite time)	When set to "0", 40ms or less operation
OCR TD (51)	Definite time Inverse time	Setting: OFF, 0.5 ~ 20 A / 0.05 A Operation time: 0.05 ~ 60.0 s / 0.01 s (Definite time) Time delay: 0 ~ 10.0 s / 0.01 s (Inverse time) Inverse time characteristic values: 0.05 ~ 15.00 / 0.01 (IEEE), 0.05 ~ 1.20 / 0.01 (IEC / KEPCO)	Characteristics curves IEEE EI / VI / MI IEC VI / EI / SI / LI KEPCO SI / VI
OCGR Inst (50N)	Instantaneous time Definite time	Setting: OFF, 5 ~ 40 A / 1A Operation time: 0, 0.05 ~ 60.0 s / 0.01 s (Instantaneous / Definite time) Motor start blocking: USE, NOT USE Motor block time: 1 ~ 60 s / 1.0 s	When set to "0", 40ms or less operation Motor Block I > 1A
OCGR TD (51N)	Definite time Inverse time	Setting: OFF, 0.10 ~ 10.00 / 0.05 A Operation time: 0.05 ~ 60.0 s / 0.01 s (Definite time) Time delay: 0 ~ 10.0 s / 0.01 s (Inverse time) Inverse time characteristic values: 0.05 ~ 15.00 / 0.01 (IEEE), 0.05 ~ 1.20 / 0.01 (IEC / KEPCO) Motor start blocking: USE, NOT USE Motor block time: 1 ~ 60 s / 1.0 s	Characteristics curves IEEE EI / VI / MI IEC VI / EI / SI / LI KEPCO SI / VI Motor Block I > 1A
SGR (67G)	Definite time	Zero phase current: 1.0 ~ 20.0 mA / 0.1mA Zero phase voltage: 8.0 ~ 80.0 V / 1 V Direction standard angle: 0 ~ 359 ° / 1 ° Operation time: 0.05 ~ 60.0 s / 0.01 s	Operation angle: ±87 ° (Fixed)
SEF (51S)	Definite time	Zero phase current: 1.0 ~ 20.0 mA / 0.1mA Operation time: 0.05 ~ 60.0 s / 0.01 s	
DOCGR (67NI)	Instantaneous time Definite time	Zero phase current: 0.5 ~ 40.0 A / 0.1A Zero phase voltage: 10 V (Fixed) Direction standard angle: 0 ~ 359 ° / 1 ° Operation time: 0, 0.05 ~ 60 s / 0.01 s (Instantaneous / Definite time)	When set to "0", 50ms or less operation Operation angle: ±87 ° (Fixed)
DOCGR (67ND)	Definite time Inverse time	Zero phase current: 0.1 ~ 10.0 A / 0.05 A Zero phase voltage: 10 V (Fixed) Direction standard angle: 0 ~ 359 ° / 1 ° Time delay: 0 ~ 10.0 s / 0.01 s (Inverse time) Inverse time characteristic values: 0.05 ~ 15.00 / 0.01 (IEEE), 0.05 ~ 1.20 / 0.01 (IEC / KEPCO)	Characteristics curves IEEE EI / VI / MI IEC VI / EI / SI / LI KEPCO SI / VI Operation angle: ±87 ° (Fixed)

3. Relay Elements

GIPAM3000 RELAY SETTING

Protection relay	Operation type	Operation Value Setting / Variation, Operation time	Note
UVR (27)	Definite time	Setting: OFF, 10 ~ 110 V / 1.0 V Operation time : 0.05 ~ 60.0 s / 0.01 s Auto reset : USE, NOT USE Dead Voltage Block : USE, NOT USE Operating Indication : USE, NOT USE Operation mode : SINGLE PHASE PLC Output : PLC or DO4 of user define	Dead Voltage Block: When the value of voltage lower than 6V, the UVR does not operate.
UVR (27R)	Definite time	Setting : OFF, 10 ~ 110 V / 1 V Operation time: 0.05 ~ 60.0 s / 0.01 s Auto reset: USE, NOT USE Dead Voltage Block : USE, NOT USE Operation time : USE, NOT USE	Dead Voltage Block: When the value of voltage lower than 6V, the UVR does not operate.
OVR (59)	Definite time	Setting: OFF, 40 ~ 180 V / 1.0 V Delayed Operation time: 0.05 ~ 60.0 s / 0.01 s	
OVRR (59R)	Definite time	Setting : OFF, 40 ~ 180 V / 1.0 V Delayed Operation time : 0.05 ~ 60.0 s / 0.01s	
OVGR (64)	Definite time	Setting : OFF, 5 ~ 80 V / 1.0 V Delayed Operation time: 0.05 ~ 60.0 s / 0.01 s	
NSOVR (47N)	Definite time	Setting : OFF, 11 ~ 110 V / 1.0 V Operation time : 0.05 ~ 60.0 s / 0.01 s	
POR (47P)	Definite time	Setting : OFF, 5 ~ 100 % / 1 % Operation time : 0.05 ~ 60.0 s / 0.01 s Vub(Unbalanced Factor) : NEMA, XGIPAM, G2K NEMA: $Vub = \text{Max}(V_{line} - V_{avg}) / V_{avg} * 100\%$ XGIPAM: $Vub = \text{Max}(V_{phase} - V_{avg}) / V_{avg} * 100\%$ G2K: $Vub = (V_{max} - V_{min}) / V_{avg} * 100\%$	
DPR (32P)	Definite time	Setting : OFF, 15 ~ 500 W / 1W Direction : FORWARD, REVERSE Operation time : 0.10 ~ 60.0 s / 0.01 s	
DQR (32Q)	Definite time	Setting: OFF, 11 ~ 500 VA / 1VA Direction : FORWARD, REVERSE Operation time: 0.10 ~ 60.0 s / 0.01 s Equation: $Qa = Ia * (Vb - Vc) * \cos(\angle(Vb - Vc) - \angle Ia) / \sqrt{3}(Y)$ $Qa = Ia * (Vbc) * \cos(\angle Vbc - \angle Ia) / \sqrt{3}(\Delta)$	-

3. Relay Elements

GIPAM3000 RELAY SETTING

Protection relay	Operation type	Operation Value Setting / Variation, Operation time	Note
DOCR Inst (67I)	Instantaneous time Definite time	Setting: OFF, 5 ~ 150 A / 1 A Direction standard angle: 0 ~ 359 ° / 1 ° Operation time: 0, 0.05 ~ 60.0 s / 0.01 s	When set to "0", 50ms or less operation Operation angle: ±87 ° (Fixed)
DOCR TD (67D)	Definite time Inverse time	Setting: OFF, 0.5 ~ 20 A / 0.05 A Direction standard angle: 0 ~ 359 ° / 1 ° Time delay: 0 ~ 10.0 s / 0.01 s (Inverse time) Inverse time characteristic values: 0.05 ~ 15.00 / 0.01 (IEEE) / 0.05 ~ 1.20 / 0.01 (IEC / KEPCO)	Characteristic curve IEEE EI / VI / MI IEC VI / EI / SI / LI KEPCO SI / VI Operation angle: ±87 ° (Fixed)
UFR (81U)	Definite time	60Hz setting: OFF, 50 ~ 60 Hz / 0.01 Hz 50Hz setting: OFF, 40 ~ 50 Hz / 0.01 Hz Operation time: 0.10 ~ 60.0 s / 0.01 s Low voltage operation limit: 40 V (Fixed)	PT#1 Fixed
OFR (81O)	Definite time	60Hz setting: OFF, 60 ~ 70 Hz / 0.01 Hz 50Hz setting: OFF, 50 ~ 60 Hz / 0.01 Hz Operation time: 0.10 ~ 60.0 s / 0.01 s Low voltage operation limit: 40 V (Fixed)	PT#1 Fixed
ROCOF (81R)	Definite time	Setting: OFF, 0.1 ~ 2.0 Hz/s / 0.1 Hz/s Operation time: 0.20 ~ 1.00 / 0.01s Low voltage operation limit: 40 V (Fixed)	PT#1 Fixed
NSOCR (46)	Definite time	Setting: OFF, 0.5 ~ 5.0 A / 0.1A Time delay: 0.1 ~ 60.0 s / 0.01s	
THERMAL (49)	Definite time	Operation value: OFF, 1.0 ~ 10.0 A / 0.05 A Thermal time constant: 2.0 ~ 32.0 min / 0.5 min Cooling thermal time constant: 2.0 ~ 32.0 min / 0.5 min Overload rate: 0.8 ~ 1.2 / 0.1 ALARM: USE, NOT USE ALARM setting: 70 ~ 90 % / 1 %	
STALL (48)	Definite time	Setting: OFF, 1.0 ~ 50.0 A / 0.05 A Operation time: 1.0 ~ 60.0 s / 0.01 s Motor starting time: 1.0 ~ 60.0 s / 0.1 s	
LOCK (51LR)	Definite time Inverse time	Setting: OFF, 1.0 ~ 50.0 A / 0.05 A Time delay: 0.05 ~ 60.0 / 0.01 s(Definite time) Inverse time characteristic values: 0.05 ~ 1.20 / 0.01 (Inverse time)	IEC VI / EI

3. Relay Elements

GIPAM3000 RELAY SETTING

Protection relay	Operation type	Operation Value Setting / Variation, Operation time	Note
UPR (37P)	Definite time	Setting : OFF, 15 ~ 500 W / 1 W Operation time: 0.10 ~ 60.0 s / 0.01 s Direction : FORWARD, REVERSE No Electric Operation Limit: 15.0 VA (Fixed)	
UCR (37)	Definite time	Setting : OFF, 0.5 ~ 4.5 A / 0.1 A Operation time : 0.10 ~ 60.0 s / 0.01 s No Current Operation Limit : 0.1 A (Fixed)	
SYNC (25)	Definite time	V Diff: OFF, 2 ~ 50 V / 1 V Phase Diff: OFF, 5 ~ 45 ° / 1 ° Frequency Diff : OFF, 0.01 ~ 0.50 Hz / 0.01 Hz Allowable SYNC Voltage for Setting: 40 ~ 132 V (Fixed) Whether to use Dead Voltage Input : USE, NOT USE Dead Voltage Setting: 10 ~ 30 V / 1 V	
RECLOSING (79)	—	43RC: OFF, DI16 or VO_43RC 63CB: OFF, DI17 or VO_63CB Reclosed Operation Input: OCR, OCGR, DOGR, DOOGR Instantaneous operation limit of 2 nd input: USE, NOT USE Reclosed circuit number: 1 ~ 5 / 1 times Prepare Time: 1.0 ~ 180.0 s / 0.1 s Dead Voltage Time: 0.2 ~ 60.0 s / 0.1 s Reclaim Time: 1.0 ~ 180.0 s / 0.1 s	
NCH (66)	—	Motor start number Limit: OFF, 1 ~ 5 / 1 times Monitoring cycle: 1 ~ 60 min / 1 min Thermal limit: OFF, 10 ~ 80 % / 1 % Motor Starting Condition: When the Max value of three-phase is measured over 0.04A, it is considered as motor start.	*If the remaining Thermal limit function is used, the THERMAL(49) setup value is used as well.
CBF (50BF)	Definite time	Setting: OFF, 1.0 ~ 5.0 A / 0.5 A Operation time: 0.1 ~ 1.00 s / 0.01s	
PTF (60F)	—	V(min): 10 ~ 70 V / 1 V I _{ub} : 20 % (Fixed) I(min): 0.1 A (Fixed) I(max): 5.0 A (Fixed) Operation time: 0.04 s (Fixed) I _{ub} measuring system: NEMA	Operation conditions : CB1 Closed state & minimum current 0.1A for 3 phases & maximum current 5.0A for three phases & current unbalance rate 20% or less & the voltage is below the setting value

3. Relay Elements

GIPAM3000 RELAY SETTING

Protection relay	Operation type	Operation Value Setting / Variation, Operation time	Note
CLP	Definite time	Setting: OFF, 120 ~ 1,000 % / 5 % Limiting time: 1.0 ~ 60.0 s / 0.1 s Restarting time: 10.0 s (고정) Setting: 50 / 51 / 50N / 51N (FI TYPE) 50 w1 / 50 w2 / 50 w3 / 51 w1 / 51 w2 / 51 w3 50N_1 / 50N_2 / 51N_1 / 51N_2 (T TYPE)	
Current Differential Relay (87T)	Instantaneous time Definite time	HIGH setting: OFF, 5.0 ~ 100.0 A / 0.5 A Operation time: 0, 0.05 ~ 10.0 s / 0.01s (Instantaneous / Definite time) LOW setting: OFF, 1.0 ~ 5.0 A / 0.5 A Operation time: 0.05 ~ 10.0 s / 0.01s (Definite time) Slope1: 15 ~ 80 % / 1 % Slope2: 15 ~ 80 % / 1 % KNEE POINT: 5.0 ~ 100.0 A / 0.5 A 2nd Harmonic limit: OFF, 5 ~ 50 % / 1 % CT Wiring Compensation(Io): ON, OFF	When set to "0", 50ms or less operation
Ground Differential Relay (87N)	Instantaneous time Definite time	Setting: OFF, 0.25 ~ 5.0 A / 0.05 A Operation time: 0, 0.05 ~ 10.0 s / 0.01 s (Instantaneous / Definite time) Slope: 15 ~ 80 % / 1 %	

※ Instantaneous/ Inverse time operation of OCR/OCGR in T TYPE is same as FI TYPE.

※ Operating time error at definite time

- 1) RECLOSING (79) Relay element: $\pm 5\%$ of operating value or $\pm 50\text{ms}$
- 2) NCH (66) relay element: within 50ms
- 3) PTF (60F) relay element: within 40ms
- 4) Other relay elements: $\pm 5\%$ of operation value or 35ms, whichever is greater

※ Notice for "OCR, OCGR, DOCR, DOCGR, LOCK"

- 1) Disk Emulation function: It follows the operating principle of the induction disc type relay and operates on the relay element "OCR, OCGR, DOCR, DOCGR, LOCK". Disk Emulation can be set in "System Setting - Disk Emulation".

- 2) Return characteristic setting function: INST (definite time) and INVERSE (inverse time) can be set.

When Disk Emulation function is USE, It returns according to the set return characteristics and does not apply the constant delay in the relay setting.

※ DOCGR (67ND): In DOCGR operation, the zero phase voltage (V_0) displayed in the Trip window are shown variably in V_{gpt} (PT4) or $3V_0$ (Vector Sum) depending on the selection of the zero phase voltage.

※ Caution when using PLC INDEX: OP_Confirm (IX1.7.24)

- This index usage is only for Rely element except "2nd Harmonic block, OVRP(59R), UVRP(27R), Sync(27), Reclosing(79), NCH(66), CBF(50BF), PTF(60F), CLP " in FI type

4. Status Monitoring Function

GIPAM3000 Status Monitoring Function

4.1 DI/DO Status Monitoring

(1) DI function

1) DI composition: Total 20 points, DI01~DI04 are status display contacts for CB1 and CB2.

(For CB1 status, DI01 is ON Status and DI02 is OFF status, For CB2 status, DI03 is ON status and DI04 is OFF status)

2) External Power Specification: AC/DC 110V, DC 125V

(2) DO function

1) DO composition: 4 points for Control and 17 points for Signal

2) DO recording function: The DO operation is cumulatively recorded. The maximum recording is 65535. When exceeded, it is initialized to '0'

4.2 CB Status Monitoring

GIPAM3000 has 2 CBs (maximum). The function for monitoring CB status shows the current status of CB connected to the product.

(1) Status Monitoring

CB Status	Display Indication	Color	Note
ON	CLOSE	RED	
OFF	OPEN	GREEN	
MIDDLE	BAD	ORANGE	When CB DI input status is all ON
	INTERMEDIATE	ORANGE	When CB DI input status is all OFF

(2) Operation Counts and Energization Time

1) Operation Counts: CB operation is cumulatively recorded.

Maximum recording is 65535. When exceeded, it is automatically reset to '0' and does not record Roll-over event.

2) Energization Time: CB accumulates to the Close point and records up to 4,294,967,295(Hour) in 1 hour.

-. The energization time that does not exceed 1 hour is not accumulated but holding.

However, when the CB is closed subsequently, it automatically accumulates from the Holding time.

-. When setting the CB energization time, the accumulated energization time is initialized.

-. When CB2 setting is changed to PO, the energization time reset and does not accumulate.

(3) TCS, TRS status indication: TCS monitors when the CB is ON. TRS indicates the running state.

(4) TRS immediate execution: TRS monitoring executes periodically, and the execution cycle can be set in "Device Setting-CB Setting".

It is function that can execute TRS immediately.

4.3 VO Status Monitoring

Virtual Output, shortly VO, is composed of total 64 contacts on the PLC embedded in the product.

It indicates RED color as ON status. 1 through 32 contacts are generally used and it is recommended to use specific VO only for designated VO.

4. Status Monitoring Function

GIPAM3000 Status Monitoring Function

VO Number	VO Name	Purpose	Note
VO33	VO_43RC	43RC input to reclosed	F TYPE only
VO34	VO_63CB	63CB input to reclosed	F TYPE only
VO36	VO_WAVE	Starting wave recording	F / T TYPE common
VO37~VO40	VO_LED1~4	TRIP LED lighting	F / T TYPE common
VO35,VO41~VO64	VO35, VO41~VO64	Reserved	F / T TYPE common

※ In T TYPE, VO33 and VO34 are general VOs that are not allocated with Reserved.

4.4 Control Contact function

Control Contact (CC) is used for simulation test of PLC ladder operation.

There are 32 points in total and it operates with 500ms pulse output like DO control, and the ON state is displayed in red during operation.

4.5 Power system diagram (MIMIC) function

This function shows the power system diagram that the product is used. It can be edited through the PC Manager.

Circuit breaker, DI, CC operation and control are possible. Also, voltage, current, frequency, power factor, and power measurement values are displayed.

4.6 GOOSE reception status function

This function is used in IEC 61850 communication to display the receiving status of the GOOSE message being subscribed to on the screen.

The number of Subscribe GOOSE is 32, and the status display is as shown in the table below.

(01 ~ 16) GOOSE uses inputs that can be known as TRUE and FAUSE, and (17 ~ 32) GOOSE is recommended to use as breaker operation input.

Subscribe GOOSE(01~16)	Status display
TRUE	TRUE (red)
FALSE	FALSE (green)
Communication OFF LINE	OFFLINE (gray)

Subscribe GOOSE(17~32)	Status display
00	[00] (orange)
01	[01] (green)
10	[10] (red)
11	[11] (orange)
Communication OFF LINE	OFFLINE (gray)

4.7 DI / DO / CC / VO / GOOSE Name Set function

The user can set the DI / DO / CC / VO / GOOSE name of the product using PC Manager, and the notation is up to 10 characters in English.

The displayable characters are based on "ASCII Character Map". However, for VO, only VO1 ~ VO32 used for general purpose can display the VO Name.

5. Record Browsing Function

GIPAM3000 Record Browsing Function

Record browsing function is a data recorded in sequence referring to all changes such as operation status (input and output), Setting, and controls. Since the events records the issues from operation status with time information, Record Browsing Function helps users to analyze the accident record convenient with recording in 1msec units.

5.1 Event Recording Function

The Event Recording Function records up to 1,000 additional information on the event and the cause along with the time. The types and contents of the recorded information are as follows. With using The Filter function, user could find all event records easily by changing relay Setting, changing status, changing system setting, changing device Setting, control commands and device information. If there are more than 1,000 event records, Roll-over function deletes old records sequentially.

- (1) Relay Operation (Pick Up / Operation / Reset Event): Operation Status, Operation Phase, Waveform Presence, Control Authority, and Occurrence Time
- (2) Various setting change and record deletion event: Changes in content, Control authority, and Occurrence time
- (3) CB / DI / DO / VO / CC / GOOSE status change: Each set name and operation status, control authority, occurrence time

5.2 Accident Recording Function

The Accident Recording Function refers to a function in which only information of relay operation is separately extracted from the recorded events. The total 200 accident records are allowed to be stored.

Displays relay operation status (Pick Up/Operation/Reset), operation phase, information about amount of electricity, waveform presence, control authority, and occurrence time. The amount of electricity is displayed Primary side (standard) by reflecting ratios of PT and CT. The old records are deleted sequentially with Roll-over function when there are more than 200 accident records.

5.3 PQ Recording Function

PQ Recording Function is only provided in FI TYPE. It saves PQ operation records exclusively from recorded event and allow storing up to 200 PQ records. Record contents displays Start, End, Duration, Voltage magnitude of phase, Peak voltage, Control authority, and Occurrence time of PQ (Sag, Swell, Interruption). The old records are deleted sequentially with Roll-over function when there are more than 200 PQ records. The voltage is indicated on the secondary side (standard)

5.4 Accident Waveform Recording Function

The Accident Waveform Recording Function records the waveforms of voltage and current to analyze accident in case of relay operation. Users are allow to store up to 16 events and Roll-over function deletes the old waveforms sequentially. The record contents indicates relay operation, operation source, control authority, and occurrence time.

5. Record Browsing Function

GIPAM3000 Record Browsing Function

5.5 RMS Recording Function

RMS Trend Recording Function refers to the function of recording the voltage and current with converting to RMS value to facilitate system analysis when the motor is activated. FI TYPE could store voltage and current of 3-phase, and T TYPE could store current of 1st winding and 2nd harmonic current as RMS value for 1 minute. RMS Recording Function has Roll-over function as well recording up to 10 waveforms.

5.6 DEMAND Record function

DEMAND recording function is a function supported only in FI TYPE, and it is a function to record peak demand and over demand.

(1) DEMAND Definition: It is the average value of current and power measured during the demand period.

(2) DEMAND Category

1) Peak Demand: Record the maximum average current and power measured during the set demand period.

It is not recorded for every demand period, however, when the value is higher than all previously recorded values.

It is recorded as the primary Value.

Contents	HMI Display	Demand period (setting)
Max current	PK DM I3Φ	1 ~ 600s / 1s
Active power (max)	PK DM P3Φ	15 / 30 / 60 min
Reactive power (max)	PK DM Q3Φ	

2) Over Demand: Records when the current and power values measured within the demand period exceed the current and power values set by the user.

However, if it is exceeded several times within the demand period, the maximum value is recorded as the primary Value

Contents	HMI Display	Demand period (setting)	Standard value (based on primary side).
Excess current	OV DM I3Φ	1 ~ 600s / 1s	1~999999A / 1A
Excess active power	OV DM P3Φ	15 / 30 / 60 min	1~99999999W / 1W
Excess reactive power	OV DM Q3Φ		1~99999999VAr / 1VAr

(3) Note: Demand value & period are reset when wiring type, demand setting, PT / CT rating change.

※ Waveform recording: The relay element, RMS records and PQ are recorded with the event description.

Storage is recorded for about 1 second (64 cycles). Waveforms are stored in non-volatile memory, and do not turn off the device until writing is complete.

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.1 Connection Method Setting

* This is the PT terminal wiring Method of device, Possible to Protect malfunction as correct wiring

(1) FI TYPE: WYE(3P 4W), DELTA(3P 3W) connection

6.2 Transformer Setting

(1) FI TYPE: When changing the setting, the amount of Power and Demand are recorded. However, Vgpt / 3Vo Max is deleted and being recorded as Events.

Contents	Setting Range	Note
Phase Transformer 1 st	55 ~ 999,999 V	Step 1V
Phase Transformer 2 nd	55.0 ~ 125.0 V	Step 0.1V
Grounding Transformer 3 rd	—	Indicate $\sqrt{3}$ times rating of the Phase Transformer 2 nd (Read Only)

(2) T TYPE

Contents	Setting range	Note
Winding	2 Winding / 3 Winding	
Phase Transformer 1 st	100 ~ 999,999V	Step 1V
Phase Transformer 2 nd	100 ~ 999,999V	Step 1V
Phase Transformer 3 rd	100 ~ 999,999V	Step 1V
1 st ~ 2 nd Winding	Y-Y, Y-D, D-Y, D-D	
1 st ~ 2 nd Phase-shift	0 ~ 11 / 1	Means 30° per 1.
1 st ~ 3 rd Winding	Y-Y, Y-D, D-Y, D-D	
1 st ~ 3 rd Phase-shift	0 ~ 11 / 1	Means 30° per 1.

※ 1st ~ 3rd related setting is available only when it is set to "3 Winding".

※ Once set to Y-Y, D-D, Phase-shift can be set EVEN numbers.

※ Once set to Y-D, D-Y, Phase-shift can be set ODD numbers.

※ When the connection method is changed, the Power and Demand records are deleted and being recorded as Events.

6.3 Current Transformer Setting

Once changing the setting, the amount of Power and Demand are recorded. However, Inct Max is deleted and being recorded as Events.

(1) FI TYPE

Contents	Setting Range	Note
CT/NCT 1 st	5 ~ 9,999 A	Step 1A
CT/NCT 2 nd	5 A (fixed)	Read Only
ZCT	200mA / 1.5mA (fixed)	Read Only

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

(2) T TYPE

Contents	Setting range	Note
1st/2nd/3rd winding CT primary	5 ~ 9,999 A	Step 1A
1st/2nd/3rd winding CT secondary	5 A (fixed)	Read Only
1st/2nd winding NCT primary	5 ~ 9,999 A	Step 1A
1st/2nd winding NCT secondary	5 A (fixed)	Read Only

6.4 Control system setting

Function to check and set the subject that performing the control.

Contents	Setting range	Note
Control subject	LOCAL/REMOTE	Indicates the current control subject (read only)
Control subject change source	KEY COMMAND / DI15	LOCAL when ON, REMOTE when OFF (when DI15 is selected)

6.5 2 Harmonic suppression function

This function is only for FI TYPE and prevents malfunction of 32P (DPR) relay element due to 2nd harmonics generated by inrush current.

(1) Setting values: USE / NOT USE, harmonic ratio 5 ~ 50% / 1%

6.6 Disk Emulation function

Disk Emulation function: It follows the operating principle of the induction disc type relay and operates on the relay element

"OCR, OCGR, DOGR, DOCGR, LOCK". When this function is USE, It returns according to the set return characteristics and does not apply the constant delay in the relay setting.

(1) Setting value: USE / NOT USE

6.7 Language Setting

(1) KOREAN: Displays menus and messages on the screen in Korean.

(2) ENGLISH: Displays menus and messages on the screen in Korean.

※ The language change is possible only on the HMI and not on the PC-Manager.

When changing the language on the HMI, the HMI alone reboots for a short time (within 15 seconds).

6.8 Security Setting

For the security of the product, there are password setting and security use setting, and the password consists of 4 digits.

After security authentication, the password unlocking time is valid until the LCD Backlight off function is activated, and the initial password is "0000".

※ LCD Backlight is off when there is no screen input (touch or key input) for 15 minutes.

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.9 Waveform Recording Setting

This is a setting that allow users to check and change the setting values related to Waveform recordings.

Contents	Setting Range	Note
Total record cycle	64 (fixed)	Read Only
Number of samples per cycle	32 (fixed)	Read Only
Record cycle before event	32 (fixed)	Read Only
Record Trigger	OP or OP/VO_WAVE or OP/PQ	Possible to set-up. VO_WAVE is dedicated to VO36 exclusively. Protection or Power quality operation.

6.10 RMS Recording Setting

This is setting that allow users to check the RMS record Setting.

Contents	Setting Range	Note
Save length	3,600 (fixed)	Read Only
Number of samples per cycle	1 (fixed)	Read Only
Record Trigger	CB1 CLOSE(fixed)	Read Only

6.11 Demand current/Power setting

Demand current/Power setting is provided only on FI type to operate "5.6 Demand Recording Function"

(1) Setting Contents for Demand current

Contents	Setting Range	Note
Use Status	NOT USE, USE	
Demand Current	1 ~ 999,999 A	Step 1A
Demand Time Limit	1 ~ 600 sec	Step 1sec

(2) Setting Contents for Demand Power

Contents	Setting Range	Note
Use	NOT USE, USE	
Active Power	1 ~ 99,999,999 W	Step 1 W
Reactive Power	1 ~ 99,999,999 VAr	Step 1 VAr
Power Demand Time Limit	15 / 30 / 60 min	

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.12 Relay setting group

The relay setting group refers to the relay correction group of the product, and the GIPAM3000 supports three setting groups.

The user can select the setting group to be used according to the situation, and the setting group can be automatically changed through DI18 ~ DI20 input.

Contents		Setting range	Note
Active setting group		1 ~ 3	
Resetting suppression time		1sec (fixed)	Read Only
Setting group 1~3	Automatic activation	NOT USE, USE	
	Input	DI18 ~ DI20(fixed)	Group1(DI18), Group2(DI19), Group3(DI20) [Read Only]

(1) Resetting suppression time: After the setting group is changed, even if a normal change operation condition occurs, during 1 second, the setting group is not changed and after 1 second, the setting group is changed according to the setting group change input status.

(2) Operation description

- 1) The setting group is activated only one setting group at a time, there is no priority between the setting groups, and it operates as the latest input group.
- 2) When the setting group input source (DI18 to DI20) is changed at the same time, the current setting group is maintained without changing
- 3) When DI18 / 19/20 input is selected, DI input operates in 500ms pulse form.
- 4) When the setting group is changed in the relay operation pick-up / operation state, all operations are initialized in software.
- 5) Among the relay elements, "25, 79, 66, 50BF, 60F, CLP" are not applied to the setting group.
- 6) When using setting group 3 (DI20), it overlaps with Panel Reset (DI20), so use Panel Reset DI after changing the connection and PLC Logic.

6.13 CB setting

CB setting is a function to check and change the Setting related to the breaker, and supports CB1 and CB2 Setting, respectively.

(1) CB1 Setting

Contents	Setting range	Note
Circuit monitoring	NOT USE, USE	
Contact monitoring	NOT USE, USE	
Contact monitoring period	1 to 365 days	Step 1day

(2) CB2 Setting

Contents	Setting range	Note
Function selection	CB or PO	Initial Setting: PO
Circuit monitoring	NOT USE, USE	
Contact monitoring	NOT USE, USE	
Contact monitoring period	1 to 365 days	Step 1day

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

(3) Function Detail

- 1) The initial value of CB#2 is PO, and even if PO is changed to CB, the status of DO displayed in "Status Monitoring – DI/DO Status" does not change to PO1/PO2. Users may change the name of DO with Manager Program.
- 2) TCS, Trip Circuit Supervision: To monitor and notify any abnormal status as monitoring the OPEN control circuit of breaker.
- 3) TRS, Trip Relay Supervision: To monitor and notify any abnormal status as monitoring the Auxiliary Relay of OPEN control relay
- 4) When setting to PO for CB2 function selection, the functions of TCS and TRS do not work properly.

※ Internal resistance value of TRIP output terminal upon TRS operation

Relay1 status(CB Relay)	Relay2 status(TRS Operation Relay)	Internal resistance value
OPEN	OPEN	424.4kΩ±2.0%
OPEN	CLOSE	214.4kΩ±2.0%
CLOSE	OPEN	214.4kΩ±2.0%
CLOSE	CLOSE	0Ω

6.14 LED Setting

With using TRIP Assign LED (10) located on the right side of the product, this function is to display the status by turning ON/OFF specific Relay elements and VO. It can be set to FI and T model relay elements and VO_LED1 ~ VO_LED4

However, in the case of FI model, Synchronization detection (Sync, 25) and Cold Load Pickup (CLP) LED Setting are not provided.

6.15 User Selection Screen Setting

If the user does not touch or input any KEY for 10 minutes, the screen converts to the set screen (set by user). When being selected more than one, the set screens maintains its display for 5 sec and moves to other set screens. Users may set their screens up to three.

- (1) Usage status: USE or NOT USE
- (2) Screen selection: User Selectable Screen

Type	Setting Contents	Note
On Screen (FI / T)	Total Measurement, Current, Harmonics	Measurement
	DI/DO, CB, VO, CC, System Diagram, GOOSE Reception	Monitoring
On Screen (FI)	Voltage/Frequency, Power/Amount of Power, Power Factor	Measurement
	DEMAND record	Record

6.16 Function Key Setting

The Function Key is to use F1 and F2 on the front side of the product to set a shortcut (shortcut key) to the set screen.

- (1) Usage status: USE or NOT USE
- (2) Function key setting screen: Same as screen selection in "User selection screen".

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.17 Remote manager Setting

Remote manager is a function to connect PC-Manager using the rear communication port.

(1) Usage status: USE or NOT USE

(2) Serial address: For Modbus-RTU and DNP3.0 serial models, set the serial address and connect to the remote manager through the B port.

※ For Modbus-TCP, DNP3.0 TCP and IEC61850 Ed1 / Ed2 models, remote manager access is possible through the Ethernet port on the rear.

※ To execute commands such as Setting and control using the remote manager, the product control authority must be in the "LOCAL" state.

6.18 PQ Setting

It is a function to set PQ (Sag, Swell, Interruption) and supports only FI model. Set "6.9 Waveform Recording" for waveform recordings.

When PQ operates, it records Start, End, Duration, Phase voltage magnitude and phase, Peak voltage, Control authority, and Time of occurrence.

Contents	Setting range	Note
SAG Use	NOT USE, USE	
SAG Voltage	40 ~ 90%	Step 10%, based on PT secondary rated voltage.
SWELL Use	NOT USE, USE	
SWELL Voltage	110 ~ 160%	Step 10%, based on PT secondary rated voltage.
INTERRUPTION Use	NOT USE, USE	
INTERRUPTION Voltage	10%(fixed)	Read Only / Based on PT secondary rated voltage.

6.19 MODBUS-RTU Setting

It is a device setting for RS485 communication method using MODBUS Protocol and provides 2 channels of serial port.

Contents	Setting range	Initial value
Address	1 ~ 247	247
Communication speed[BPS]	9600, 19200, 38400	9600
Parity	EVEN, ODD, NONE	EVEN
Change FLOAT order	USE, NOT USE	NOT USE
MODBUS communication map	[FI model] 3000FI, 2000FIM, 2200FNFZ, 2200DG, 2200IG [T model] 3000T, 2000T, 2200T	[FI] 3000FI [T] 3000T

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.20 DNP3.0 SERIAL Setting

DNP 3.0 Serial Setting is a device setting for RS 485 using DNP3.0 Protocol. It provides 2 channels of serial port.

Contents	Setting Range	Initial Value
Link Address	1 ~ 65519	65519
Speed [BPS]	9600, 19200, 38400	9600
Parity	EVEN, ODD, NONE	EVEN
DNP LINK CONFIRM MODE	NEVER, SOMETIMES, ALWAYS	NEVER
DNP3.0 Map	[FI model] 3000FI, 2000FIM, 2200FNFZ [T model] 3000T, 2000T, 2200T	[FI] 3000FI [T] 3000T

※ RS485 communication

- 1) Operating mode & Maximum Communication Distance: Maximum 1.2Km in Differential mode.
- 2) Line & Cable Specification: Use 2-Pair Cable with AWG22, Twisted Shield Pair Cable.

※ DNP LINK CONFIRM MODE Explanation

- 1) SOMETIMES: Allow link confirmation to the Master in the case of Multi Frame Message
- 2) ALWAYS: Allow Link confirmation to the Master for All Frames
- 3) NEVER: Never allow Link confirmation to the Master.

6.21 MODBUS-TCP Setting

Device setting for 10/100 Base-T/TX 2 RJ45 Port or 100 Base-FX 2 LC TYPE optical port communication using MODBUS Protocol.

Contents	Setting Range	Initial Value
IP address	1.0.0.0 ~ 223.255.255.255	192.168.0.33
Subnet Mask	255.0.0.0 ~ 255.255.255.0	255.255.255.0
Gateway	1.0.0.0 ~ 223.255.255.255	192.168.0.1
Time input	SNTP, Master, None	Master
IP address for SNTP	1.0.0.0 ~ 223.255.255.255	223.255.255.255
MAX IDLE TIME[sec]	10 ~ 60	30
Float Order Change	NOT USE, USE	NOT USE
RSTP Priority	0 ~ 61440	32768
MODBUS Map	[FI model] 3000FI, 2000FIM [T model] 3000T, 2000T, 2200T	[FI] 3000FI [T] 3000T

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

6.22 DNP3.0 TCP Setting

Device Setting for two 10/100 Base-T/TX (RJ45 Port) or two 100 Base-FX (LC TYPE Optical Port) communication methods using DNP3.0 Protocol.

Contents	Setting range	Initial value
Link address	1 ~ 65519	65519
IP address	1.0.0.0 ~ 223.255.255.255	192.168.0.33
Subnet mask	255.0.0.0 ~ 255.255.255.0	255.255.255.0
Gateway	1.0.0.0 ~ 223.255.255.255	192.168.0.1
Time input	SNTP, Master, None	Master
SNTP server IP address	1.0.0.0 ~ 223.255.255.255	223.255.255.255
MAX IDLE TIME[sec]	10 ~ 60	30
DNP LINK CONFIRM MODE	NEVER, SOMETIMES, ALWAYS	NEVER
RSTP priority	0 ~ 61440	32768
DNP3.0 communication map	[FI model] 3000FI [T model] 3000T	[FI] 3000FI [T] 3000T

6.23 IEC 61850 Setting

Device Setting for two 10/100 Base-T/TX (RJ45 Port) or two 100 Base-FX (LC TYPE Optical Port) communication methods using IEC61850 Protocol.

Contents	Setting range	Initial value
IP address	1.0.0.0 ~ 223.255.255.255	192.168.0.33
Subnet mask	255.0.0.0 ~ 255.255.255.0	255.255.255.0
Gateway	1.0.0.0 ~ 223.255.255.255	192.168.0.1
Time input	SNTP, None	SNTP
SNTP IP address	1.0.0.0 ~ 223.255.255.255	223.255.255.255
TCP KEEP ALIVE TIME[sec]	10 ~ 60 s	60
RSTP priority	0 ~ 61440	32768

6. Setting for Power System and Device

GIPAM3000 Settings for Power System and Device

※ Classification by Communication Method

Contents	10BASE-T	100BASE-TX	100BASE-FX
Max Transfer Rate	10 Mbps	100 Mbps	100 Mbps
Topology	Star	Star	Star
Transmission Media	UTP(CAT.3, CAT.5)	UTP(CAT.5), STP(Level 3)	Wavelength: 1300nm Multi-Mode fiber, LC TYPE Connector Fiber Size: 62.5/125, 50/125um
Access Control Method	CSMA/CD	CSMA/CD	CSMA/CD
Transmission Code	Manchester	4B/5B + MLT-3	4B/5B + NRZI
Max Transmission distance	Up to 100m between Hub and Terminal	Up to 100m between Hub and Terminal	Up to 2km per Segment

6.24 CB Operation counts & Energization Time Setting

This is a function to set the operation frequency and energization time of both CB1 and CB2. The setting is located on the "Data Management" menu screen.

Contents	Setting Range	Note
CB1/2 Operating Counts	0 ~ 65,535	Step 1
CB1/2 Energization Time	0 ~ 4,294,967,295 Hour	Step 1 Hour

6.25 Power Setting

This function is to set the amount of power accumulated into an arbitrary value. The setting is located on the "Data Management" menu screen.

Contents	Setting Range	Units	Note
S TotVAh	0.000 ~ 99,999,999,999.999	VAh	Step 0.001
P TotWh	0.000 ~ 99,999,999,999.999	Wh	Step 0.001
rP TotWh	0.000 ~ 99,999,999,999.999	Wh	Step 0.001
Q TotVAh	0.000 ~ 99,999,999,999.999	VAh	Step 0.001
rQ TotVAh	0.000 ~ 99,999,999,999.999	VAh	Step 0.001

6.26 Time (RTC) Setting & Tolerance

(1) RTC Setting: PC Manager Program, Remote communication can be set-up at the HMI. In HMI, user can set in "Device information - Time information.

Users can change into the local time as it has offset function. When changing the local time offset and time together, it is recommended to change the date/time setting after setting the local time offset.

(2) RTC tolerance: Time tolerance is 60 seconds/month. From full charge to discharge using a super capacitor for time-keeping in the event of a product blackout. The power outage compensation time is 1 day and will be reset to 09:00 on 1 January 2000 when the super capacitor is discharged.

7. User Interface

7.1 GIPAM3000 TERMINAL BLOCK Composition

1. FI TYPE TERMINAL BLOCK Composition

CT/PT				DO			COMM		DI & POWER					
76	Va+	Va-	61	46	CB1 OPEN+	CB1 OPEN-	31	RJ45 PORT	FE1	RX TX	16	DI02	DI01	1
77	Vb+	Vb-	62	47	PO1+	PO1-	32		FE2	RX TX	17	DI04	DI03	2
78	Vc+	Vc-	63	48	CB1 CLOSE+	CB1 CLOSE-	33				18	DI05	DLCOM (01~04)	3
79	Vgpt+	Vgpt-	64	49	PO2+	PO2-	34				19	DI07	DI06	4
80	Vaux+	Vaux-	65	50	DO01	DO02	35				20	DLCOM (05~08)	DI08	5
81	BLANK	BLANK	66	51	DO03	DO04	36				21	DI10	DI09	6
82	BLANK	BLANK	67	52	DO_COM (01~04)	DO05	37				22	DI12	DI11	7
83	TRX1+	TRX1-	68	53	DO06	DO07	38				23	DI13	DLCOM (09~12)	8
84	TRX2+	TRX2-	69	54	DO_COM (05~07)	DO08	39				24	DI15	DI14	9
85	BLANK	BLANK	70	55	DO09	DO10	40				25	DI17	DI16	10
86	Ia+	Ia-	71	56	DO11	DO12	41				26	DI19	DI18	11
87	Ib+	Ib-	72	57	DO_COM (08~12)	DO13	42				27	DLCOM (13~20)	DI20	12
88	Ic+	Ic-	73	58	DO14	DO15	43				28	BLANK	BLANK	13
89	Iinct+	Iinct-	74	59	DO16	DO17	44		TE1	29	PWR(-)	PWR(+)	14	
90	Izct+	Izct-	75	60	DO_COM (13~17)	BLANK	45		TE2	30	FG	FG	15	

※ PO1 and PO2 Setting can be changed to CB and used as CB2 OPEN and CB2 CLOSE.

7. User Interface

7.1 GIPAM3000 TERMINAL BLOCK Composition

2. T TYPE TERMINAL BLOCK Composition

CT/PT			DO			COMM		DI & POWER					
76	BLANK	BLANK	61	46	CB1 OPEN+	CB1 OPEN-	31	FE1	RX TX	16	DI02	DI01	1
77	la w1+	la w1-	62	47	PO1+	PO1-	32	FE2	RX TX	17	DI04	DI03	2
78	lb w1+	lb w1-	63	48	CB1 CLOSE+	CB1 CLOSE-	33	RJ45 PORT		18	DI05	DL COM (01~04)	3
79	lc w1+	lc w1-	64	49	PO2+	PO2-	34			19	DI07	DI06	4
80	lnct1+	lnct1-	65	50	DO01	DO02	35			20	DL COM (05~08)	DI08	5
81	la w2+	la w2-	66	51	DO03	DO04	36			21	DI10	DI09	6
82	lb w2+	lb w2-	67	52	DO_COM (01~04)	DO05	37			22	DI12	DI11	7
83	lc w2+	lc w2-	68	53	DO06	DO07	38			23	DI13	DL COM (09~12)	8
84	lnct2+	lnct2-	69	54	DO_COM (05~07)	DO08	39			24	DI15	DI14	9
85	la w3+	la w3-	70	55	DO09	DO10	40			25	DI17	DI16	10
86	lb w3+	lb w3-	71	56	DO11	DO12	41			26	DI19	DI18	11
87	lc w3+	lc w3-	72	57	DO_COM (08~12)	DO13	42			27	DL COM (13~20)	DI20	12
88	BLANK	BLANK	73	58	DO14	DO15	43			28	BLANK	BLANK	13
89	TRX1+	TRX1-	74	59	DO16	DO17	44		TE1	29	PWR(-)	PWR(+)	14
90	TRX2+	TRX2-	75	60	DO_COM (13~17)	BLANK	45	TE2	30	FG	FG	15	

※ PO1 and PO2 Setting can be changed to CB and used as CB2 OPEN and CB2 CLOSE

7. User Interface

7.1 GIPAM3000 TERMINAL BLOCK Composition

3. FI TYPE Default PLC Logic Composition

Name	No	Initial Setting usage	Other usage	CC No	Note
DI01	1	CB1 Status input (52a)	N/A	–	
DI02	16	CB1 Status input (52b)	N/A	–	
DI03	2	CB2 Status input (52a)	General DI	–	
DI04	17	CB2 Status input (52b)	General DI	–	
DI05–DI18	–	General DI	General DI	–	
DI19	26	Buzzer Stop	General DI	–	When attaching Pushbutton to PNL, connect to the corresponding DI.(Apply to A contact)
DI20	12	Panel Reset	General DI	–	
CB1 OPEN	31, 46	CB1 OPEN output	N/A	–	
CB1 CLOSE	33, 48	CB1 CLOSE output	N/A	–	
PO1	32, 47	POWER OUT1 output	General DO	–	PO Selection: General DO
PO2	34, 49	POWER OUT2 output	General DO	–	CB Selection: Control output for CB2
DO01	50	50/51/67I/67D	General DO	CC01	
DO02	35	50/51N(OCGR)	General DO	CC02	
DO03	51	67G/51S/67NI/67ND	General DO	CC03	
DO04	36	UVR Latch(Normal)	N/A	CC04	Output can be changed to Normal in UVR setting.
DO05	37	POWER FAIL	N/A	–	operated by direct control and used for alarm of power fail
DO06	53	81U/81O/81R	General DO	CC06	
DO07	38	46/37P/59R	General DO	CC07	
DO08	39	27R/32P/32Q	General DO	CC08	
DO09	55	47P/47N	General DO	CC09	
DO10	40	25(SYNC–OP)	General DO	CC10	
DO11	56	CB_ON_LAMP	General DO	CC11	When attaching CB ON/OFF status lamp to PNL, connect it to the appropriate DO terminal.
DO12	41	CB_OFF_LAMP	General DO	CC12	
DO13	42	59/49	General DO	CC13	
DO14	58	64,48/51R	General DO	CC14	
DO15	43	27(UVR–OP),37/66	General DO	CC15	27 (UVR–OP) is normal output.
DO16	59	86X(Lock–out)	General DO	CC16	
DO17	44	BUZZER	General DO	CC17	

Note) 1. 64(OVGR) element is not connected to TRIP and is set as default alarm.

2. 27(UVR) can be used as Latch contact (DO04) and Normal contact (DO15) without changing PLC

7. User Interface

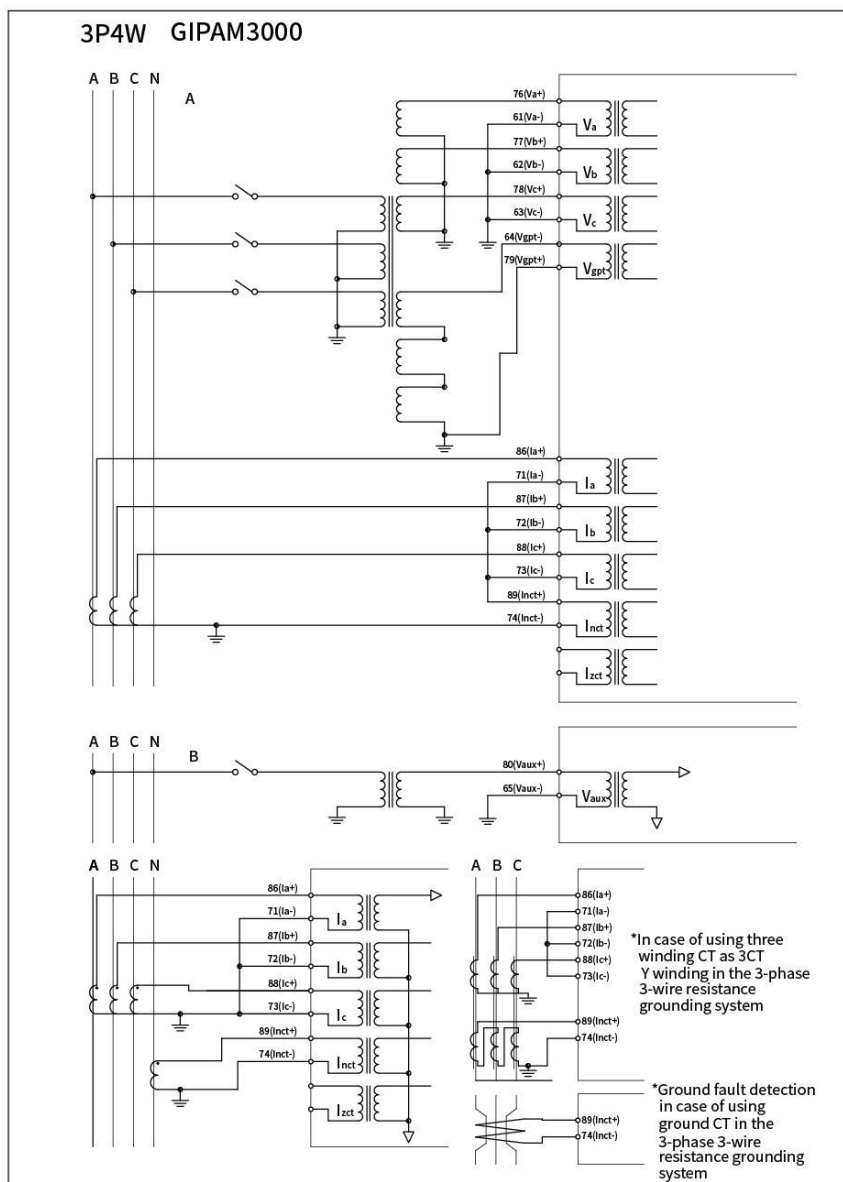
7.1 GIPAM3000 TERMINAL BLOCK Composition

4. T TYPE Default PLC Logic Composition

Name	No	Default setting	After Change	CC	Note
DI01	1	CB1 Status Input (52a)	No Change	—	
DI02	16	CB1 Status Input (52b)	No Change	—	
DI03	2	CB2 Status Input (52a)	General DI	—	
DI04	17	CB2 Status Input (52b)	General DI	—	
DI05-DI18	—	General DI	General DI	—	
DI19	26	Buzzer Stop	General DI	—	When attaching Pushbutton to PNL, connect to the corresponding DI.(Apply to A contact)
DI20	12	Panel Reset	General DI	—	
CB1 OPEN	31, 46	CB1 OPEN output	No Change	—	
CB1 CLOSE	33, 48	CB1 CLOSE output	No Change	—	
PO1	32, 47	POWER OUT1 output	General DO	—	PO : General DO CB : CB2 control output
PO2	34, 49	POWER OUT2 output	General DO	—	
DO01	50	50/51(OCR 1 st wiring)	General DO	CC01	
DO02	35	50/51(OCR 2 nd wiring)	General DO	CC02	
DO03	51	50/51(OCR 3 rd wiring)	General DO	CC03	
DO04	36	87T(DFR)	General DO	CC04	
DO05	37	POWER FAIL	No Change	—	It operates by direct control and alarm when power failure
DO06	53	87N(DFRG)	General DO	CC06	
DO07	38	General DO	General DO	CC07	
DO08	39	50/51N(OCGR 1 st)	General DO	CC08	
DO09	55	50/51N(OCGR 2 nd)	General DO	CC09	
DO10	40	General DO	General DO	CC10	
DO11	56	CB_ON_LAMP	General DO	CC11	When attaching CB ON/OFF status lamp to PL, connect to the appropriate DO terminal
DO12	41	CB_OFF_LAMP	General DO	CC12	
DO13	42	General DO	General DO	CC13	
DO14	58	General DO	General DO	CC14	
DO15	43	General DO	General DO	CC15	
DO16	59	86X(Lock-out)	General DO	CC16	
DO17	44	BUZZER	General DO	CC17	

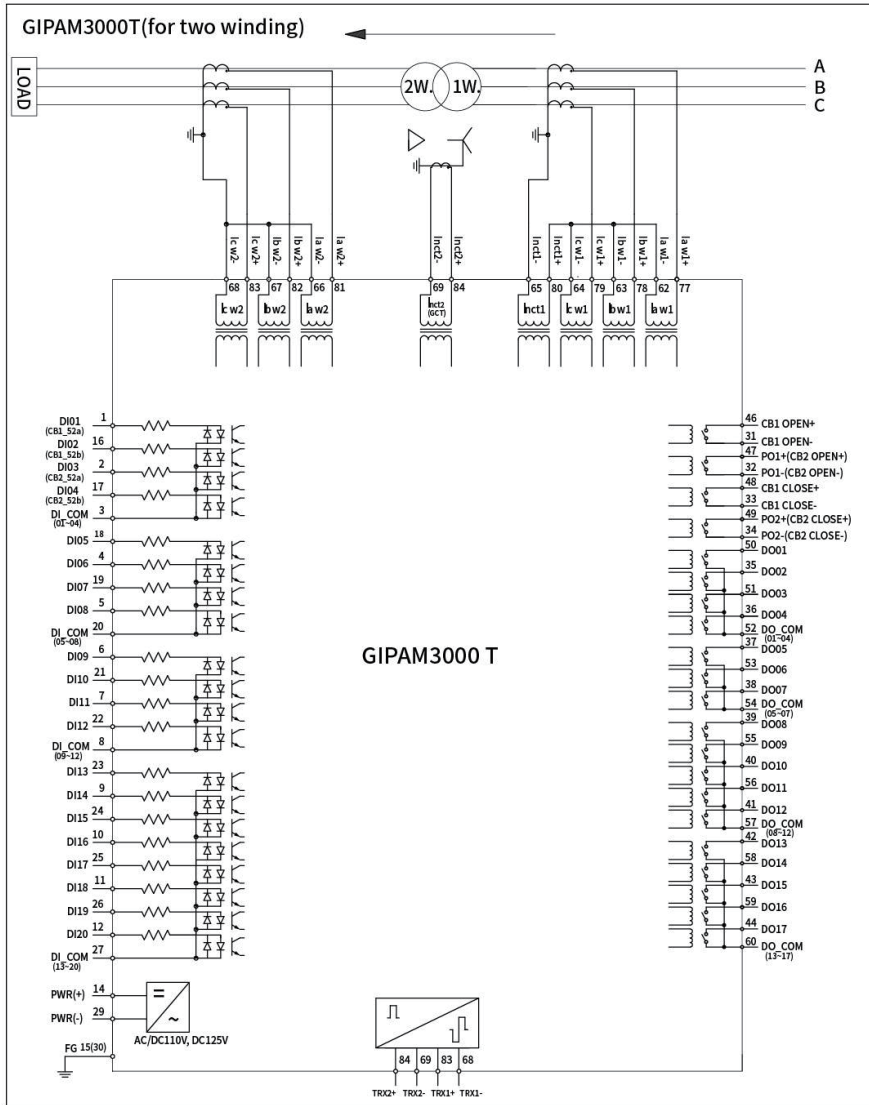
7. User Interface

7.2 GIPAM3000 FI Wiring Diagram



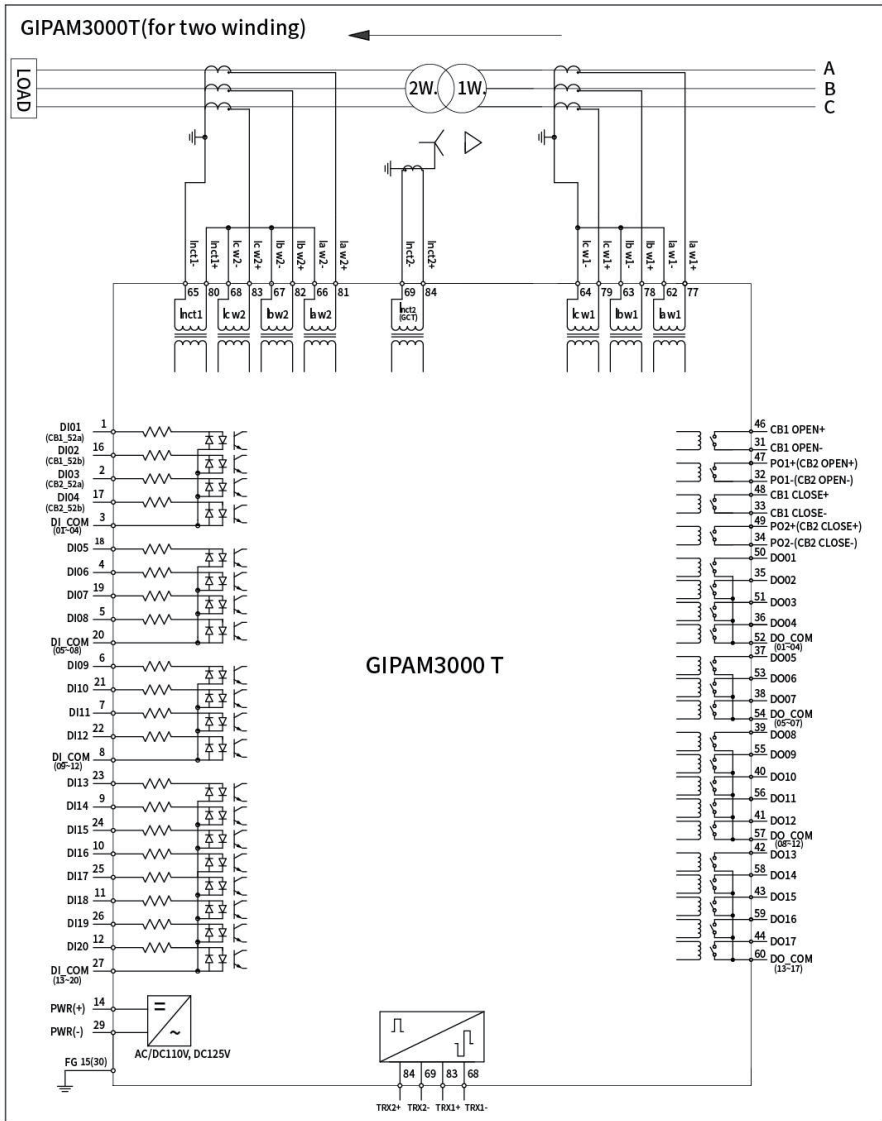
7. User Interface

7.3 GIPAM3000 T(2nd wiring) Wiring Diagram



7. User Interface

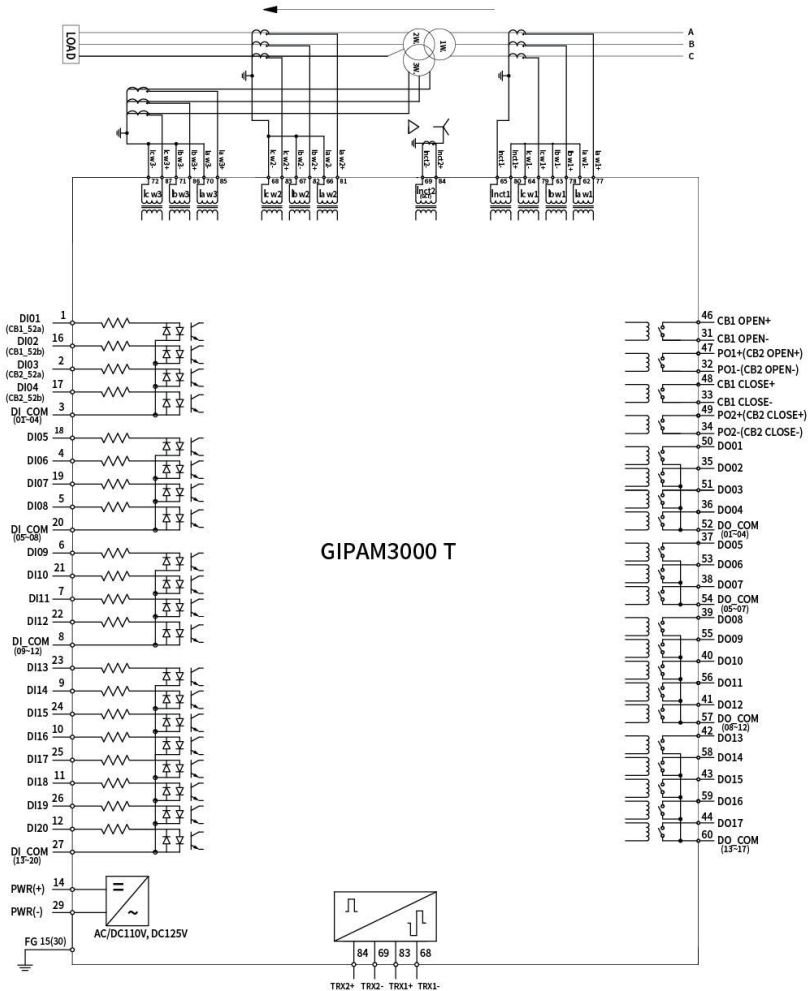
7.3 GIPAM3000 T(2nd wiring) Wiring Diagram



7. User Interface

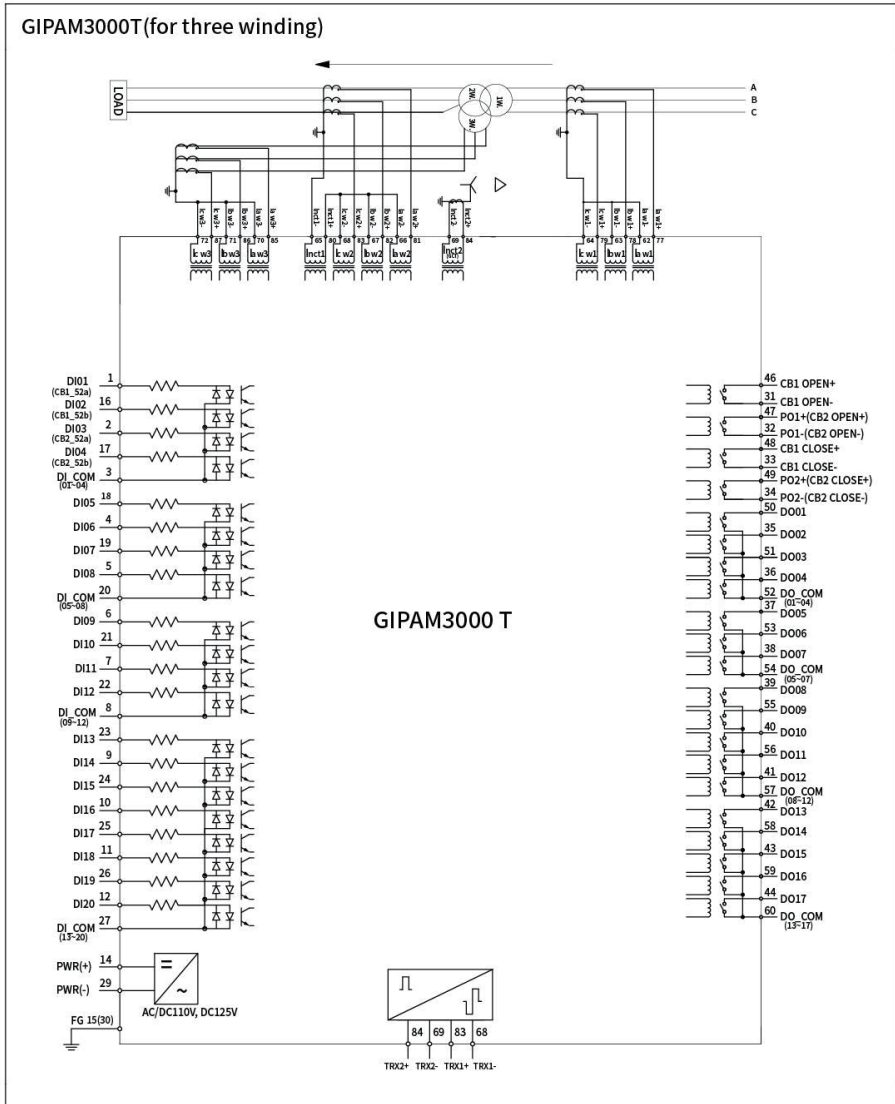
7.4 GIPAM3000 T(3rd wiring) Wiring Diagram

GIPAM3000T(for three winding)



7. User Interface

7.4 GIPAM3000 T(3rd wiring) Wiring Diagram



8. Characteristic Curve

GIPAM3000 Characteristic Curve (Inverse)

8.1 Inverse operation relay elements: OCR, OCGR, DOCGR, DOCR, LOCK(51LR)

8.2 Operation time equation

$$t(s) = \text{TMS} \left[\frac{k}{\left(\frac{G}{G_S}\right)^\alpha - 1} + c \right] + CD$$

TMS (Time Multiplier Setting) refers to the inverse time characteristic value commonly called TL.

G_S is the current set as the operation relay element and G is the operation fault current.

k , α , c are factors for each operation curve, and CD stands for Constant Delay.

8.3 Return time equation

$$t_r(s) = \text{TMS} \left[\frac{t_r}{1 - \left(\frac{G}{G_S}\right)^\beta} \right]$$

TMS (Time Multiplier Setting) refers to the inverse time characteristic value commonly called TL.

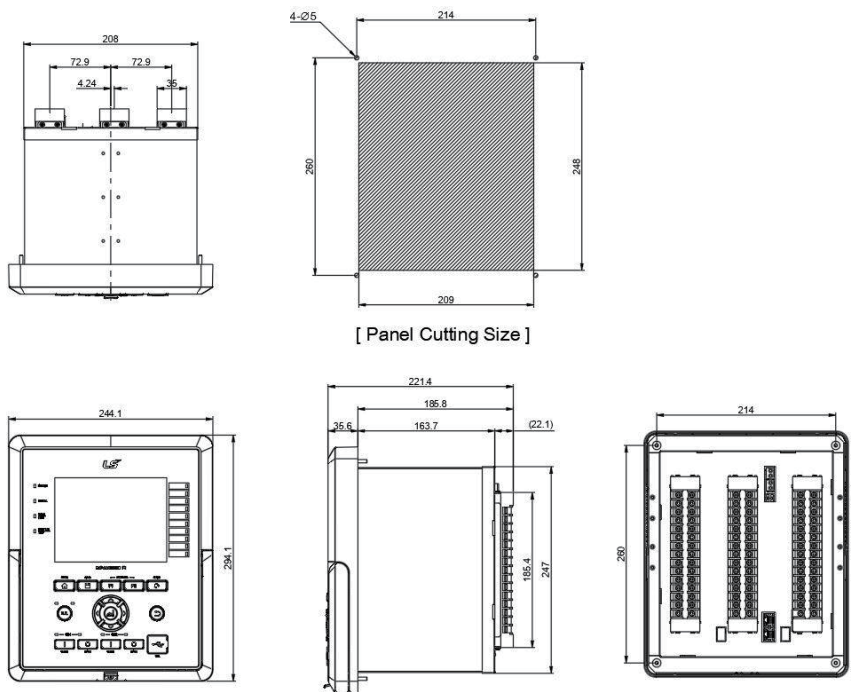
G_S is the current set by the operation relay element and G is the operation fault current.

β and t_r are factors for each operation curve.

Contents	TYPE	TMS Range	TMS Step	k	c	α	t_r	β
IEC	SI	0.05 ~ 1.20	0.01	0.14	0	0.02	9.7	2
	VI			13.5	0	1	43.2	2
	EI			80	0	2	58.2	2
	LI			120	0	1	80	2
IEEE	MI	0.05 ~ 15.0	0.01	0.0515	0.114	0.02	4.85	2
	VI			19.61	0.491	2	21.6	2
	EI			28.2	0.1217	2	29.1	2
KEPCO	SI	0.05 ~ 1.20	0.01	0.11	0.42	0.02	—	—
	VI			39.85	1.084	1.95	—	—

9. External Dimension

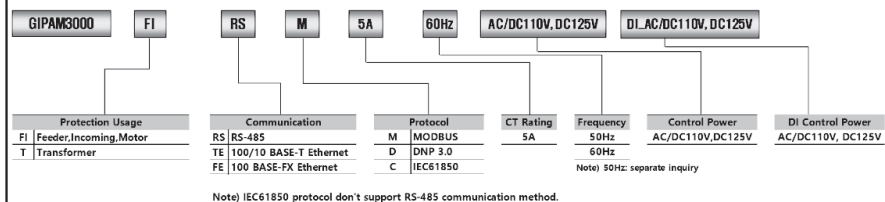
External Dimension & Cutting Size (mm)



10. Ordering Information

GIPAM3000 Equipment Naming System

Ordering Information





www.lselectric.co.kr

LS ELECTRIC Co., Ltd.

79562713302

LSELECTRIC



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Specifications in this instruction manual are subject to change without notice due to continuous products development and improvement.

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