GIPAM2200

Multi-function Digital Power Protection Surveillance Device
with a wide range of Protection Elements and Measurement Elements

GIPAM2200

Digital Integrated Protection & Monitoring Equipment

- Variety of Protection Functions per Protection Use
- Convenient GIPAM2200 Setting
- EVENT & FAULT RECORDING
- Sequence of Event (SOE) functions
- VECTOR DIAGRAM
- Time Characteristic Curve
- Select Before Operating (SBO) & Check Before Operating (CBO) functions
- Wide Range of Communication Compatibilities
- TRIP LOGIC & SEQUENCE
- ANALOG INPUT (Option)
- TRIP CIRCUIT SUPERVISION (TCS) & TRIP RELAY SUPERVISION (TRS)
- CIRCUIT BREAKER FAILURE (CBF)
- PT (VT) FAILURE

Contents

GIPAM2200 is a multi-function digital power protection surveillance device featuring a wide variety of protection elements and measurement elements for fault surveillance, protection and comprehensive monitoring of receiving and distribution panels.
GIPAM2200 series can be used for incoming, feeder and high-voltage motor and transformer protection.

GIPAM2200

Digital Integrated Protection & Monitoring Equipment

Overcurrent protection function includes protection elements of overcurrent, ground fault overcurrent, selective ground fault, directional ground fault, reverse phase overcurrent protection elements for each phase and neutral points with time and instantaneous elements. It also features differential ratio and ground fault differential relay elements for a transformer's protection by allowing 2 wiring transformer protection.

GIPAM2200 can also configure logic with an easy-to-use PLC program for I/O contacts allowing it to be applied to various sequences, and it also allows the system to be easily configured to the specific use designated by the user.

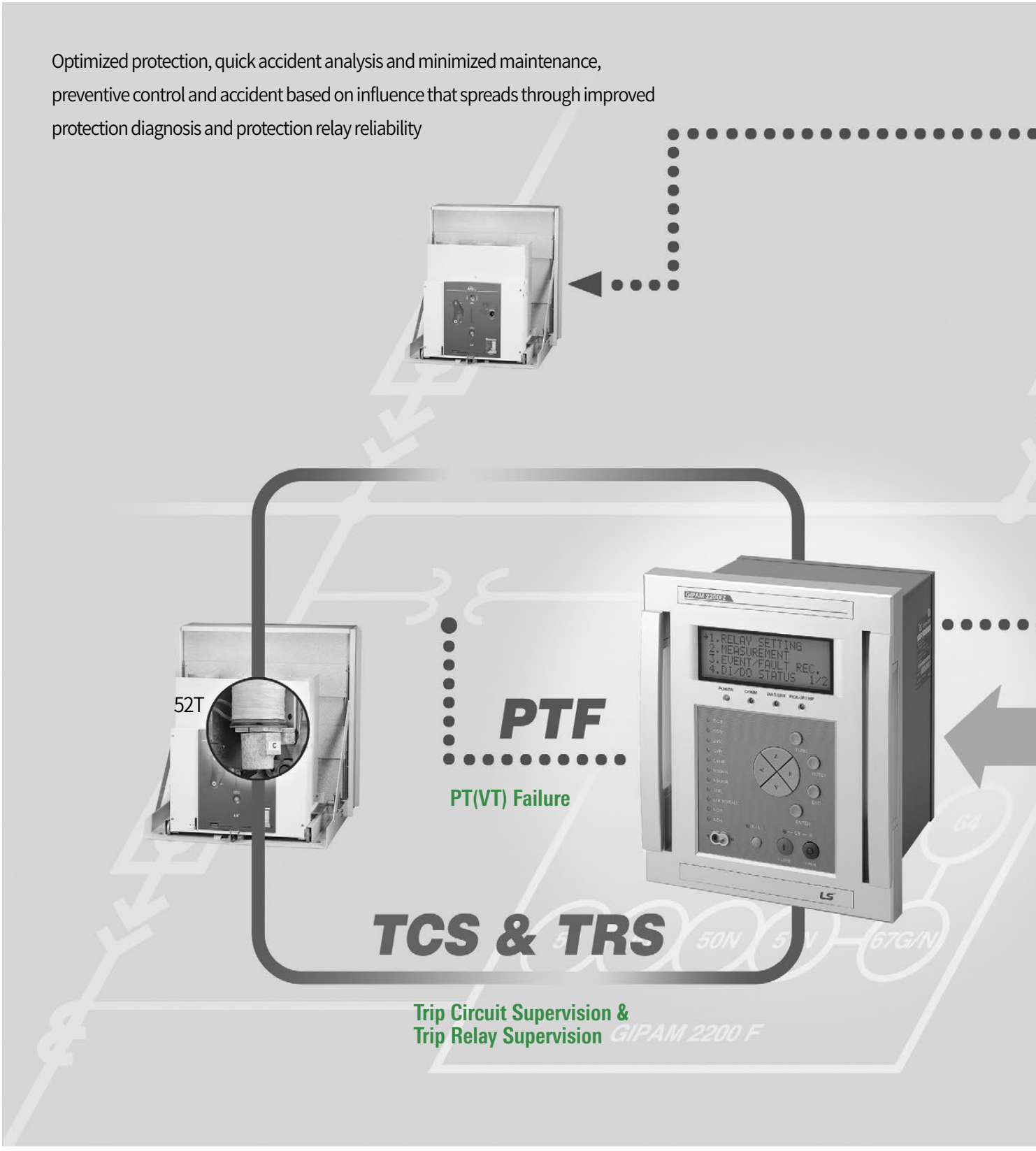
GIPAM2200 supports various monitoring and measurement functions, and it is capable of storing 800 recent events, 200 faults and up to 64 cycles of fault waveform data allowing convenient accident analysis. It also performs self-diagnosis even during operation, and generates an alarm upon detecting a fault.

GIPAM2200 features an IrDA (infrared) serial port for computer connections, as well as port for optical communication (optic) and RS485 with upper systems, and supports DNP3.0 and MODBUS protocols which are the most commonly used protocols in the industrial power field.

Through the operation program for PC interface, the user will be able to setup and check various functions the protection element and monitoring the product supports.


GIPAM 2200FZ
→1.RELAY SETTING
2.MEASUREMENT
3.EVENT/FAULT REC.
4.DI/DO STATUS 1/2
POWER
COMM
DIAG/ERR
PICK-UP/TRIP
OCR
SGR
UVR
OVR
OVGR
NSOVR
NSOCR
THR
LOCK/STALL
UCR
NCH
FUNC
RESET
ESC
ENTER
R/L
CB
CLOSE
OPEN
LS

Optimized protection, quick accident analysis and minimized maintenance, preventive control and accident based on influence that spreads through improved protection diagnosis and protection relay reliability



Select Before Operating (SBO) & Check Before Operating (CBO)

Control after selecting an item prior to executing the control command

Improved reliability and security for all circuit breaker controls

Trip Circuit Supervision (TCS) & Trip Relay Supervision (TRS)

Circuit breaker trip circuit surveillance (TCS)
Relay trip contact surveillance (TRS)

Circuit Breaker Failure (CBF)

Circuit breaker failure outputs upper level circuit breaker output
Prevention of the accident's influence spreading (protection collaboration)

CBF

SBO & CBO

Select Before Operating &
Check Before Operating

EVENT & FAULT RECORDING

PT(VT) Failure (PTF)

Prevent unnecessary system blocking
by detecting secondary PT fuse opening
(differentiation with abnormal system voltage)

Product characteristics

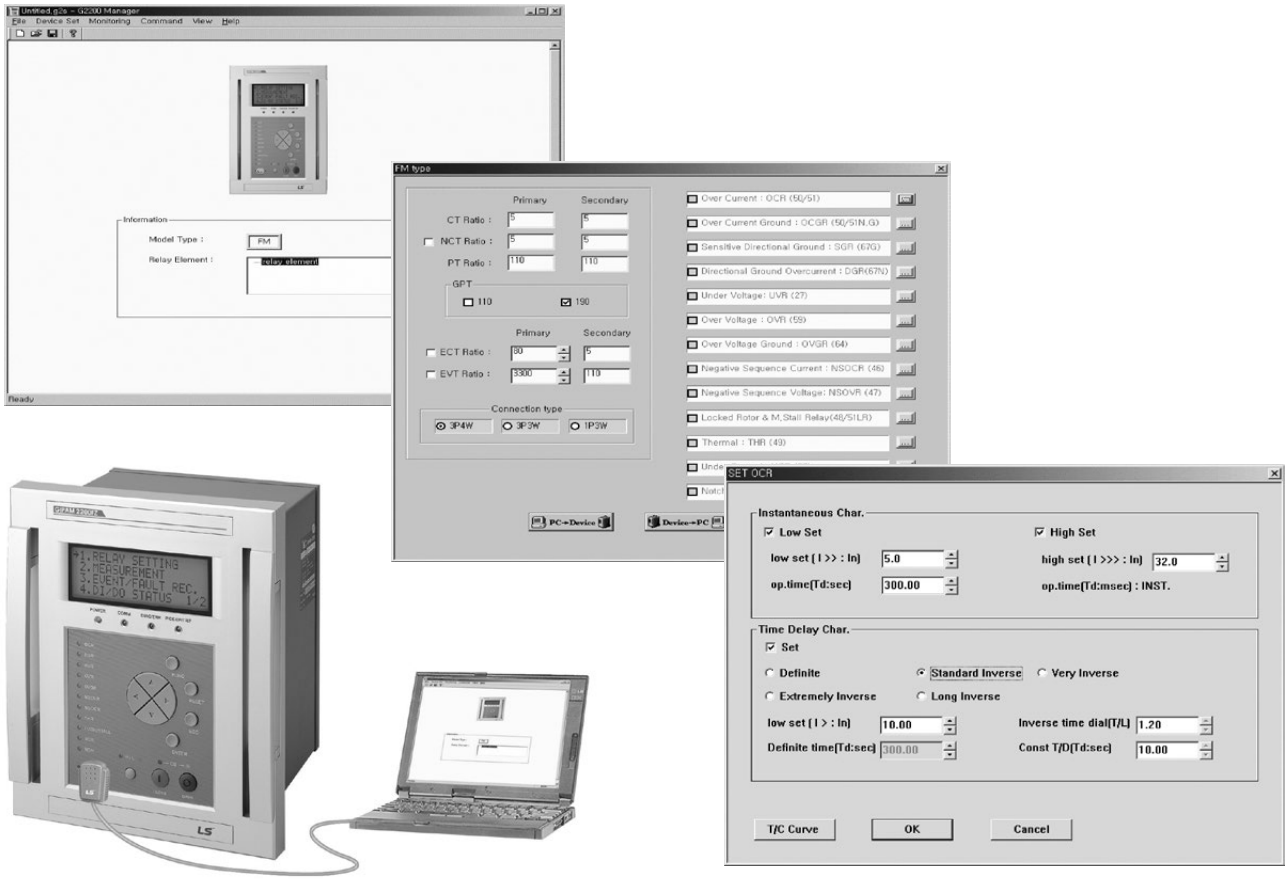
Variety of Protection Functions per Protection Use

Prevent unnecessary system blocking by detecting secondary PT fuse opening
(differentiation with abnormal system voltage)

- Overcurrent relay: 50/51
- Ground overcurrent relay: 50/51N
- Negative sequence overcurrent relay: 46
- Undervoltage relay: 27
- Overvoltage relay: 59
- Ground overvoltage relay: 64
- Negative sequence overvoltage relay: 47
- Sensitive directional ground relay: 67G
- Directional reactive power relay: 32Q
- Over frequency relay: 81O
- Ratio frequency relay: 81R
- Synchronizing-check relay: 25
- Directional ground relay: 67N
- Thermal overload relay: 49
- Stall/Locked rotor relay: 48/51LR
- Under current relay: 37
- Notching or jogging relay: 66
- Ratio differential relay: 87T-P
- Ground ratio differential relay: 87T-G
- Directional active power relay: 32P
- Under current relay: 37P
- Under frequency relay: 81U
- Directional overcurrent relay: 67P
- Directional overcurrent ground relay: 67N

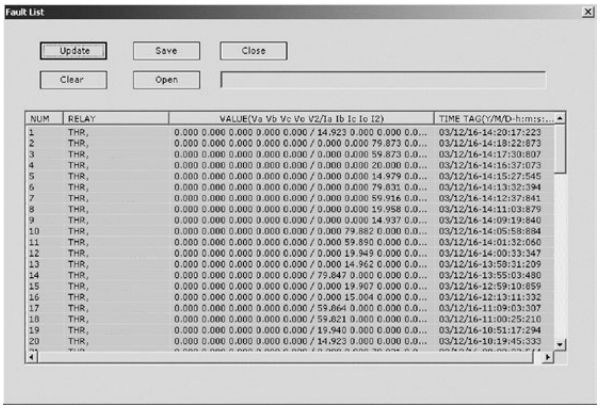
Convenient GIPAM2200 Setting

The operation program for PC interface that is provided for GIPAM2200 setting (GIPAM Manager) allows the user to easily check and setup functions of GIPAM2200 including all relay settings. After configuring individual parameters from a PC, user needs to download the setting to GIPAM 2000 series through the front communication port (IrDA) to apply. As it is capable of downloading/uploading data, it is very easy to perform maintenance as well.

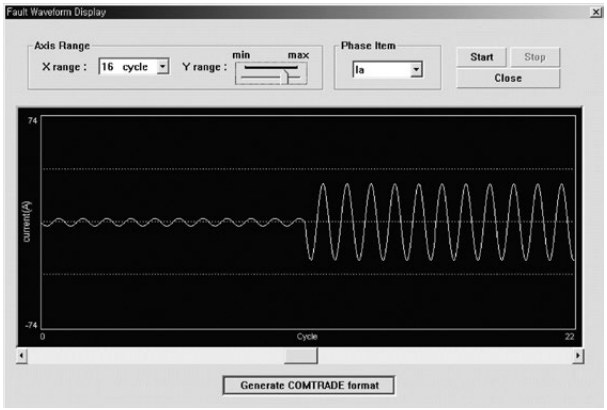


EVENT & FAULT RECORDING

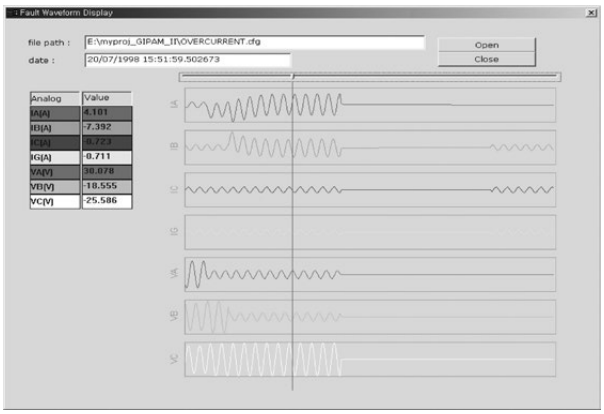
GIPAM2200 can save up to 800 events such as relay operation, circuit breaker operation, contact operation, control history and auto-inspection results. If a fault occurs in the cable or load side, GIPAM2200 will save up to 200 fault details including cause of fault, fault voltage and fault current.



It is also able to record up to 64 cycles of fault details of thewaveforms, and the number of recordings can be adjusted according to the frequency division.



Accident waveform can be saved as a Comtrade (IEEE) file format for subsequent waveform analysis or can be used in Fault Simulation.

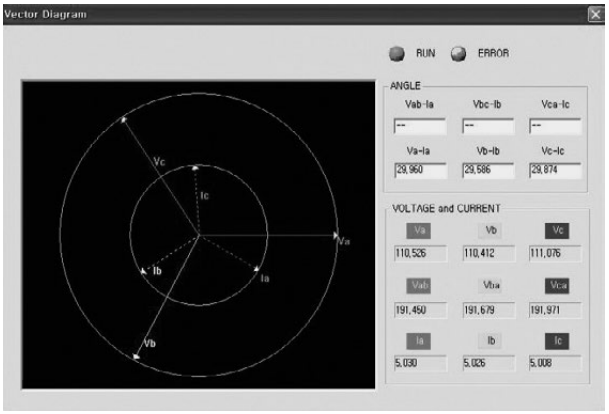


Sequence of Event (SOE) Function

When an event, such as an alarm due to internal relay operation, circuit breaker operation, self-diagnosis result, occurs, GIPAM2200 records the event every 1ms in sequential order to enable troubleshooting and checking of operation. The SOE function can save up to 800 events, including recently recorded events, and details of each event can be viewed from the “EVENT LIST” of the “EVENT/FAULT REC” menu. The records can also be saved as a file in GIPAM Manager (more than 800 items can be managed).

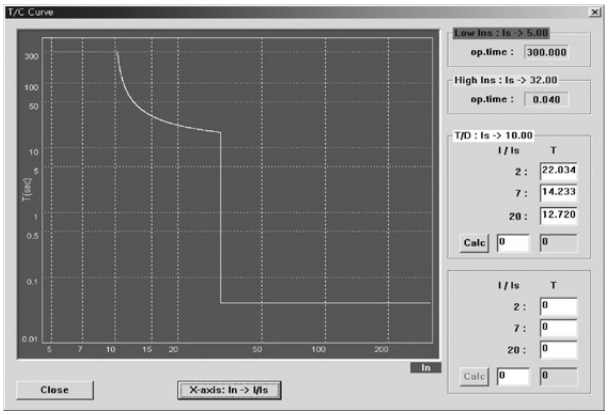
VECTOR DIAGRAM

GIPAM2200 displays a Vector Diagram of the system voltage, current and phase through the operation program for PC interface. With this information, the user can visually identify the electric energy allowing easy identification of the system status.



Time Characteristic Curve

GIPAM2200 uses the operation program for PC interface to correct individual relay elements and generate a time characteristic curve of the setting values. As it displays the graph immediately, it is easier to configure protection relay elements and configure protection collaboration between systems.



Product characteristics

Select Before Operating (SBO) & Check Before Operating (CBO) functions

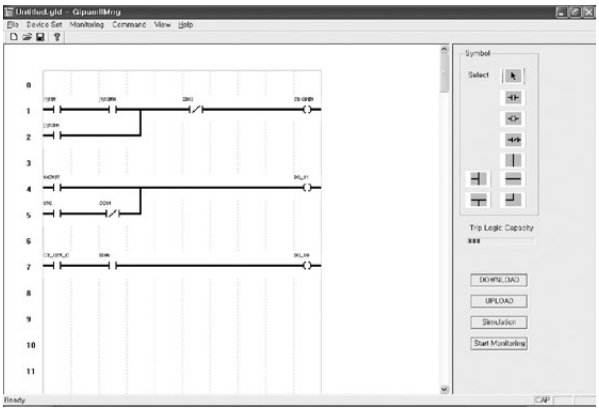
This function executes control commands only after selecting a control point and confirming a normal response from the selected point for greater control reliability and security. GIPAM2200 applies SBO/CBO functions on the power contact for CB control. The selected control point will wait for a control execution command for 5 seconds after responding, and if an execution command is not delivered within 5 seconds, it returns to its previous state, and if an execution command is delivered properly within 5 seconds, only then it will execute the control operation.

Wide Range of Communication Compatibilities

GIPAM2200 supports RS485/422 and Fiber Optic communications and supports DNP3.0 and MODBUS protocols that allow easy application in various systems in the industrial field. It also supports Ethernet based communication with the use of a protocol converter, which enable high-speed data transfer as well as duplex communication for a differentiated system establishment. The system also features an IrDA (infrared) port that enables easy upload/download with a PC.

TRIP LOGIC & SEQUENCE

Operation signals of all I/O contacts and relay elements of GIPAM2200 series, including the trip relay, can be operated according to a user-created logic. Logic can be configured easily through the PC operation program included allowing it to be used in various sequences.



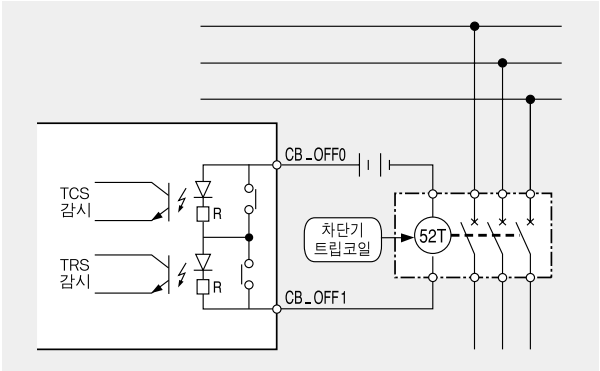
ANALOG INPUT (Option)

GIPAM2200 allows 4-point analog contact input which allows it to measure a variety of analog data including internal temperature of receiving/distributing panels, transformer temperature, motor interior stator and bearing temperature, rectification-based AC/DC voltage and current measurement.

- AI Input Range: DC 4~20mA
- Number of Contacts: 4 Point
- Display Method: User Define
- Accuracy: 0.2% at Full scale

TRIP CIRCUIT SUPERVISION (TCS) & TRIP RELAY SUPERVISION (TRS)

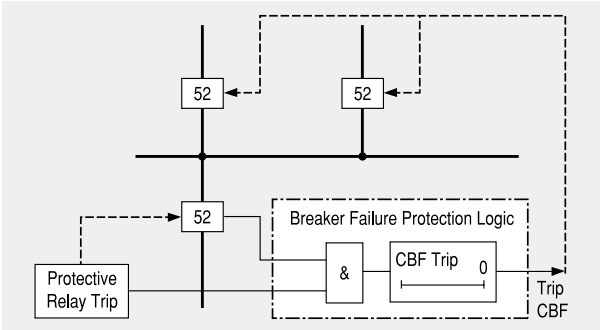
GIPAM2200 supplies fine currents to the trip circuit, which consists of circuit breaker trip coil, control power and trip relay, and checks it every 1 hour to determine faults in the trip circuit. In addition, by configuring the trip relay as 2 pole serial connection rather than a 1 pole independent structure to operate fixed cycle or contact when necessary for auto inspection of the trip relay without operating the circuit breaker. Results of the auto inspection are then recorded as Events, and it is able to prevent accidents in advance as a contact is outputted when and where a fault occurs.



*During normal conditions, each end of the CBOFF generates approximately 40KΩ, so connecting it with an external device may cause voltage to be distributed resulting the external device to not operate properly.

CIRCUIT BREAKER FAILURE(CBF)

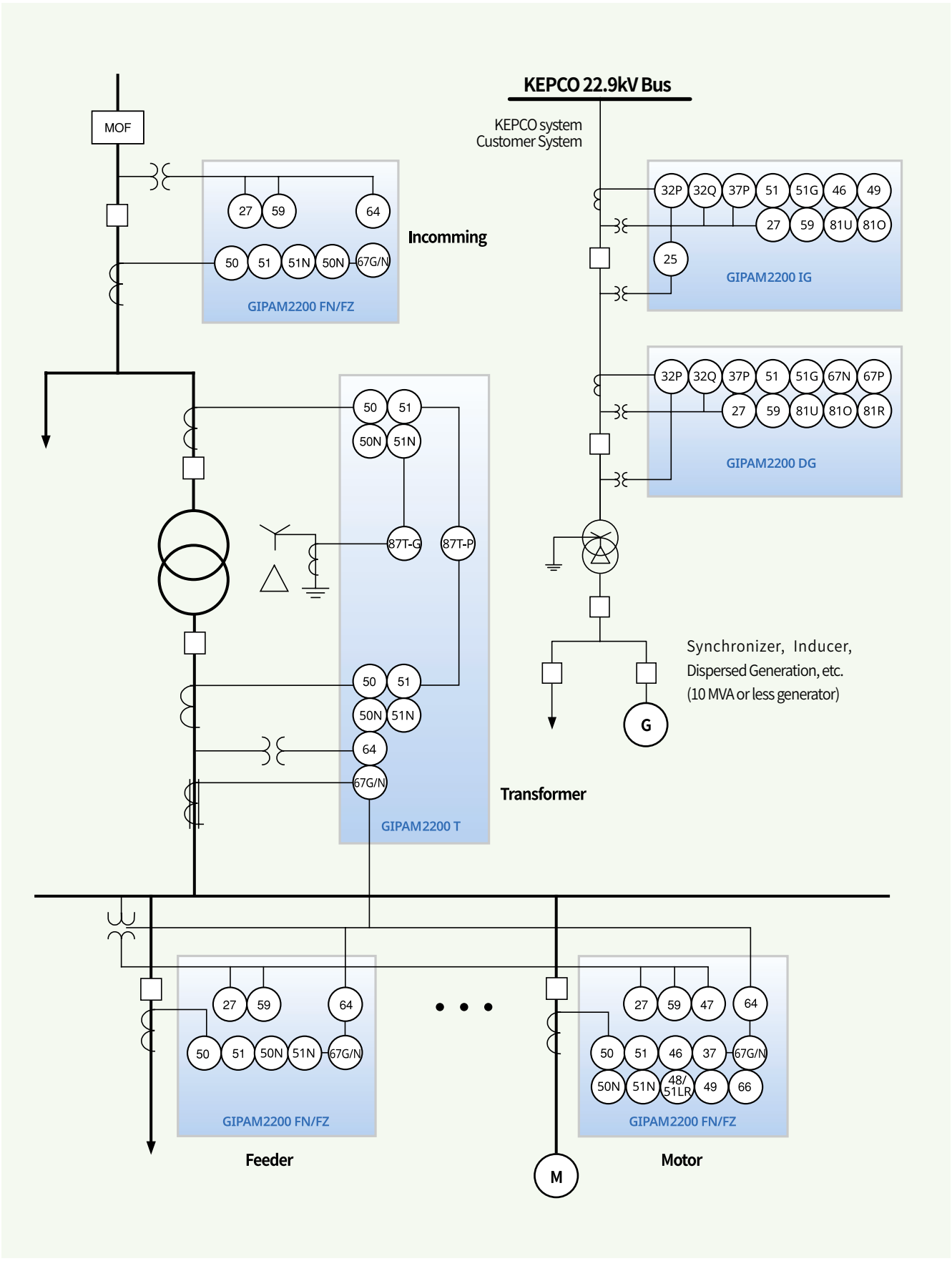
When the circuit breaker or trip circuit fault occurs causing the circuit breaker not operate despite a trip signal output, GIPAM2200 uses a breaker failure function to trip the upper circuit breaker and protect the system. In addition to the trip signal if a fault occurs during CB close/open control, an alarm can be generated.



PT (VT) FAILURE

As the system is capable of generating alarm message and outputting logic by detecting opening (melt down) of secondary PT fuse, it is possible to prevent the blocking caused by the operation of relay elements such as UVR and NSOVR. It does not operate at low voltage or interruption conditions, and it determines PT fuse opening by comparing the current, voltage and circuit breaker status. The user can set up a trip block to prevent tripping and can generate alarm signals with DO output. This system restores itself once the PT fuse is replaced.

Functional Block Diagram



Function & Rating

Protection Function

Protection Use	Type	Protection Element		
Incoming Feeder Motor	GIPAM2200 FN	·OCR (50/51) ·UVR (27) ·NSOVR (47) ·48/51LR	·OCGR (50/51N) ·OVR (59) ·NSOCR (46) ·UCR (37)	·DGR (67N) Note 4) ·OVGR (64) Note 3) ·THR (49) ·NCH (66)
	GIPAM2200 FZ	·OCR (50/51) ·UVR (27) ·NSOVR (47) ·48/51LR	·SGR (67G) ·OVR (59) ·NSOCR (46) ·UCR (37)	·OVGR (64G) Note 3) ·THR (49) ·NCH (66)
Distributed Generator	GIPAM2200 DG	·OCR (50/51) ·OVR (59) ·DPR (32P) ·UFR (81U)	·OCGR (50/51N) ·UPR (37P) ·OFR (81O) ·DOCR (67P)	·UVR (27) ·DQR (32Q) ·DOCGR (67N) ·ROCOF (df/dt, 81R)
Interconnection Generator	GIPAM2200 IG	·OCR (50/51) ·OVR (59) ·DPR (32P) ·UFR (81U)	·OCGR (50/51N) ·NSOCR (46) ·UPR (37P) ·OFR (81O)	·UVR (27) ·THR (49) ·DQR (32Q) ·SYNC Check (25)
Transformer	GIPAM2200 T1	·DFR (87T-P) ·OCR-2 (50/51) ·OVGR (64) Note 3)	·DFR (87T-G) ·OCGR-1 (50/51N) ·DGR-1 (67N) Note 4)	·OCR-1 (50/51) ·OCGR-2 (50/51N) ·DGR-2 (67N) Note 4)
	GIPAM2200 T2	·DFR (87T-P) ·OCR-2 (50/51) ·OVGR (64) Note 3)	·DFR (87T-G) ·OCGR-1 (50/51N) ·SGR-2 (67G)	·OCR-1 (50/51) ·DGR-1 (67N) Note 4)
	GIPAM2200 T3	·DFR (87T-P) ·OCR-2 (50/51) ·OVGR (64) Note 3)	·DFR (87T-G) ·OCGR-2 (50/51N) ·SGR-1 (67G)	·OCR-1 (50/51) ·DGR-2 (67N) Note 4)

Note) 1. Models are differentiated according to ground fault system. Please take caution when selecting a model (refer to the Designation System).
2. Lock-out (86) element can be configured with logic.
3. OVGR is not connected to CB_OFF (Trip Circuit) (edit logic, if necessary)
4. DGR is identical to DOCGR

Measurement function

Type	Measurement	Range	Accuracy(%)	Remarks
GIPAM2200 FN/FZ GIPAM2200 IG GIPAM2200 DG	Current (A)	0.0A ~ 999.99kA	±0.5%	Each phase current
	Voltage (V)	0.0V ~ 999.99kV	±0.5%	Line voltage , Phase voltage
	Active power (W)	0.00W ~ 999.99MW	±1.0%	Forward, Reverse
	Reactive power (Var)	0.00Var ~ 999.99MVar	±1.0%	
	Active energy (WH)	0.00Wh ~ 9999.999MWh	±1.0%	Forward, Reverse
	Reactive energy (VARH)	0.00Varh ~ 9999.999MVarh	±1.0%	
	Frequency (F)	45 ~ 65Hz	±0.5%	
	Power Factor (PF)	-1.000 ~ 1.000	±1.0%	cosθ, Lead (-) / Lag (+)
	Image current (Io)	0.0A ~ 999.9A		Io(In), Io(In)_max
	Reverse phase current (I2)	0.0A ~ 999.99kA		
	Image voltage (Vo)	0.0V ~ 999.99V		Vo, Vo_max
	Reverse phase voltage (V2)	0.0V ~ 999.99kV		
GIPAM2200 T	Current (A)	0.0A ~ 999.99kA	±0.5%	Each phase current
	Image current (Io)	0.0A ~ 999.9A		Io(In), Io(In)_max
	Reverse phase current (I2)	0.0A ~ 999.99kA		
	Image voltage (Vo)	0.0V ~ 999.99V		o, Vo_max
	Differential Current (Id)			
	Inhibitory Current (Ir)			
	Image Differential Current (Iod)			
	Image Inhibitory Current (Ior)			

Note) The minimum measured voltage input is 2% (2.2V) and the minimum measured current input is 1% (0.05A).

Ratings

Type		Specification
Wiring		1P3W, 3P3W, 3P4W
Input	Frequency	60Hz
	Voltage	PT: 110V GPT: 190V, 190 / √3V
	Current	CT: 5A ZCT: 200 / 1.5mA
	Control voltage	AC/DC 110V / 125V
	Power consumption	Normal: 30W or less, Operation: 70W or less
	Burden	PT: 0.5VA or less
		CT: 1.0VA or less
	Input contacts 6EA	Digital Input: AC/DC 110V/125V
Output contact	2EA for POWER	AC 250V 16A / DC 30V 16A, Resistive Load
		4000VA, 480W
	10EA for ALARM	AC 250V 5A/DC 30V 5A, Resistive Load
		1250VA, 150W
Insulation Resistance		DC 500V 10MΩ or more
Insulation Voltage		AC 2kV (1kV)/minute
Lightning impulse voltage		AC 5kV(3kV) or higher 1.2×50μs standard wave form supplied
Overload withstand	Current circuit	Rated Current × 2: No fault after 3-hour supply
		Rated Current × 20: No fault after 2-second supply
	Voltage circuit	Rated Voltage × 1.15: No fault after 3-hour supply
Fast Transient Disturbance		Power Input 4kV
		Other Input 2kV (Analog Input : 1kV)
Electrostatic Discharge(ESD)		Air 8kV
		Contact 6kV
Operation temperature		-10°C ~ 55°C
Storage temperature		-25°C ~ 70°C
Operation Humidity		80% or less (no condensation)
Altitude		1000m or less above sea level
Others		Location with no abnormal vibration and impact occurs Location with no atmospheric pollution
Applied Standards		IEC 60255, IEC 61000-4, KEMC 1120
Dimension (W×H×D)		237×285×223mm
Weight		7.8kg or less

Communication Specs

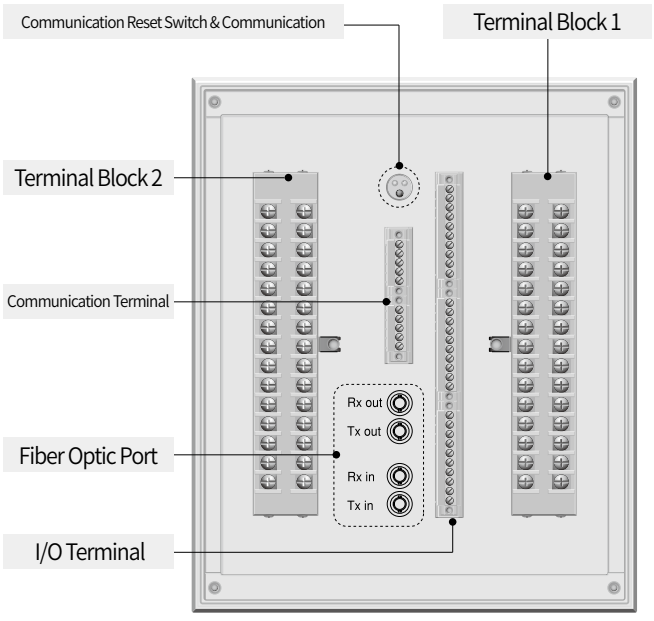
GIPAM2200 uses universal RS485 communication which is capable of transferring data at 38.4kbps, with the features like RS-485 and fiber optic ports and supports DNP3.0 and MODBUS protocols.

1) **Supported Protocol**
DNP3.0, MODBUS

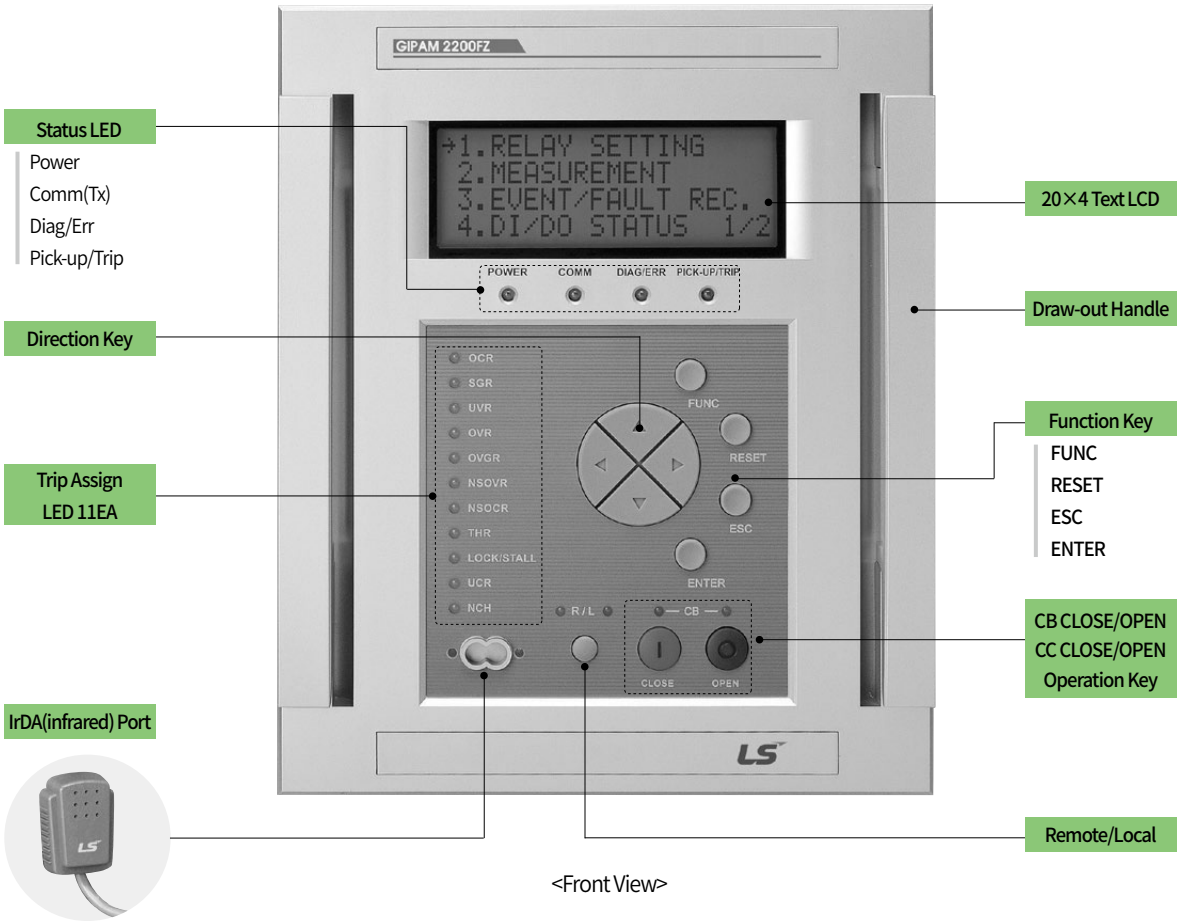
2) **RS-485 Communication**
- Operation Mode: Differential
- Communication Range: max. 1.2Km
- Communication Cable: Universal RS-485 Shielded twist 2-Pair cable
- Communication Speed: 9600bps ~ 38.4kbps
- Transfer Method: Half-Duplex
- +Max. I/O Voltage: -7V ~ +12V

3) **Fiber/Optic Communication (Optical Transceiver specification)**
- Wave Length: 820nm
- Fiber Size: 50/125, 62.5/125, 100/140μm
- Optic Connector Type: ST Type
- Optic Link Distance : 4km (may vary according to data rate)
  (Data bit rate of GIPAM 2000: 9600bps-230.4kbps)
- Transceiver Specification: 500m (175Mbps) ~ 2.7km (20Mbps)
- Fiber : Multi Mode Cable

Note) For more information about communication protocols, please contact the manufacturer.



<Rear View>



<Front View>

FUNC — **FUNCTION**
Select DGR or OCGR from ground system options

RESET — **Return Trip**
LED display after accident, Restore LCD message

ESC — **ESC**
Cancel selected item, cancel setting change
Move to upper menu

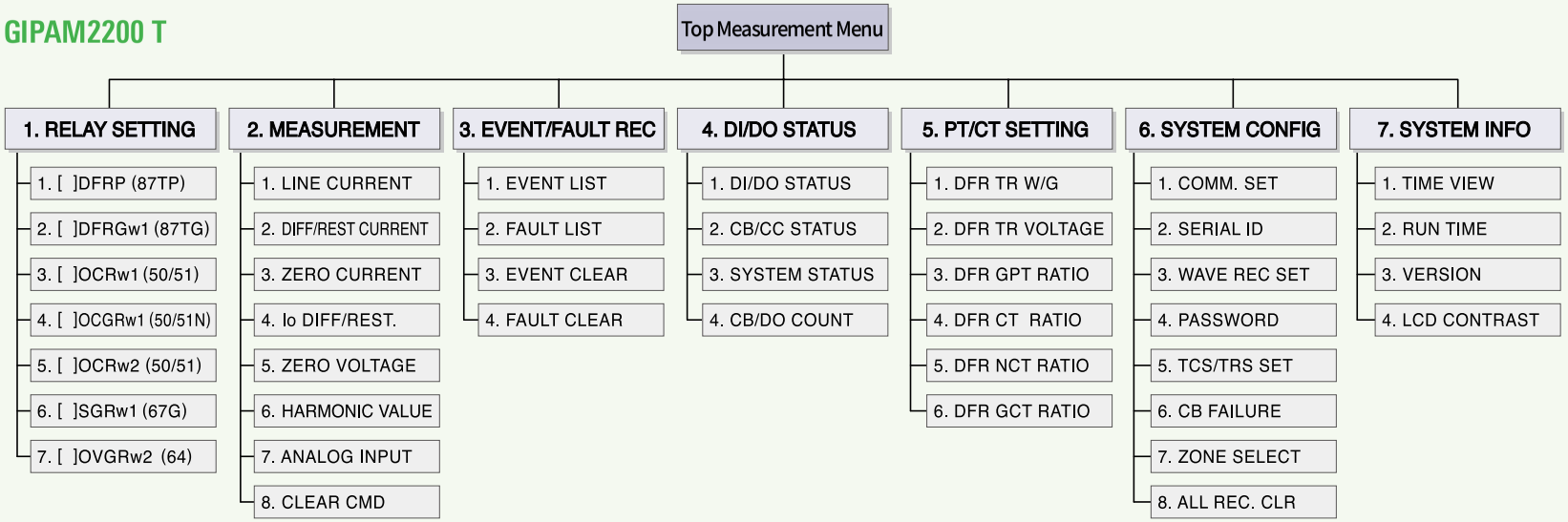
ENTER — **ENTER**
Select item, confirm setting

R/L — **Remote / Local**
Green LED-Remote/Red LED-Local

< Draw-out Type >

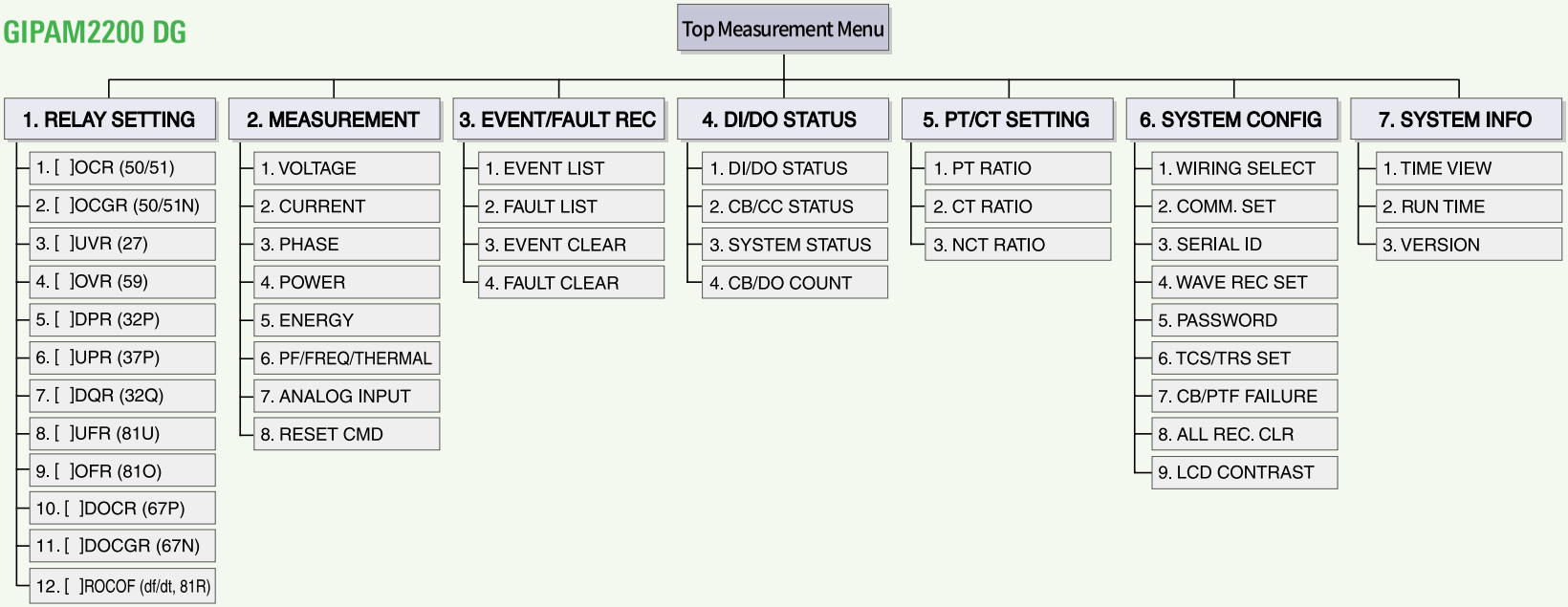
GIPAM2200 F

GIPAM2200 T



Note) 1. OCGR, SGR and DGR are displayed individually for each model according to the ground fault system.
2. In the "RELAY SETTING" menu of the GIPAM2200T model, w1 means primary winding and w2 means secondary winding.

GIPAM2200 DG



GIPAM2200 IG

Control & Setting MMI

MMI Interface

GIPAM2200 series is able to setup various relay elements using the text LCD and control key on the front panel, and it features menus such as SYSTEM Configuration and SYSTEM Information which is capable of measurement display, fault and event data logging, DI/DO monitoring, PT/CT ratio setup, wiring method and communication setting, and other product information display.

GIPAM2200 F

Protection	Operating part		Setting Range		Operating time Characteristics		Note
					Setting	Curves	
OCR (50/51)	Instantaneous	Low set	OFF, 1.0 ~ 32.0In/0.1In		Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set					
	*Time delay		OFF, 0.10 ~ 10.00In/0.01In		0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCGR (50/51N)	Instantaneous	Low set	OFF, 0.1 ~ 8.0In/0.02In		Low: 0.05 ~ 300.00s/0.01s High: 40ms or less BLOCK: OFF, 0.0~60.0s/0.1s	Definite	Block: OCGR pause to prevent malfunctioning due to inrush current up on circuit breaker operation
		High set					
	*Time delay		OFF, 0.02 ~ 2.00In/0.01In		0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
NSOVR(47)	Time delay	Low set	OFF, 0.1 ~ 1.0Vn/0.1Vn		0.05 ~ 10.00s/0.01s	Definite	V2=1/3 (VR + a2VS + aVT) a=1∠120°, a2=1∠240°
		High set					
UVR(27)	Time delay		OFF, 0.02 ~ 1.00Vn/0.01Vn		0, 0.05 ~ 10.00s/0.01s	Definite	
OVR(59)	Time delay	Low set	OFF, 0.8 ~ 1.6Vn/0.01Vn		0.05 ~ 10.00s/0.01s	Definite	
		High set					
OVGR(64) Note3)	Instantaneous		OFF, 11 ~ 80V/1V		Inst, 50 ~ 250ms/5ms	Definite	DT, SI Von=190V or 190/√3V
	Time delay		OFF, 11 ~ 80V/1V		0.05 ~ 10.00s/0.01s 0.05 ~ 300.00s/0.01s	Inverse Definite	
NSOCR(46)	Instantaneous		OFF, 0.1 ~ 1.0In/0.02In		Inst, 50 ~ 250ms/5ms	Definite	DT, SI, VI, EI, LI Inst. (Instant): 50ms or less
	Time delay		OFF, 0.1 ~ 1.0In/0.01In		0.05 ~ 1.00/0.01 0.05 ~ 10.00s/0.01s	Inverse Definite	
SGR(67G) DGR(67N)	Time delay	Image current	Grounded	OFF, 0.9 ~ 6mA/0.1mA (Ion=1.5mA)	0.05 ~ 10.00s/0.01s	Definite	Vo > Vos Io > Ios Ø(Vo) -Ø(Io) ≤ RCA + 87。 Ø(Vo) -Ø(Io) ≥ RCA - 87
			Non-grounded	OFF, 0.02 ~ 2.00Ion/ 0.01Ion(Ion=5A)			
		Image voltage	11 ~ 80V/1V (Von=190V,190/√3V)				
		Reference sensitivity Phase angle	0° ~ 90°/5°				
THR(49)	Hot		0.2 ~ 1.2In/0.01In		τh: 2.0 ~ 60.0min/0.5min	$t = \tau h \cdot \ln\left[\frac{I_2 - I_{P2}}{I^2 - (k \cdot I_B)^2}\right]$	t: Operating time k: multiple factor (0.8~1.2/0.05) τ: Thermal time constant
	Cold				τc: 2.0 ~ 60.0min/0.5min	$t = \tau c \cdot \ln\left[\frac{I_2}{I^2 - (k \cdot I_B)^2}\right]$	
Stall/Lock (48/51LR)	Time delay	Stall Current	OFF, 0.2 ~ 10.00In/0.01In		0.05 ~ 300.00s/0.01s	Definite	Starting time set 1.0~300s/0.1s
		Lock Current	OFF, 0.2 ~ 10.00In/0.01In		0.05 ~ 1.00/0.01 0.05~300.00s/0.01s	Inverse(VI,EI) Definite	
UCR(37)	Time delay		OFF,0.1 ~ 0.9In/0.02In		0.1 ~ 10.0s/0.01s	Definite	
NCH(66)	Starts Number Base Time Time between starts Block Restart Block Residual Thermal				1 ~ 5 times / 1 time 10 ~ 60min/1min 0 ~ 60min/1min 0 ~ 60min/1min 10 ~ 80%/1%		

Note) 1. *Operating Delay Time Setting: 0.00~10.00s/0.01s (only applied on inverse time)
2. If nominal operation time is less than 40ms during inverse time, it receives definite time properties (IDMT)
3. OVGR is not connected to CB_OFF (Trip Circuit) (use edit logic, if necessary)

Operation Characteristics

GIPAM2200 T

Protection	Setting Range		Operating time Characteristics	Note
DFR (87T-P)	Low set	Id (Pick up): 0.2 ~ 1.0In/0.1In Slope 1: 15 ~ 100%/1% Slope 2: 15 ~ 100%/1% Knee Point: 1.0 ~ 20.0In/0.1 In	Inst, 0.05 ~ 10.00s/0.01s	Normal mode Inst: 40ms or less Inrush mode Inst: 40ms or less
		Inrush Inhibit: ON (10 ~ 50%/1%) OFF		
	HIgh set	Id (Pick up): 2.0 ~ 32.0 In/0.1In	40ms or less	2Harmonic/A fundamental wave
	Io Elimination: ON, OFF			
DFR (87T-G)	Image Differential Current	Iod (Pick up): 0.05 ~ 1.00In/0.01In Slope: 15 ~ 100%/1%	Inst, 0.05 ~ 10.00s/0.01s	Inst: 40ms or less

Protection	Operating part		Setting Range		Operating time Characteristics		Note
					Setting	Curves	
OCR-1 (50/51)	Instantaneous	Low set	OFF, 1.0 ~ 32.0In/0.1In		Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set					
	* Time delay		OFF, 0.10 ~ 10.00In/0.01In		0.05 ~ 1.20/0.01 0.05~300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCR-2 (50/51)	Instantaneous	Low set	OFF, 1.0 ~ 32.0In/0.1In		Low: 0.05 ~ 300.00s/0.01s High:40ms or less	Definite	
		High set					
	* Time delay		OFF, 0.10 ~ 10.00In/0.01In		0.05 ~ 1.20/0.01 0.05~300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCGR-1 (50/51N)	Instantaneous	Low set	OFF, 0.1 ~ 8.0In/0.02In		Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set					
	* Time delay		OFF, 0.02 ~ 2.00In/0.01In		0.05 ~ 1.20/0.01 0.05~300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCGR-2 (50/51N)	Instantaneous	Low set	OFF, 0.1 ~ 8.0In/0.02In		Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set					
	* Time delay		OFF, 0.02 ~ 2.00In/0.01In		0.05 ~ 1.20/0.01 0.05~300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OVGR(64) Note3)	Instantaneous		OFF, 11 ~ 80V/1V		Inst, 50 ~ 250ms/5ms	Definite	DT, SI Von=190V or 190/√3V
	Time delay		OFF, 11 ~ 80V/1V		0.05~10.00s/0.01s 0.05~300.00s/0.01s	Inverse Definite	
SGR(67G) DGR(67N)	Time delay	Image current	Grounded	OFF, 0.9 ~ 6mA/0.1mA (Ion=1.5mA)	0.05 ~ 10.00s/0.01s	Definite	Vo > Vos Io > Ios Ø(Vo) -Ø(Io) ≤ RCA + 87。 Ø(Vo) -Ø(Io) ≥ RCA - 87
			Non-grounded	OFF, 0.02 ~ 2.00Ion/ 0.01Ion(Ion=5A)			
		Image voltage	11 ~ 80V/1V (Von=190V,190/√3V)				
		Reference sensitivity Phase angle	0° ~ 90°/5°				

Note) 1. *Operating Delay Time Setting: 0.00~10.00s/0.01s (only applied on inverse time)
2. If nominal operation time is less than 40ms during inverse time, it receives definite time properties (IDMT)
3. OVGR is not connected to CB_OFF (Trip Circuit) (use edit logic, if necessary)

GIPAM2200 IG

Protection	Operating part		Setting Range	Operating time Characteristics		Note
				Setting	Curves	
OCR (50/51)	Instantaneous	Low set	OFF, 1.0 ~ 32.0In/0.1In	Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set				
	*Time delay		OFF, 0.10 ~ 10.00In/0.01In	0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCGR (50/51N)	Instantaneous	Low set	OFF, 0.1 ~ 8.0In/0.02In	Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set				
	*Time delay		OFF, 0.02 ~ 2.00In/0.01In	0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
UVR(27)	Time delay	Low set	0.2 ~ 1.0Vn/0.01Vn	0.05 ~ 10.00s/0.01s	Definite	
		High set				
	UVR Auto Reset		Auto reset if voltage returns beyond set value			
OVR(59)	Time delay	Low set	OFF, 0.8 ~ 1.6Vn/0.01Vn	0.05 ~ 10.00s/0.01s	Definite	
		High set				
NSOCR(46)	Instantaneous		OFF, 0.1 ~ 1.0In/0.02In	Inst, 50 ~ 250ms/5ms	Definite	DT, SI, VI, EI, LI Inst. (Instant): 50ms or less
	*Time delay		OFF, 0.1 ~ 1.0In/0.01In	0.05 ~ 1.00/0.01 0.05 ~ 10.00s/0.01s	Inverse Definite	
THR(49)	Hot		0.2 ~ 1.2In/0.01In	τh: 2.0 ~ 60.0min/0.5min	Inverse	
	Cold			τc: 2.0 ~ 60.0min/0.5min		
DPR(32P)	Time delay	Forward overpower	OFF, 0.80 ~ 1.50Pn/0.01Pn	0.10 ~ 120.00/0.10s	Definite	
		Reverse overpower	OFF, 0.01 ~ 0.50Pn/0.005Pn	0.10 ~ 120.00/0.10s	Definite	
DQR(32Q)	Time delay		OFF, 0.02 ~ 1.20Qn/0.01Qn	0.10 ~ 120.00/0.10s	Definite	
UPR(37P)	Time delay		OFF, 0.01 ~ 0.80Pn/0.005Pn	0.10 ~ 120.00/0.10s	Definite	
UFR(81U)	Time delay		OFF, fn-10 ~ fn/0.01Hz	0.10 ~ 300.00/0.10s	Definite	Fn=60Hz
	Low voltage Block		0.50 ~ 0.90Vn/0.01Vn			
OFR(81O)	Time delay		OFF, fn ~ fn+10/0.01Hz	0.10 ~ 300.00/0.10s	Definite	Fn=60Hz
	Low voltage Block		0.50 ~ 0.90Vn/0.01Vn			
SYNC_CHK (25)	Voltage Difference		2 ~ 50V/1V			Synchronous Allowed Voltage 0.5Vn ~ 1.20Vn
	Phase Difference		5 ° ~45 ° /1 °			
	Slip Frequency		0.01 ~ 0.5Hz/0.01Hz			
	Circuit breaker activation time		0 ~ 1000ms/1ms			
	Dead Voltage		OFF, 0.20 ~ 0.40Vn/0.01Vn			

Note) 1. *Operating Delay Time Setting: 0.00~10.00s/0.01s (only applied on inverse time)
2. If nominal operation time is less than 40ms during inverse time, it receives definite time properties (IDMT)

Operation Characteristics

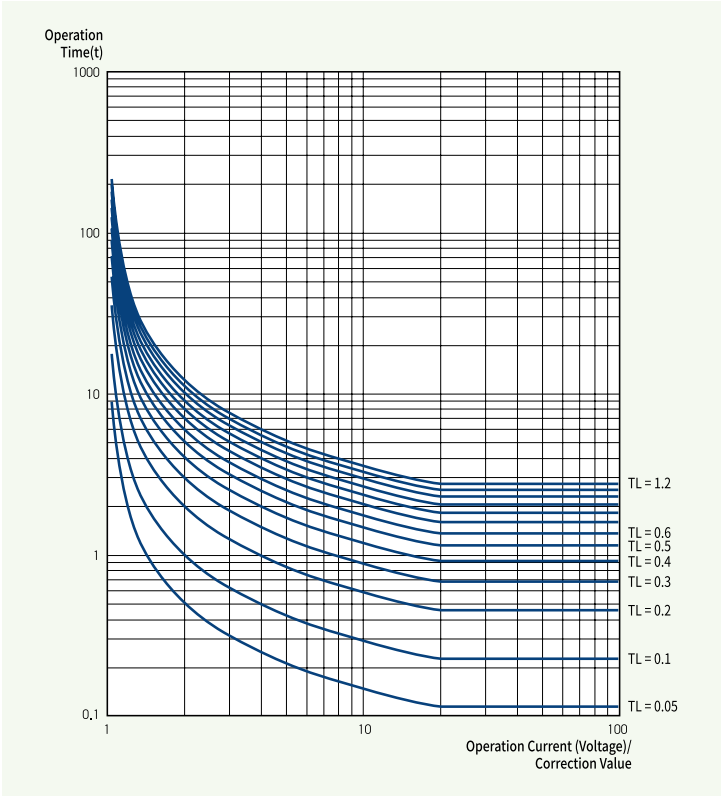
GIPAM2200 DG

Protection	Operating part		Setting Range	Operating time Characteristics		Note
				Setting	Curves	
OCR (50/51)	Instantaneous	Low set	OFF, 1.0 ~ 32.0In/0.1In	Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set				
	*Time delay		OFF, 0.10 ~ 10.00In/0.01In	0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
OCGR (50/51N)	Instantaneous	Low set	OFF, 0.1 ~ 8.0In/0.02In	Low: 0.05 ~ 300.00s/0.01s High: 40ms or less	Definite	
		High set				
	Time delay		OFF, 0.02 ~ 2.00In/0.01In	0.05 ~ 1.20/0.01 0.05 ~ 300.00s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
UVR(27)	Time delay	Low set	OFF, 0.02 ~ 1.00Vn/0.01Vn	0.05 ~ 10.00s/0.01s	Definite	
		High set				
	UVR Auto Reset		Auto reset if voltage returns beyond set value			
OVR(59)	Time delay	Low set	OFF, 0.8 ~ 1.6Vn/0.01Vn	0.05 ~ 10.00s/0.01s	Definite	
		High set				
DPR(32P)	Time delay	Forward overpower	OFF, 0.80 ~ 1.50Pn/0.01Pn	0.10 ~ 120.00/0.10s	Definite	
		Reverse overpower	OFF, 0.01 ~ 0.50Pn/0.005Pn	0.10 ~ 120.00/0.10s	Definite	
UPR(37P)	Time delay		OFF, 0.01 ~ 0.80Pn/0.005Pn	0.10 ~ 120.00/0.10s	Definite	
DQR(32Q)	Time delay		OFF, 0.02 ~ 1.20Qn/0.01Qn	0.10 ~ 120.00/0.10s	Definite	
UFR(81U)	Definite		OFF, fn-10 ~ fn/0.01Hz	0.10 ~ 300.00/0.10s		Fn=60Hz
	Low voltage Block		0.50 ~ 0.90Vn/0.01Vn			
OFR(81O)	Time delay		OFF, fn ~ fn+10/0.01Hz	0.10 ~ 300.00/0.10s	Definite	Fn=60Hz
	Low voltage Block		0.50 ~ 0.90Vn/0.01Vn			
DOCR (67P)	Instantaneous		OFF, 1.0 ~ 32.0/0.1In	0.05 ~ 300.0/0.01s	Definite	
	*Time delay		OFF, 0.1 ~ 10.0/0.01In	0.05 ~ 1.20/0.01s 0.05 ~ 300.0/0.01s Operation Delay Time: 0.0 ~ 10.0s/0.01s	Inverse Definite	DT, SI, VI, EI, LI
	Directional Characteristic		Characteristic Angle Setting: 0 ~ 359°/1°, Op Range: 50 ~ 90°/5°			
	DOCR BLOCK		If all voltage drops below 11V when a 3-phase short circuit accident occurs, the voltage memorized during normal condition (1sec) is used to determine the direction. If the DOCR BLOCK is set to ON, the directional element becomes blocked.			
DOCGR (67N)	Instantaneous		OFF, 0.1 ~ 8.0/0.02In		Definite	
	*Time delay		OFF, 0.02 ~ 2.0/0.01In	0.05 ~ 1.20/0.01s 0.05 ~ 300.0/0.01s Operation Delay Time: 0.0 ~ 10.0s/0.01s	Inverse Definite	DT, SI, VI, EI, LI 1. GPT 3Vo: Vo due to GPT input 2. Calc 3Vo: Vo due to 3-phase voltage calculation
	Directional Characteristic		Characteristic Angle Setting: 0 ~ 359°/1°, Op Range: 50 ~ 90°/5°			
ROCOF (df/dt, 81R)	Definite		OFF, 0.1 ~ 2.0/0.1 (Hz/s)	0.20 ~ 60.00/0.1s	Definite	
	Low voltage Block		0.50 ~ 0.90Vn / 0.01Vn			

Note) 1. *Operating Delay Time Setting: 0.00~10.00s/0.01s (only applied on inverse time)
2. If nominal operation time is less than 40ms during inverse time, it receives definite time properties (IDMT)
3. There are two methods of detecting Vo. One is receiving GPT input and the other is the calculate PT value. The method can be selected from the menu

Characteristic Curve

Standard Inverse Time - SI



• Apply: Over-current (50/51)
Ground Fault and Current (50/51N)
Ground Fault and Voltage (64)
Reverse Phase and Current (46)

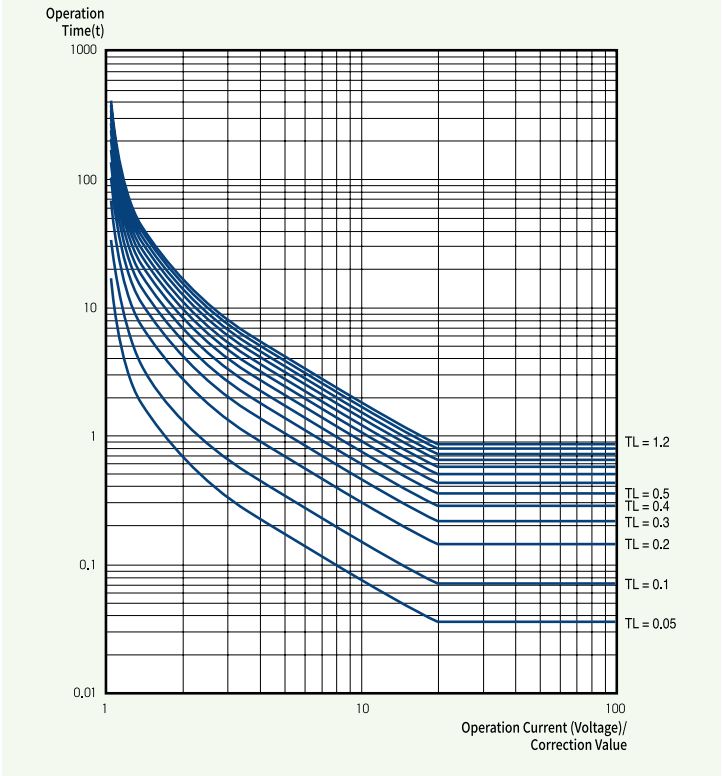
$$t = \frac{0.14}{(I/Is)^{0.02}-1} \times TL + C$$

· Time Correction Lever TL: 0.05~1.2
(Ground Fault and Voltage / Reverse Phase and Current } TL: 0.05~1.0)

· Relay Characteristic Value C: 0

· Operation Delay Time: 0.00~10.00s/0.01s
(applied only during inverse time of Overcurrent, Ground Fault Overcurrent, Reverse Phase Overcurrent)

Very Inverse Time -VI



• Apply: Over-current (50/51)
Ground Fault and Current (50/51N)
Ground Fault and Voltage (64)
Reverse Phase and Current (46)
Locked Rotor (51LR)

$$t = \frac{13.5}{(I/Is)-1} \times TL + C$$

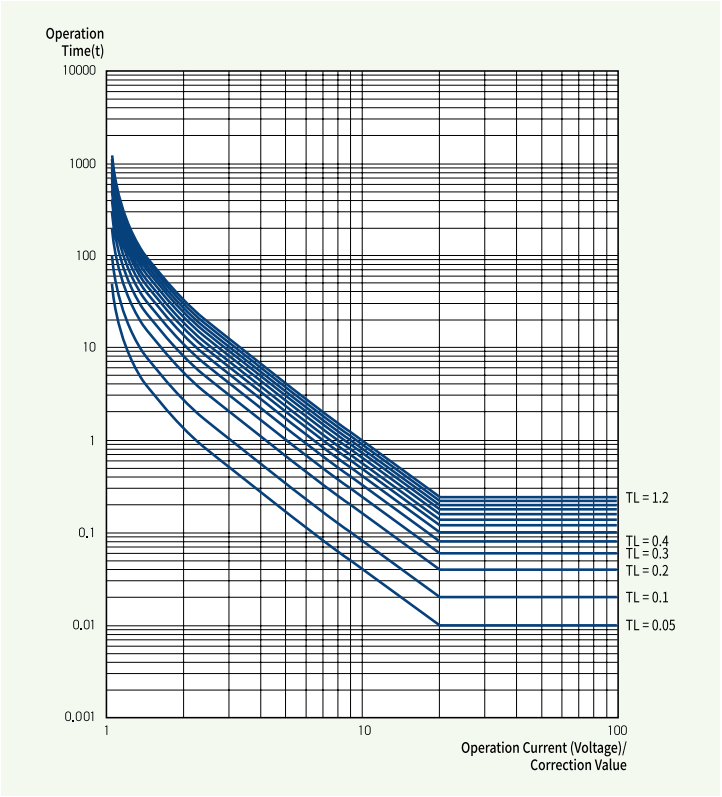
· Time Correction Lever TL: 0.05~1.2
(Ground Fault and Voltage / Reverse Phase and Current / Locked Rotor } TL: 0.05~1.0)

· Relay Characteristic Value C : 0

· Operation Delay Time: 0.00~10.00s/0.01s
(applied only during inverse time of Overcurrent, Ground Fault Overcurrent, Reverse Phase Overcurrent)

Characteristic Curve

Extremely Inverse Time - EI



• Apply: Over-current (50/51)
Ground Fault and Current (50/51N)
Ground Fault and Voltage (64)
Reverse Phase and Current (46)
Locked Rotor (51LR)

$$t = \frac{80}{(I/Is)^2-1} \times TL + C$$

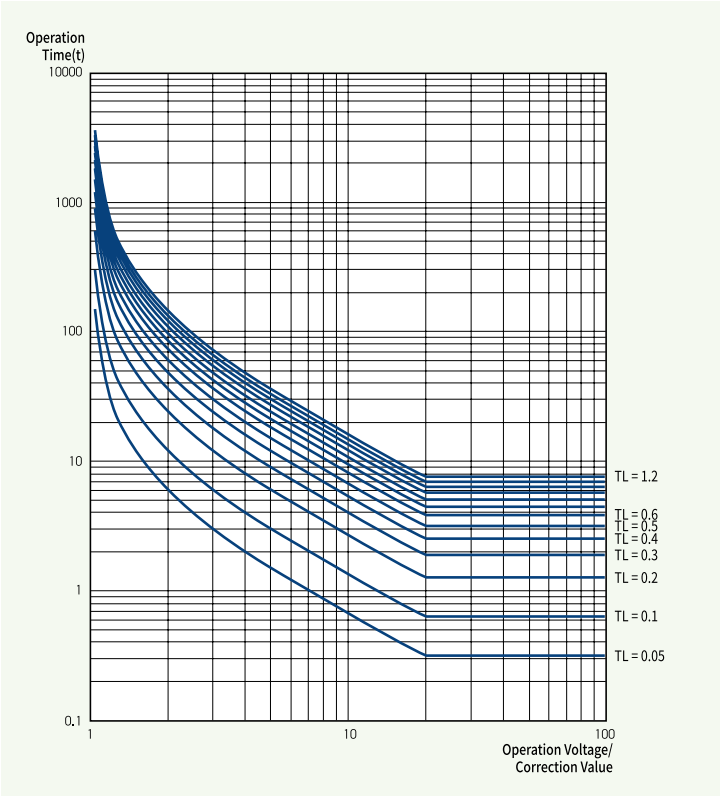
· Time Correction Lever TL: 0.05~1.2

(Ground Fault and Voltage / Reverse Phase and Current / Locked Rotor } TL: 0.05~1.0)

· Relay Characteristic Value C: 0

· Operation Delay Time: 0.00~10.00s/0.01s
(applied only during inverse time of Overcurrent, Ground Fault Overcurrent, Reverse Phase Overcurrent)

Long Inverse Time - LI



• Apply: Over-current(50/51)
Ground Fault and Current (50/51N)
Reverse Phase and Current (46)

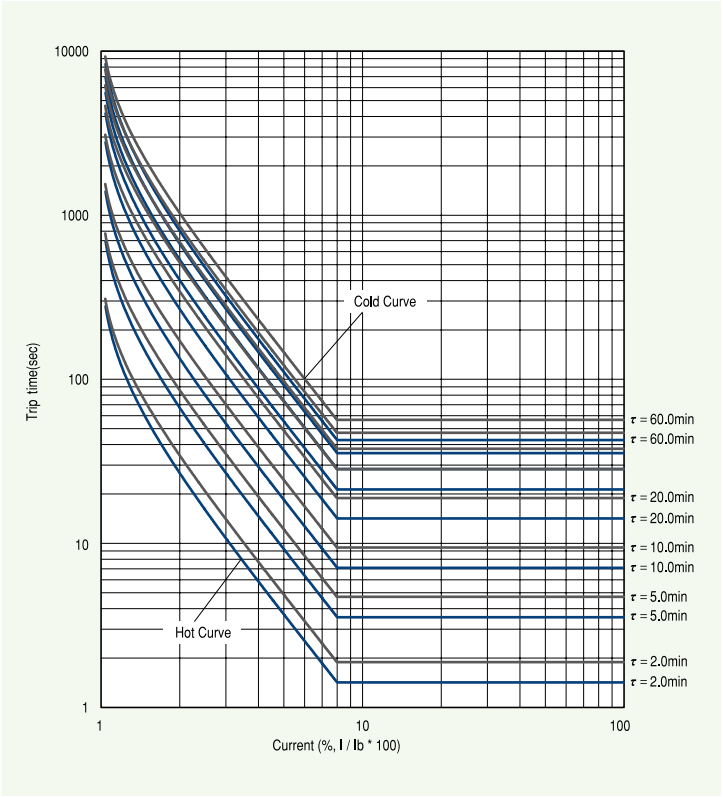
$$t = \frac{120}{(I/Is)-1} \times TL + C$$

· Time Correction Leve TL: 0.05~1.2
(Reverse Phase and Current TL: 0.05~1.0)

· Relay Characteristic Value C: 0

· Operation Delay Time: 0.00~10.00s/0.01s
(applied only during inverse time)

Thermal Curve



• **Apply : Thermal Overload Relay ((49)**

HOT $t = \tau_h \cdot \ln \frac{I^2 - I_P^2}{I_2 - (k \cdot I_B)_2}$

$\tau_h = 2.0 \sim 60.0\text{min}$

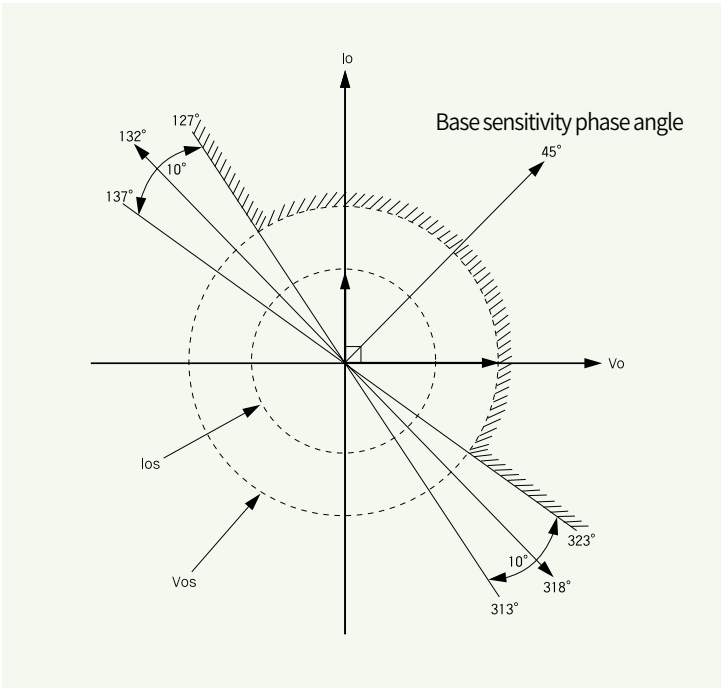
COLD $t = \tau_c \cdot \ln \frac{I^2}{I_2 - (k \cdot I_B)_2}$

$\tau_c = 2.0 \sim 60.0\text{min}$

In case of $\begin{cases} I_P = 0.5 \\ k = 1 \\ I_B = 1 \end{cases}$

I_P: Load current before fault
I_B: Rated load current
k: Overload constant
I: Fault current
τ h (τheating): Thermal time constant during operation
τ c (τcooling): Thermal time constant during cooling

Cold state is $I_P = 0$



• **Apply : Select ground Fault (67G)**
Directional ground Fault (67N)

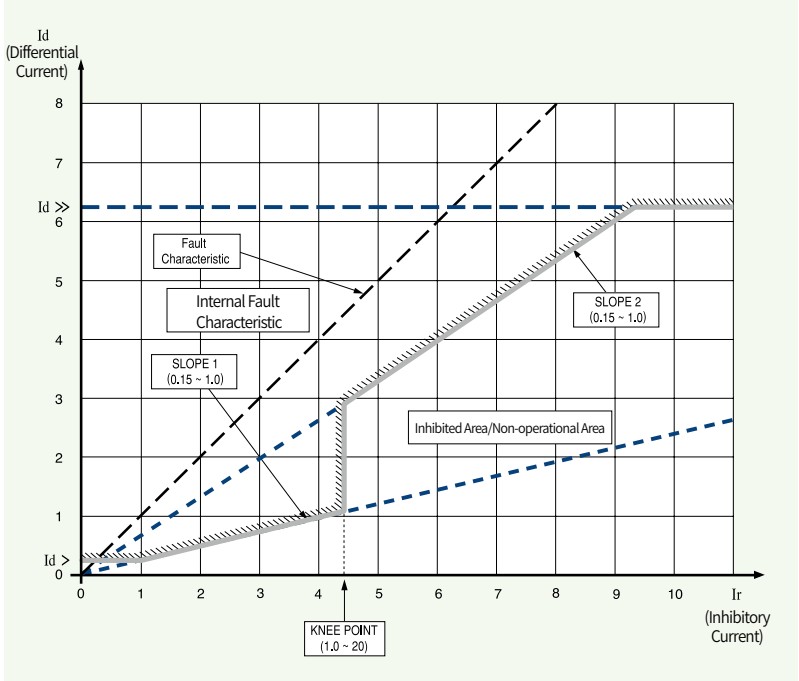
(a) I/O range where pick-up actually occurs:
323° ~ 127°
(b) I/O range where drop-out occurs after pick-up:
137° ~ 313°

Vo > Vos
Io > Ios
RCA-87。 ≤ Ø(Vo)-Ø(Io) ≤ RCA+87。

※ RCA(Relay Characteristic Angel) :
Relay Characteristic Angles

Characteristic Curve

Ratio Differential Curve



• **Apply: Transformer protection differential ratio relay**

$Id = I_{differtial} = |\bar{I}_1 - \bar{I}_2|$ (Vector sum.)

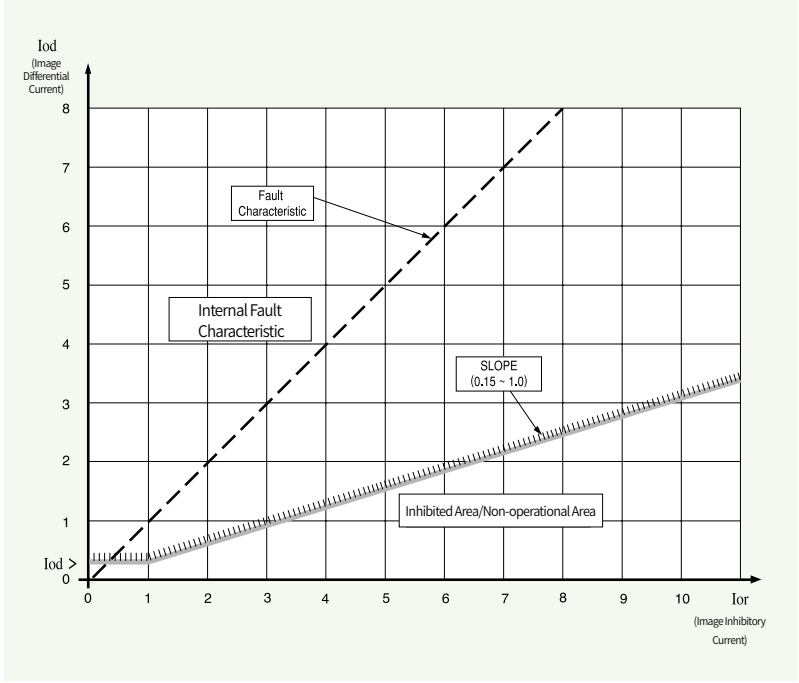
$Ir = I_{restraint} = |I_1| + |I_2|$ (Scalar sum.)

$SLOPE = \left[\frac{Id}{Ir}\right]$

Fault Characteristic: Transformer interior complete fault characteristics
(I1st = If , I2nd = 0)

Id: Differential current
Ir: Inhibitory current
Id>: Time differential current (Low set: 0.2~1.0)
Id>>: Instantaneous differential current
(High set: 2.0~32.0)
Knee Point: Inflection point
SLOPE 1: Characteristic gradient 1
SLOPE 2: Characteristic gradien2

Ground Ratio Differential Curve



• **Apply: Ground Fault in a Differential Relay (87T-G)**

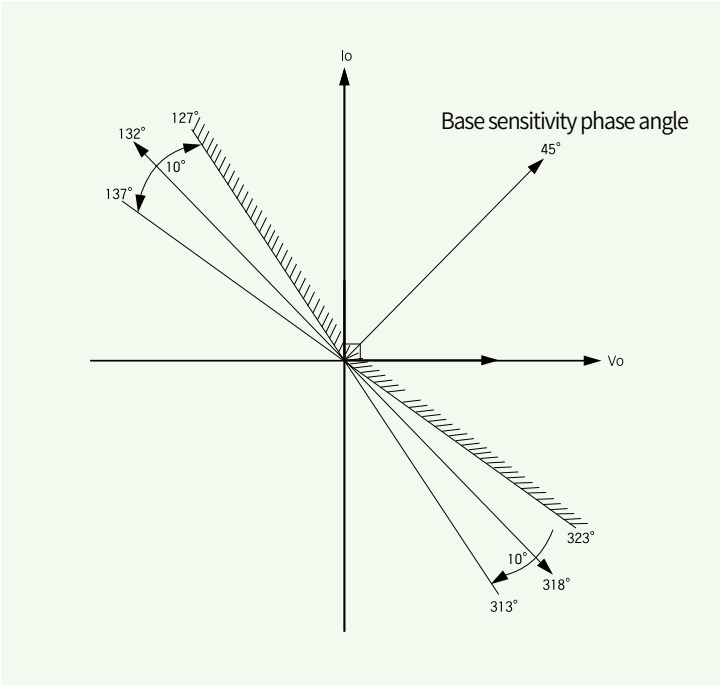
$Iod = |3\bar{I}o - \bar{I}g|$ (Vector sum.)

$Ior = |3\bar{I}o| + |\bar{I}g|$ (Scalar sum.)

$SLOPE = \left[\frac{Iod}{Ior}\right]$

Fault Characteristic: Transformer interior complete fault characteristics
(I1st = If , I2nd = 0)
Iod : Image Differential Current
Ior : Image Inhibitory Current
Iod> : Image Time Differential Current (0.05 ~ 1.00)
SLOPE : Characteristic gradient

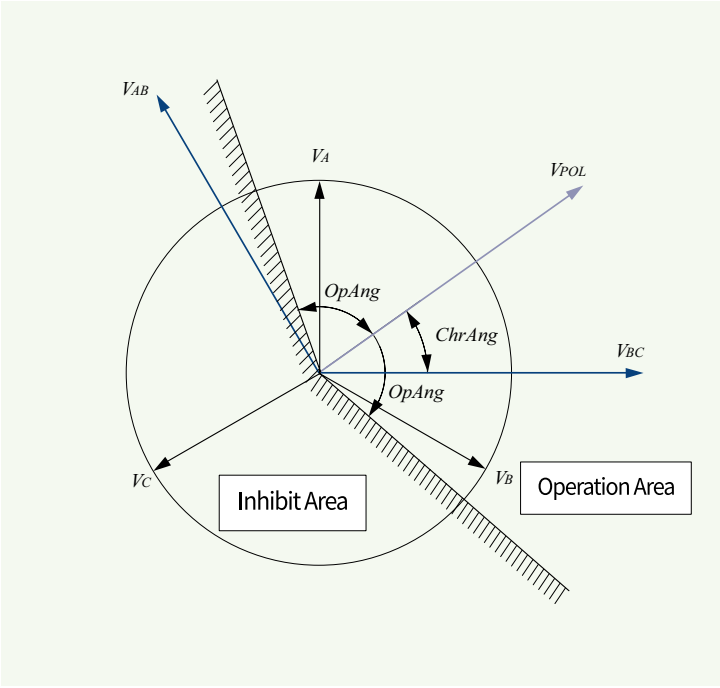
Directional Element Operation Range



• **SGR, DGR, DOCGR**

※Range where SGR and DGR relays pick-up occurs
RCA-87° ≤ ∠Vo-∠Io ≤ RCA+87°
(RCA (Operation Characteristi cangle) = 0~90/5°)

※Range where DOCGR relays winner pick-up occurs
RCA - Op Ang ≤ ∠Vo-∠Io ≤ RCA + Op Ang
(RCA = 0~359/1°, Op Ang = 50~90/5°)



• **DOCR**

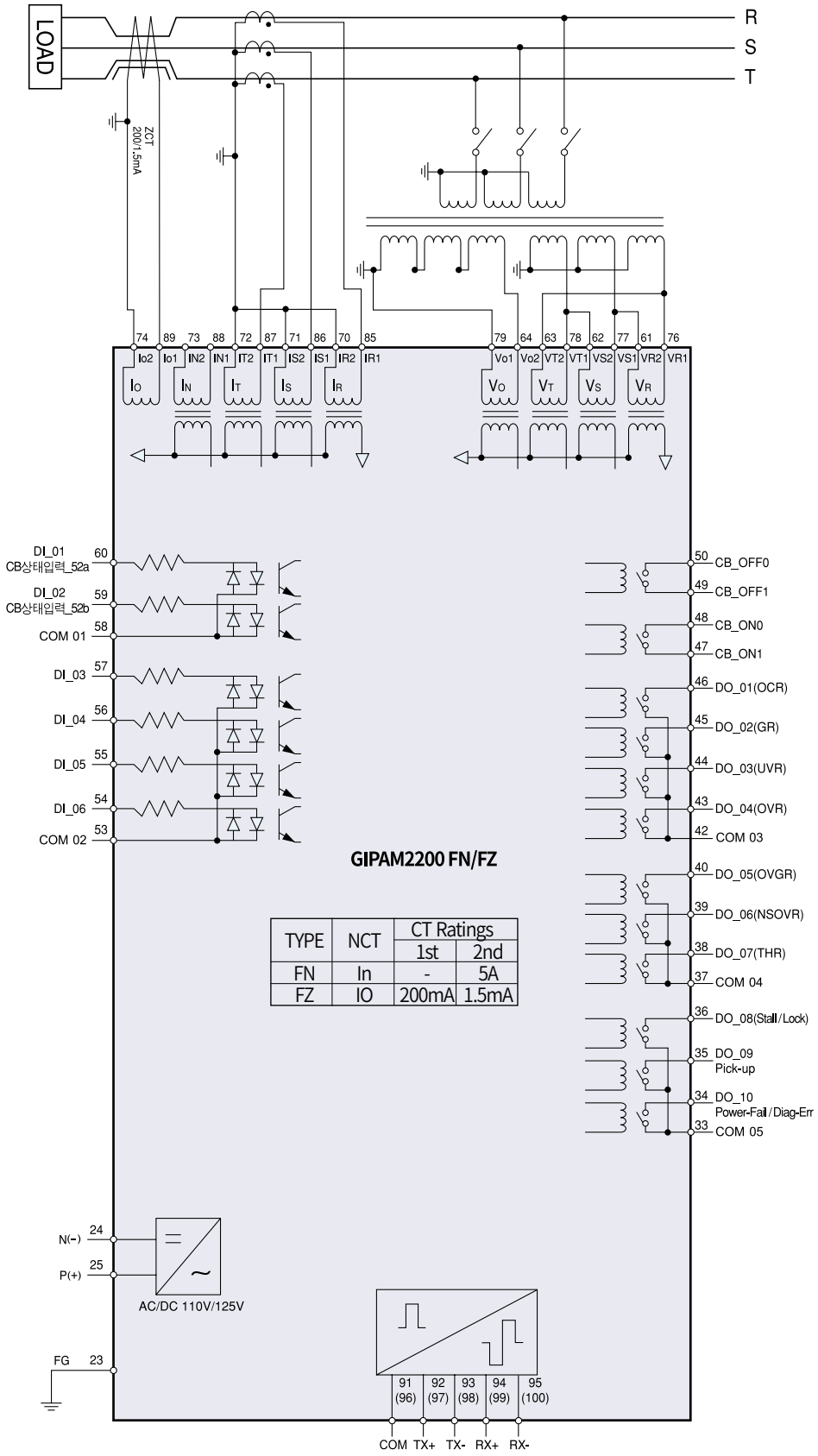
※ Range where DOCR relays winner pick-up occurs
RCA - Op Ang ≤ ∠Vo-∠Io ≤ RCA + Op Ang
(RCA = 0~359/1°, Op Ang = 50~90/5°)

- DOCR Polarity Based

phase	Operation Current	Polarity Voltage
A	Ia	Vbc = Vb - Vc
B	Ib	Vca = Vc – Va
C	Ic	Vab = Va - Vb

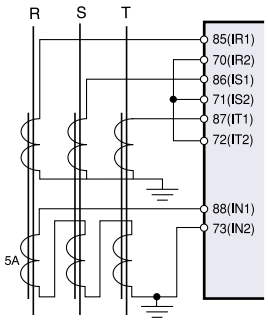
Wiring Method

3P3W

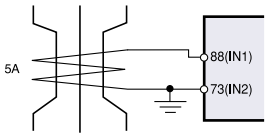


GIPAM2200 FN/FZ

TYPE	NCT	CT Ratings	
		1st	2nd
FN	In	-	5A
FZ	IO	200mA	1.5mA



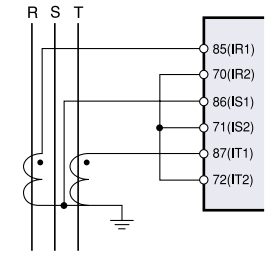
*In case of using three winding CT as 3CT Y wiring in the 3-phase 3- wire resistance grounding system



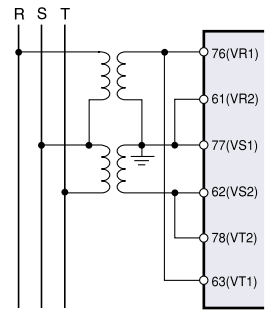
*Ground fault detection in case of using ground CT in the 3-phase 3-wire resistance grounding system

GIPAM2200 FN

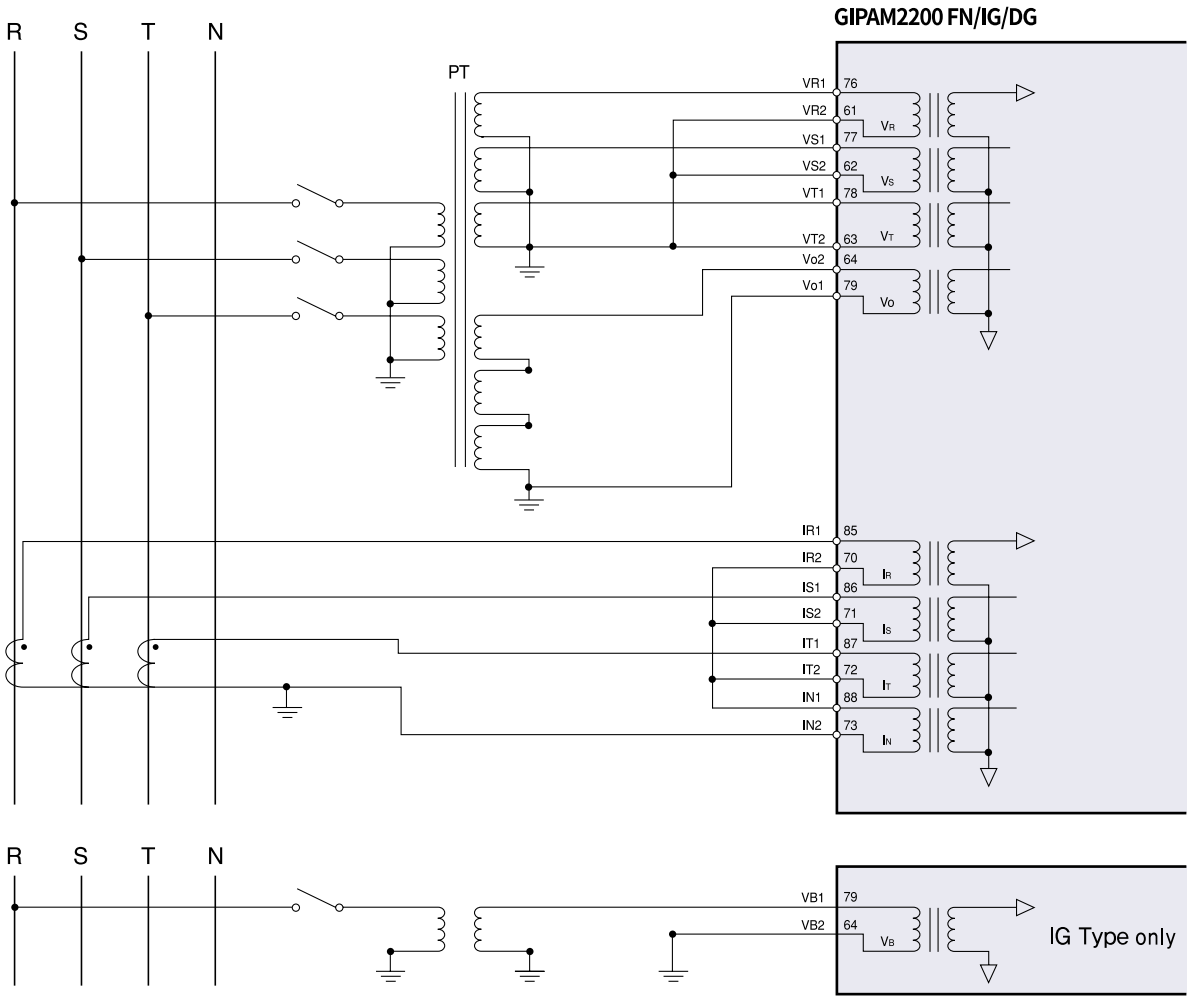
2CT application



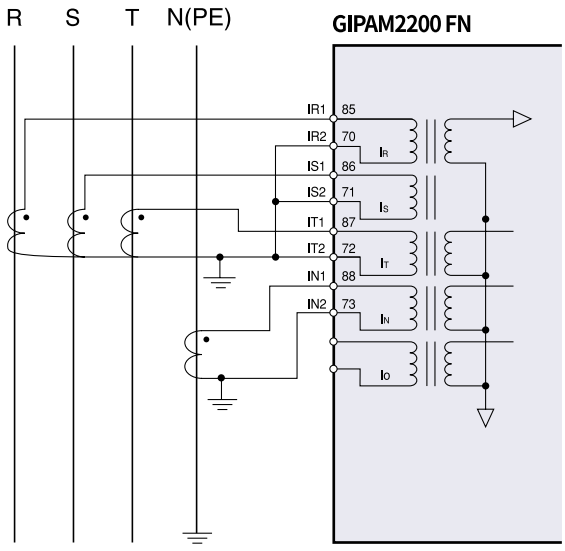
2PT application
OPEN DELTA(△)Wiring



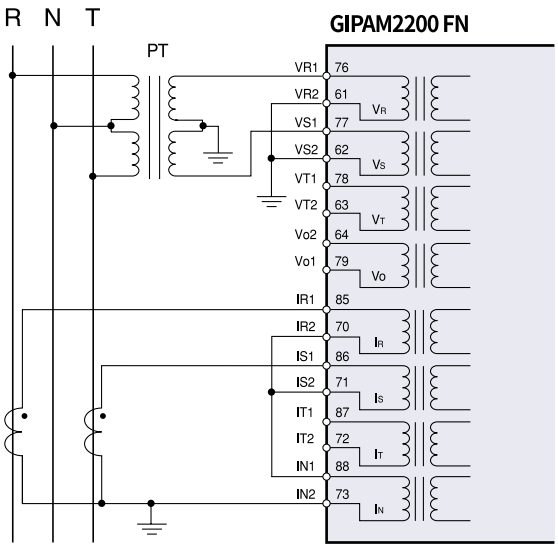
3P4W



1P3W



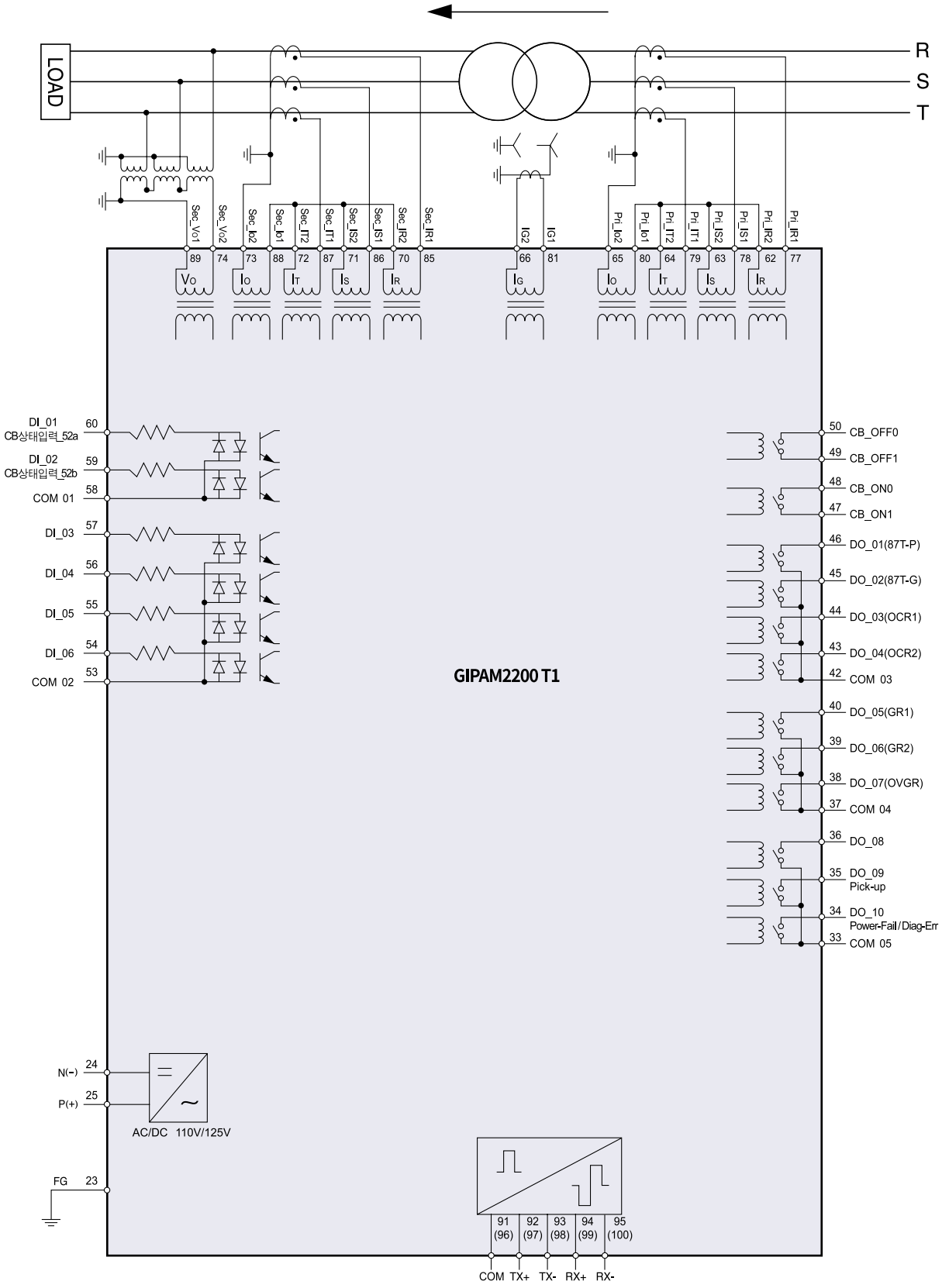
*If a separate CT is used at the transformer neutral point



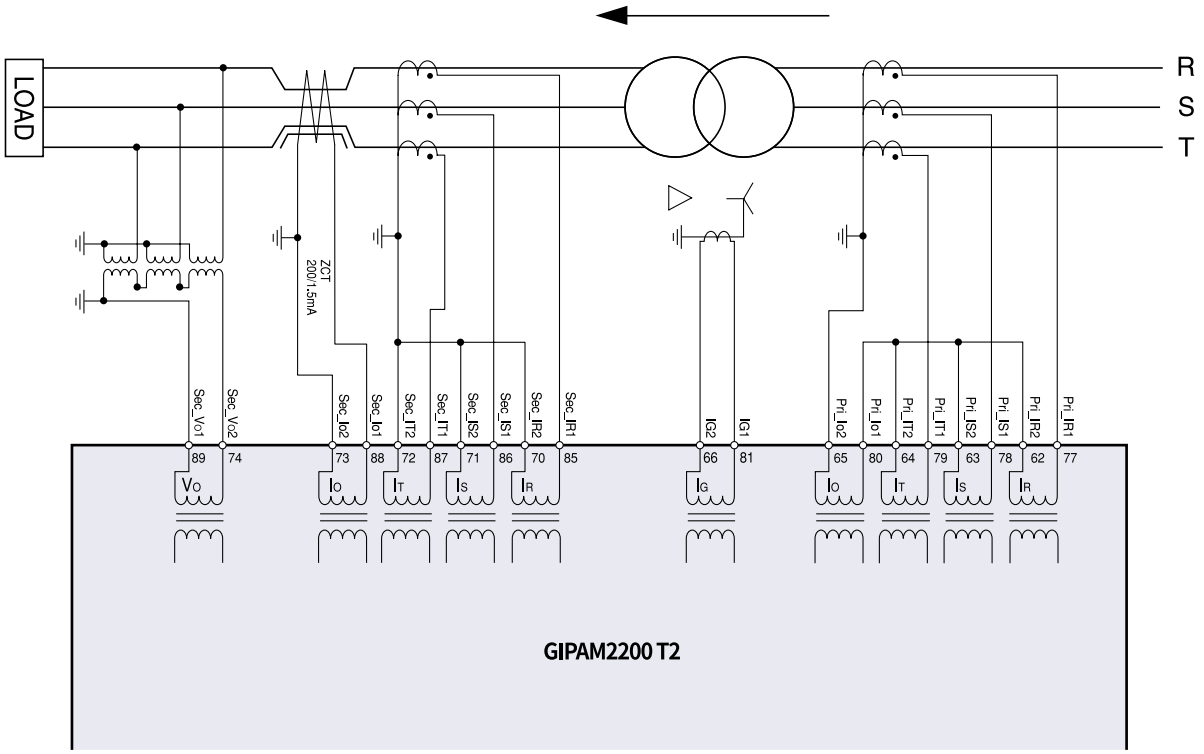
*Only FN model can use 1P3W.

Wiring Method

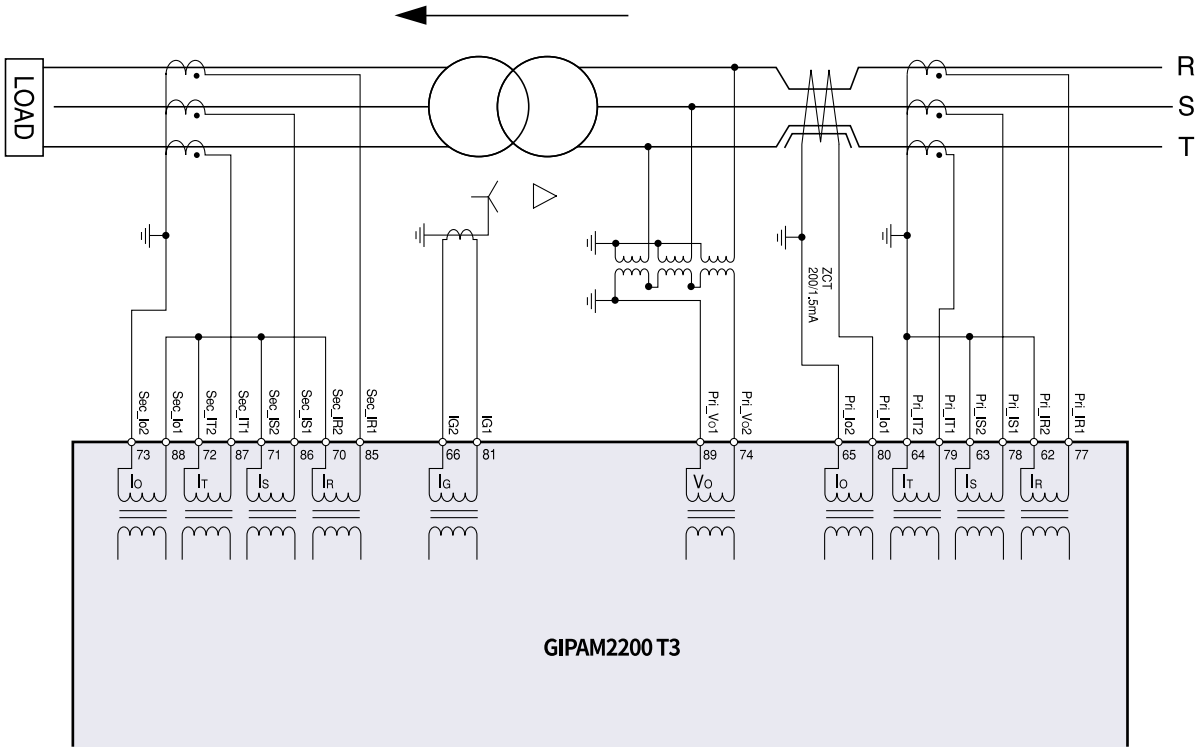
GIPAM2200 T1



GIPAM2200 T2

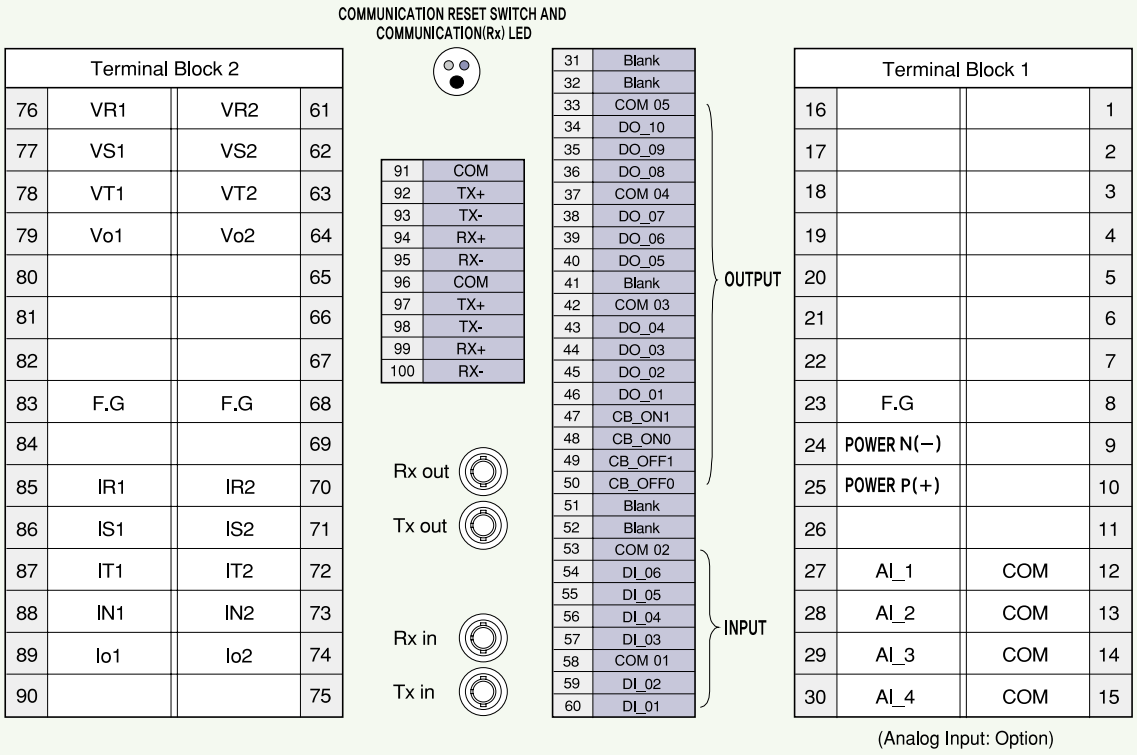


GIPAM2200 T3



Contact Structure

GIPAM2200 FN/FZ

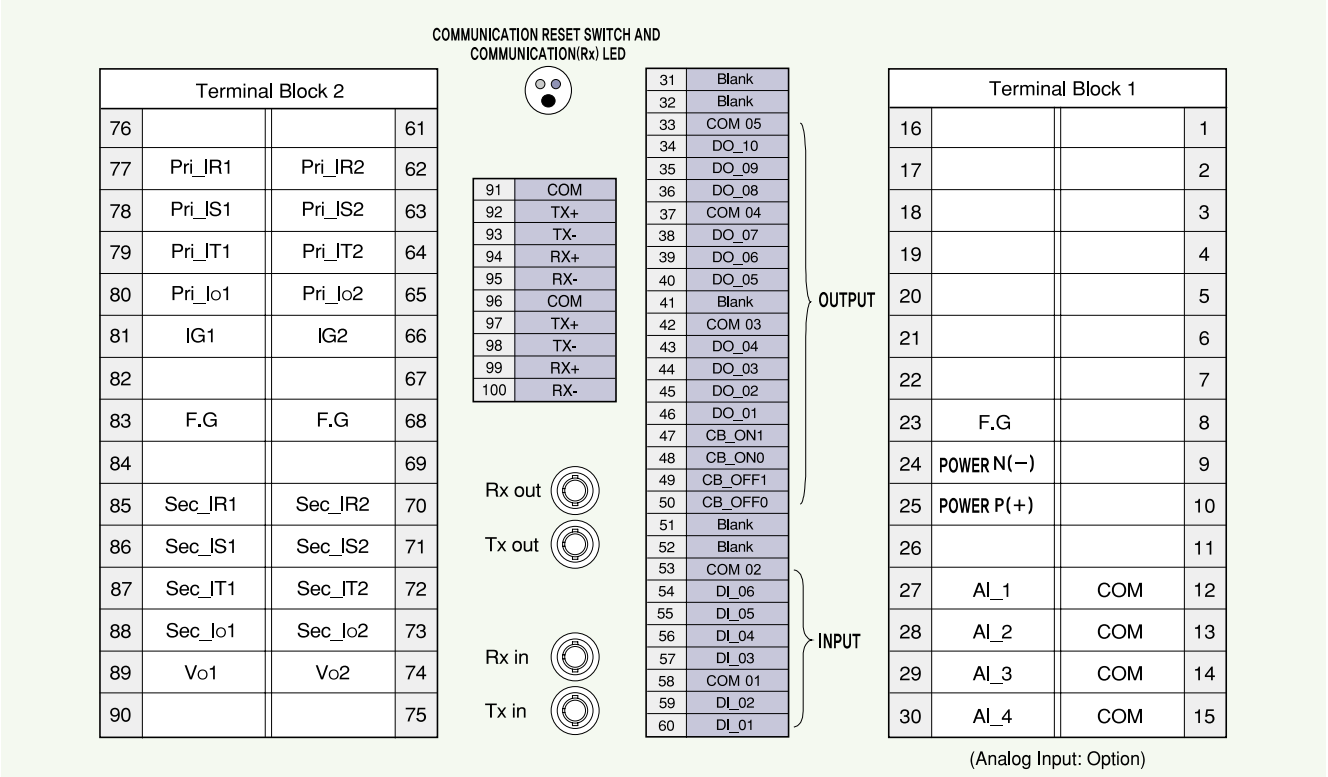


FN/FZ Model I/O Contact Structure

Terminal Number	Terminal Details	Default Use	Updated Use
60	DI_01	CB Status input_52a	Unchangeable
59	DI_02	CB Status input_52b	
57	DI_03	General DI	General DI
56	DI_04	General DI	General DI
55	DI_05	General DI	General DI
54	DI_06	General DI	General DI
50	CB_OFF0	CB_OPEN OUTPUT	Unchangeable Note3)
49	CB_OFF1		
48	CB_ON0	CB_CLOSE OUTPUT	
47	CB_ON1		
46	DO_01	50/51 (OCR)	General DO (Normal/Pulse)
45	DO_02	50/51N, 67G/N (OCGR/SGR/DGR)	General DO (Normal/Pulse)
44	DO_03	27 (UVR) Note3)	General DO (Normal/Pulse)
43	DO_04	59 (OVR)	General DO (Normal/Pulse)
40	DO_05	64 (OVGR) Note3)	General DO (Normal/Pulse)
39	DO_06	47 (NSOVR)	General DO (Normal/Pulse)
38	DO_07	49 (THR)	General DO (Normal/Pulse)
36	DO_08	48/51LR (Stall/Lock)	General DO (Normal/Pulse)
35	DO_09	Pick-up (Relay element Pick-up)	Unchangeable
34	DO_10	Power_Fail/Diag_Err (Power failure and self diagnosis)	

Note) 1. In case of General DO, Normal (Holding) or Pulse (0.1~10s) output can be selected.
2. Relay element output is latched on with a self-maintaining circuit configured.
3. OVGR is not connected to CB_OFF (Trip Circuit) (use edit logic, if necessary)
4. When setting up the UVR Auto Reset, the DO self-maintaining circuit must be released at Logic Diagram.

GIPAM2200 T



(Analog Input: Option)

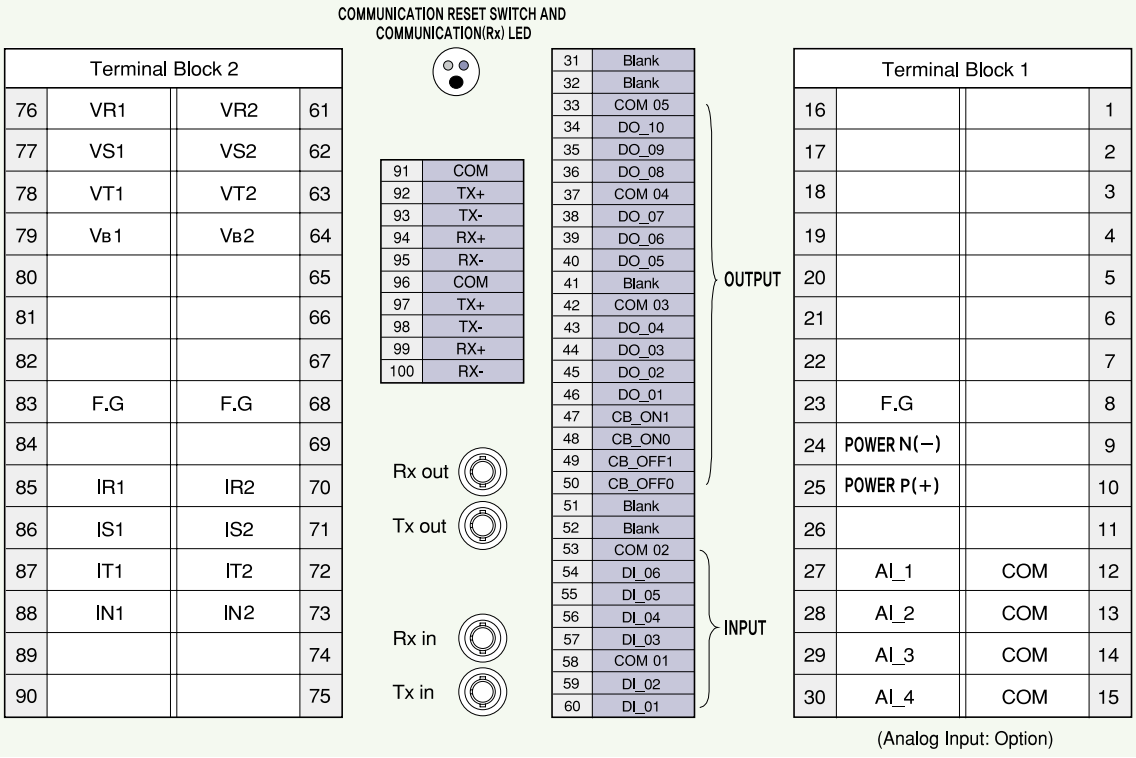
T Model I/O Contact Structure

Terminal Number	Terminal Details	Default Use	Updated Use
60	DI_01	CB Status input_52a	Unchangeable
59	DI_02	CB Status input_52b	
57	DI_03	General DI	General DI
56	DI_04	General DI	General DI
55	DI_05	General DI	General DI
54	DI_06	General DI	General DI
50	CB_OFF0	CB_OPEN OUTPUT	Unchangeable Note3)
49	CB_OFF1		
48	CB_ON0	CB_CLOSE OUTPUT	
47	CB_ON1		
46	DO_01	87T-P (DFR)	General DO (Normal/Pulse)
45	DO_02	87T-G (DFR)	General DO (Normal/Pulse)
44	DO_03	50/51 (OCR 1)	General DO (Normal/Pulse)
43	DO_04	50/51 (OCR 2)	General DO (Normal/Pulse)
40	DO_05	50/51N, 67G/N (OCGR/SGR/DGR 1)	General DO (Normal/Pulse)
39	DO_06	50/51N, 67G/N (OCGR/SGR/DGR 2)	General DO (Normal/Pulse)
38	DO_07	64 (OVGR) Note3)	General DO (Normal/Pulse)
36	DO_08	General DO (Normal)	General DO (Normal/Pulse)
35	DO_09	Pick-up (Relay element Pick-up)	Unchangeable
34	DO_10	Power_Fail/Diag_Err (Power failure and self diagnosis)	

Note) 1. In case of General DO, Normal (Holding) or Pulse (0.1~10s) output can be selected.
2. Relay element output is latched on with a self-maintaining circuit configured.
3. OVGR is not connected to CB_OFF (Trip Circuit) (use edit logic, if necessary)

Contact Structure

GIPAM2200 IG

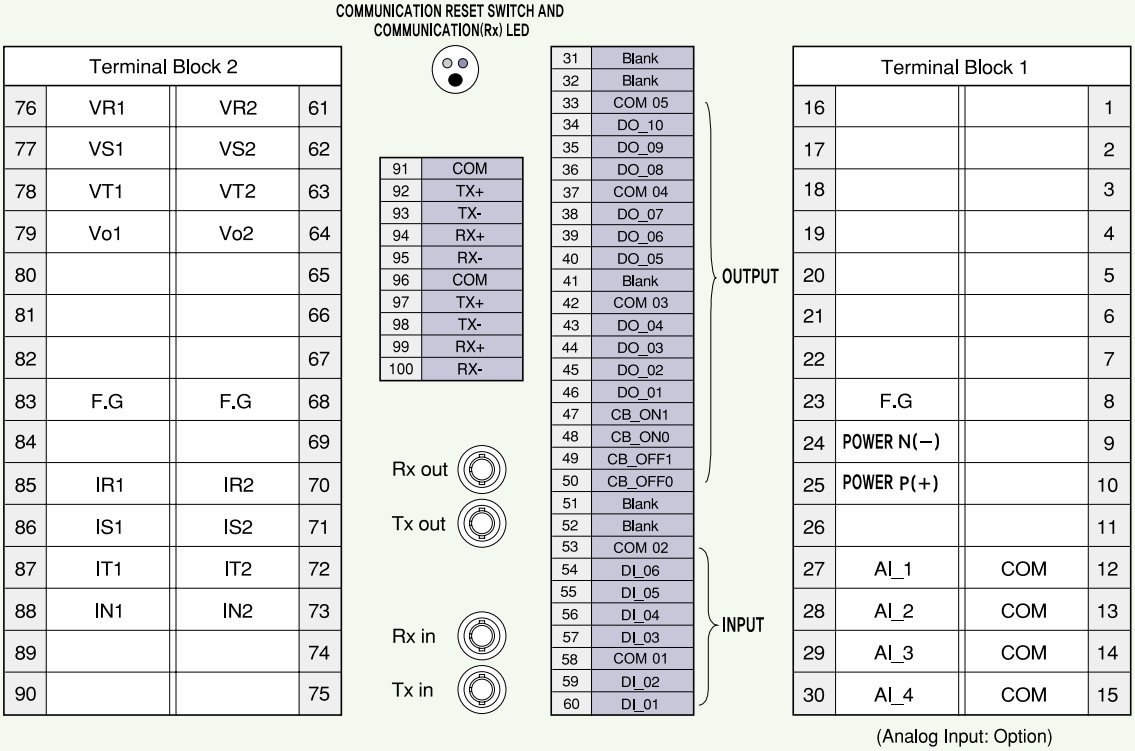


IG Model I/O Contact Structure

Terminal Number	Terminal Details	Default Use	Updated Use
60	DI_01	CB Status input_52a	Unchangeable
59	DI_02	CB Status input_52b	
57	DI_03	General DI	General DI
56	DI_04	General DI	General DI
55	DI_05	General DI	General DI
54	DI_06	General DI	General DI
50	CB_OFFO	CB_OPEN OUTPUT	Unchangeable
49	CB_OFF1		
48	CB_ON0	CB_CLOSE OUTPUT	
47	CB_ON1		
46	DO_01	50/51 (OCR)	General DO (Normal/Pulse)
45	DO_02	50/51N(OCGR)	General DO (Normal/Pulse)
44	DO_03	27 (UVR) Note3)	General DO (Normal/Pulse)
43	DO_04	59 (OVR)	General DO (Normal/Pulse)
40	DO_05	32P(DPR), 37P(UPR)	General DO (Normal/Pulse)
39	DO_06	81O(OFR), 81U(UFR)	General DO (Normal/Pulse)
38	DO_07	32Q(DRPR), 46(NSOCR), 49(THR)	General DO (Normal/Pulse)
36	DO_08	25(SYNC)	Unchangeable
35	DO_09	Pick-up (Relay elemen Pick-up)	
34	DO_10	Power_Fail/Diag_Err (Power failure and self diagnosis)	

Note) 1. In case of General DO, Normal (Holding) or Pulse (0.1~10s) output can be selected.
2. Relay element output is latched on with a self-maintaining circuit configured.
3. When setting up the UVR Auto Reset, the DO self-maintaining circuit must be released at Logic Diagram.

GIPAM2200 DG

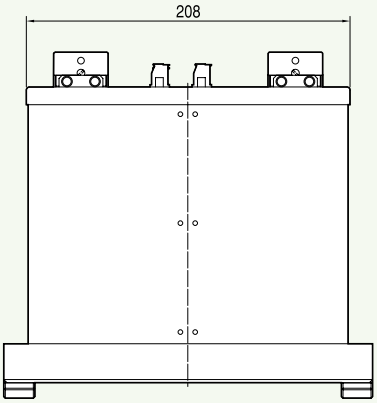


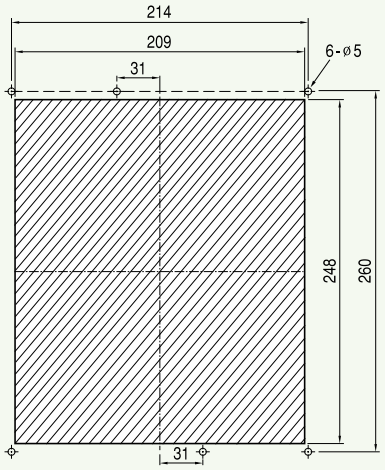
DG Model I/O Contact Structure

Terminal Number	Terminal Details	Default Use	Updated Use
60	DI_01	CB Status input_52a	Unchangeable
59	DI_02	CB Status input_52b	
57	DI_03	General DI	General DI
56	DI_04	General DI	General DI
55	DI_05	General DI	General DI
54	DI_06	General DI	General DI
50	CB_OFFO	CB_OPEN output	Unchangeable
49	CB_OFF1		
48	CB_ON0	CB_CLOSE output	
47	CB_ON1		
46	DO_01	50/51, 67P (OCR, DOCR)	General DO (Normal/Pulse)
45	DO_02	50/51N, 67N(OCGR, DOCGR)	General DO (Normal/Pulse)
44	DO_03	27 (UVR) Note3)	General DO (Normal/Pulse)
43	DO_04	59 (OVR)	General DO (Normal/Pulse)
40	DO_05	81O(OFR), 81U(UFR), 81R(ROCOF,df/dt)`	General DO (Normal/Pulse)
39	DO_06	86X	General DO (Normal/Pulse)
38	DO_07	32P, 32rP Note4)	General DO (Normal/Pulse)
36	DO_08	Reserved(Not available)	-
35	DO_09	Pick-up (Relay elemen Pick-up)	Unchangeable
34	DO_10	Power_Fail/Diag_Err (Power failure and self diagnosis)	

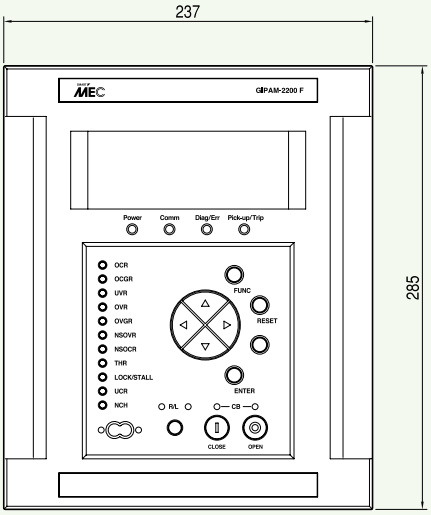
Note) 1. In case of General DO, Normal (Holding) or Pulse (0.1~10s) output can be selected.
2. Relay element output is latched on with a self-maintaining circuit configured.
3. When setting up the UVR Auto Reset, the DO self-maintaining circuit must be released at Logic Diagram.
4. There is no 32P, 32rP in CB OPEN output, so you need to modify LOGIC if necessary.

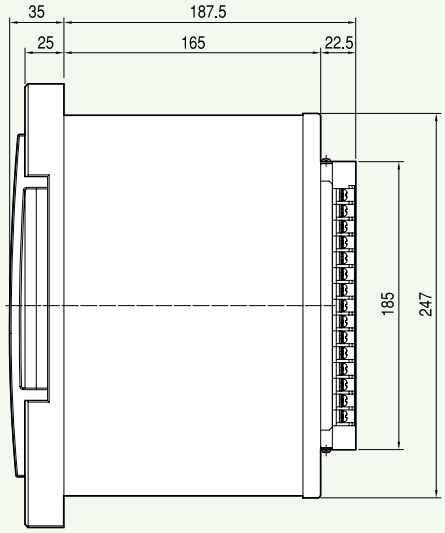
Dimensions

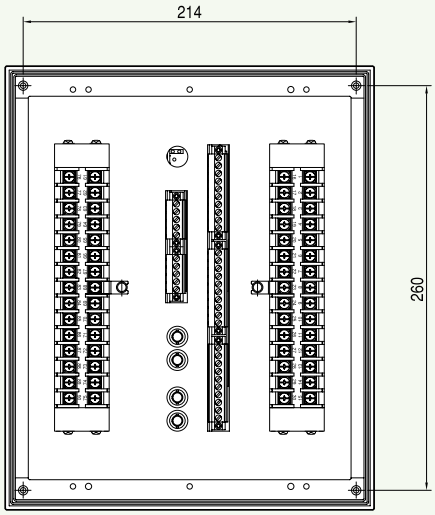




<Cut Size>







GIPAM2200

FN | RS | D | 110V | 5A

Protection Use & Transformer Input	
FN	Feeder, Incoming, Motor / NCT
FZ	Feeder, Incoming, Motor / ZCT
T1	Transformer / Pri_NCT, Sec_NCT
T2	Transformer / Pri_NCT, Sec_ZCT
T3	Transformer / Pri_ZCT, Sec_NCT
DG	Linked cable protection
IG	Linked cable protection

Communication	
RS	RS-485, 422
OP	Fiber Optic

Protocols	
D	DNP 3.0
M	MODBUS

PT Rating
110V
100V

CT Rating
5A

60Hz | AC/DC 110V | DI_AC/DC 110V | AI

Frequency
60Hz

Control Power
AC/DC 110V

Digital Input
AC/DC 110V

Analog Input	
AI	4 ~ 20mA
-	None

GIPAM - OPTO MASTER — IrDA(infrared) Serial Port(Option)