ISO14001, ISO9001

SMART MEC

Digital Protection Relay (DPR)

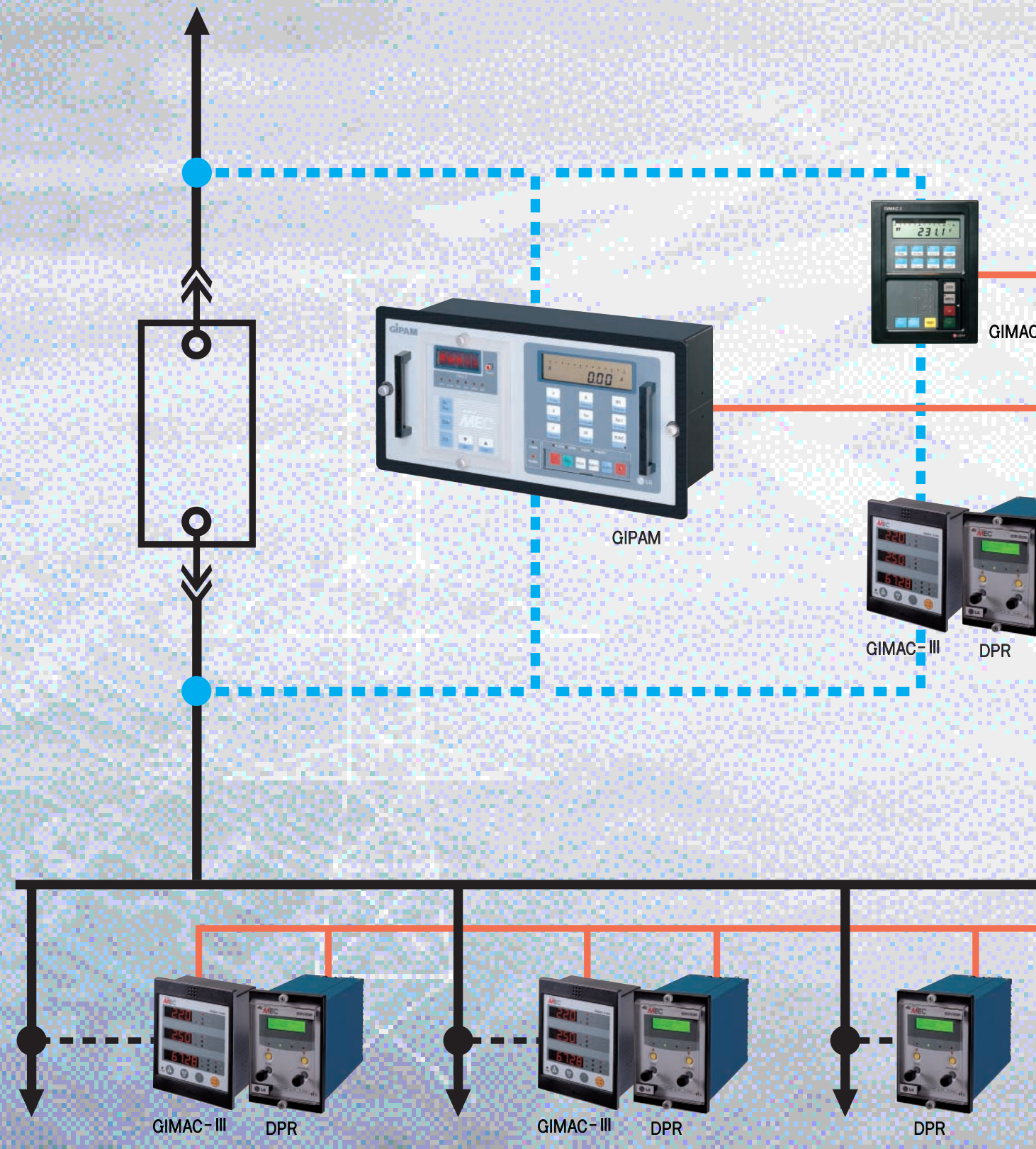
Digital Integrated Metering & Control Equipment (GIMAC-Ⅲ)

SMART-MEC series
Digital Protection Relay/ Digital Integrated Metering & Control Equipment

LG Industrial Systems

LG's advanced technology realized the digitalization of the measuring, monitoring and protecting equipment in the power transmission and distribution system.

Get a chance to use the reliable Digital Protection Relay and Digital Integrated Meter.



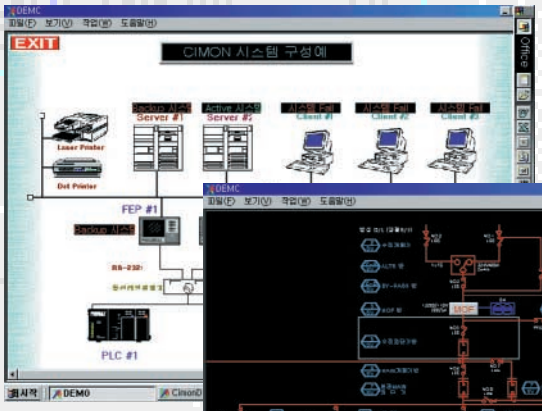
It is applicable to various programs for power monitoring & control system.

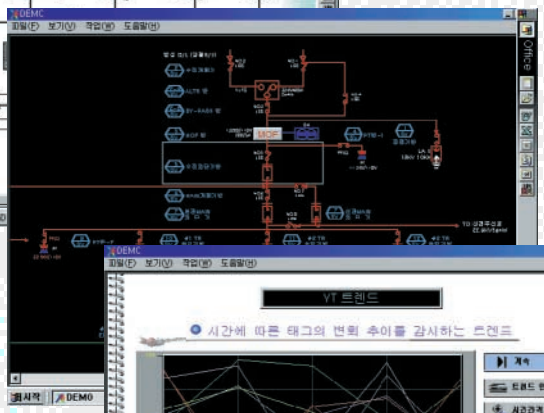
Desktop PC

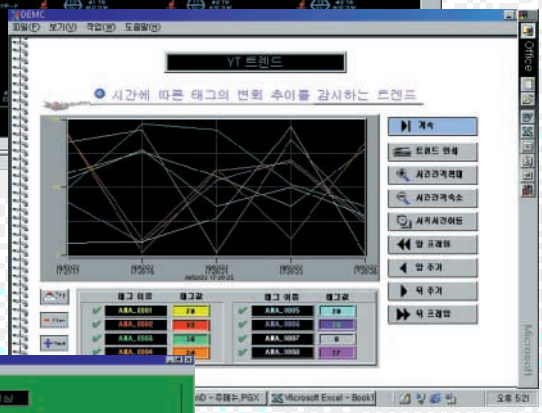
RS232C
RS485

Protocol
Converter

GMPC - II







- II

I-NET
communication
network

DPR

μ -RTU

Digital Integrated Meter(GIMAC-III)

■ Wide range of the PT input voltage(AC 480V)
- 48~576Vac without additional primary PT.

■ Measure the 12 values with one Digital Integrated Meter.
- 12 values are displayed by the three LED windows
- Saving the installation space and easy wiring, compare with those of Analog type's

■ Various function with compact dimension
- 144mm(Width)×177mm(Height)×100mm(Depth)

■ Easy to operate and set
- Set and check all the values by operating the ket button in the front.

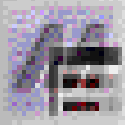
■ Apply the EEPROM (Electrically Erasable Programmable Read only Memory) memory
- Power capacity (wh) value can be recorded and restored during the electrical outage.

■ EMC test certificate
- EMC test certified by TOKIN in Korea

■ Various communication network
- By the I-NET's exclusive communication and Modbus communication(option), it is available for network constitution and remote supervision with the higer systems
- Easy to change the communication module and it provides easy constitution of a communication network.
- By connecting with the protocol transducer(GMPC), it can be changed from I-NET to RS232C serial communication

■ Pulse output for the Active and Reactive power capacity

■ Apply the International standard
- IEC 1036, KEMC 1110



Ratings and measurement

DIGITAL INTEGRATED METER

Ratings

Type designation			GIMAC-215NN
Wiring type			1phase 2wires, 1phase 3wires, 3phase 3wires, 3phase 4wires
Input	Voltage(Vn)		AC480V (48～576V)
	Current(In)		5A (0.125～6A)
	Frequency		60Hz (45～65Hz)
	Control voltage		DC110V (DC88～126V)
	Input burden		PT:0.3VA CT:0.15VA Power consumption:10VA
Output	Pulse out	Active power capacity	A cycle : Min. 250ms, width : 100ms Note1)
		Reactive power capacity	Accuracy : 2.0%
	Output element		SSR(Solid State Relay)
	External power supply		DC 24V(DC12～24V)
	Continuous carrying current		0.4A
	Maximum output pulse		4Hz
Display type			4digit 7segments × 2line, 5digit 7segment × 1line
Communication function			I-NET (MODBUS) Note2)
Insulated resistance			DC 500V 100MΩ and over
Insulation voltage (Power frequency withstand voltage)			AC 2kV(1kV) for 1 minute and over
Impulse voltage (Lightning impulse withstand voltage)			5kV(3kV) for 1.2 × 50㎲ and over
Overload withstand capacity	Current circuit		In × 2 for 3 hours
			In × 20 for 2 seconds
	Voltage circuit		Vn × 1.2 for 3 hours
Temperature	Transporting		-20～55℃
	Storage		-25～75℃
Humidity			80% RH (non-condensing)
Altitude			2000m and below
Applicable standard			IEC1036, KEMC1110
Weight(Without communication function)			0.86kg (0.81kg)
Dimension			144(W) × 177(H) × 100(D)mm

Note1) The ratio of pulse output can be changeable according to the parameter setting described in page 7.
Note2) For MODBUS communication, please contact us when you order

Measuring indication

Parameter	Range	Accuracy	Remark
Voltage(V)	0～9,999kV	±1.0%	each phase/wire to wire voltage
Current(A)	0～9,999kA	±1.0%	each wire current indication
Active power(W)	0～99,999MW	±2.0%	
Reactive power(Var)	0～99,999MVar	±2.0%	
Active power watts(Wh)	0～99,999MWh	±2.0%	
Reactive power vars(Varh)	0～99,999MVarh	±2.0%	
Power factor(PF)	-1.0～1.0	±2.0%	(-) : phase
Frequency(F)	45～65Hz	±0.5%	
Reverse active power(Reverse W)	0～99,999MW	±2.0%	"W" LED flickers on
Reverse active power watts(Reverse Wh)	0～99,999MWh	±2.0%	"WH" LED flickers on
Current demands	0～9,999kA		"WINDOW 2" flickers on
Power demands	0～99,999MW		"WINDOW 3" flickers on

■ "WINDOW 1" : It can be displayed each phase/phase to phase voltage by operating No. 1 of key.
■ "WINDOW 2" : It can be displayed each wire current and current demands by operating No. 2 of key.
■ "WINDOW 3" : It can be displayed active/reactive power (and capacity), power factor, frequency, reverse power (and capacity), power demands by operating No. 3 of key.
■ All measured parameters will be scroll displayed when pushing the "ENTER" key at normal operation mode.
■ The reverse power will be displayed at "WINDOW 3" when it happens

Constitution

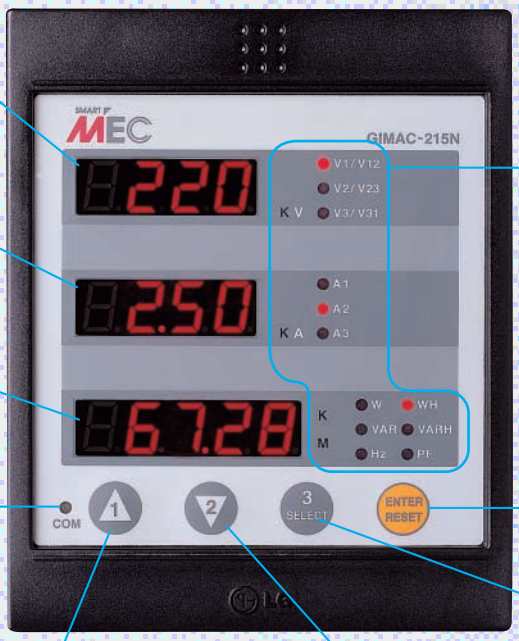
DIGITAL INTEGRATED METER

WINDOW 1
Each phase/Line- line voltage indication

WINDOW 2
Each line current and current demands indication

WINDOW 3
Active/Reactive power
Reverse power,
Power factor, Frequency
Power demands indication

COMM LED
Flickers on during normal communication



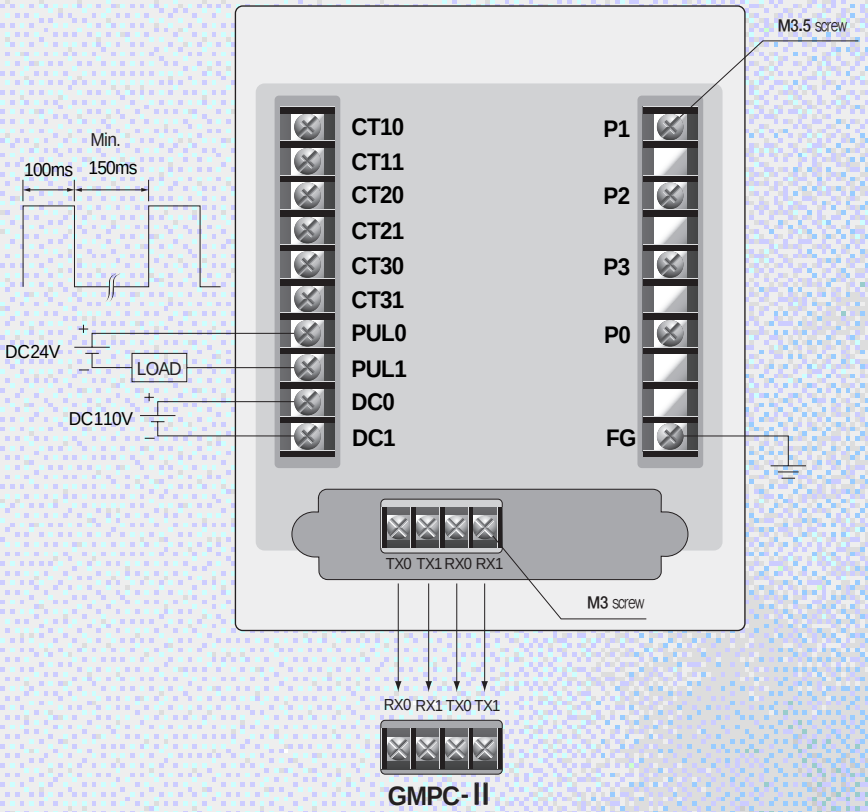
LED indication
Indicating parameter or unit displayed at each WINDOWs

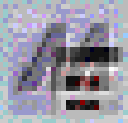
ENTER Key (RESET)
- Returning to normal operating mode after setting completion
- Each parameter initialized at setting mode
- Scroll displaying measured parameter

UP Key(1)
- WINDOW 1 parameter indication
- Searching setting value and setting parameter at setting mode

DOWN Key(2)
- WINDOW 2 parameter indication
- Searching setting value and setting parameter at setting mode

SELECT Key(3)
- WINDOW 3 parameter indication
- Searching setting value and setting parameter at setting mode





Operating and setting method

DIGITAL INTEGRATED METER

Operating and setting method

① It will be changed to the setting mode when pressing No. 2 key and No. 3 key at the same time. Setting parameter is indicated at "WINDOW 1" and the setting value is indicated at "WINDOW 3"

② Search the setting parameters by pushing the UP(1) or DOWN(2) key

③ "WINDOW 1" displayed setting parameter flickers on if the SELECT(3) key is pressed one time. At this time please set the required data value at "WINDOW 3" with UP(1) or DOWN(2)key,then it will be completed to set the relevant parameter by pushing the SELECT(3) key once again.

④ Continuously, please set another parameters by repeating the sequence of ② and ③.

⑤ Please reset to normal operation mode by pressing the ENTER key one time after all settings completed.

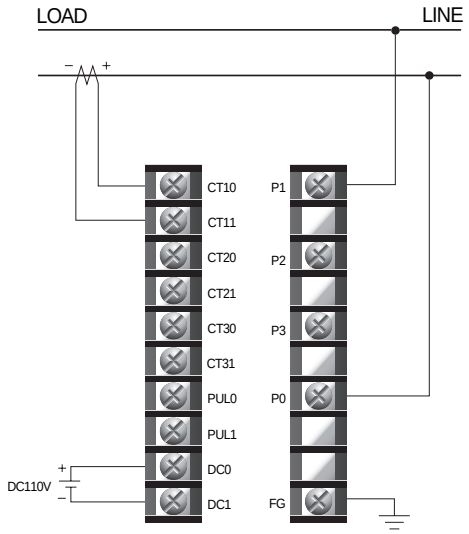
Setting parameters

NO	Parameters	Display		Remarks
		WINDOW 1	WINDOW 3	
1	Wiring type	Conn	1~6	1: 1P2W 4: 3P3W (Open delta) 2: 1P3W 5: 3P4W (Phase voltage indication) 3: 3P3W(Direct) 6: 3P4W (Wire to wire voltage indication)
2	PT ratio	P.t	1.0~30,000	0.1 step
3	CT ratio	C.t	1~30,000	1 step
4	Pulse output ratio	Pcnt	1~30,000	1 step
5	Output pulse	Pout	1~2	1: Active power capacity pulse output 2: Reactive power capacity pulse output
6	Communication transmission function	rEPo	1~2	1: Disable for periodic up-date of measured data 2: Available for periodic up-date of measured data(GIMAC⇔I-NET card)
7	Address	Addr	1~255	1 step
8	Power demand time	P.d	1~60(분)	Setting the time interval of power demand(1 step)
9	Current demand time	Cd1	10~3,600(sec)	Setting the time interval for the current demand of 1st wire(1 step)
		Cd2	10~3,600(sec)	Setting the time interval for the current demand of 2nd wire(1 step)
		Cd3	10~3,600(sec)	Setting the time interval for the current demand of 3rd wire(1 step)
10	Watts/Vars indication unit	Unit	1~3	1: Basic (Wh, Varh) 2: Kilo (kWh, kVarh) 3: Mega (MWh, MVarh)
11	Active power watts reset	AE-r	Measured value and storage value	Data initialized when one time pressing SELECT(3) key and then pressing ENTER key
12	Reactive power vars reset	rE-r		
13	Reactive power capacity reset	rS-r		
14	Power demand reset	P.d-r		
15	Current demand reset	C1-r		
		C2-r		
		C3-r		
16	Program version	ProG	xxxxx	Indicating the software version applied to the product (Not changeable)

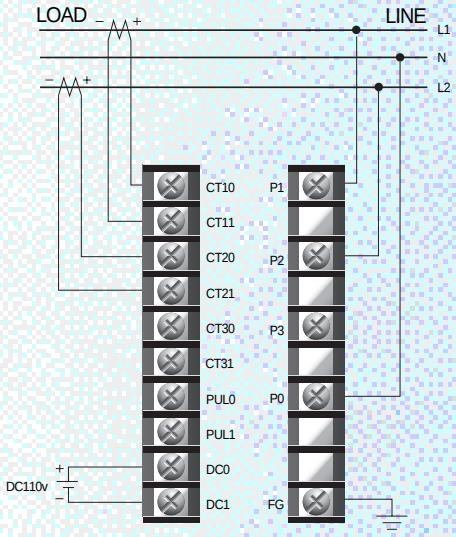
Connection methods

DIGITAL INTEGRATED METER

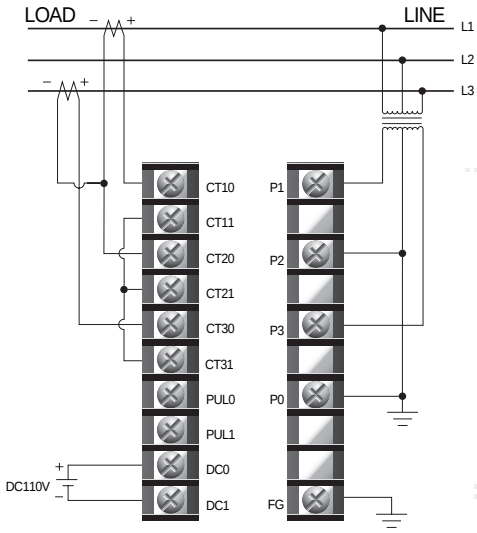
1P 2W CONNECTION



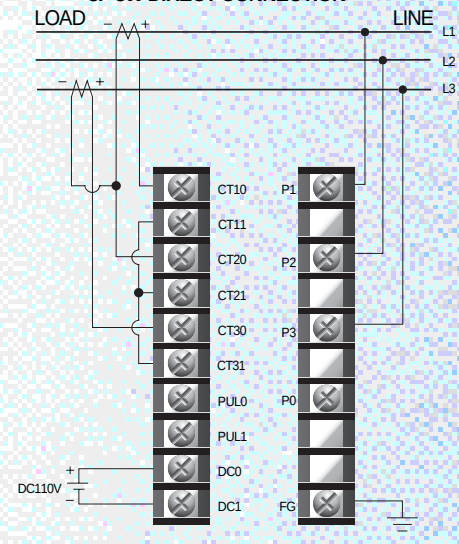
1P 3W CONNECTION



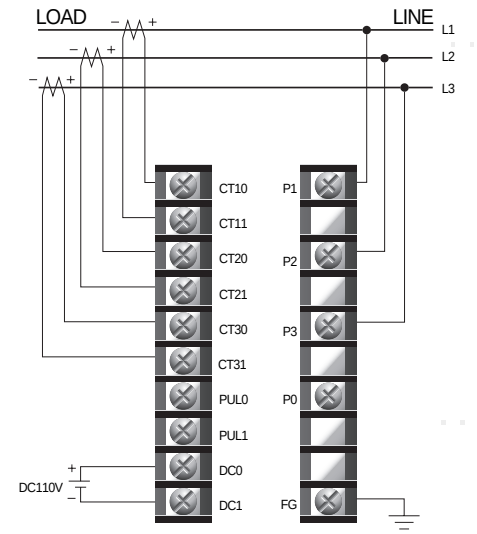
3P 3W OPEN DELTA CONNECTION



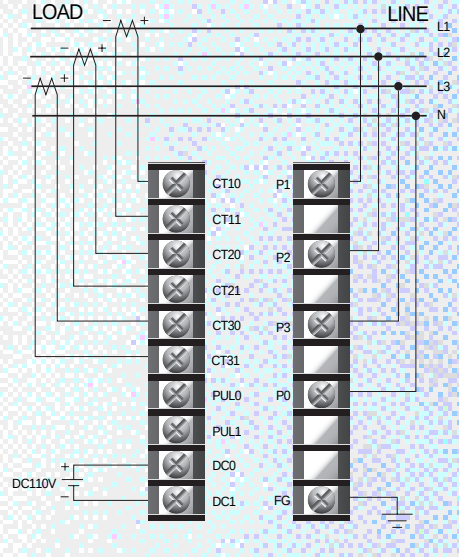
3P 3W DIRECT CONNECTION



3P 3W DIRECT CONNECTION-3CT

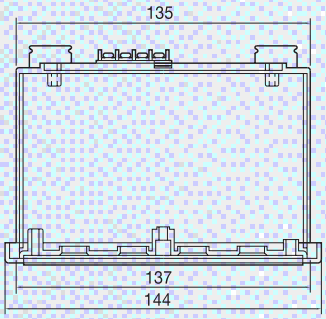


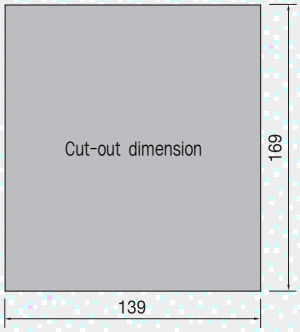
3P 4W DIRECT CONNECTION

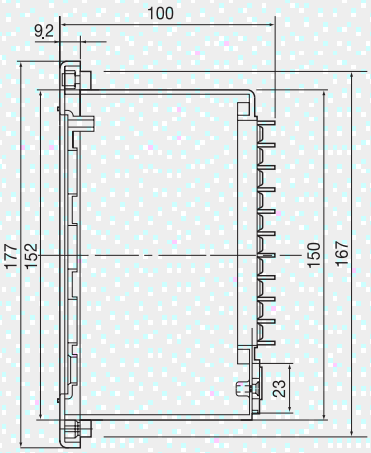


Dimensions and ordering information

DIGITAL INTEGRATED METER







Ordering information

GIMAC- ② ① ⑤ Ⓜ Ⓝ

Type	
1	Relay connecting type(GIMAC-II) Note1)
2	Separated window type(GIMAC-III)

Control voltage	
1	DC110V

Measuring element	
5	Measuring integrated

PT ratio	
N	Standard
S	Non-standard Note1)

Communication function Note2)	
N	Built-in communication card
O	No communication card

GIMAC- COMⅡ

Communication unit	
COM	I-NET communication module(for GIMAC-115N)
COMⅡ	I-NET communication module(for GIMAC-215N)

Note 1) Non-standaed type is applicable to GIMAC-II(Type 1) and please refer the catalog of GIMAC-II

Note 2) Only available for GIMAC-III

Digital Protection Relay (DPR)

■ Compact design
- 124mm(Width) × 177mm(Height) × 243mm(Depth)

■ Easy to operate and set
- Set and check all the values by operating the ket button in the front.

■ Back-lit LCD display
- Back-lit LCD diaplay provide increased visibility
- Easy to check the cause of a fault and setting status by the abundant indication functions
- LCD flickers when all trips happens

■ Adjustable current and operation time
- Minute setting steps for the current and time are appropriate for network protection.

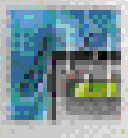
■ The use of the output contacts are programmable
- Various settings for output contacts(Trip or Alarm) are available
- For details, refer to the table in page 15, 19

■ Fault recording function
- When there is a fault in the power line, it records the fault wave forms for 10 cycles to the EEPROM.

■ Sequence of Event Function(S.O.E/Optional)
- It provides the sequence of the event (relay operation and cause of the fault and data adjustment, etc) to the higher system by the mili second intervals and it helps to analyze the cause of the fault easily.

■ Various communication network configurations
- I-NET exclusive communication and Modbus communication(optional)

■ EMC/EMI test certified



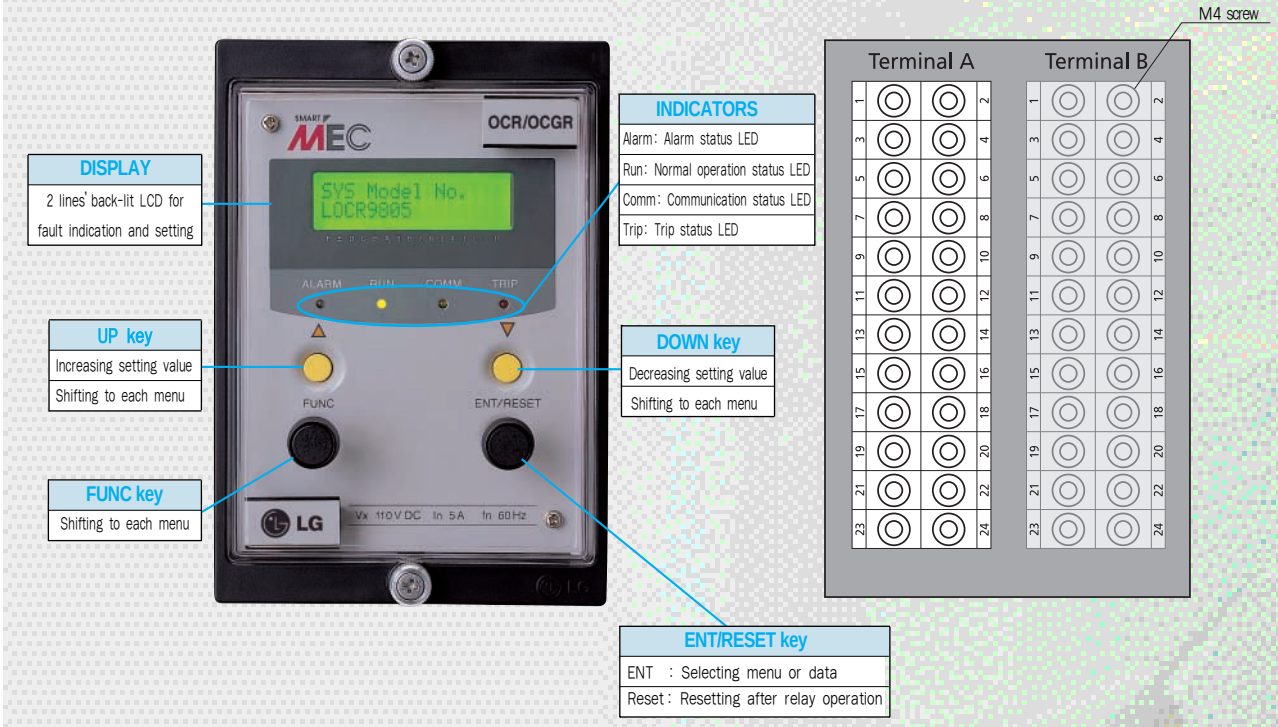
Environmental characteristics

DIGITAL PROTECTION RELAY

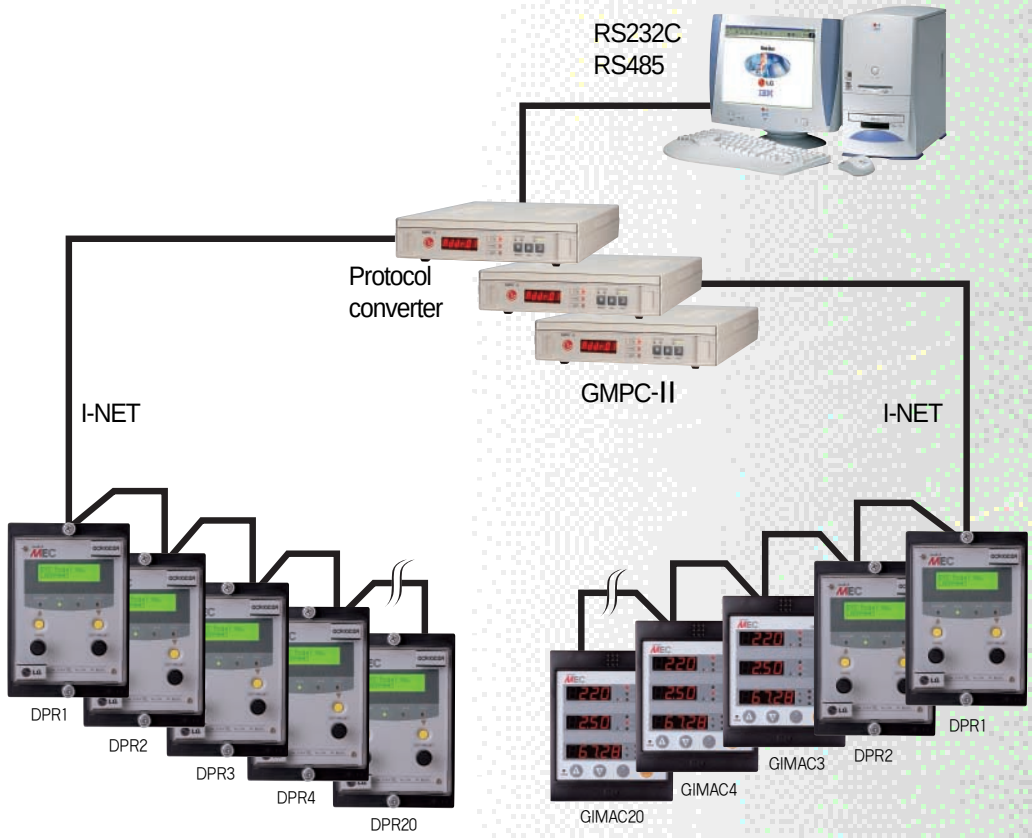
Dielectric withstand	IEC 255-5	2kV rms. for 1 minute between all case terminals connected together and the case earth.
	KEMC1120	2kV rms. for 1 between all terminals of independent circuits with terminals and each independent circuit connected together
		1kV rms. for I minute between each all terminals of open contact circuits
High voltage impulse	IEC 255-5	5kV peak, 1.2 × 50㎲, between all terminals connected together and case earth
	KEMC1120	5kV peak, 1.2 × 50㎲, between mutual PT/CT circuits
		5kV peak, 1.2 × 50㎲, between PT/CT circuits and control circuits
		3kV peak, 1.2 × 50㎲, between mutual control circuits
		3kV peak, 1.2 × 50㎲, between all terminals of PT/CT circuits
		3kV peak, 1.2 × 50㎲, between all terminals of control power supply circuits
Insulation resistance	IEC 255-5	DC 500V 10㏁ and over between all case terminals connected together and the case earth.
	KEMC1120	DC 500V 5㏁ and over between all terminals of independent circuits with terminals and each independent circuits connected together DC 500V 5㏁ and over between each terminals of open contact circuits
Overload capacity	KEMC1120	Current circuit : In × 2 for 3 hours(2 times by 1 minute interval) In × 20 for 2 seconds
	JEC-2500	In × 40 for 1 second
	KEMC1120	Voltage circuit : Vn × 1.15 for 3 hours (1 time)
High frequency disturbance	IEC 255-22-1	2.5kV Peak between independent circuits and case
	ClassIII	1.0kV Peak across terminals of the same circuit
Fast transient disturbance	IEC 255-22-4	4kV applied directly to power input
	ClassIV	2kV applied to other inputs
Electrostatic discharge	IEC 255-22-2	8kV discharge in air with cover in place
(ESD)	ClassIII	6kV point contact discharge with cover removed
RFI	KEMC1120	Making a wave by accessing to the edge of relay with 5W transceiver(150MHz, 400MHz)
EMI	EN 50081-2	AC power:0.15～0.50MHz, standard 79dB, average 66dB
	ClassII	0.50～30MHz, standard 73dB, average 60dB
Operating temperature	IEC 68-2-1	-10～55℃
Storage temperature	IEC 68-2-2	-20～70℃
Humidity	IEC 68-2-3	56 days at 93% RH and +40℃
Shock	IEC 255-21-2 ClassIII	30g, 3times/dir.
	KEMC 1120	
Vibration	KEMC 1120	30Hz, 0.4mm vibration applied for 600 seconds
Enclosure protection	IEC 529	IP 50(dust protected)

Constitution

DIGITAL PROTECTION RELAY



System constitution



Additional functions

DIGITAL PROTECTION RELAY

Constant-supervision with self-diagnostics

High reliability of relay will be provided by various self-diagnostics function.
When errors occurs it will be displayed "Error No." at LCD display window, then the front ALARM LED lights on and LCD display window flickers on also.
At the same time ALARM relay(Sys fail) will be output.

1. Internal ROM check: "Error 1"
2. Internal RAM check: "Error 2"
3. A/D converter check: "Error 3"
4. CPU watchdog check: "Error 4"
5. Power supply check: "Error 5"
6. EEPROM(Backup memory) check: "Error 6"
7. Calibration check: "Error 7"

When the self-diagnostics error happens, the relay is not operated until the cause of that fault is cleared.

Fault records

1. The fault curves are recorded into EEPROM when line fault happens, which will provide fast and correct grasping for the cause of a fault.
2. Storage the sample value of each phase for 10 cycles before and after the fault
   - 5 cycles before the fault
   - 5 cycles after the fault
   - 8 samples for a cycle
3. A fault recording information is available for ascertaining them via communications.

Sequence of event (S.O.E)

Many events (including relay operation, cause of fault, data adjustment) can be provided to the higher system

1. Kinds of event
   - The cause of a relay operation(trip)
   - The data adjustment of a relay
   - Error occurrence of auto-diagnostics
   - Relay resetting
2. Twenty events are stored in a buffer (maximum)

Communication specification

1. I-NET communication

High speed, high reliability of serial communication by use of the custom LSI(GC829016) developed by LGIS

1) Data rate : 250kbps
2) Cable length : 1000m(max.)
3) Insulation : Pulse Transformer
4) Connection : 4 Wires multi-drop
5) Signal modulation : Bipolar modulation
6) Connectable quantity : Max. 20units per a GMPC(a protocol converter)
7) Address : Parameter setting from 1 to 255
8) Communication cable : Low capacitance LAN interface cable
   - Spec : LIREV AMESB 22AWG 2-pair (1/0.643)
   - Impedance : 10MHz, 120(Ω)
   - Termination : Please use it by connecting 2 resistors with each end of cable

2. MODBUS communication (Optional)
   - FIELD BUS open protocol applied
   - Please contact us before applying this communication method

Overcurrent relay for phase and ground faults (OCR & OCGR)

Features

- Self-diagnostics
- Fault recording
- Sequence of event(S.O.E)
- High speed serial data communication
- International standard applied
  -IEC 255, IEC 1000-4, KEMC 1120

Operation characteristic curves (Refer to page22)

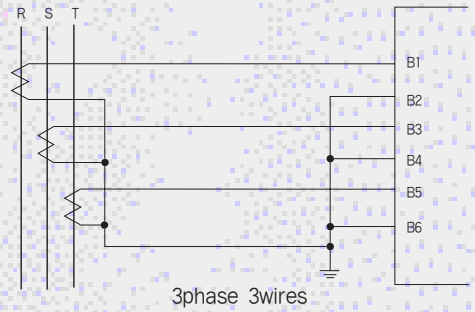
- Standard inverse time
- Very inverse time
- Extremely inverse time
- Long inverse time
- Definite time

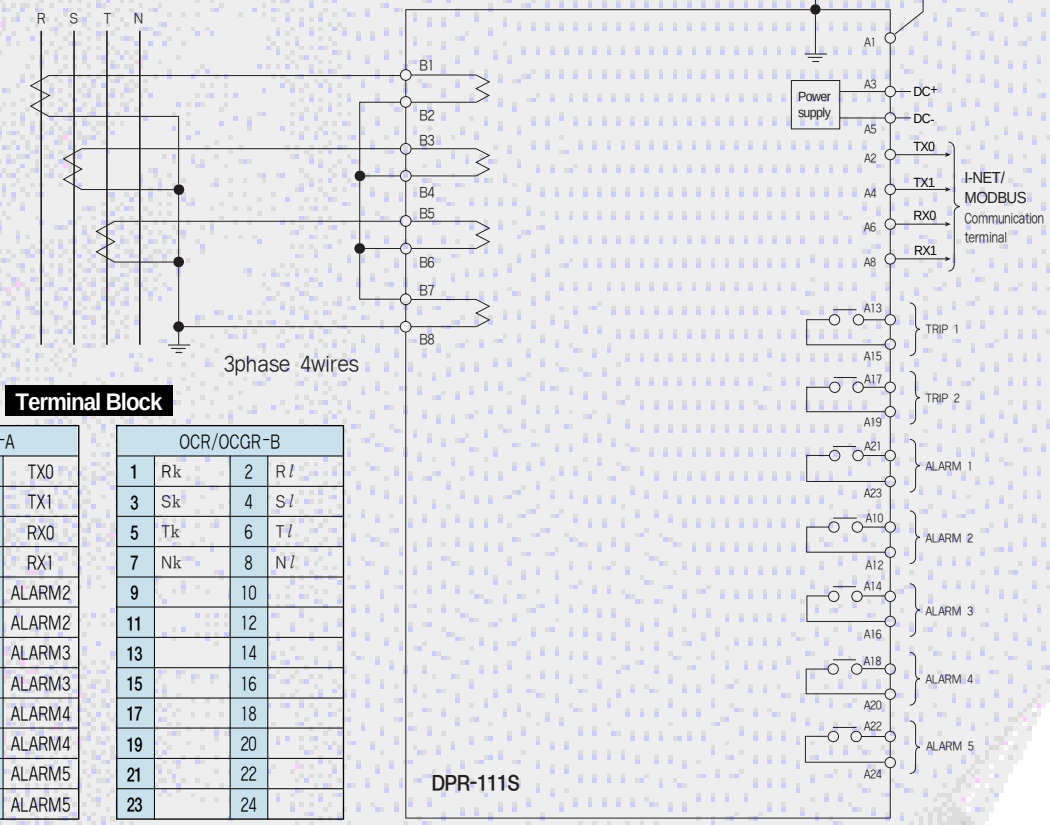
DPR-111S

Type designation			DPR-011S	DPR-111S
ANSI code			50/51 × 3	50/51 × 3 50/51N × 1
Ratings	Current(In)		5A	
	Frequency(fn)		50/60Hz	
	Control power(Vx)		DC 110/125V (DC85~150V)	
	Input burdens		0.5VA and below	
Relay elements			3 phase overcurrent protection(OCR)	3 phase overcurrent protection(OCR) Ground fault overcurrent protection(OCGR)
Setting range	Time delayed setting	Phase	1~16A/0.5A (20~200%)	1~16A/0.5A (20~200%)
		Earth		0.2~2.5A/0.1A (4~50%)
	Instantaneous setting	Phase	10~160A/5A (200~3200%), Lock	10~160A/5A (200~3200%), Lock
		Earth		2.5~40A/2.5A (50~800%), Lock
Operating time	Time delayed element	Inverse	Standard inverse, Very inverse, Extremely inverse, Long inverse 0.05~1seconds in a 0.2 step	
		Definite	0.1~10seconds in a 0.2 step	
	Instantaneous	Definite	Within 35msec	
Additional function			Self-diagnostics Fault recording Sequence of event(S.O.E)	
Communication mode			I-NET(MODBUS) Note1)	
Display			Back-lit LCD(Dot matrix)	
Output contacts	Switching capacity		Make 10A/250Vac, 0.5sec, resistive Break 1A/250Vac 0.1PF	
	Constitution (7EA) Note2)		Trip relay 2a, 1250VA and over Alarm relay 4a System fail relay 1a	
	Type	At trip operation	Trip relay + Trip LED + Alarm relay	
		Seif-diagnostics error	System fail relay + Alarm relay	
		At normal	RUN LED	
Insulation resistance			DC 500V 100MΩ and over	
Dielectric withstand			2kV(1kV) rms. and over for 1 minute	
High voltage impulse			5kV(3kv) peak and over applied for 1.2 × 50μs	
Overload capacity		Current circuit	Rated current(In) × 2 for 3 hours Rated current(In) × 20 for 3 seconds Rated current(In) × 40 for 3 seconds	
		Voltage circuit	Rated Voltage(Vn) × 1.15 for 3 hours	
Temperature		Operating	-10~55℃	
		Storage	-20~70℃	
Humidity			80% RH (Non-condensing)	
Applied standard			IEC 255, IEC 1000-4, KEMC 1120	
Weight			3.2kg	
Dimension			124(W) × 177(H) × 243(D)mm	

Note1) Pleaee contact us for MODBUS communication before your order.
Note2) The output contacts are programmable.

Connection methods





Terminal Block

OCR/OCGR-A			
1	F.G	2	TX0
3	DC+	4	TX1
5	DC-	6	RX0
7		8	RX1
9		10	ALARM2
11		12	ALARM2
13	TRIP 1	14	ALARM3
15	TRIP 1	16	ALARM3
17	TRIP 2	18	ALARM4
19	TRIP 2	20	ALARM4
21	ALARM1	22	ALARM5
23	ALARM1	24	ALARM5

OCR/OCGR-B			
1	Rk	2	R*l*
3	Sk	4	S*l*
5	Tk	6	T*l*
7	Nk	8	N*l*
9		10	
11		12	
13		14	
15		16	
17		18	
19		20	
21		22	
23		24	

Output contacts OCR, OCGR

●:Default(When shipment) ○:Programmable ×:Not available

Unit	Kinds of contacts / Output contacts		TRIP RELAY			ALARM RELAY									
			TRIP	Trip-INST	Trip-TD	ALM-Trip	ALM-INST	ALM-TD	ALM-I1	ALM-I2	ALM-I3	ALM-I4	ALM-Sys Fail	PICK-Up	No use
OCR / OCGR	TRIP 1	for Trip	●	○	○	×	×	×	×	×	×	×	×	×	×
	TRIP 2		●	○	○	×	×	×	×	×	×	×	×	×	×
	ALARM 1	for Alarm	×	×	×	○	○	○	●	○	○	○	×	○	○
	ALARM 2		×	×	×	○	○	○	○	●	○	○	×	○	○
	ALARM 3		×	×	×	○	○	○	○	○	●	○	×	○	○
	ALARM 4		×	×	×	○	○	○	○	○	○	●	×	○	○
	ALARM 5		×	×	×	×	×	×	×	×	×	×	●	×	×
Purpose of contacts			Trip	Instantaneous Trip	Time delayed Trip	Trip Alarm	Instantaneous Trip	Time delayed Trip	"R" phase Trip	"S" phase Trip	"T" phase Trip	"N" phase Trip	Self-diagnotics Error	Overload Pre alarm	No use

Note 1) Alarm relay can not be used for Trip (CB control) contacts.
Note 2) Alarm-I4 is not available for DPR-011S(OCR)
Note 3) In case of Trip1, Trip2, the contacts, status are stored as an EVENT, if they were changed during operation

Selective Ground Relay(SGR)

DIGITAL PROTECTION RELAY

Features

- Self-diagnostics
- Fault recording
- Sequence of event(S.O.E)
- High speed serial data communication
- International standard applied
  -IEC 255, IEC 1000-4, KEMC 1120

Operation characteristic curves

(Refer to page 22)

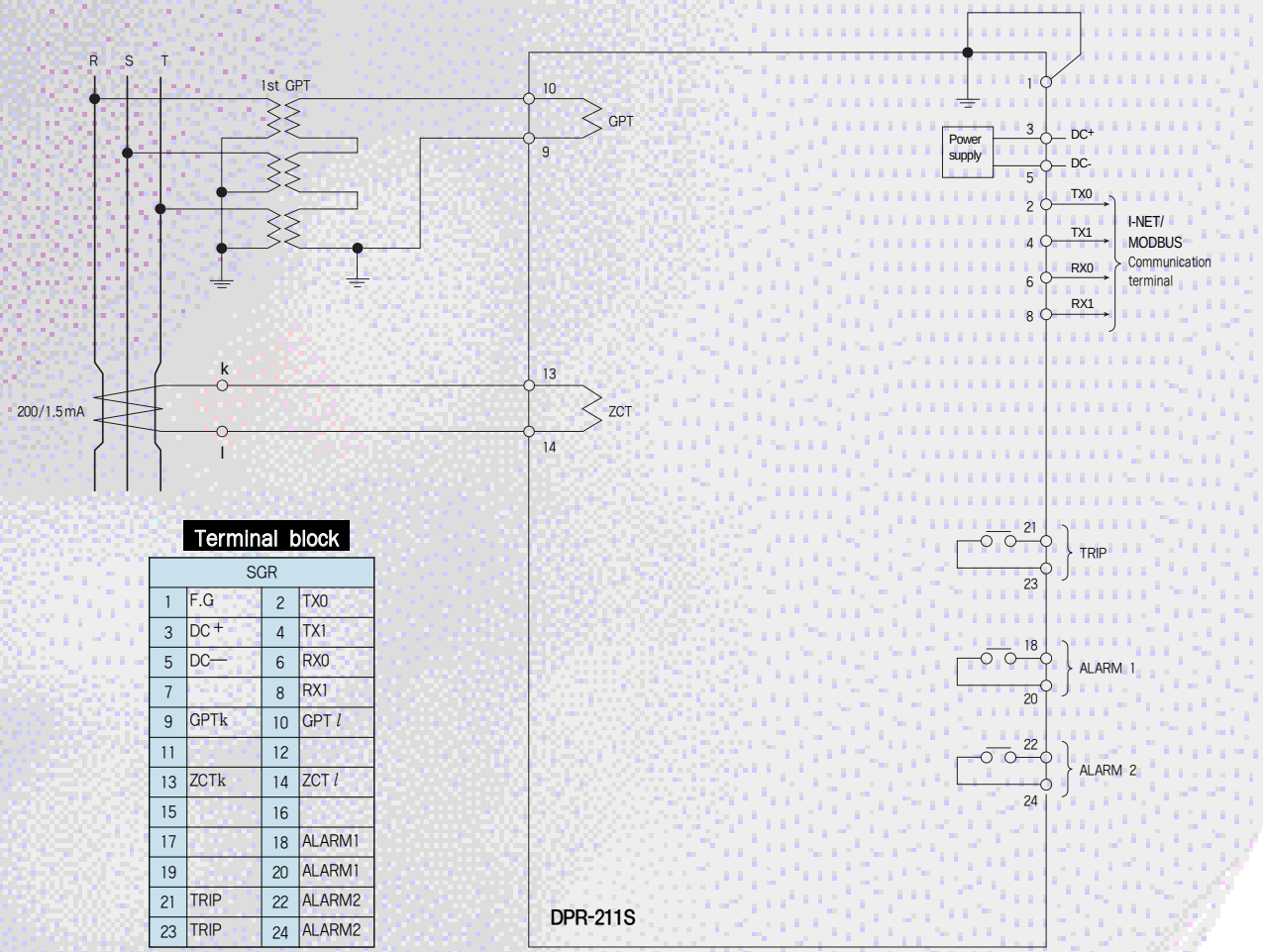
- Definite time

DPR-211S

Type designation			DPR-211S
ANSI code			67G
Ratings	Zero phase current(Ion)		1.5mA
	Frequency(fn)		50/60Hz
	Zero sequence voltage(Von)		190V
	Control power(Vx)		DC 110/125V(DC85～150V)
	Input burdens		0.5VA and below
Relay elements			Selective earth fault protection(SGR)
Setting range	Operating current(Io)		0.9～5.4mA/0.3mA
	Operating voltage(Vo)		4～76V/4V
	Operating phase angle		0 °, 30°, 45°, 60°, 90°
Operating time	Definite time		0.1～10seconds in a 0.1초 step
Additional function			Self-diagnostics Fault recording Sequence of event(S.O.E)
Communication mode			I-NET(MODBUS) Note1)
Display			Back-lit LCD(Dot matrix)
Output contacts	Switching capacity		Make 10A/250Vac, 0.5sec, resistive Break 1A/250Vac 0.1PF
	Constitution (3EA)		Trip relay 1a, 1250VA and over Alarm relay 1a System fail relay 1a
	Type	At trip operation	Trip relay + Trip LED + Alarm relay
		Self-diagnostics error	System fail relay + Alarm LED
		At normal	RUN LED
Insulation resistance			DC 500V 100MΩ and over
Dielectric withstand			2kV(1kV) rms. and over for 1 minute
High voltage impulse			5kV(3kv) peak and over applied for 1.2 × 50㎲
Overload capacity	Voltage circuit		Vn × 1.15 for 3 hours
Temperature	Operating		-10～55℃
	Storage		-20～70℃
Humidity			80% RH
Applied standard			IEC 255, IEC 1000-4, KEMC 1120
Weight			2.8kg
Dimension			124(W) × 177(H) × 243(D)mm

Note 1) Please contact us for MODBUS communication before your order

Connection methods



Terminal block

SGR			
1	F.G	2	TX0
3	DC +	4	TX1
5	DC—	6	RX0
7		8	RX1
9	GPTk	10	GPT *l*
11		12	
13	ZCTk	14	ZCT *l*
15		16	
17		18	ALARM1
19		20	ALARM1
21	TRIP	22	ALARM2
23	TRIP	24	ALARM2

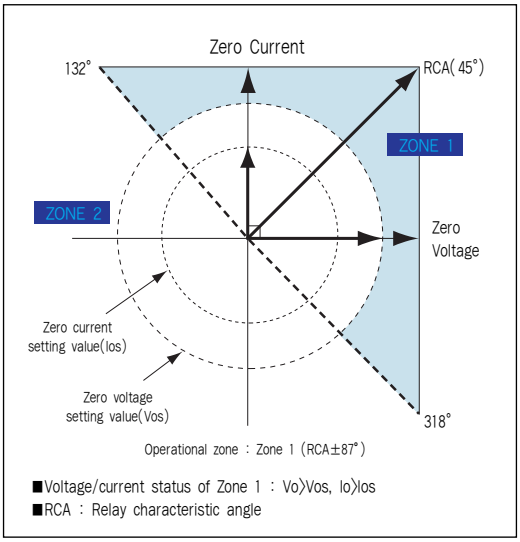
Output contacts of SGR

●:Default(when shipment) ○:Programmable ×:Not available

Unit	Output contacts \ Kinds of contacts		Trip relay	Alarm relay	
			TRIP	ALM-Trip	ALM-Sys fail
SGR	Trip	for Trip	●	×	×
	Alarm 1	for Alarm	×	○	×
	Alarm2		×	○	×
Purpose of contacts			Trip	Trip Alarm	Self-Diagnostics Error

Note) 1. Alarm relay can not be used for Trip(CB control) contacts.

Operating phase characteristics



Under and Overvoltage Relay (UVR & OVR)

DIGITAL PROTECTION RELAY

Features

- Self-diagnostics
- Fault recording
- Sequence of Event(S.O.E)
- High speed serial data communication
- International standard applied
  -IEC 255, IEC 1000-4, KEMC 1120

DPR-411S

Operation characteristic curves

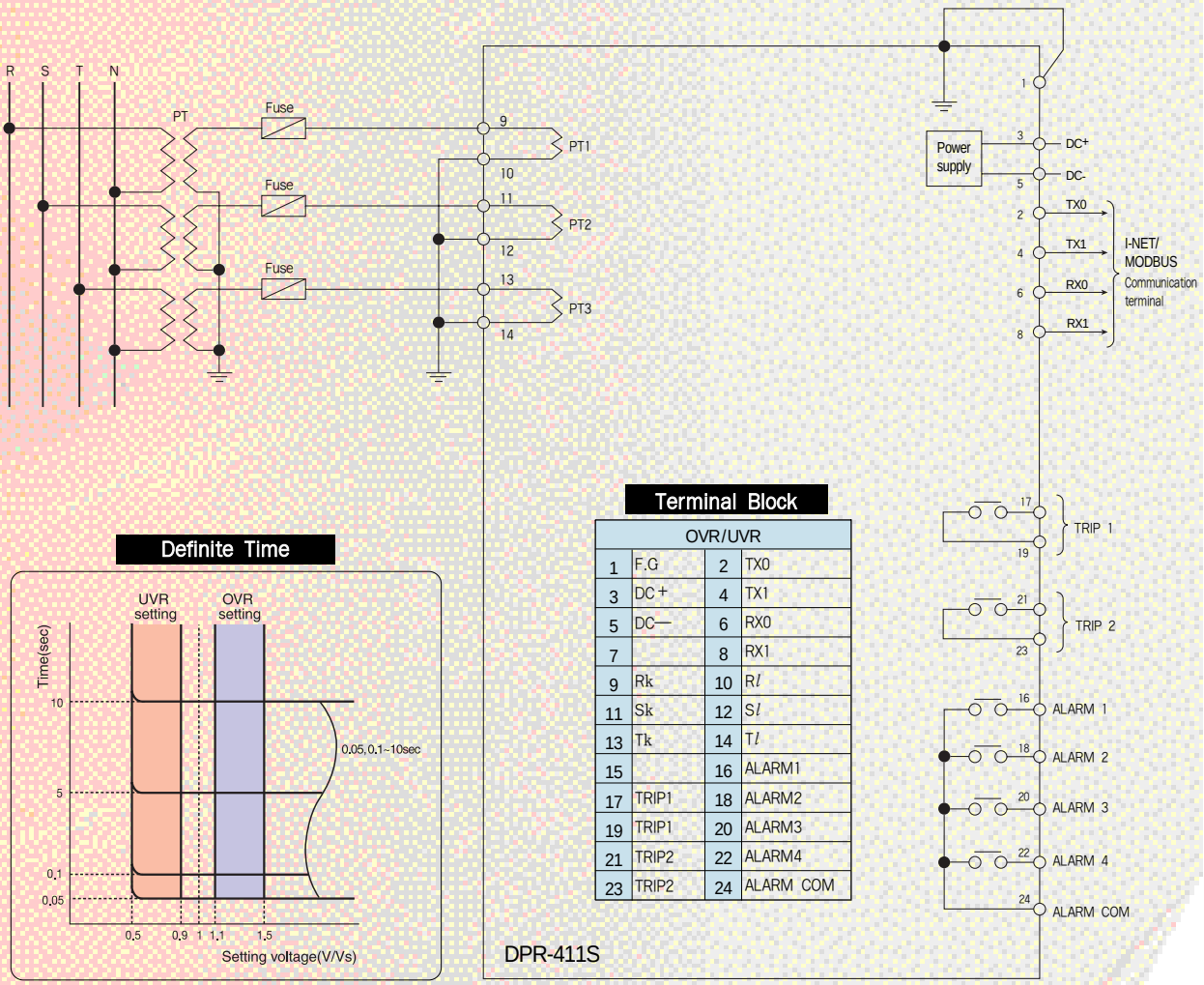
(Refer to page 22)

- Definite time

Type designation			DPR-311S	DPR-411S
ANSI code			59(27)	59/27
Ratings	Volltage(Vn)		110V	
	Frequency(fn)		50/60Hz	
	Control power(Vx)		DC 110/125V (DC85~150V)	
	Input burdens		0.5VA and below	
Relay elements			3phase overvoltage protection(undervoltage protection) -Selecting UVR or OVR	3phase overvoltage protection(OVR) 3phase overvoltage protection(UVR)
Setting range	Time delayed element	OVR	121~165V/2V (110~150%)	
		UVR	55~99V/2V (50~90%), No-voltagge locking Note1)	
Operating time	Time delayed definite element		0.05, 0.1~10seconds in a 0.1 step	
Additional function			Self-diagnostics Fault records Sequence of event(S.O.E)	
Communication mode			I-NET(MODBUS) Note2)	
Display			Back-lit LCD (Dot matrix)	
Output contacts	Switching capacity		Make 10A/250Vac, 0.5sec, resistive Break 1A/250Vac 0.1PF	
	Constitution(6EA) Note3		Trip relay 2a, 1250VA and over Alarm relay 3a System fail relay 1a	
	Type	At Trip operation	Trip relay + Trip LED + Alarm relay	
		Self-diagnostics error	System fail relay + Alarm relay	
		At Normal	RUN LED	
Insulation resistance			DC 500V 100㏁ and over	
Dielectric withstand			2kV(1kV) rms, and over for 1minute	
High voltage impulse			5kv(3kV) peak and over applied for 1.2 × 50㎲	
Overload capacity	Voltage circuit		Vn × 1.15 for 2 hours	
Temperature	Operating		-10~55℃	
	Storage		-20~70℃	
Humidity			80% RH (Non- condensing)	
Applied standard			IEC 255, IEC 1000-4, KEMC 1120	
Weight			3.1kg	
Dimension			124(W) × 177(H) × 243(D) mm	

Note 1) No-voltage Lock : The lock function can be selected not to be tripped when no input voltage appeared (20% and under of rated voltage)
Note 2) Please contact us about MODBUS system
Note 3) The output contacts are programmable

Connection methods



Terminal Block

OVR/UVR			
1	F.G	2	TX0
3	DC +	4	TX1
5	DC—	6	RX0
7		8	RX1
9	Rk	10	R*l*
11	Sk	12	S*l*
13	Tk	14	T*l*
15		16	ALARM1
17	TRIP1	18	ALARM2
19	TRIP1	20	ALARM3
21	TRIP2	22	ALARM4
23	TRIP2	24	ALARM COM

Definite Time

Output contacts of OVR/UVR

●:Default(When shipment) ○:Programmable ×:Not available

Unit	Output contacts \ Kinds of contacts		Trip relay		Alarm relay							
			TRIP	TRIP-3phase	ALM-Trip	ALM-3phase	ALM-V1	ALM-V2	ALM-V3	ALM-Sys fail	PICK-Up	No use
OVR / UVR	Trip 1	for Trip Note 3)	●	×	×	×	×	×	×	×	×	×
	Trip 2		×	●	×	×	×	×	×	×	×	×
	Alarm 1	for Alarm	×	×	○	○	●	○	○	×	○	○
	Alarm 2		×	×	○	○	○	●	○	×	○	○
	Alarm 3		×	×	○	○	○	○	●	×	○	○
	Alarm 4		×	×	×	×	×	×	×	●	×	×
Purpose of contacts			1phase and over fault among of R,S,T	R,S,T all phase fault	1phase and over trip	3phase Trip	"R" phase Trip	"S" phase Trip	"T" phase Trip	Self-diagnostics Error	Overload Pre alarm	No use

Note 1) Alarm relay can not be used for Trip(CB control) contacts.
Note 2) DPR-311S is available for selectable use as OVR or UVR, and it will be set on UVR when shipment.
Note 3) DPR-411S is used as OVR, UVR multiple relay. The Trip 1 is OVR and Trip 2 is for UVR as Trip contacts and it can be selected by Trip or Trip- 3phase.

Over Voltage Ground Relay(OVGR)

DIGITAL PROTECTION RELAY

Features

- Self-diagnostics
- Fault recording
- sequence of event(S.O.E)
- High speed serial data communication
- International standard applied
  -IEC 255, IEC 1000-4, KEMC 1120

DPR-511S

Operation characteristic curves

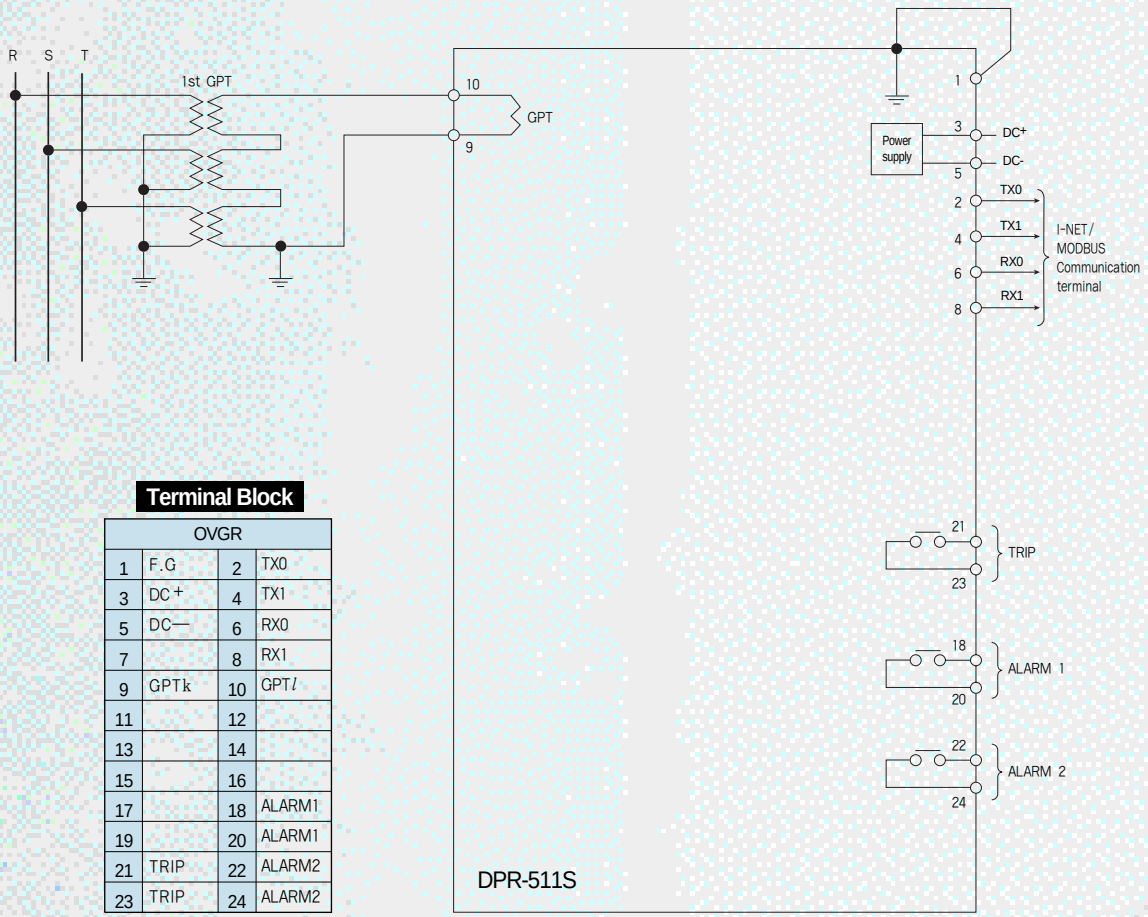
(Refer to page 22)

- Standard inverse time
- Very inverse time
- Extremely inverse time
- Long inverse time
- Definite time

Type designation			DPR-511S
ANSI code			64
Ratings	Voltage(Von)		190V
	Frequency(fn)		50/60Hz
	Control power(Vx)		DC 110/125V (DC85～150V)
	Input burdens		0.5VA and below
Relay elements			Over Voltage Ground Protection (OVGR)
Setting range	Time delayed setting		20～76V/2V (10.5～40%)
	Instantaneous setting		20～76V/2V (10.5～40%), Lock
Operating time	Time delayed element	Inverse	Standard inverse, Very inverse, Extremely inverse 0.05～1.00sec in a 0.01sec step
		Definite time	0.1～10sec in a 0.1sec step
	Instantaneous element	Definite time	Within 35 msec
Additional function			Self-diagnostics Fault records Sequence of event(S.O.E)
Communication mode			I-NET(MODBUS) Note1)
Display			Back-lit LCD (Dot matrix)
Output contacts	Switching capacity		Make 10A/250Vac, 0.5sec, resistive Back 1A/250Vac, 0.1PF
	Constitution (3EA)		Trip relay 1a, 1250VA and over Alarm relay 1a System fail relay 1a
	Type	At Trip operation	Trip relay + Trip LED + Alarm relay
		Self-diagnostics error	System fail relay + Alarm relay
		At Normal	RUN LED
Insulation resistance			DC 500V 100㏁ and over
Dielectric withstand			2kV(1kV) rms. and over for 1 minute
High voltage impulse			5kV(3kV) peak and over applied 1.2 × 50㎲
Overload capacity	Voltage circuit		Vn × 1.15 for 3 hours
Temperature	Operating		-10～55℃
	Storage		-20～70℃
Humidity			80% RH
Applied standard			IEC255, IEC1000-4, KEMC1120
Weight			2.8kg
Dimension			124(W) × 177(H) × 243(D) mm

Note 1) Please contact us about MODBUS system

Connection methods



Terminal Block

OVGR			
1	F.G	2	TX0
3	DC +	4	TX1
5	DC—	6	RX0
7		8	RX1
9	GPTk	10	GPTl
11		12	
13		14	
15		16	
17		18	ALARM1
19		20	ALARM1
21	TRIP	22	ALARM2
23	TRIP	24	ALARM2

Output contacts of OVGR

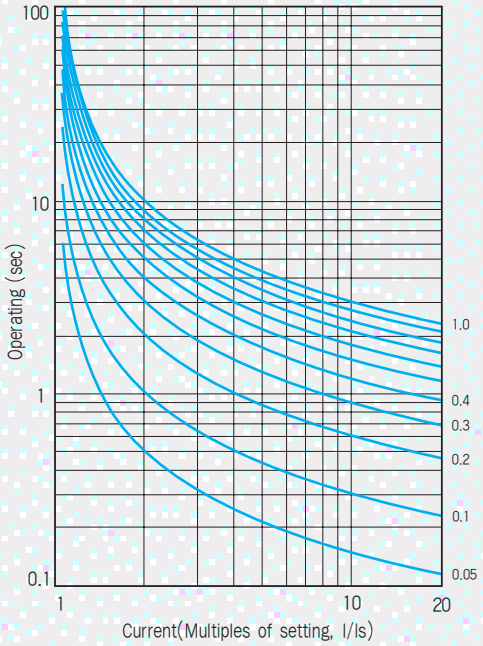
●:Default(When shipment) ○:Programmable ×:Not available

Unit	Output contacts \ Kinds of contacts		Trip relay	Alarm relay	
			TRIP	ALM-Trip	ALM-Sys fail
OVGR	Trip	for Trip	●	×	×
	Alarm1	for Alarm	×	●	×
	Alarm2		×	×	●
Purpose of contacts			Trip	Trip alarm	Self-diagnostics error

Note 1) Alarm relay can not be used for Trip(CB control) contacts.

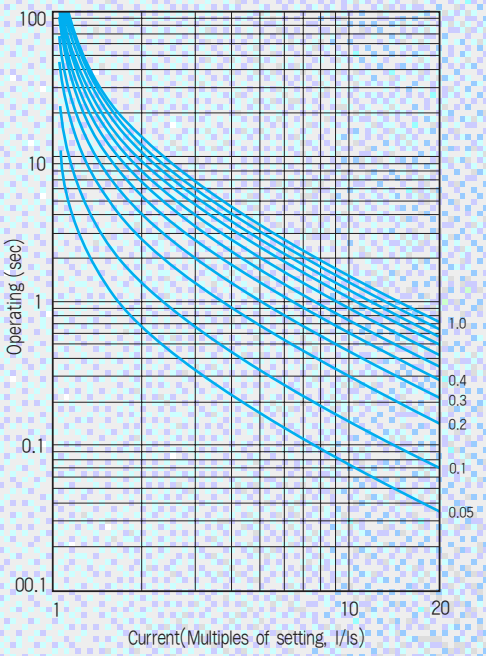
Standard inverse - (OCR, OCGR, OVGR)

Standard inverse time (SI)



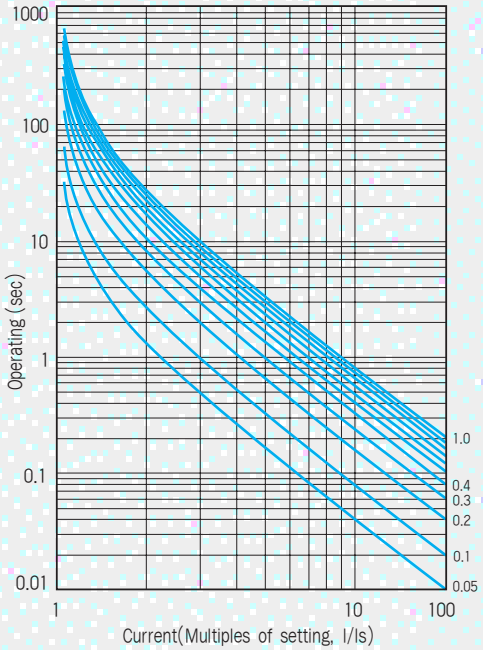
Very inverse - (OCR, OCGR, OVGR)

Very inverse time (VI)



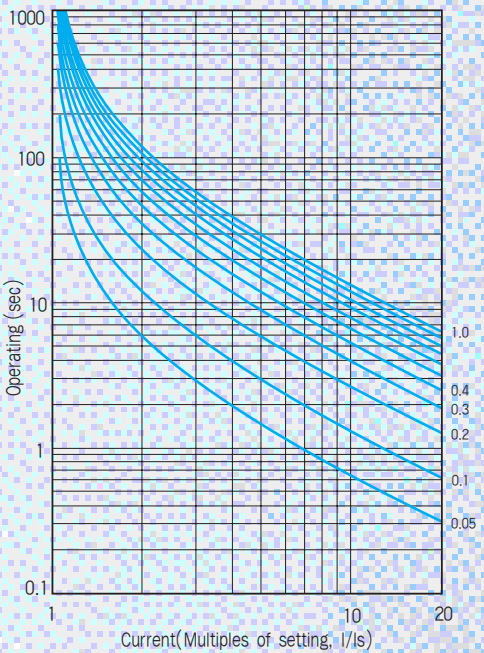
Extremely inverse - (OCR, OCGR, OVGR)

Extremely inverse time (EI)



Long inverse - (OCR, OCGR, OVGR)

Long inverse time (LI)

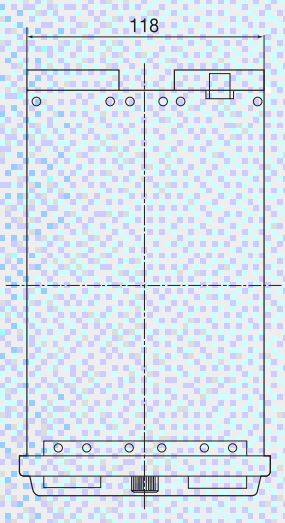


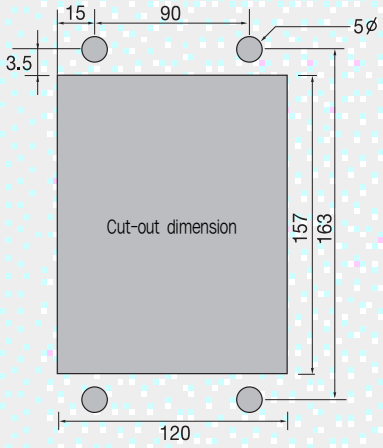
■ Operating time : $t(sec) = \frac{\beta}{\left(\frac{I}{Is}\right)^{\alpha} - 1} \times Tap$

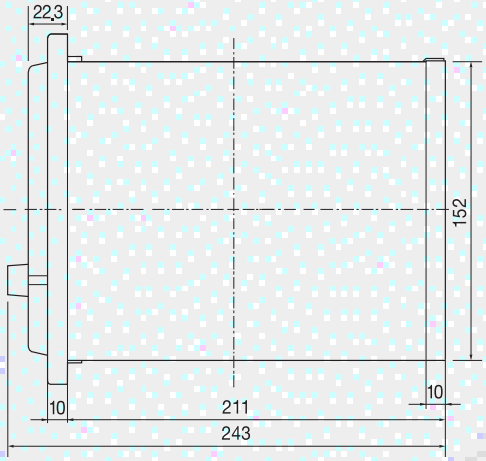
(Tap : 0.05~1.0)

- SI : $\alpha = 0.02$ $\beta = 0.14$
- VI : $\alpha = 1$ $\beta = 13.5$
- EI : $\alpha = 2$ $\beta = 80$
- LI : $\alpha = 1$ $\beta = 120$

Dimensions and ordering information







Selection and ordering data

DPR - ① ② ③ ④

① Protection element	
0	OCR
1	OCG/OCGR
2	SGR
3	OVR(UVR) Note1)
4	OVR/UVR
5	OVGR

② Control voltage	
1	DC110/125V

③ Communication	
1	I-NET
2	MODBUS Note2)

④ Optional	
-	Standard
S	S.O.E function

Note 1) DPR-311S is available for selectable use for OVR or UVR and DPR -411S is multi-relay with OVR and UVR
Note 2) Please contact us about MODBUS communication system

LG constantly endeavors to improve our products, so that information in this catalog is subject to change without notice.

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