



DEESYS
DIGITAL
ELECTRICAL
SAFETY
SOLUTIONS

PRODUCTS GUIDE

DIGITAL ELECTRICAL SAFETY SOLUTIONS



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Digital Power Quality Analsys Meter·Digital Power Protective Relay
Digital Power Leakage Protector·Digital Ground Fault Protective Relay
Analog Scale Meter·Zero Phase Transformer
Current Transformer·Potential Transformer

Notes on installation

- » Excessive shock or damage may be applied during the distribution process, resulting in an abnormal condition. First, check that there are no abnormalities such as appearance.
 - » Please observe the following for installation. And, for safety, installation must be performed by a certified technician.
 - When installing the product in the switchboard, be careful not to insert it with excessive force or to put stress on the product.
 - When installing to the switchboard using bolts and nuts, use a tool suitable for size and tighten it firmly.
- ※ Recommendation of Tightening Torque - M3 : 0.48~0.98N/m
M4 : 0.98~1.47N/m
M5 : 1.47~1.96N/m

Notes on how to use

- » Please use it within the rated range.
 - Use outside(over current or over voltage) the rated range may cause malfunction.
- ※ For details, refer to the catalog or instruction user manual.

Notes on repair in case of malfunction and handling in case of abnormality

- » In case of abnormal sound, abnormal heat or malfunction, take emergency measures such as blocking the input power immediately, and then contact the nearest agency or A/S center of DEESYS office.

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■ Zero Phase Current Transformer

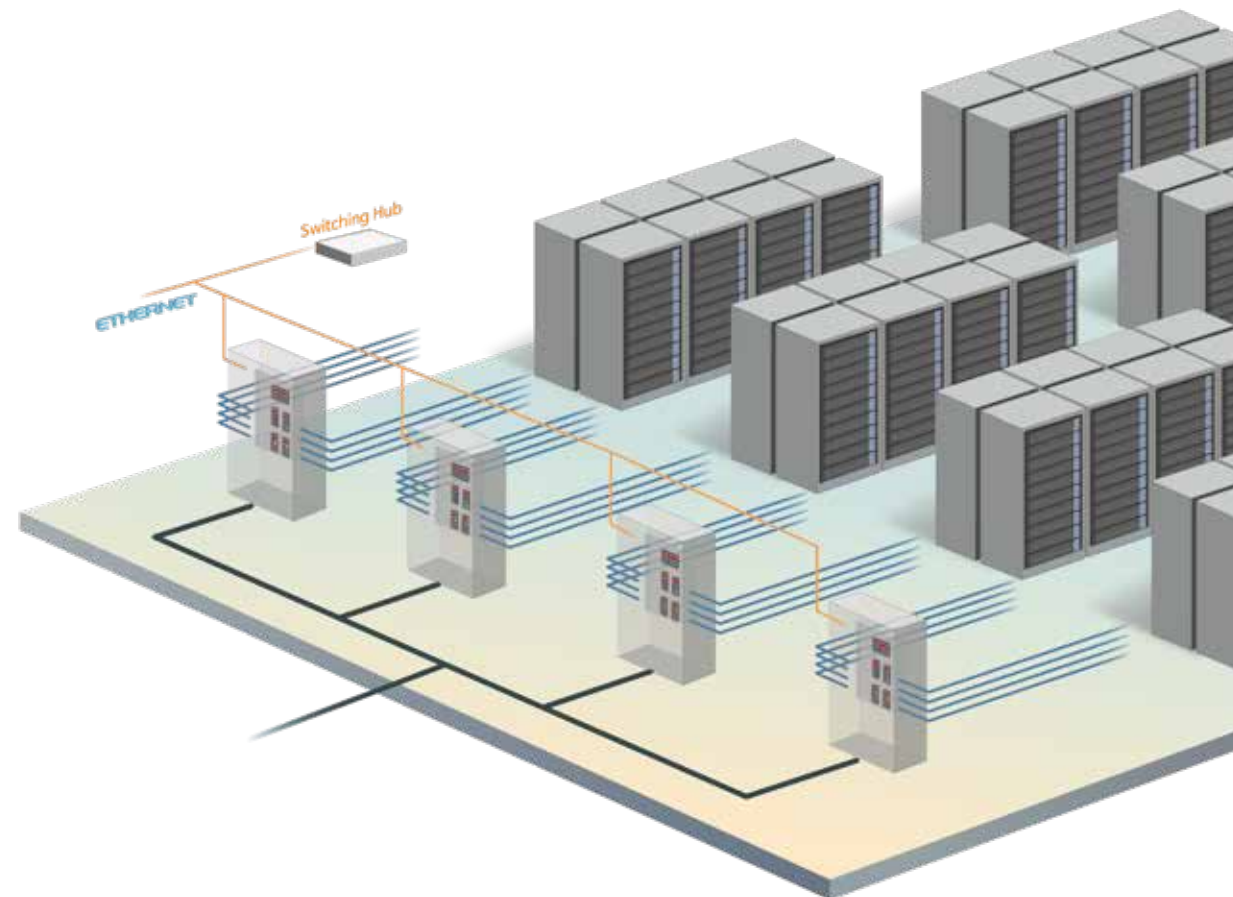
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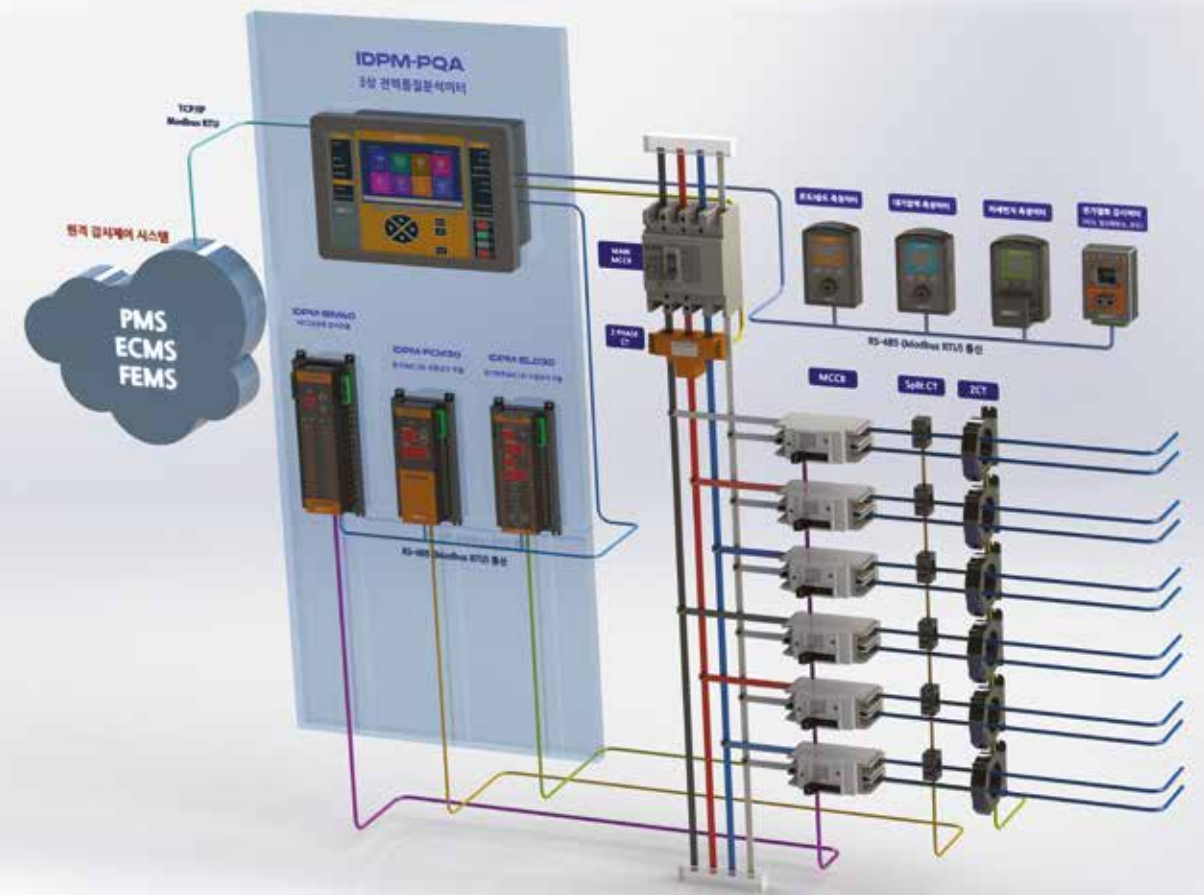
Advantage of PQA System

Digital power meter used in the previous panel board energy management system was installed in the branch load(server) inside the panel board to solve such problems as the narrow space inside the panel board, risk of voltage-current connection, and economic feasibility of installation. The system has the competitive price to install the single-phase feeder with 30 circuits inside the panel board.



Single-phase, 3-phase feeder power measuring module IDPM-FCM30(30 circuits), short circuit monitoring module IDPM-ELD30(30 circuits), and circuit breaker monitoring module IDPM-BIM60(60 circuits) monitor leakage current and MCCB trip condition of each feeder through ZCT. The values measured and collected in a lump by branch load are transferred to digital power measurement meter IDPM-IFLB90 via the internal network(RS-485) of the data center and the main power information inside the panel board is provided quickly and accurately to the power safety manager.

Electrical Line Diagram for PQA System



Power Quality and Safety Analyzer - All in One Power Meter



IDPM-PQA
Power Quality Analyzer Meter



IDPM-IFLB
PQA (Entry Model)



IDPM-FMC30
30 Circuits Current,
Power Wattage
Measuring
Module



IDPM-ELD30
30 Circuits
Leakage Current
Detective
Module



IDPM-BIM60
30 Circuits
Breaker Status
Monitoring
Module



Intelligent Digital Power Meter
- Power Quality All in one

- ◆ IDPM-PQA Meter measures and quantifies energy loss due to harmonics and power imbalance problems and then monitors it, so users can find the cause of energy loss within the system, thereby reducing operating costs.
- ◆ Sag, Swell, Interruption, Transient, Harmonics (1-63 harmonics), Flicker wave forms are saved in accordance with the power quality standard (IEC 61000-4-30 class A), and ITIC Curve is provided.
- ◆ Provides annual, monthly, and daily changing trends for voltage, current, and wattage.
- ◆ Using the Report Program, you can write and print-out the power quality evaluation report required by the EN 50160 standard.

계측 요소

Parameter		Real Time	Average	Sum	Maximum	Minimum
Voltage	Phase Voltage	◎	◎		◎	◎
	Line Voltage	◎	◎		◎	◎
	Zero Phase Volt.	◎			◎	
Current	Phase Current	◎	◎		◎	◎
	Zero Phase Curr.	◎			◎	
Power	Active Power	◎		◎		
	Reactive Power	◎		◎		
	Apparent Power	◎		◎		
Amount of electricity	Net Energy	◎		◎		
	Received Energy	◎		◎		
	Transmitted Energy	◎		◎		
	Sunned Energy	◎		◎		
Frequency		◎				
Power Factor		◎		◎		
Demand	Net Energy			◎	◎	
	Received Energy			◎	◎	
	Transmitted Energy			◎	◎	
	Sunned Energy			◎	◎	
Trend	Voltage		◎		◎	◎
	Current		◎		◎	◎
	Energy		◎		◎	◎
Harmonics	Voltage	◎				
	Current	◎				

Main Fuction

▶H.M.I (7" TFT LCD)

Using IDPM-PQA adopts 7inch TFT LCD, it monitors metering, power quality, branch circuit status and cold-zone status in real time and displays event record, waveform analysis, harmonic analysis, vector analysis, ITIC curve, etc.

▶Event Record

IDPM-PQA records up to 1,000 events about what (Type), in which phase (Phase), when (Time), for how long (Duration), and at what value (Vrms) for the generated power quality parameter .

▶Wave Record

It provides accident analysis waveforms of 3 cycles before and after the accident with 1,024 sampling using the Manager Program.



▶Redundancy of Control Power

IDPM-PQA is designed with dual control power, so even if one phase is lost, it operates stably with the voltage of the other phase. Also, if you connect a DC 12V battery to the battery terminal, you can check the operation of the instrument even if all phases are missing.

▶Switch Hub Fuction

IDPM-PQA has 2 ports of TCP/IP type Ethernet for smooth network connection, so it can perform the role of Switch-Hub by itself during multi-drop, so multi-drop connection between devices is easy.

▶Circuit Breaker Operation Control

IDPM-PQA is equipped with a key to control the circuit breaker status (Close / Open). The lock key at the bottom always maintains the locked state to prevent accidents caused by arbitrary manipulation. In order to control the circuit breaker, you must release the lock state and press CB On/Off to change the state.

▶ITIC Curves

IDPM-PQA provides ITIC Curve according to IEEE 1100 standard. ITIC Curve displays the size and time of the operation time of power quality parameters such as instantaneous undervoltage (Sag), instantaneous overvoltage (Swell), instantaneous power failure (Interruption), and transient voltage (Transient) by dividing the points into safe and unsafe areas. , each indicated number evaluates the safe state of the supply voltage.

▶Power Quality Evaluation Report

The power quality evaluation report required by the EN 50160 standard can be prepared and printed-out using the Report Program that provides separately.

Metering



- * Measures phase voltage, line voltage, current, power, wattage, frequency, power factor, demand, etc.

Phasor



- * The magnitude and phase of each phase of 3-phase voltage and current are displayed in real time with a vector diagram.

Harmonics



- * Provides a real-time graph of the harmonics contained in each phase of three-phase voltage and current.
- * Percentage of the RMS value of the fundamental component is displayed.

Trend



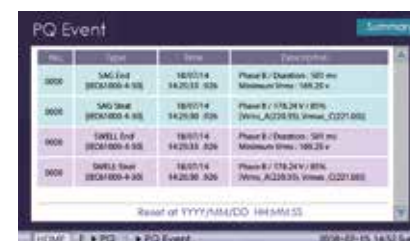
- * A graph of the change trend is provided by day, month, and year for phase voltage, current, and active power.
- * Displays the maximum, minimum, and average values for each phase.

Circuit Breaker



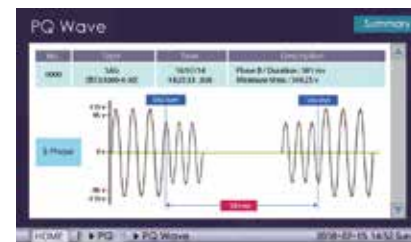
- * On/Off, Remote/Local status display

PQ Event



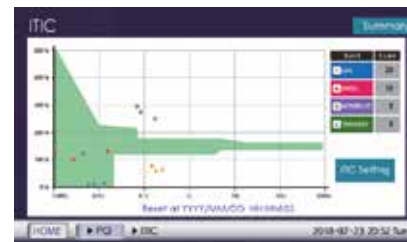
- * Event is recorded when Sag, Swell, Transient, Interruption, Flicker, Harmonics occur.

PQ Wave



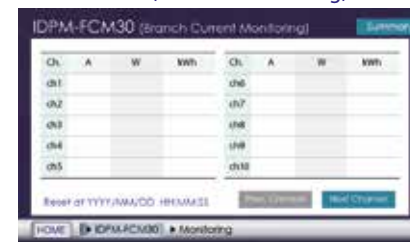
- * Provides analysis function in the device itself without SCADA (FMS/PMS)
- * Real-time measurement of power quality and analysis of waveforms recorded in Events when PQ occurs

ITIC Curve



- * Sag, Swell, Transient, Interruption measurement
- Provision of power quality distribution characteristics to ITIC Curve.
- Display the number of occurrences to determine the power stabilization status.

IDPM-FCM30 (Current Monitoring)



- * Measure and display branch current and wattage for each circuit.
- * When a value out of the range of Upper Current and Lower Current set for each circuit is measured, it is saved as an Event.

IDPM-ELD30 (Fault Leakage)



- * Displays the operating status of each circuit due to leakage current
- * The branch circuit in which leakage current occurred is the branch number is displayed in red.

IDPM-BIM60 (MCCB Status)



- * Displays On, Off, Trip status of MCCB
- * In the breaker status display, Off status is green, On status is displayed in red, Trip status is displayed in blue.

Sensor

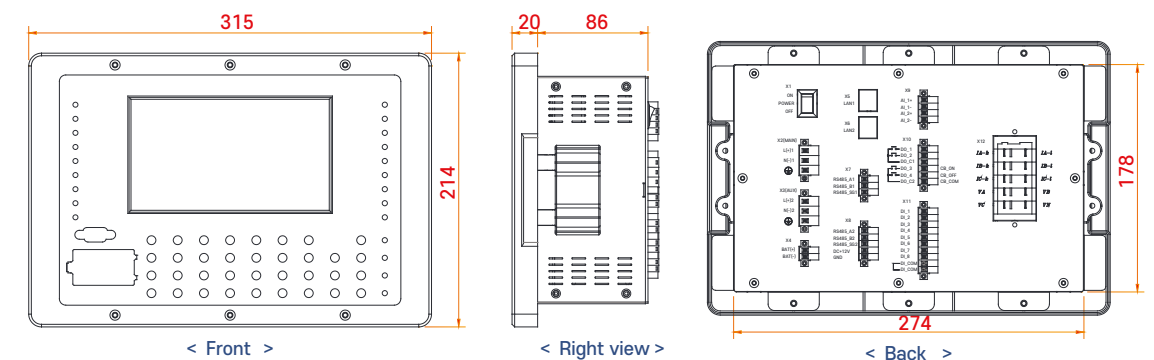
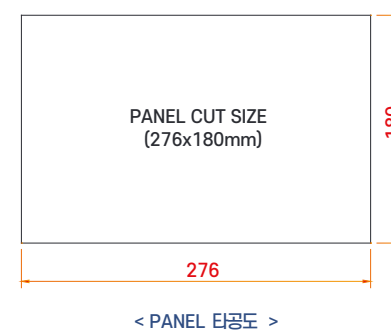
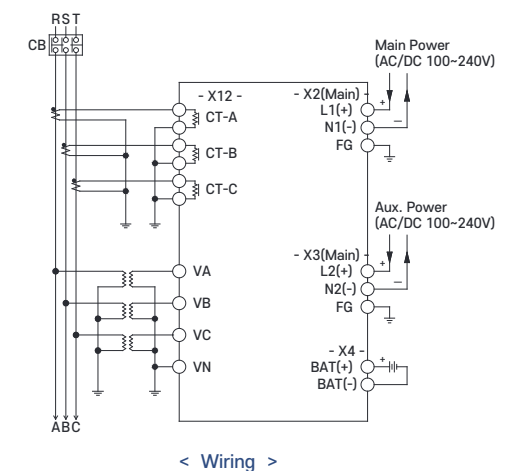


- * Arc, CO gas concentration, temperature measurement inside the switchboard.
- * Manage the temperature, humidity and dew point temperature of the cold zone by designating up to 6 points.

Applicable standard

항목	규격
Accuracy	
Volatage, Current	IEC 62053-22 ±0.2% Reading
Powerm Energy	IEC 62053-22 Class 0.5S
Power Quality	
Power Quality Measurement (Sag, Swell, Transient)	IEC 61000-4-30 Class A
Flicker	IEC 61000-4-15 Class F1
Harmonic & Inter Harmonics	IEC 61000-4-7 Class A
Total Harmonics Distortion (THD)	IEC 61000-4-7 Class I
EMC	
Electrostatic Discharge [ESD]	IEC 61000-4-2 (KS C 9610-4-2)
EM Field	IEC 61000-4-3 (KS C 9610-4-3)
Electric Fast Transient	IEC 61000-4-4 (KS C 9610-4-4)
Surge Immunity	IEC 61000-4-5 (KS C 9610-4-5)
Conducted RF Immunity	IEC 61000-4-6 (KS C 9610-4-6)
Rated Power Frequency Magnetic Field	IEC 61000-4-8 (KS C 9610-4-8)
Voltage Dip / Short Interruptions	IEC 61000-4-11 (KS C 9610-4-11)
Conducted disturbance test	KN 11
Radioactive disturbance test	KN 11
CE Safety Requirement for Electrical Equipment	IEC 61010-1
Power Quality Standard Report	EN 50160

외형 규격 및 결선도





Intelligent Digital Power Meter
- Incoming Feeder, ELD, Binary input

- ◆ Measurement of 0.2% of reading for voltage and current and power and wattage are KS C IEC 62053-22 class 0.5S.
- ◆ It judges low-pressure phase rotation and turns on the phase lamp in case of reverse or phase loss to prevent misconnection.
- ◆ It saves power quality data such as sag, swell, interruption, and THD for up to 300 cycles, and can be converted into a comtrade file.
- ◆ It supports Modbus RTU and TCP/IP communication as communication protocol, and has a switch hub function for TCP/IP communication.

Ratings and Specifications

Classification		Applicable Range
Wiring Method		3P4W, 3P3W, 1P3W, 1P2W
Rated frequency		50 / 60Hz
PT Input	Ratings	AC 110V / 220V / 380V
	Measuring Range	AC 90 ~ 500V (Less than 1.0VA)
CT Input	Ratings	AC 5A
	Measuring Range	AC 0.2 ~ 10.0A (Less than 0.5VA)
Control Power	Ratings	AC/DC 80 ~ 260V (Less than 10VA)
Digital Input		DI1, DI2, DI3
Digital Output		DO1 ⇔ DO_com1 / DO2 ⇔ DO_com2
Incoming Display	3 Phase Meas. Range	A, V, kW, kVar, kVA, kWh, kVarh, PF, Hz
	PT Reverse Phase Lamp	Phase (Red)
Feeder Display	Single Phase Meas. Range	30 channel Current / Energy (Max. 90pcs)
ELD Display	Leakage Curr. Meas. Range	30 channel Leakage Curr./Accident Curr.(Max. 90pcs)
	Accident Current Lamp	Trip (Red)
Reset		Power Quality Lamp Reset
Power Quality (PQ)	Transient	Abnormal voltage display (based on phase voltage)
	Sa	Momentary low voltage display (based on phase voltage)
	Swel	Momentary overvoltage display (based on phase voltage)
	Interruption	Momentary Power Outage display (based on phase voltage)
	THD	High frequency content expressed in % (V THD, I THD)
Comm.	Meter ⇔ Module	Comm. method RS-485C, Modbus RTU
	Module ⇔ Module	Comm. Lamp SC (Green)
	Meter ⇔ PLC	Comm. method LAN, TCP/IP (auto)
		Comm. Lamp Lan (Green)

Environmental tolerance test and applicable standards

Classification	Specification	Standard
Insulation resistance	DC 500V, 1min / 100MQ or more	IEC60255-5
Commercial frequency withstand voltage	AC 2kV, 1min	IEC60255-5
Surge immunity	Control power: ±2kV, 5 times	IEC61000-4-5
EFT Burst	Control Power: ± 2kV, 1min	IEC61000-4-4
ESD	Air : ± 8kV / Contact : ± 6kV	IEC61000-4-2
Temp. Characteristics	No operation abnormality at ambient temp. -20°C ~ 70°C	IEC61000-4-6

Power Quality Analysis

► PQ Event

IDPM-IFLB90 uses the management program to store power quality data such as instantaneous voltage drop (Sag) and instantaneous voltage rise (Sag/Swell), instantaneous power failure (Interrupt), voltage THD, and current THD for up to 300 cycles of events.

► PQ Wave

By using the management program, the operation status of data stored in events such as transient, sag, swell, interruption, and THD of 3-phase input voltage is displayed as a waveform.

► ITIC Curve

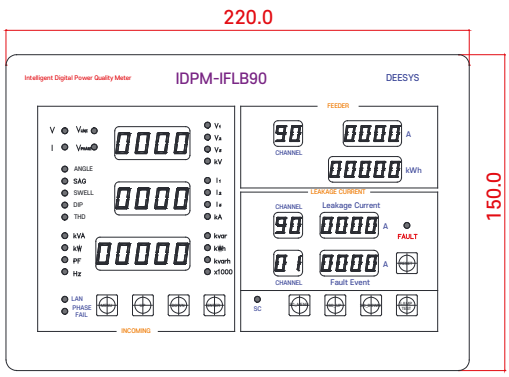
The ITIC (Information Technology Industry Council) Curve displays the size and time of the operation point of the power quality parameter by dividing the points in the safe and unsafe areas, and evaluates the safety state of the supply voltage with each indicated number.

► Harmonics

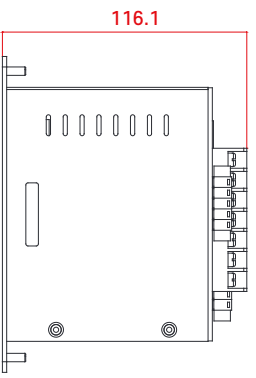
The harmonics contained in each of the three-phase voltage and current are analyzed up to 63 harmonics and displayed as a graph.



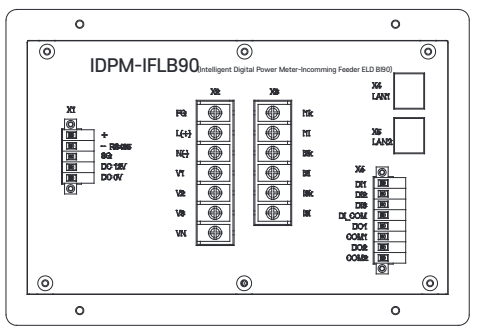
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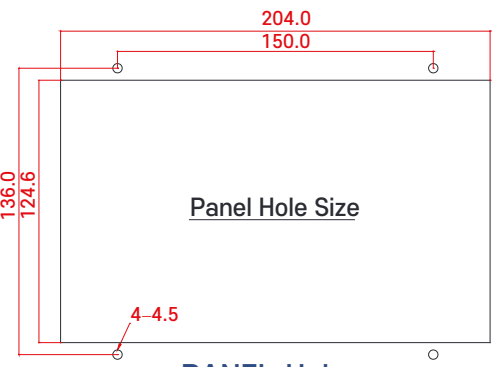
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Intelligent Digital Power Meter
- Feeder Current Module 30

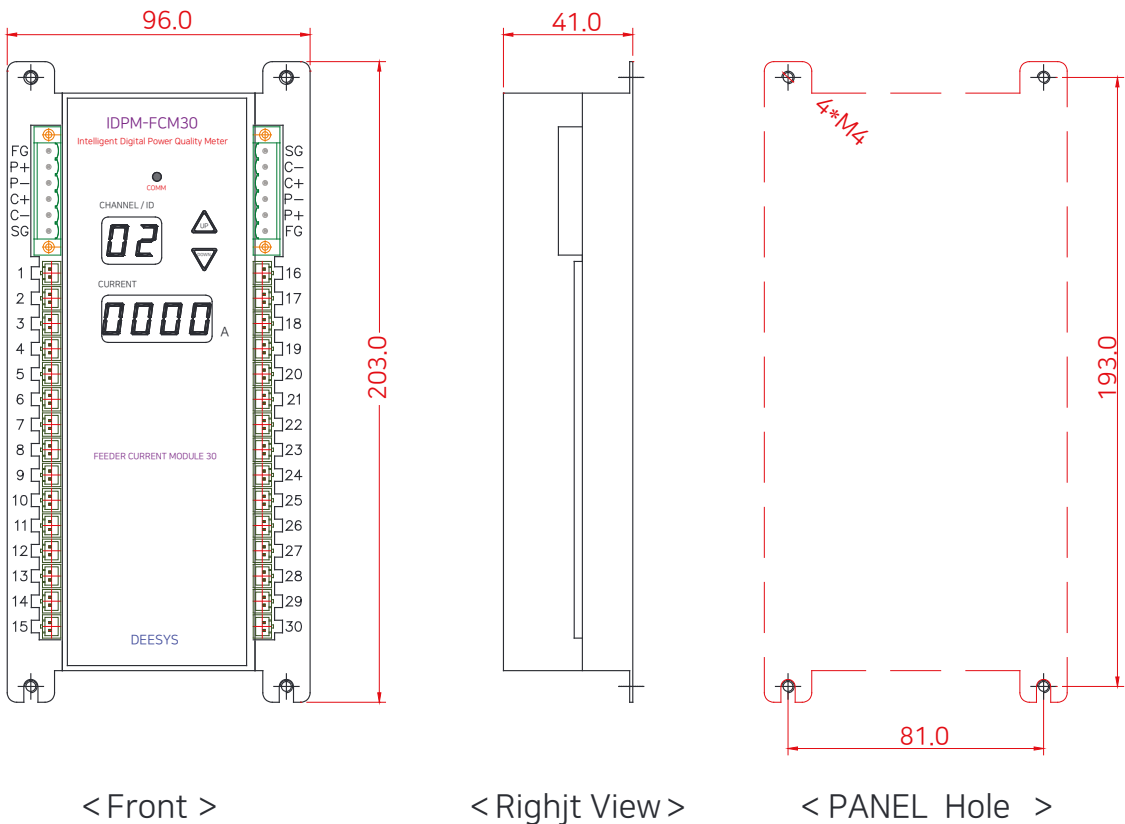
- ◆ Single-phase branch current is measured up to 30 circuits using split type CT.
- ◆ By extending up to 3 modules, it is possible to measure current and wattage up to 90 circuits.
- ◆ No separate power is required, and only the main device IDPM-PQA or IDPM-IFLB90 and 485 communication cable are used to transmit data.



Rating

Classification		Rated Standard
Wiring Method		1P2W
Rated frequency		50 / 60Hz
Control Current		DC +12V (Slef Supplied)
CT Input	Ratings	AC 5A
	Measurement Range	AC 0.08 ~ 50.00A
	Accuracy	± 0.2%
Count of Feeders		30ch / 1module (Max. 90ch)

Dimensions





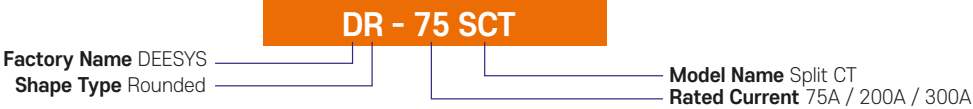
Single Phase C.T/ Leakage Current Detective ZCT
- DR-75SCT/200SCT/300SCT

- ◆ This Current, Leakage detection sensor Split CT has a high accuracy of 0.5%, and as a split type, it can be easily replaced and installed even in panels that are difficult to install additionally.
- ◆ ZCT is a fire-fighting type approved product, and it is divided into round type and busbar type, and the product can be selected according to the usage rating.

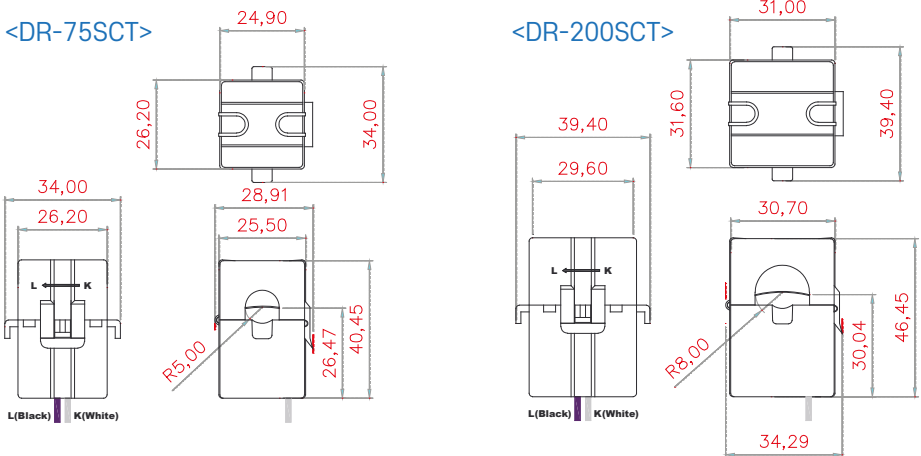
Ratings

Model	DR-75SCT	DR-150SCT	DR-300SCT
Rated Current	0.01 ~ 60.0A	0.01 ~ 200A	0.01 ~ 200A
Max. Current	100A	200A	300A
Current Ratio	75A / 25mA	200A / 50mA	300A / 100mA
Standard Accuracy	Class 0.5% (10ohm)		
Linearity Error	Less than 1%		
Operating Frequency	50 ~ 200kHz		
Operating Temperature	-30 ~ 85°C		
Dielectric Voltage	AC 2.2kV / 1min		
Case Grade	UL94V0, RoHS		

Model Verify

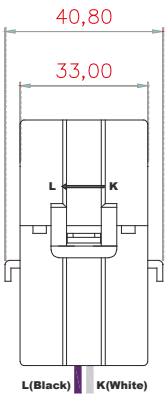
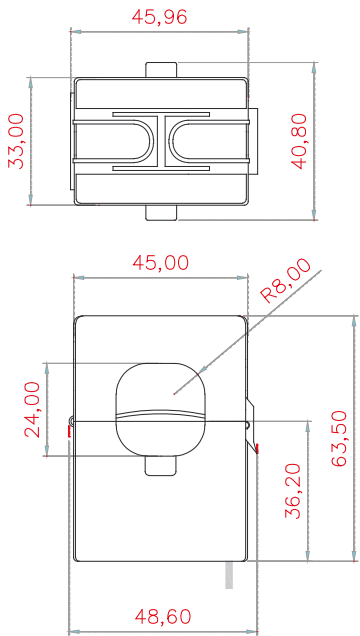


Dimensions



Dimensions

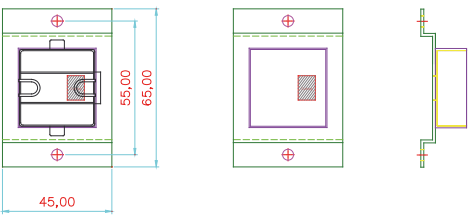
<DR-300SCT>



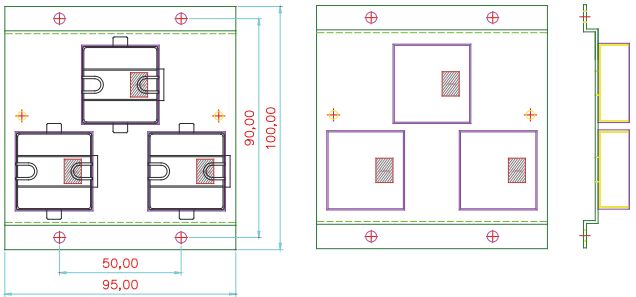
3 Phase Split CT/Leakage Current ZCT
- DR-75SCT/200SCT/300SCT

- ◆ By using a 3-phase bracket for current/leakage detection, it can be easily installed even in a panel where it is difficult to install ZCT.

Single Phase Bracket



3 Phase Bracket





Intelligent Digital Power Meter - Earth Leakage Detector 30

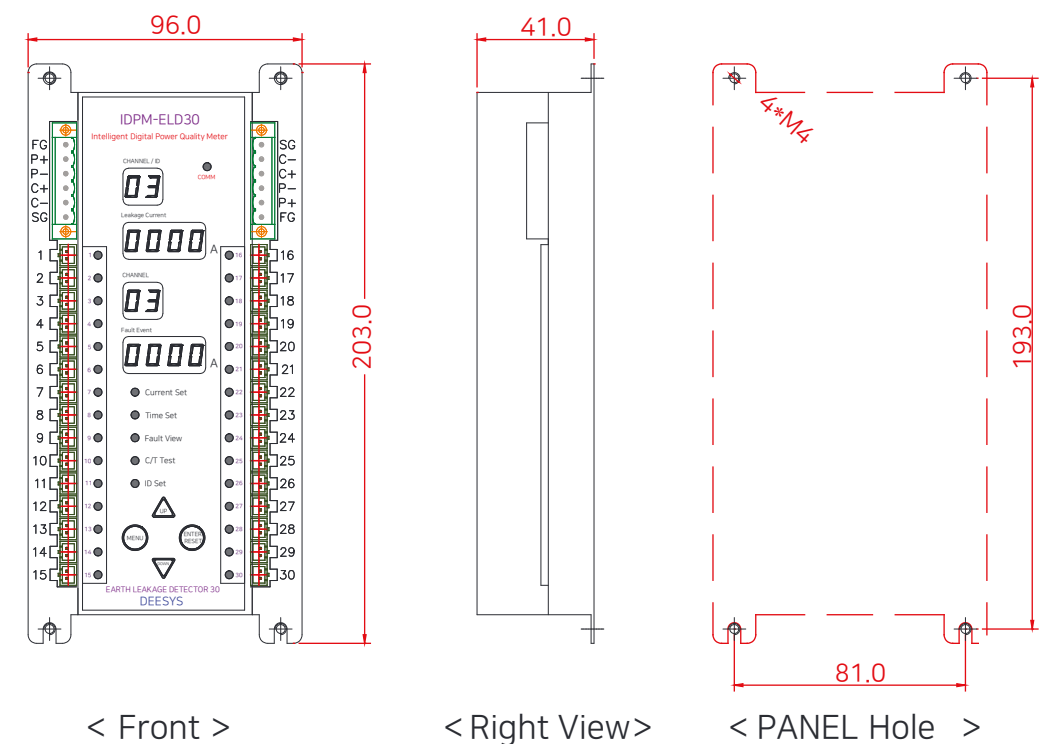
- ◆ Using ZCT, it detects the leakage current of branch circuit up to 30 circuits in real time.
- ◆ Up to 3 modules can be extended to detect up to 90 circuits, and the latest leakage current value for each circuit can be stored and checked.
- ◆ Leakage current can be detected and measured up to 10A, and delay time can be set for each circuit.
- ◆ There is no need for a separate power source, and only the main device IDPM-PQA or IDPM-IFLB90 and 485 communication cable are used to transmit data.



Ratings

Classification		Standards
Wiring Method		1P2W
Rated Frequency		50 / 60Hz
Control Current		DC +12V (Self supplied)
ZCT Input	Ratings	AC 200mA / 100mV
	Operating Range	75 ~ 100mV
동작전류	Setting Range	AC 0.1 ~ 10.0A (0.1A step)
	Measurement Range	AC 0.02 ~ 12.00A
	Accuracy	± 0.2%
동작시간	Setting Range	0.05 ~ 10.00sec (0.05step)
	Operation Characteristics	Definite Time
	Operation Error	25msec, ±10% (0.2 ~ 10.0sec)
Counter of Feeders		30ch / 1module (Max. 90ch)

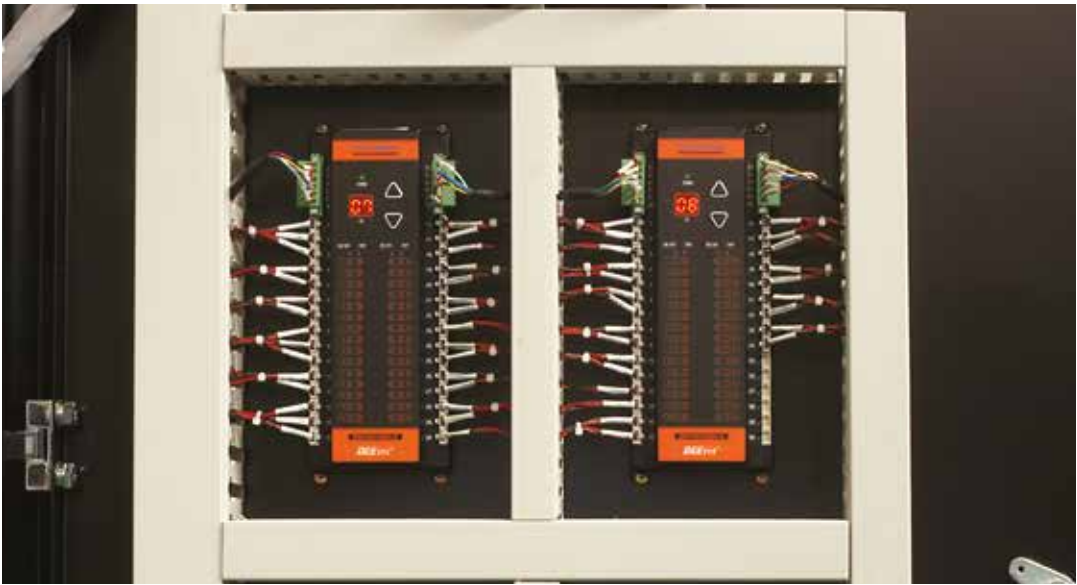
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Intelligent Digital Power Meter
- Binary Input Module 30

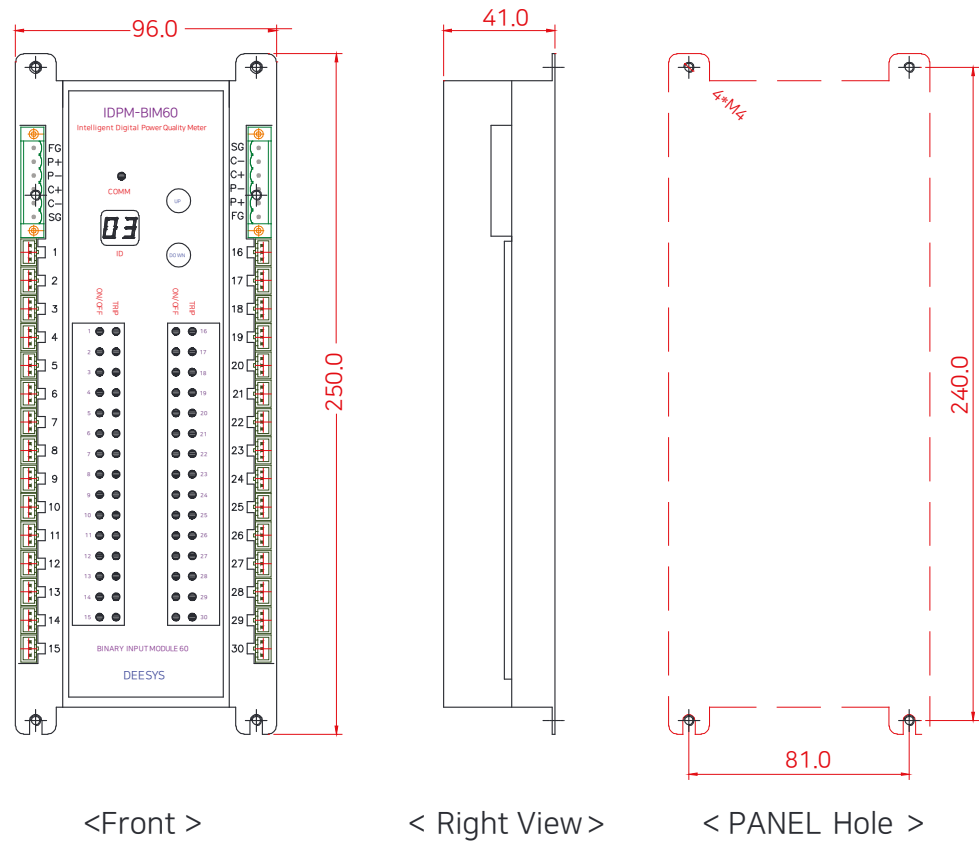
- ◆ Real-time monitoring of On/Off status and Trip status using 3P contact point of branch Circuit breaker.
- ◆ Branch breaker On state is indicated by Blue and Trip state by Red lamp.
- ◆ There is no need for a separate power source, and only the main device IDPM-PQA or IDPM-IFLB90 and 485 communication cable are used to transmit data.



Ratings

Classification		Standard
Wiring Method		3P contact point of branch Circuit breaker
Control Power		DC +12V (Self supplied)
CB Status Monitoring	On / Off	On Status : Blue lamp
	Trip	Trip Status : Red lamp
Count of Feeders		30ch / 1module (Max. 90ch)

Dimensions





Digital internet of Thing - Temperature & Humidity Serial Communication

- ◆ Designate and manage the constant temperature and humidity check and dew point temperature in various environments and places including cold-zone.
- ◆ DioT-TH100 This is a product that applies RS485 Modbus communication method as a miniaturized model.

Ratings

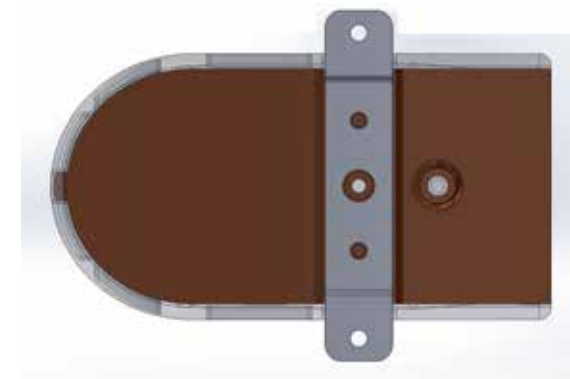
Classification		Standard
Control Power	Input Voltage	DC 12V (option DC 24V)
	Power Consumption	Within 0.3W
Temperature	Measurement Range	-40 ~ 125°C
	Measurement Accuracy	±0.3% (-40 ~ 90°C)
Humidity	Measurement Range	0 ~ 110 RH
	Measurement Accuracy	±2% RH
Communication		RS-485C, Modbus RTU
Mounting Method		Fixed on Panel

Main Functions

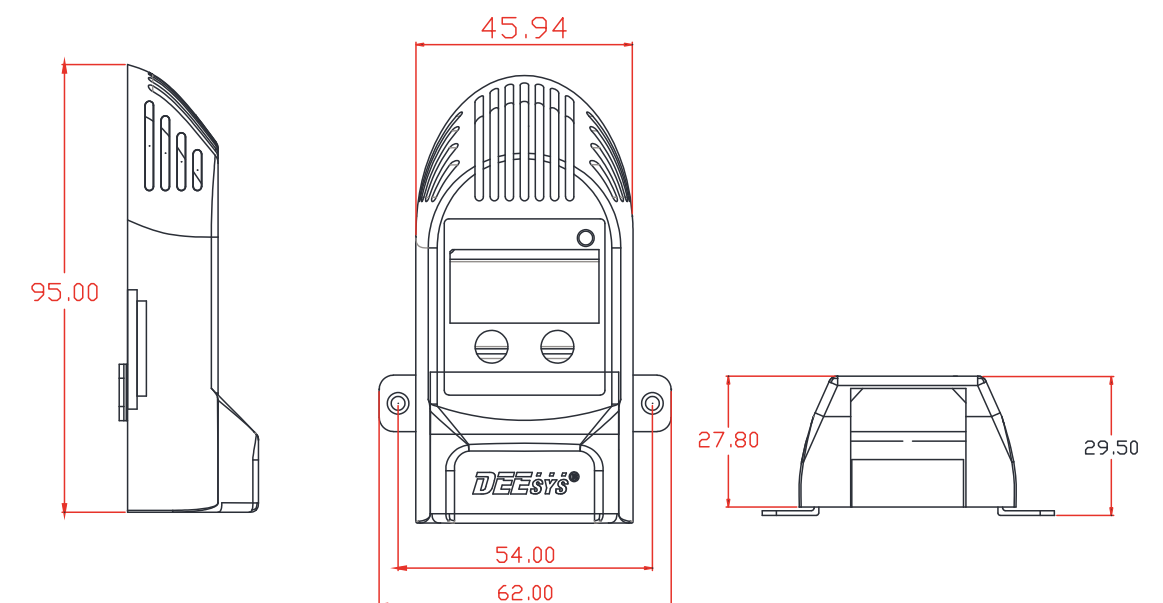
- RS-485 wiring method / Modbus RTU protocol support
- Implementation of precise measurement by semiconductor-type MEMS sensor
- Measurement of temperature, humidity and dew point temperature
- Design of minimizes the influence of wind direction in the cold zone
- Controlled power use DC 12V auxiliary power, low power consumption circuit design

Mounting Method

- A : Magnetic Mount : Outside of Panel
- B : Dedicated Mount : Fixed to communication cable harness



Dimensions





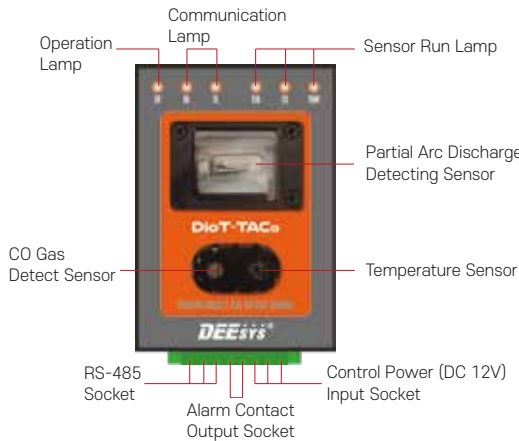
Digital internet of Thing
- Temperature & Humidity, Arc, Co gas sensor

- ◆ Electrical deterioration monitoring alarm is a fire prevention alarm that generates an alarm if a certain condition is exceeded by measuring the internal temperature and humidity of the panel, detecting the flame for arc, and the concentration of co gas to prevent the occurrence of a fire in the panel in advance.
- ◆ The measured data value is used for remote monitoring using RS485 communication, and up to 3 points can be installed and managed in connection with the PQA meter.

Ratings

Classification	Standard
Control Power	DC 12V (option DC 24V)
Digital Output	DO_1 ⇄ DO_C
Communication	RS-485C, Modbus RTU

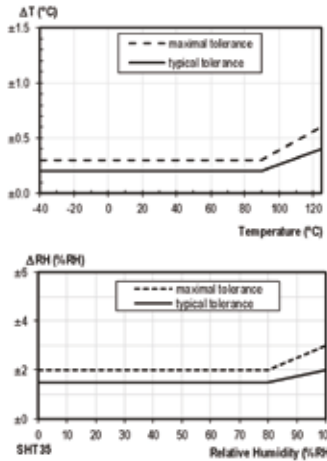
Operation Details



Function 1

►Temp. and Humidity Sensing

In order to measure the temperature of the transformer inside the switchboard, the contact part of the bus-bar, and other high-voltage lines, the temperature inside the switchboard is measured using an infrared measuring temperature sensor.



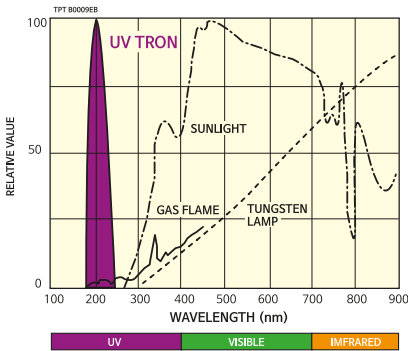
Temp. Sensing Range	-40~125°C
Temp. Sensing Setting	0.0~99.9°C (Default 30°C)
Temp. Accuracy	±0.2°C (-40~90°C)

Humidity Sensing Range	0~100%RH
Humidity Accuracy	±1.5%RH (0~80%RH)

Function 2

►Spark discharge and spark detection

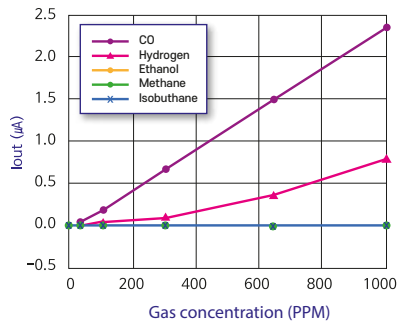
It detects only continuous spark discharge in the wavelength band of 185-260 nm, which is the UV region that causes electric fires. It is designed not to react to external light such as sunlight or fluorescent lamps through an ultraviolet selective transmission filter.



Operating Range	0~5,000ppm
Operating Temp.	-10~50°C
Sensing Range Setting	1~999ppm (Default 100ppm)
Sensing Cycle Setting	1~9,999sec (Default 1sec)
Sensing Count Setting	1~9,999count (Default 3count)

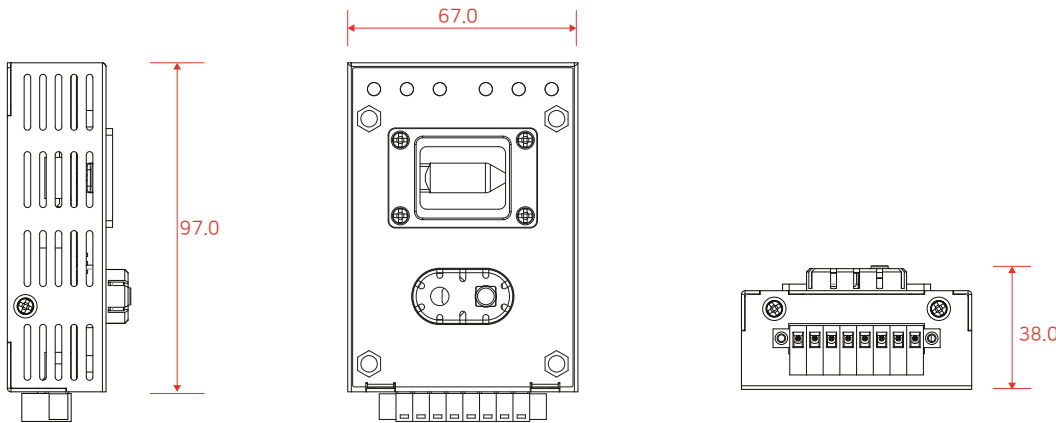
►Co-gas Detecting

If the electrical coating inside the panel is damaged, carbonization and ignition occur due to insulation breakdown, accompanied by co-gas. Co-gas concentration is measured using an electrochemical carbon monoxide detection sensor.



Operation Range	0~5,000ppm
Operation Temperature	-10~50°C
Sensing range Setting	1~999ppm (Default 100ppm)

Dimensions





Digital Over Current Relay with Reclosing



DIPR-K210 / DIPR-K211



Digital Intelligent Protective Relay
- Over Current Relay with Reclosing

- ◆ DIGITAL fully calculated 3-phase overcurrent, ground fault overcurrent, load unbalance, OLTC Includes BLOCKING, and reclosing elements.
- ◆ It is possible to select and use each necessary relay element by 'ENABLE'.
- ◆ Logic can be configured with a simple PLC program for input/output contacts, so it can be applied to various sequences and easily configured according to the user's specific use.
- ◆ Various monitoring and measurement functions are supported, and 512 events, 12 X 60 cycles of fault and maximum waveform data can be saved, making accident analysis easier. Also, the self-diagnosis function is performed during operation, and an alarm is output when an error occurs.
- ◆ Through the operating program for the PC interface, you can set and monitor all protection elements and set and check various functions supported by the product.

Ratings

Input Current	Rating	AC 5A
	Overload capacity	Continuous 10A, 20times Current 2sec, 40times current 1sec
	Input Burden	Less than 0.3 VA / PHASE
Frequency	Input Frequency	60Hz
Control Power	Rated Input	AC/DC 110~220V (Free Voltage)
	Output Burden	50VA
Contact Capacity	Output contact	TRIP#1 ~ ALARM#D (1a x 11ea, 1b x 2ea)
	Rated Voltage	AC 250V, DC 125V
	Continuous current capacity	16A / AC 250V
	0.5 second closing capacity	30A / DC 125V
	Opening capacity	DC 125V, 30W, time constant 25ms, 1A
	Material	AgCdO
Comm.	Protocol	MODBUS
	RS-485	1 port
	RS-232C	38,400bps, univ. RS-232C CROSS CABLE
Applicable Standard	KEPCO standard	OC Relay : ES-5945-0001 Reclosing OC Relay : ES-5945-0002
Use Environment	Normal Use Status	Ambient Temp. : -10°C ~ +55°C Relative humidity : daily 30% ~ 80% Sea level : Lower than 1,000m
Size (W × H × D : mm)	-	161.5×223×204.9mm
Weight	-	5.3 kg

Relay Specification Overview

- ▶ 50/51 x 3, 50N/51N, 46, 50B, 79 configurations
- ▶ Real-time storage of information such as accident time in case of line failure by 512 events
- ▶ Built-in Fault Record function to save the accident waveform in case of an accident (max 12)
- ▶ Built-in two time curve functions of current type instantaneous and fixed time, KEPCO purchase standard (definite time limit, long & very inverse time, inverse time limit, very inverse time, early inverse time)
- ▶ The set value and logic configuration of the relay are permanently stored regardless of the presence or absence of control power.

Environment of use

Storing Temp. Range	-10°C ~ 55 °C
Working Temp. Range	-25 °C ~ 70 °C
Working RH Range	Daily everage 30 ~ 80%
Elevation	Less than sea level 1000m
etc	A place without vibration and shock
Applicable Standard	ES-5943-0001/ES-5945-0002 IEC 60255

Case

Structure	Rectangular Recessed Drawout Type
Color	Munsell No. N1.5(Black)
Material	Steel

Instantaneous Overcurrent Element [50]

Operation	Operating current correction	1.0 ~ 80.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operation time correction	Instantaneous (40 ~ 50ms), Definite time (0.04 ~ 10s/0.01 STEP)
	Operation time precision	Definite time (±35ms), 또는 ±5%
Return	Return value	More than 95% of correction value
	Return time	Less than 40ms
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)



DIPR-K211

This product is a digital fully operational relay manufactured according to KEPCO standard, and has built-in fault protection of 3-phase line, unbalance detection of load line (UBOCR), and re-closing element. Depending on each characteristic, KEPCO MAIN TR or 23KV It is a product with high reliability that has the function of recording, storing, and analyzing accidents as a product suitable for protection against faults in three-phase lines such as D/L.

Instantaneous Overcurrent Element [51]

Operation	Operating current correction	0.1 ~ 12.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operating time characteristics	KNI, KVI, NI, VI, EI, LI, DT
	Operating time correction	0.1 ~ 10.0S (0.1 STEP)
	Operating Time Accuracy	Less than ±5% of correction value or ±35ms
Return	Return value	More than 95% of correction value
	Return time	Less than 100mS
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)

Instantaneous Earth Fault Overcurrent Element [50N]

Operation	Operating current correction	1.0 ~ 40.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operating time characteristics	Instantaneous (40 ~ 50ms), Definite time (0.04 ~ 10s/0.01 STEP)
	Operating time correction	Definite time (±35ms)
Return	Return value	More than 95% of correction value
	Return time	Less than 40ms
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)

Instantaneous Earth Fault Overcurrent Element [51N]

Operation	Operating current correction	0.1 ~ 12.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operating time characteristics	KNI, KVI, NI, VI, EI, LI, DT
	Operating time correction	0.1 ~ 10.0S (0.1 STEP)
	Operating Time Accuracy	Less than ±5% of correction value or ±35ms
Return	Return value	More than 95% of correction value
	Return time	Less than 100ms
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)

Load unbalance Element [46]

Operation	Operating current correction	0.1 ~ 4.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operating time characteristics	Instantaneous time
	Operating time correction	0.1 ~ 10.0S (0.1 STEP)
	Operating Time Accuracy	Less than ±5% of correction value or ±35ms
Return	Return value	More than 95% of correction value
	Return time	Less than 100ms
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)

OLTC BLOCKING 요소 [50B]

Operation	Operating current correction	5.0 ~ 80.0A (0.1A STEP)
	Operating Current Accuracy	Less than ±5% of correction value
	Operating time characteristics	Instantaneous time
	Operating time correction	0.04 ~ 30.00s (0.01 STEP)
	Operating Time Accuracy	Less than ±5% of correction value or ±35ms
Return	Return value	More than 95% of correction value
	Return time	Less than 100ms
	Delay time (RET-TIME)	0.00 ~ 30.00S (0.01 STEP)

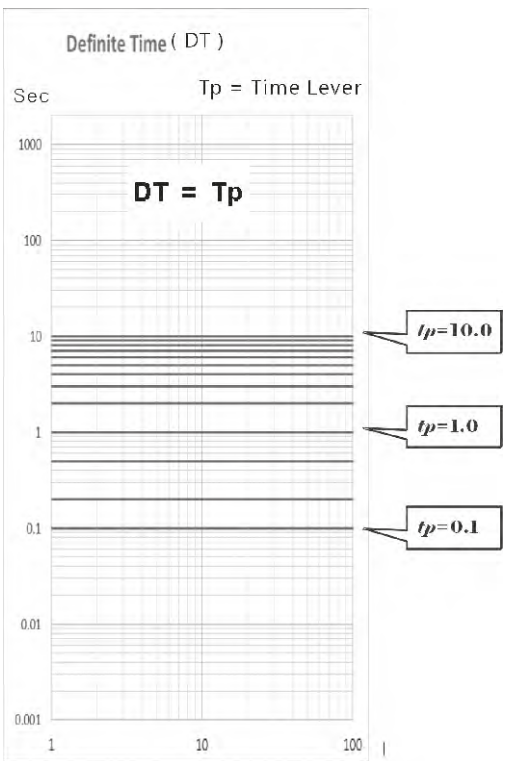
Overcurrent and Ground Fault Overcurrent Elements

Reclosing element [79]

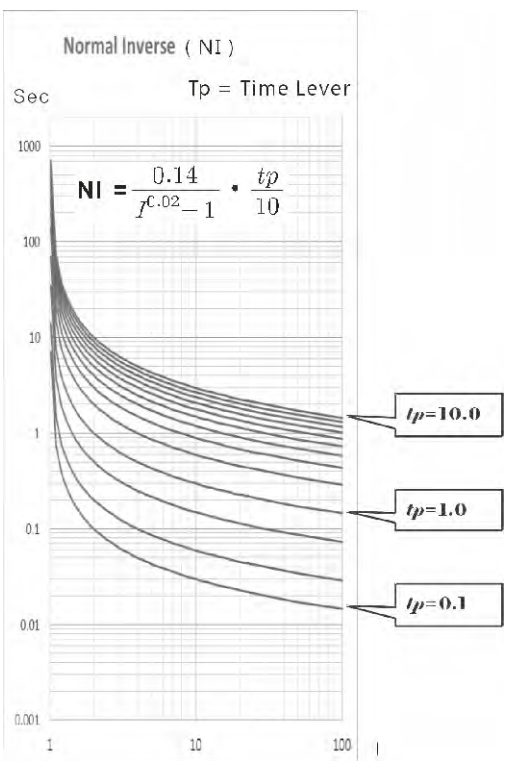
Count of reclosing element		1 ~ 3 time selectable
Instantaneous time BLOCKING		YES / NO selectable
PREPARE TIME	OP time	1 ~ 180S (1 STEP)
	Accuracy	Less than ±5% of correction value
RECLAIM TIME	OP time	1 ~ 180S (1 STEP)
	Accuracy	Less than ±5% of correction value
CLOSE PULSE SIGNAL TIME		0.1 ~ 2.0S (0.1 STEP)
DISCRIMINATION TIME		0.1 ~ 30.0 (0.1 STEP)
1 time reclosing	OP time	0.2 ~ 2.0S (0.1 STEP)
	Accuracy	Less than ±5% of correction value
2 time reclosing	OP time	0.1 ~ 30.0S (0.1 STEP)
	Accuracy	Less than ±5% of correction value
3 time reclosing	OP time	0.1 ~ 60.0S (0.1 STEP)
	Accuracy	Less than ±5% of correction value
FAIL PULSE SIGNAL TIME		1 ~ 600S (1 STEP)

Characteristic curve

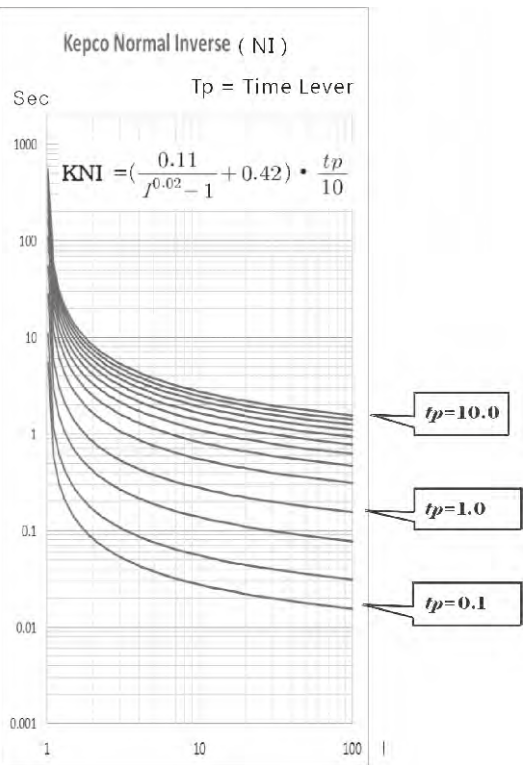
DT Curve



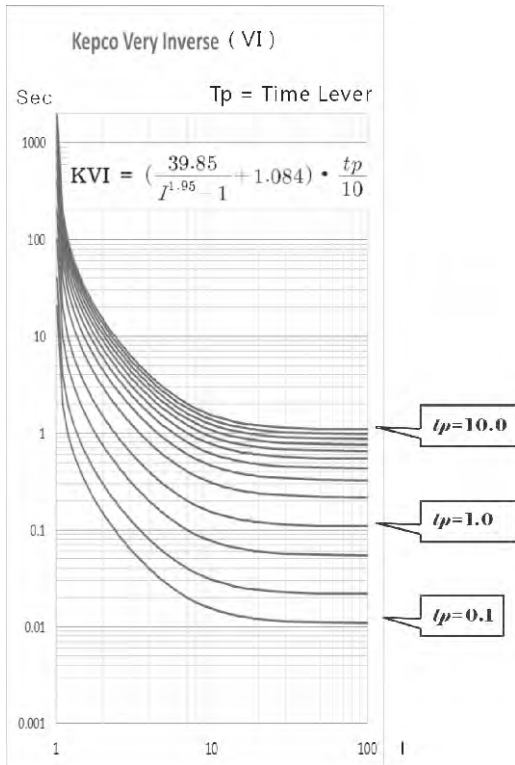
IEC NI Curve



KEPCO NI Curve



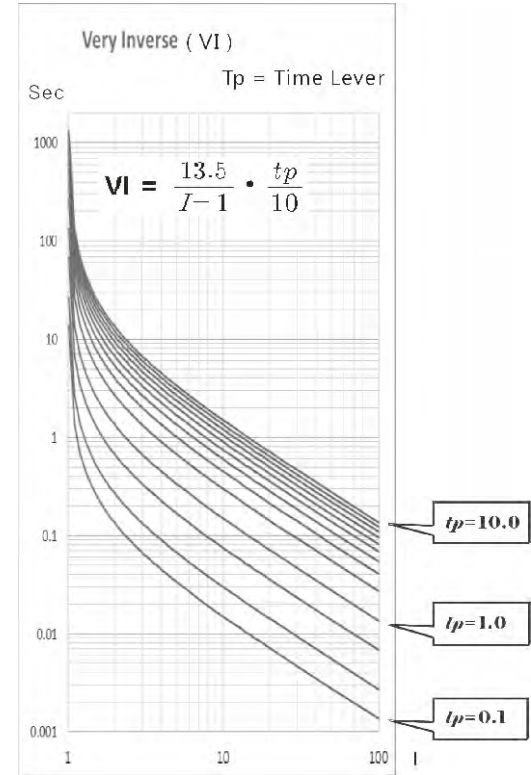
KEPCO VI Curve



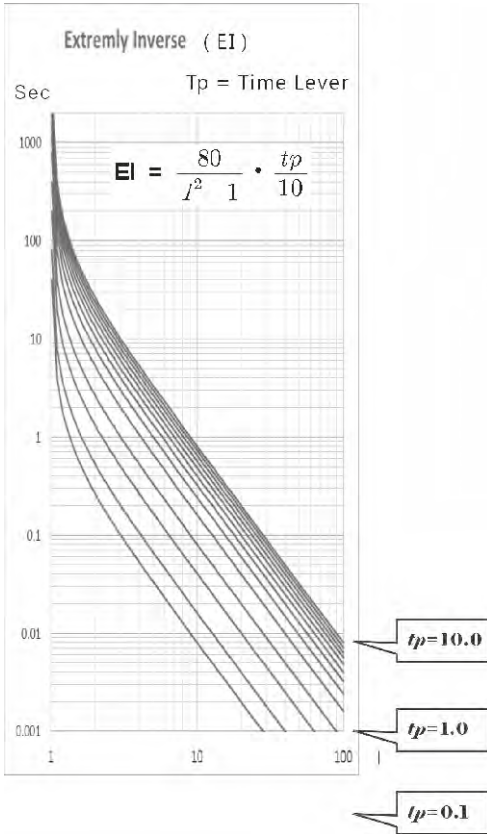
Overcurrent and Ground Fault Overcurrent Elements

Characteristic curve

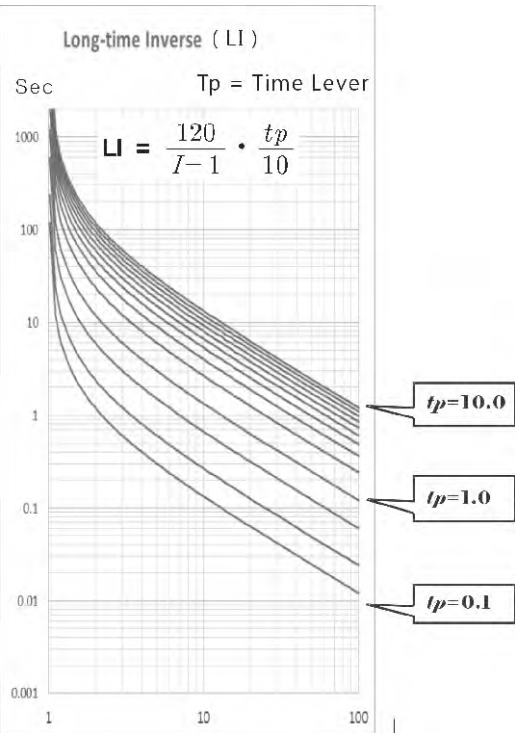
IEC VI Curve



IEC EI Curve



IEC LI Curve



24/7 Monitoring function [Self-diagnosis]

Add-on Function

DC POWER FAIL Monitoring	Without DC input
	DC input is low voltage of 83V or less
CPU & MEMORY FAIL Monitoring	CPU/ROM/RAM operation is abnormal
	CLOCK is abnormal
A/D CONVERTER FAIL Monitoring	signal line or control line is cut
	A/D CONTROL signal is abnormal
DI / DO CIRCUIT FAIL Monitoring	A/D control power is dropped over 1V
	Loss of control power
CORRECTION SETTING FAIL Monitoring	signal line or control line is cut
	set value is abnormally changed
	set value is out of the setting range

EVENT RECORDING FUCTION

Add-on Function

EVENT Count	Up to 512 (first-in, first-out recording method)
Operation time resolution	1ms
DISPLAY	EVENT TYPE : Date and time of occurrence
EVENT TYPE	SYSTEM REBOOT
	SYSTEM FAIL EVENT
	- DI / DO CIRCUIT FAIL
	- MEMORY FAIL
	- AD CONVERTER FAIL
	- DC POWER FAIL
	- SETTING FAIL
	- SYSTEM OK
STORAGE / DECODE	Relay Element EVENT
	Reclosing Element SUCCESS / FAIL
	Permanent data storage even if control power is lost
	Can be read using communication operation program
	Save as COMTRADE FILE using communication operation program

FAULT Function [FAULT RECORDING]

Add-on Function	
FAULT RECORD COUNT	Up to 12 by setting (first-in, first-out recording method)
	◆ 12 Count / 1sec (12 X 60CYCLE)
	◆ 6 Count / 2sec (6 X 120CYCLE)
	◆ 3Count / 4sec (3 X 240CYCLE)
SAMPLING	36 SAMPLING / 1 CYCLE
STORE WAVEFORM DISPLAY	FAULT TYPE and occurrence status indication for each relay element
	Display fault current and operating time
	Display the current value of the remaining phases other than the accident phase at the time of the accident
	MANAGEMENT PROGRAM
STORAGE / DECODE	Phase shift status and harmonics, VECTOR indication
	Permanent data storage even if control power is lost
	Can be read using communication operation program
	Save as COMTRADE FILE using communication operation program

METERING DISPLAY FUCTION

Add-on Function	
Phase A, B, C Current (Ia , Ib , Ic)	Display of fundamental wave current rms value for each phase
	Phase A current reference phase measurement
	Simultaneous Display of 1st and 2nd current values through CT ratio setting
	Input Current (CT) Guaranteed Range: AC 0 ~ 250A
Phase N Current (In)	Expression of fundamental wave current rms
	Simultaneous display of primary and secondary current values through CT ratio setting
	Input Current (CT) Guaranteed Range: AC 0 ~ 250A
Symmetrical current (Ips / Ins)	Normal, reversed-phase, zero-phase current magnitude and phase measurement
	Primary current value displayed by converting input current into CT ratio
	Input Current (CT) Guaranteed Range: AC 0 ~ 250A
D/I (DIGITAL INPUT)	Display the item being used out of 5 D/I
Reclosing count	Reclosing operation cumulative display up to 65535
Metering acurracy	0.1CLASS

COMMUNICATION FUCTION

Add-on Function		
RS-232C	Mounting position	1 PORT (Front of Relay)
	Purpose of use	LOCAL SETTING, EVENT and FAULT Waveform Analysis
	Transmission method	HALF - DUPLEX
	Communication speed	RS-232C
	Communication line	Universal RS-232C CROSS CABLE
RS-485	Back	1port

DIGITAL INPUT CONTACT SETTING [D/I]

Add-on Function	
D/I 1	REMOTE RESET
D/I 2	INSTANTANEOUS TRIP BLOCKING
D/I 3	CIRCUIT BREAKER STATUS (52-b)
D/I 4	Reclosing ON / OFF SWITCH (43RC)
D/I 5	GAS PRESSURE STATUS (63P)

Overcurrent/Ground Fault Overcurrent Protection (50/51, 50N/51N)

The overcurrent/ground fault overcurrent protection element can be obtained independently from two instantaneous/definite-time elements and one inverse-time element.

The instantaneous/definite-time element has a minimum operating time of 40mS or less and is configured to be supported by the inverse-time element, so three-step protection characteristics can be implemented.

The input current of the earth fault overcurrent protection element is the residual circuit connection of the earth fault protection CT or 3-phase CT, and the characteristic curve is IEC 4 types, IEEE/ANSI 7 types, and KEPCO 3 types.

Load unbalance protection (46)

The load unbalance function is 154kV MAIN TR. This is a zero-phase current detection method in which the load of 23kV D/L on the secondary side of the

In order to detect current imbalance, it is an alarm function to notify when the current waveform entering the N-phase CT of the relay is formed.

OLTC BLOCKING (50B)

OLTC BLOCKING function is a function to block OLTC (ON LOAD TAP CHANGER) to prevent damage caused by ARC occurring during the transformer tap changer process when the secondary side 23kV D/L of the 154kV main TR fails.

This relay has a current setting value of 5~80A, and the operating time characteristic basically has an instantaneous characteristic (=30mS).

Also, it is possible to change the TRIP blocking signal transmission time of 0.03~20.s by setting the time limit function.

Reclosing Characteristics (79)

The reclosing element operates based on three phases, and has a built-in function to block the secondary side OLDC (ON LOAD TAP CHANGER) of the MAIN TR, and the function can be turned OFF if necessary. In addition, even if the reclosing element FAIL operates, it maintains the normal operation as it does not have any effect on the overcurrent and ground fault overcurrent elements.

[DIPR-K210] Terminal Configuration

CT _INPUT	1	14	A	TRIP#1	27	40	TOC + TOCG
CT -INPUT	2	15	B	TRIP#2	28	41	IOC + IOCG
CT -INPUT	3	16	C	TRIP#3	29	42	PROTO_OR
CT -INPUT	4	17	N	TRIP#4	30	43	PROTO_OR
DI#1	5	18	Remote Reset	ALARM#1	31	44	PROTO_OR
DI#2	6	19	Inst Blocking	ALARM#2	32	45	PROTO_OR
	7	20		ALARM#3	33	46	IOC_OR
	8	21		ALARM#4	34	47	TOC_OR
	9	22		ALARM#5	35	48	IOCG
	10	23		ALARM#6	36	49	TOCG
ALARM#8	11	24	50B_OR (b)	ALARM#7	37	50	UBOC
ALARM#9	12	25	Sys Error (b)	FG	38	51	DC (+)
통신 (+)	13	26	통신 (-)	FG	39	52	DC (-)

[DIPR-K211] Terminal Configuration

CT-INPUT	1	14	A	TRIP#1	27	40	TOC + TOCG
CT-INPUT	2	15	B	TRIP#2	28	41	IOC + IOCG
CT-INPUT	3	16	C	TRIP#3	29	42	PROTO_OR
CT-INPUT	4	17	N	TRIP#4	30	43	CB_CLOSE
DI#1	5	18	Remote Reset	ALARM#1	31	44	50B_OR (a)
DI#2	6	19	Inst Blocking	ALARM#2	32	45	79F
DI#3	7	20	52-b	ALARM#3	33	46	IOC_OR
DI#4	8	21	43RC	ALARM#4	34	47	TOC_OR
DI#5	9	22	63P	ALARM#5	35	48	IOCG
	10	23		ALARM#6	36	49	TOCG
ALARM#8	11	24	50B_OR (b)	ALARM#7	37	50	UBOC
ALARM#9	12	25	Sys Error (b)	FG	38	51	DC (+)
통신 (+)	13	26	통신 (-)	FG	39	52	DC (-)

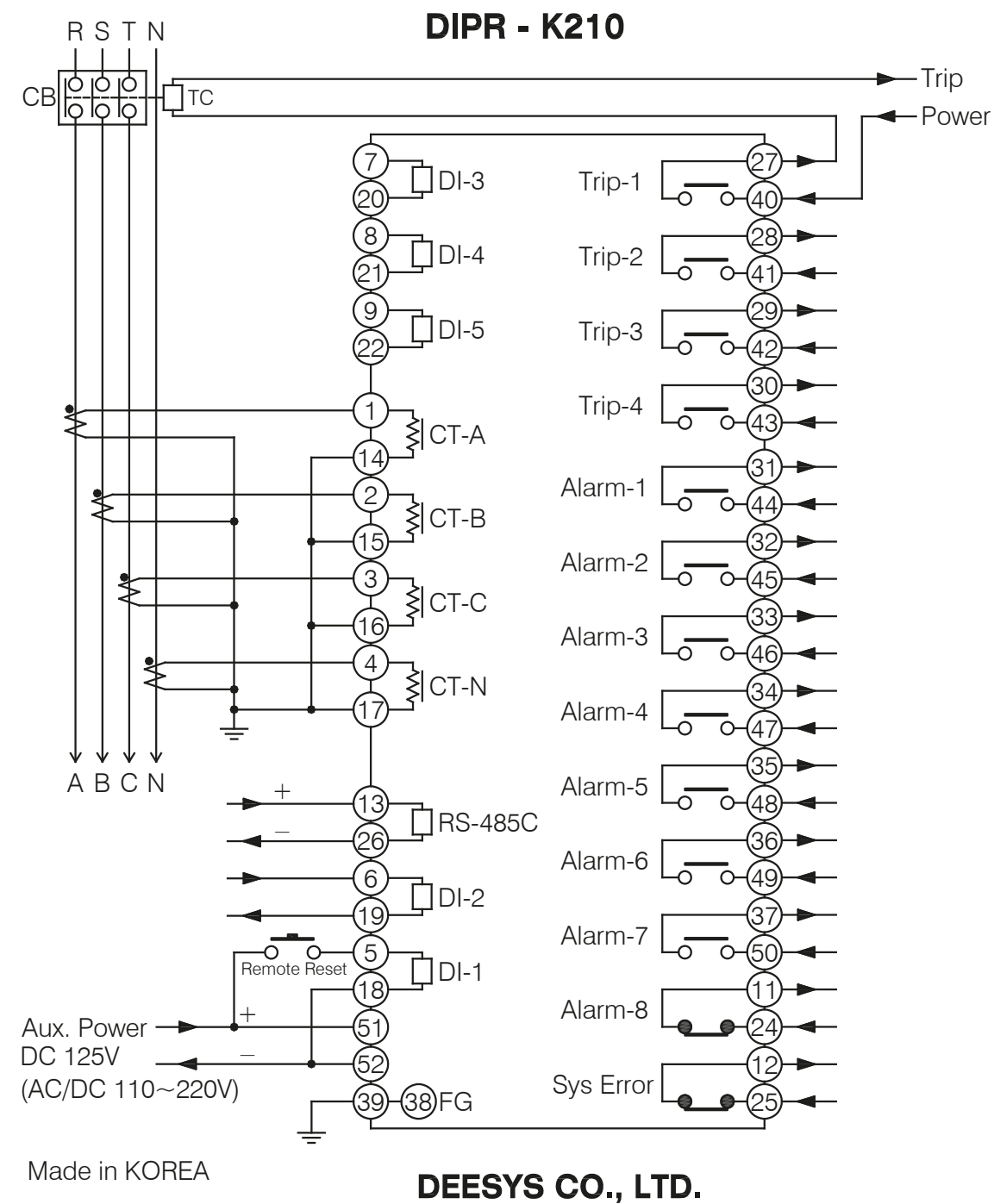
Digital Input Setting (D/I)

Input Contact				Condition of Input	Description of Setting Condition
DI#1	5	18	REMOTE RESET	7	DI (1) Input : Return Relay- REMOTE RESET SWITCH
DI#2	6	19	TRIP BLOCKING	Trip Blocking	DI (2) Input : Block Reclosing instantaneous operation
D#3	7	20	52-b	52-b	DI (3) Input : 52 b contact of CB status CHECK
DI#4	8	21	43RC	43RC	DI (4) Input : Reclosing ON / OFF SWITCH
DI#5	9	22	63P	43RC	DI (5) Input : 63 P contact of CB GAS pressure CHECK

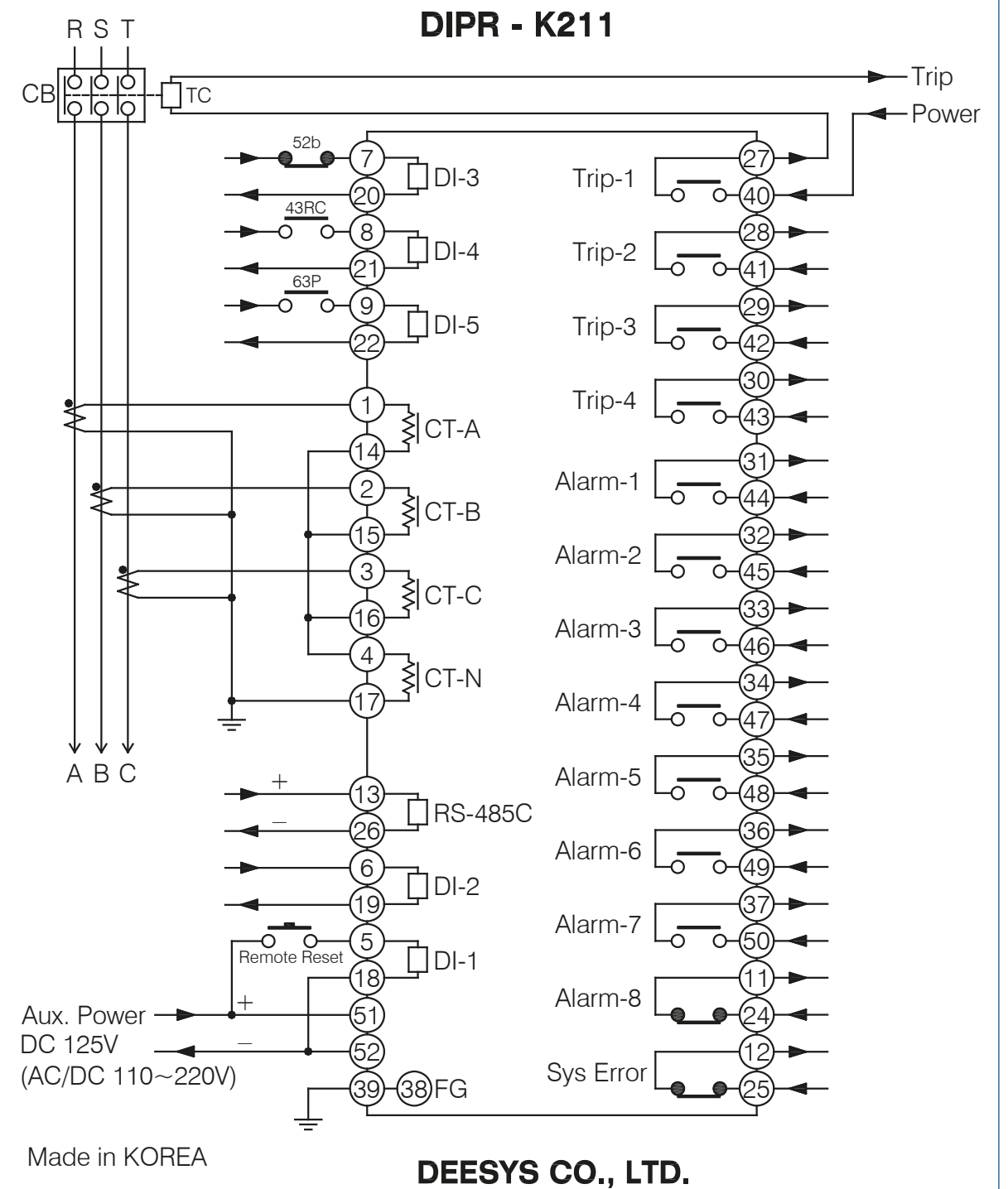
Terminal Descriptions

				OFF	Not Available
TRIP#1	2	4	TOC+TO	PROTO_OR	SYSTEM ERROR OUTPUT
	7	0	CG	IOC_OR	OUTPUT If any one of all relay operations operates
TRIP#2	2	4	IOC+IOC	IOC_A	OUTPUT If any one of all over-current instantaneous operates
	8	1	G	IOC_B	OUTPUT If over-current instantaneous time in A phase operates
TRIP#3	2	4	PROTO_	IOC_C	OUTPUT If over-current instantaneous time in B phase operates
	9	2	OR	IOC_C	OUTPUT If over-current instantaneous time in C phase operates
TRIP#4	3	4	CB_CLO	TOC_OR	OUTPUT If any one of all over-current inverse time operates
	0	3	SE	TOC_A	OUTPUT If over-current inverse time in A phase operates
ALARM #1	3	4	50B_OR(a)	TOC_B	OUTPUT If over-current inverse time in B phase operates
	1	4		TOC_C	OUTPUT If over-current inverse time in C phase operates
ALARM #2	3	4	79F	IOCG	OUTPUT If ground fault over-current instantaneous time operates
	2	5		TOCG	OUTPUT If ground fault over-current inverse time operates
ALARM #3	3	4	IOC_OR	IT_OC_A_OR	OUTPUT If A phase of over-current instantaneous or inverse time operates
	3	6		IT_OC_B_OR	OUTPUT If B phase of over-current instantaneous or inverse time operates
ALARM #4	3	4	TOC_OR	IT_OC_C_OR	OUTPUT If C phase of over-current instantaneous or inverse time operates
	4	7		IOC+TOC	OUTPUT If any over-current instantaneous or inverse time operates
ALARM #5	3	4	IOCG	IOC+IOCG	OUTPUT If any over-current or Ground instantaneous operates
	5	8		IOC+TOCG	OUTPUT If any over-current instantaneous or Ground inverse operates
ALARM #6	3	4	TOCG	TOC+IOCG	OUTPUT If any over-current inverse or Ground instantaneous operates
	6	9		TOC+TOCG	OUTPUT If any over-current inverse or Ground inverse operates
ALARM #7	3	5	UBOC	IOCG+TOCG	OUTPUT If any over-current or Ground instantaneous operates
	7	0		50B_OR	OUTPUT If 50B operates
ALARM #8	1	2	50B_OR (b)	50B_A	OUTPUT If 50B A phase operates
	1	4		50B_B	OUTPUT If 50B B phase operates
ALARM #9	1	2	SYS ERR OR	50B_C	OUTPUT If 50B C phase operates
	2	5		UBOC	OUTPUT If UBOCR operates
				79_RDY	OUTPUT After Reclosing prepare time, operation ready
				79_START	OUTPUT during started Reclosing and reclaim time
				79_FAIL	OUTPUT when reclosing fail, during the FAIL PULSE
				CB_CLOSE	OUTPUT every Reclosing operations during CB CLOSE PULSE

[DIPR-K210] External wiring diagram



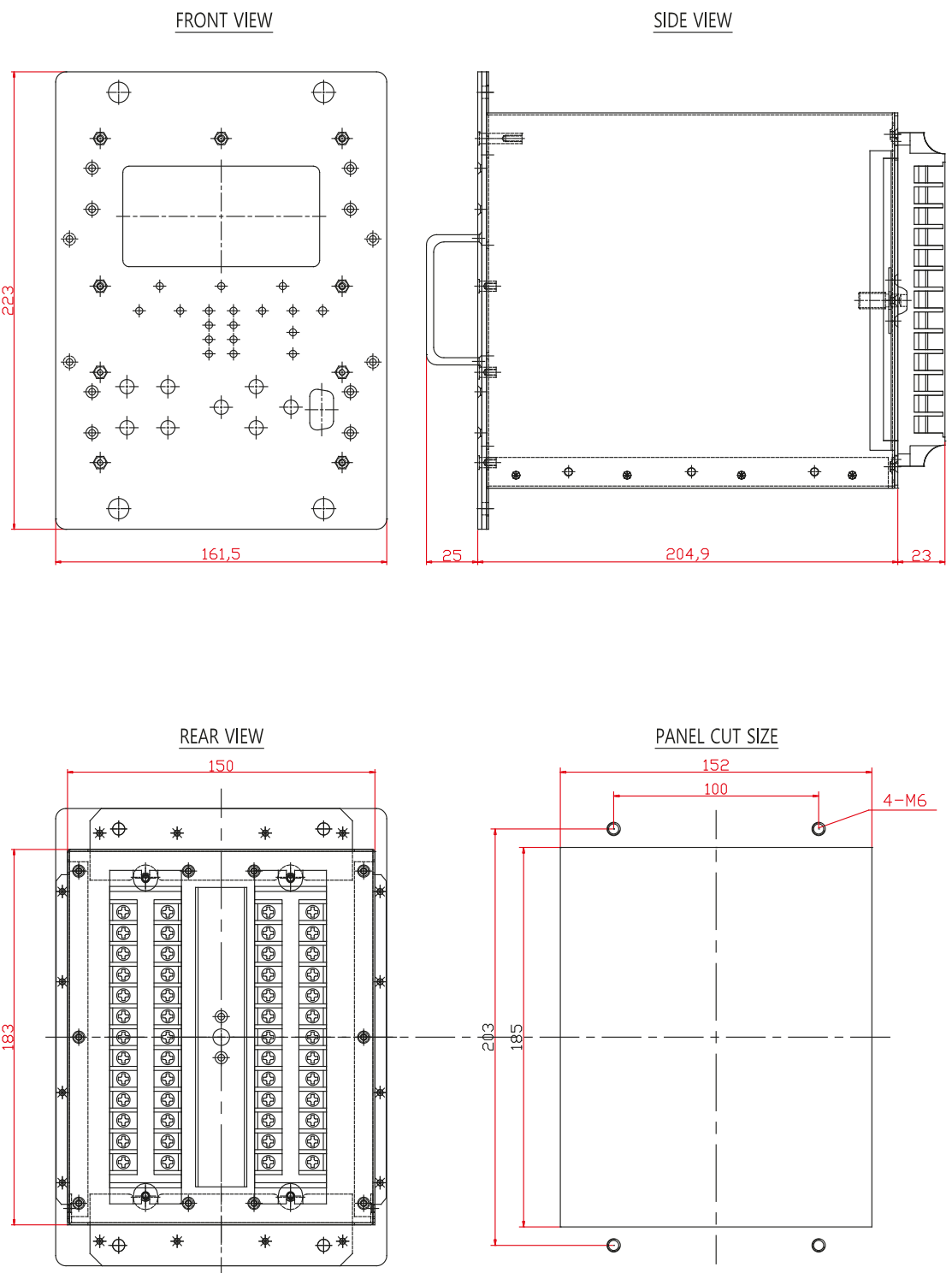
[DIPR-K211] External wiring diagram



OUTPUT Configuration

Condition of Output		Relay elements Output
1	PROTO_OR	50 + 51 + 50N + 51N (All relay element)
2	SYS_ERR	SYSTEM FAIL
3	OFF	NONE
4	UBOC	UBOCR
5	50B_C	50B (OLTC BLOCKING C Phase)
6	50B_B	50B (OLTC BLOCKING B Phase)
7	50B_A	50B (OLTC BLOCKING A Phase)
8	50B_OR	50B (OLTC BLOCKING A, B, C Phase)
9	IOCG + TOCG	50N + 51N (Ground OC N Phase instantaneous + Ground OC inverse)
10	TOC + TOCG	51 + 51N (OC A,B,C Phase Inverse + Ground OC inverse)
11	TOC + IOCG	51 + 50N (OC A,B,C Phase Inverse + Ground OC inverse)
12	IOC + TOCG	50 + 50N (OC A,B,C Phase instantaneous + Ground OC inverse)
13	IOC + IOCG	50 + 50N (OC A,B,C Phase instantaneous + Ground OC instantaneous)
14	IOC + TOC	50 + 50 (OC A,B,C Phase instantaneous + OC inverse)
15	IT_OC_C_OR	50-C + 51-C (OC C Phase instantaneous, inverse)
16	IT_OC_B_OR	50-B + 51-B (OC B Phase instantaneous, inverse)
17	IT_OC_A_OR	50-A + 51-A (OC A Phase instantaneous, inverse)
18	TOCG	51N (Ground OC N Phase inverse)
19	IOCG	50N (Ground OC N Phase instantaneous)
20	TOC_C	51- C (OC C Phase inverse)
21	TOC_B	51- B (OC B Phase inverse)
22	TOC_A	51- A (OC A Phase inverse)
23	TOC_OR	51 (OC A,B,C Phase inverse)
24	IOC_C	51- C (OC C Phase instantaneous)
25	IOC_B	51- B (OC B Phase instantaneous)
26	IOC_A	51- A (OC A Phase instantaneous)
27	IOC_OR	50 (OC A,B,C Phase instantaneous)
28	79_RDY	RECLOSING READY
29	79_START	RECLOSING START
30	79_FAIL	RECLOSING FAIL
31	79_CB_CLOSE	CB - CLOSE

Dimensions





Digital Power Protective Relay



DIPR-OC01



DIPR-OV01



DIPR-SG01



Digital Intelligent Protective Relay
- Over Current & Ground Over Current

- ◆ This relay can be applied to the protection of the distribution line, which is a direct earthing or resistance earthing system, and the protection of the feeder of the power receiving substation of the customer.
- ◆ Logic can be configured with a simple PLC program for input/output contacts, so it can be applied to various sequences and easily configured for a user's specific purpose.
- ◆ Various monitoring and measurement functions are supported, and it is possible to store 16 Faults, 128 System Events, 16 Waves and maximum waveform data, making accident analysis easier. Also, the self-diagnosis function is performed during operation, and an alarm is output when an error occurs.
- ◆ Through the operating program for the PC interface, you can set and monitor all protection elements and various functions supported by the product.

Specification Overview

- ▶ 50/51×3, 50N/51N element composition
- ▶ Real-time storage of line failure information including accident time with 128 EVENT storage
- ▶ Built-in Fault Recording function to save accident waveforms (up to 16)
- ▶ Instantaneous and definite time IEC 60255 5 built-in time curves (definite time, inverse time, strong time limit, early limit time, long time limit)
- ▶ Relay set values and LOGIC configuration are permanently saved regardless of the presence or absence of control power.

Use Envirnmant

Store Temp. Range	-10℃ ~ 55 ℃
Use Temp. Range	-25 ℃ ~ 70 ℃
Use Humidity Range	Daily 30 ~ 80%
Elevation	Low than 1,000m Sea level
etc	Place no vibration and shock
Applicable Standard	KEMC 1120, IEC60255

Case

Type	Rectangular Drawout Type
Color	Munsell No. N1.5 (Black)
Material	LUPOY

Ratings

Rated Input	Frequency	60Hz/50Hz
	Input Current	CT Rate : 5A
	Control Power	AC/DC 100V ~ 240V
	Power Consumption	Stand by : less than 10W, Run : less than 20
	Input Burden	CT : within 0.5VA/Phase
	Minimum sense current	0.1A and more
Contact Capacity	Digital Input (DI)	Digital Input : AC/DC 100V ~ 240V
	Output Contact (Relay 2Ports for DO Trip)	AC 240V 30A, DC 28V 30A: Resistive Load
	Output Contact (Relay 2Ports for DO ALARM)	AC 240V 10A, DC 30V 10A: Max. switching voltage/ current

Over Current Element [50]

RUN	Rated Current	5A
	Operating current correction	5 ~ 100A (1.0A STEP)
	Operating Current Accuracy	within ±5% of correction value
	Operation time correction	Limited time (40~50ms), Definite time (0.04~60s/0.01s STEP)
	Operation time precision	within of corrention value, or ±35ms
RETURN	Return value	95% or more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP) or continuity

Inverse Over Current Element [51]

RUN	Rated Current	5A
	Operating current correction	1.0 ~ 12.0A (0.1A STEP)
	Operating Current Accuracy	±5% of correction value
	Time Characteristic	DT, NI, VI, EI, LI (IEC)
	Operation time correction	0.10~10.0s (0.1s STEP), Definite time (0.04~60s / 0.01s STEP)
	Operation time precision	within 5% of correction value, or ±35ms
RETURN	Return value	95% and more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP) or continuity

Instantaneous Ground Fault Over Current Element [50N]

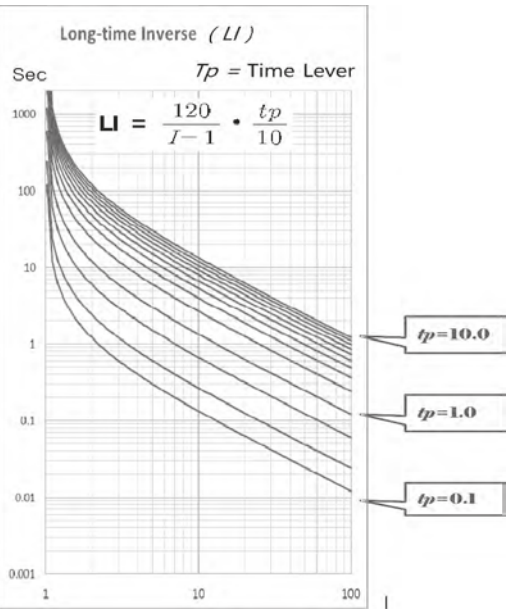
RUN	Rated Current	5A
	Operating current correction	2.5 ~ 40.0A (0.1A STEP)
	Operating Current Accuracy	within ±5% of correction value
	Operation time correction	Instantaneous time (40~50ms), Definite time (0.04~60s/0.01s STEP)
	Operation time precision	within ±35ms of correction value
RETURN	Return value	95% or more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP) or continuity

Inverse Ground Fault Over Current Element [51N]

RUN	Rated Current	5A
	Operating current correction	0.5 ~ 5.0A (0.1A STEP)
	Operating Current Accuracy	within ±5% of correction value
	Time Characteristic	DT, NI, VI, EI, LI (IEC)
	Operation time correction	0.10~10.0s (0.1s STEP), Definite time (0.04~60s / 0.01s STEP)
	Operation time precision	within 5% of correction value, or ±35ms
RETURN	Return value	95% or more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP) or continuity

Protection Relay Characteristic Curve

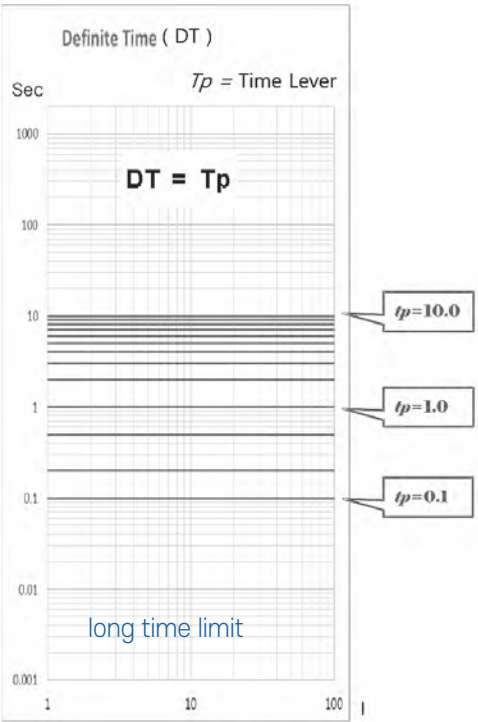
LI Curve (Long-time Inverse)



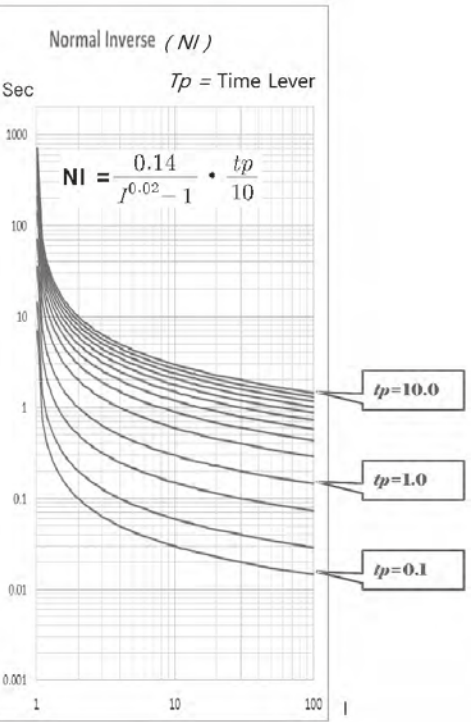
Over-current & Ground fault over-current)

Protection Relay Characteristic Curve

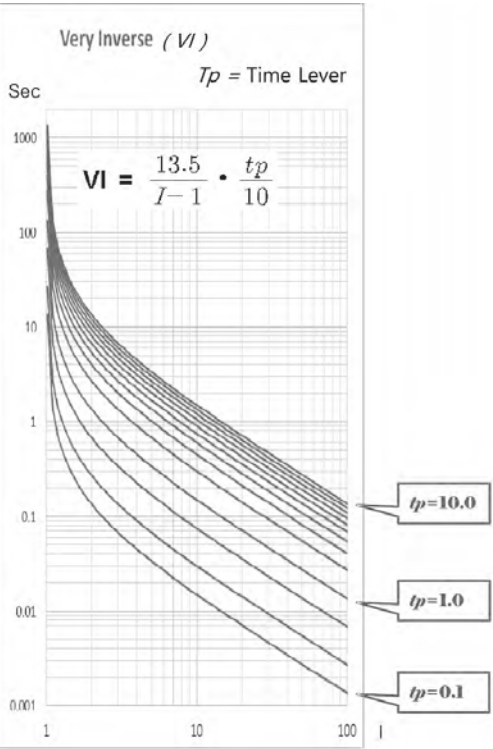
DT Curve (Definite time)



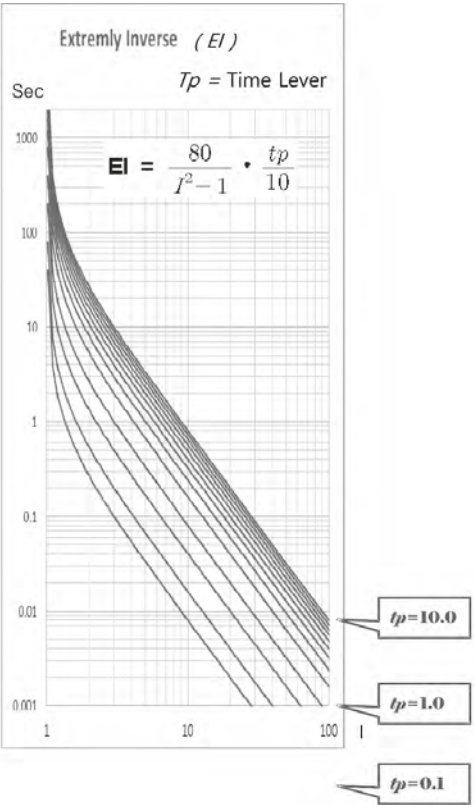
NI Curve (Normal Inverse)



VI Curve (Very Inverse)



EI Curve (Extremely Inverse)



Continuous monitoring function [Self-diagnosis]

Add-on Function	
CT/PT Calibration	It monitors whether CT/PT Calibration is performed, and if it is not valid data or calibration is not performed, it is recorded in the SYSTEM event.
Watch Dog	It judges whether DSP operates normally, and if the DSP does not operate normally, the external monitoring IC forcibly resets the DSP and peripheral devices and boots in the same order as when the first power is booted. In this case, there is no separate indication. Determining whether the DSP operates normally,
Memory and correction value abnormal monitoring	Monitors external memory errors. If the external memory does not operate normally, "FRAM ERROR" is displayed on the LCD, and if the correction value is abnormal, "MEMORY ERROR" is displayed and recorded in the SYSTEM event.

EVENT Function [EVENT RECORDING]

Add-on Function	
Fault Event : 16 count	
Trigger	Pickup, Operation
Time Tag	Time of occur event
Main Information	Fault voltage or current
Sub Information	DI/DO Status
System Event : 128 count	
Trigger	Power ON, Setting changed, DI/DO Status change
Time Tag	Time of occur event
Wave : 16 count	
Trigger	Operation
Sample/Cycle	32
Saving Cycle	30 Cycle(50/60Hz common)
Time Tag	Time of occur operation

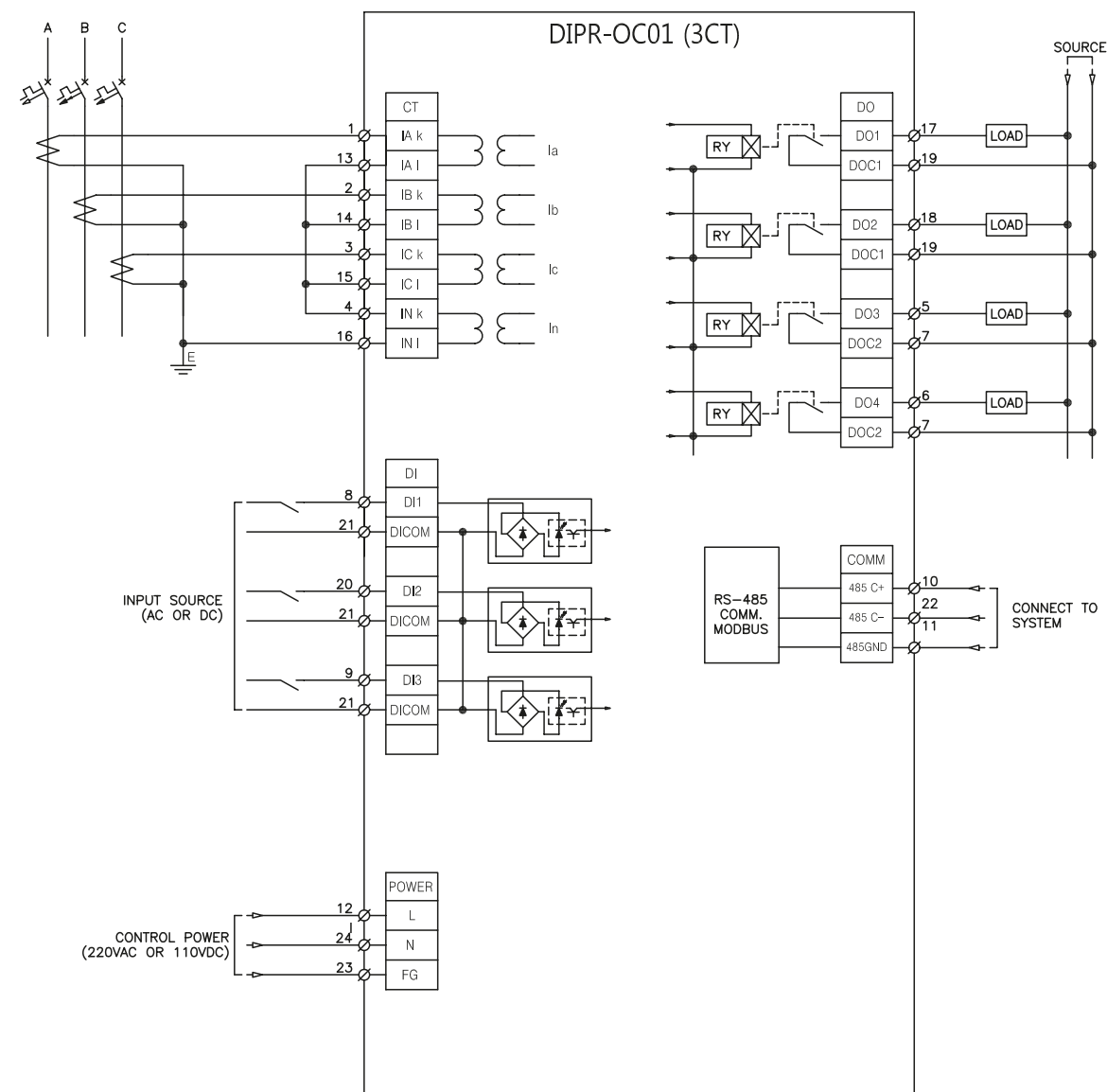
Measurement display function [METERING]

Add-on Function		
Metering Items	Display range(Based on device display value)	Error (Device input rating standard)
Phase Current(A)	0.000A ~ 999.999kA (Cut-off less than 2% of rated value)	±0.5[%] at In, ±0.5[%] or ±0.05[A] (Rated 5A)
Zero Phase Current(N)	0.000A ~ 999.999kA (Cut-off less than 2% of rated value)	±0.05 or ±0.05 (Rated 5A)

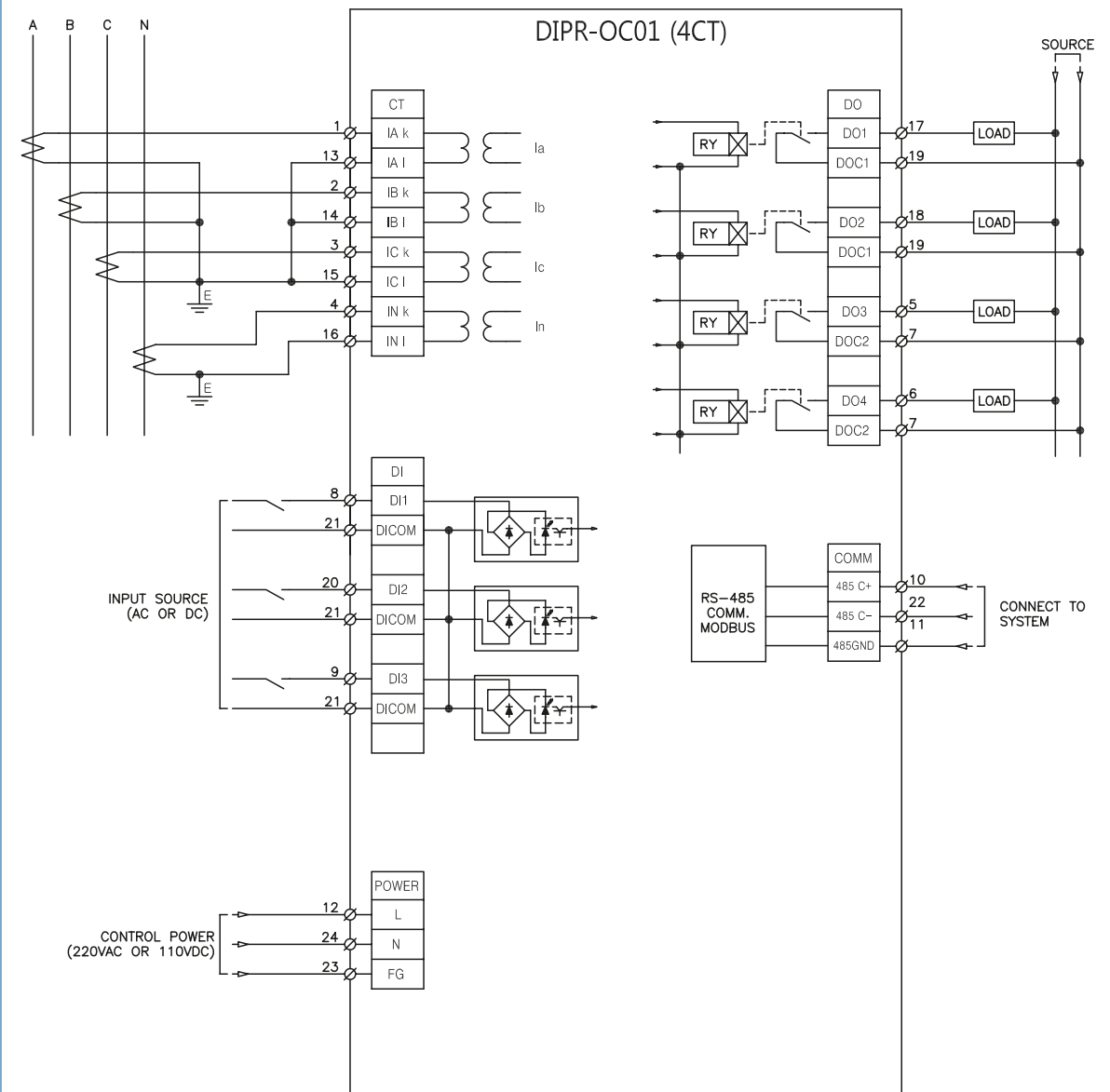
Output contact setting [DO Default Setting]

Device	ITEMS	SETTING
DIPR-OC01	DO 01	OCR Time Limit , Instantaneous TRIP
	DO 02	OCGR Time Limit, Instantaneous TRIP
	DO 03	OCR Time Limit, Instantaneous ALRAM
	DO 04	OCGR Time Limit, Instantaneous ALRAM

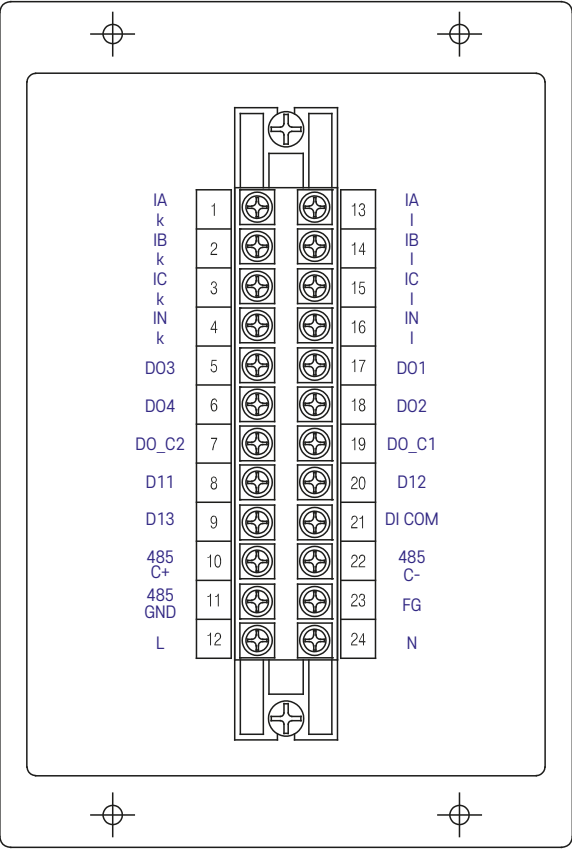
Wiring Diagram (3P 3W)



Wiring Diagram (3P 4W)

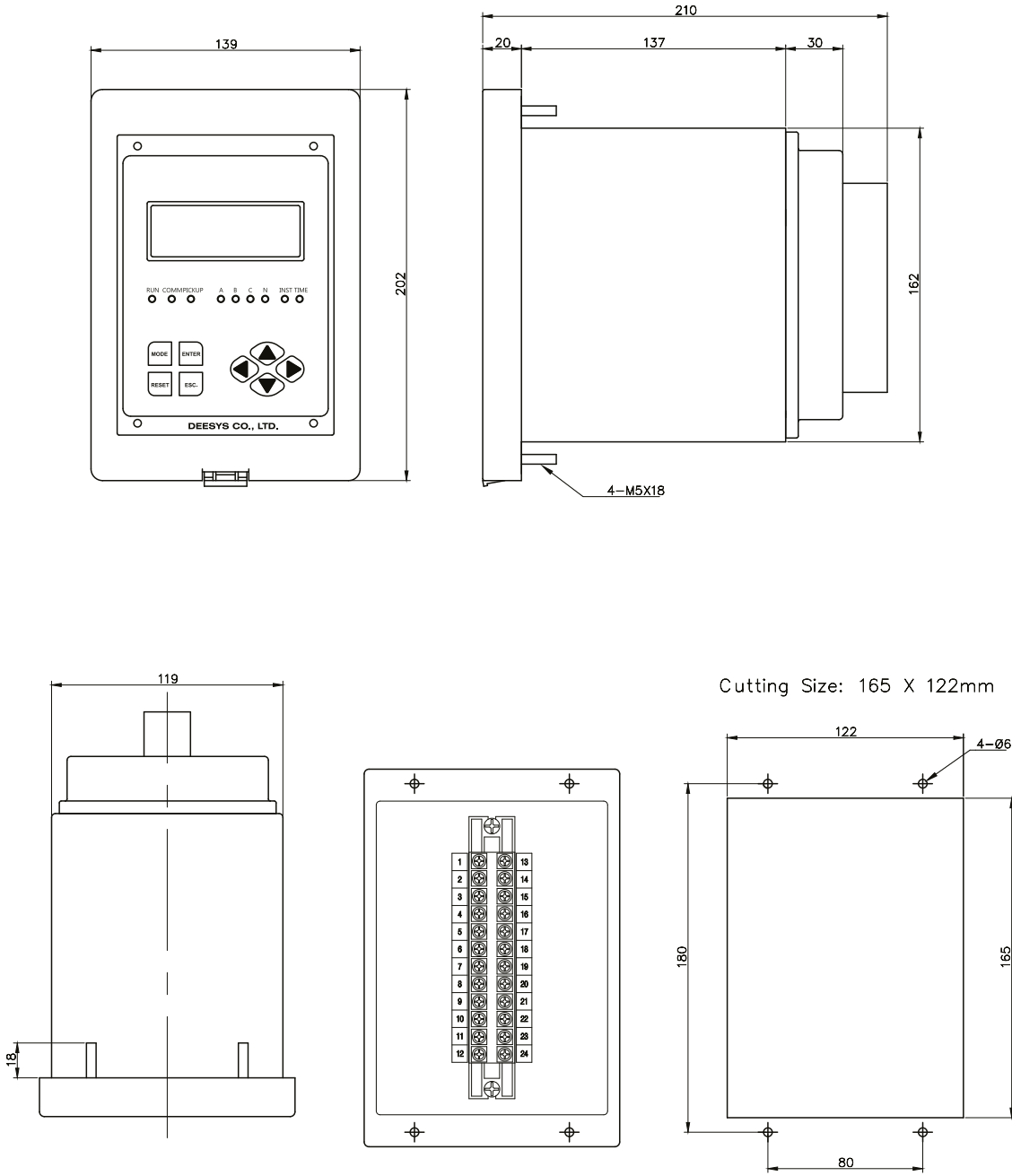


Terminal Configuration



Items	Description
IA, IB, IC, IN	Connect the current input terminal and CT.
D01 ~ D04 DO_COM1 ~ _2	Digital Output terminal. Output Trip/Alarm signal in case of accident DO_COM1(COM)-D01(NO),D02(NO) : Contact for TRIP(40A) DO_COM2(COM)-D03(NO),D04(NO) : Contact for Alarm(16A) D01 ~ 4 : Custom Setting
DI1 ~ 3/DI_COM	Digital Input Terminal. In the case of DI_1 and DI_2, the ON/OFF signal of the circuit breaker can be input and all DI terminals can be set arbitrarily by the user.
485C+/C-/GND	CommunicationTerminal. Comm. is RS-485/MODBUS method.
FG	FGound Terminal
L/N	Power Input Terminal. Rating : AC 85 ~ 240V

Dimensions





Digital Intelligent Protective Relay
- Over/Under Voltage & Ground Over Voltage

◆ It is a digital complete operation type relay equipped with DSP, and various operating times and operating voltages can be easily corrected. It performs powerful calculation function and 32 sampling per channel, and 4×20 LCD provides convenient MIMIC function and various types of display.

◆ FAULT VIEW program provided Easy system design using soft PLC function, free application to PMS system by applying MODBUS RTU protocol, and EMC performance enhancement for high and low voltage switchgear, stable system operation.

◆ As a relay that operates when abnormal voltage occurs such as undervoltage or overvoltage in the system, logic can be configured with a simple PLC program for input/output contacts, and it can be applied to various sequences and easily configured for a user's specific purpose.

◆ Various monitoring and measurement functions are supported, and 16 Faults, 128 System Events, 16 Waves and maximum waveform data can be saved, making accident analysis easier. In addition, the self-diagnosis function is performed during operation, and an alarm is output when an error occurs.

◆ Through the operating program for the PC interface, you can set and monitor all protection elements and various functions supported by the product.

계전사양 개요

- ▶ Real-time storage of line failure information including accident time by storing 128 events
- ▶ Built-in Fault Recording function to save the accident waveform in case of an accident (up to 16)
- ▶ Instantaneous and time-limited, IEC 60225 standard 2 TIME CURVE built-in (definite time, inverse time)
- ▶ The relay's set value and LOGIC configuration are permanently stored regardless of the presence or absence of control power.

Use Envirnmant

Store Temp. Range	-10℃ ~ 55 ℃
Use Temp. Range	-25 ℃ ~ 70 ℃
Use Humidity Range	Daily 30 ~ 80%
Elevation	Low than 1,000m Sea level
etc	Place no vibration and shock
Applicable Standard	KEMC 1120

Case

Type	Rectangular Drawout Type
Color	Munsell No. N1.5 (Black)
Material	LUPOY

Ratings

Rated Input	Frequency	60Hz/50Hz
	Input Votage	VT Rate : 10V / 190V
	Control Power	AC/DC 100V ~ 240V
	Power Consumption	Stand by : less than 10W, Run : less than 20W
	Input Burden	VT : within 0.5VA/Phase
Contact Capacity	Digital Input (DI)	Digital Input : AC/DC 100V ~ 240V
	Output Contact (Relay 2Ports for DO Trip)	AC 240V 30A, DC 28V 30A: Resistive Load
	Output Contact (Relay 2Ports for DO ALARM)	AC 240V 10A, DC 30V 10A: Max. switching voltage/ current

Over Voltage Element [59]

RUN	Rated Voltage	3 Phase AC 110V
	Operating voltage correction	60 ~ 160V (1.0V STEP)
	Operating voltage Accuracy	within ±5% of correction value
	Operation time correction	Limited time (40~50ms), Definite time (0.04~60s/0.01s STEP)
	Operation time precision	within 5%of corrention value or ±35ms
RETURN	Return value	95% or more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP)

Gound Fault Over Voltage Element [64]

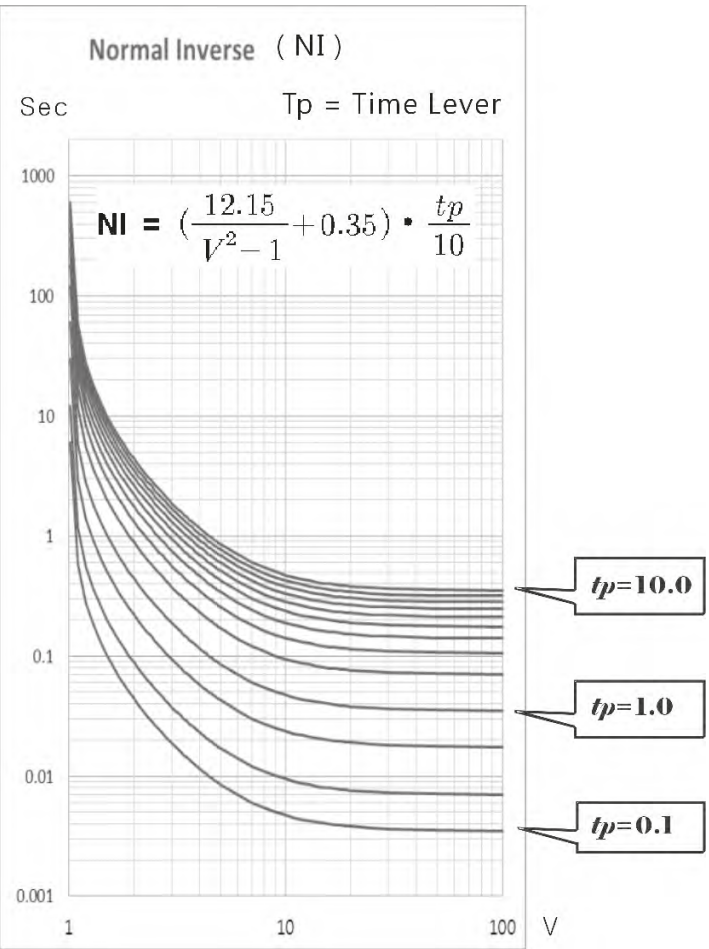
RUN	Rated Voltage	AC 110 / 190V
	Operating voltagecorrection	1.0 ~ 12.0A (0.1A STEP)
	Operating voltage Accuracy	±5% of correction value
	Operation time correction	Definite time: 0.04~60.0s (0.01s STEP), Reverse time: 0.10~10.0s (0.1s STEP)
	Operation time precision	within 5% of correction value, or ±35ms
RETURN	Return value	95% and more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP)

Low Voltage Relay Element [27]

RUN	Rated Voltage	3 Phase 110V
	Operating voltage correction	Limit-time : 20~90V (1.0V STEP) / Instantaneous time : 20~90V (1.0V STEP)
	Operating voltage Accuracy	±5% of correction value
	Operation time correction	Definite time: 0.04~60.0s (0.01s STEP) / Reverse time: 0.10~1 0.0s (0.1s STEP) / Instantaneous time : within 50ms or 0.4~1.0s STEP)
	Operation time precision	Instantaneous : 50ms / Limit-time: within 5% of correction value, or ±35ms
RETURN	Return value	Less than 105% of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00S (0.01 STEP)

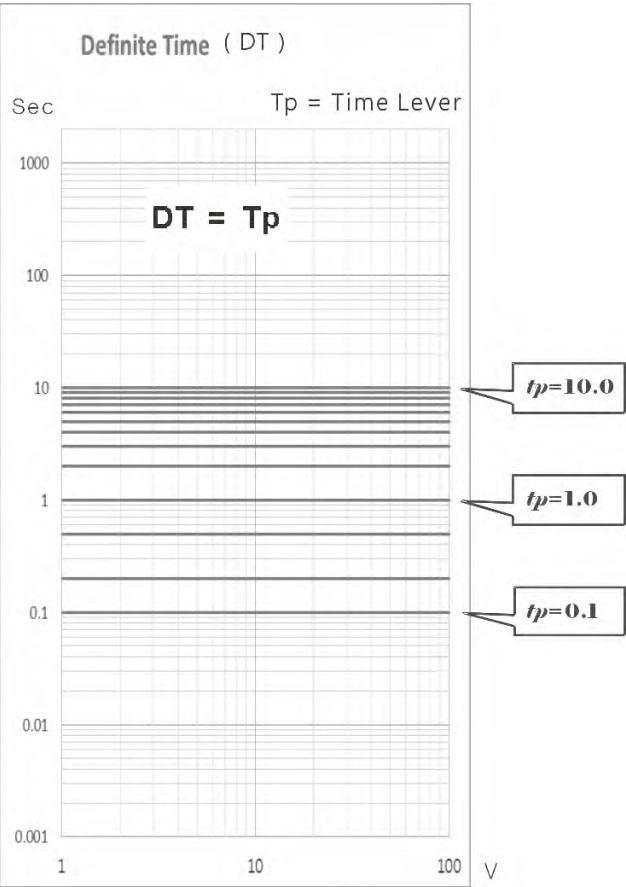
Protection Relay Characteristic Curve

IEC NI Curve (Normal Inverse)

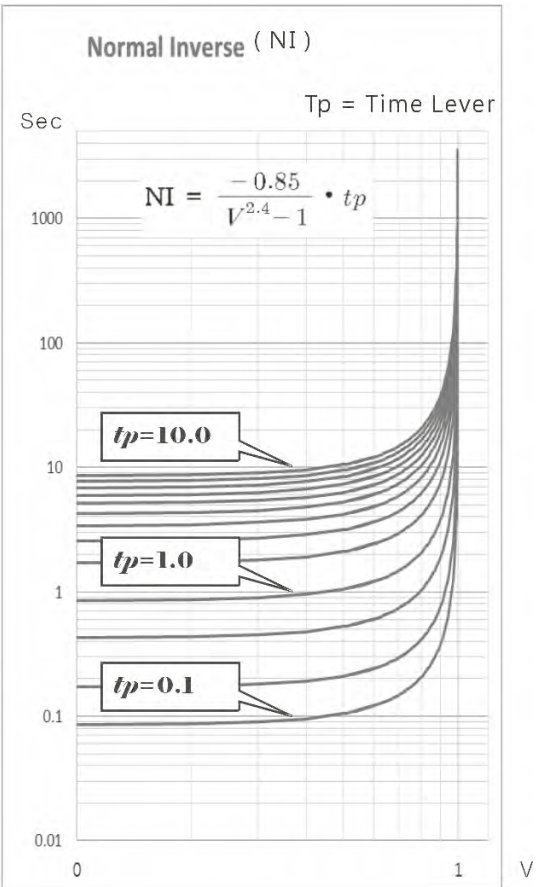


Protection Relay Characteristic Curve

IEC DT Curve (Low&Over Volage)



IEC NI Curve (Low voltage)



Continuous monitoring function [Self-diagnosis]

Add-on Function

CT/PT Calibration	It monitors whether CT/PT Calibration is performed, and if it is not valid data or calibration is not performed, it is recorded in the SYSTEM event.
Watch Dog	It judges whether DSP operates normally, and if the DSP does not operate normally, the external monitoring IC forcibly resets the DSP and peripheral devices and boots in the same order as when the first power is booted. In this case, there is no separate indication. Determining whether the DSP operates normally,
Memory and correction value abnormal monitoring	Monitors external memory errors. If the external memory does not operate normally, "FRAM ERROR" is displayed on the LCD, and if the correction value is abnormal, "MEMORY ERROR" is displayed and recorded in the SYSTEM event.

EVENT FUNCTION [EVENT RECORDING]

Add-on Function	
Fault Event : 16 count	
Trigger	Pickup, Operation
Time Tag	Time of Event occurrence
Main Information	Fault Voltage or Current
Sub Information	DI/DO Status
System Event : 128 count	
Trigger	Power ON, Setting Change, DI/DO Status change
Time Tag	Time of Event occurrence
Wave : 16 count	
Trigger	Operation
Sample/Cycle	32
Saving Cycle	30 Cycle(50/60Hz common)
Time Tag	Time of Operation occurrence

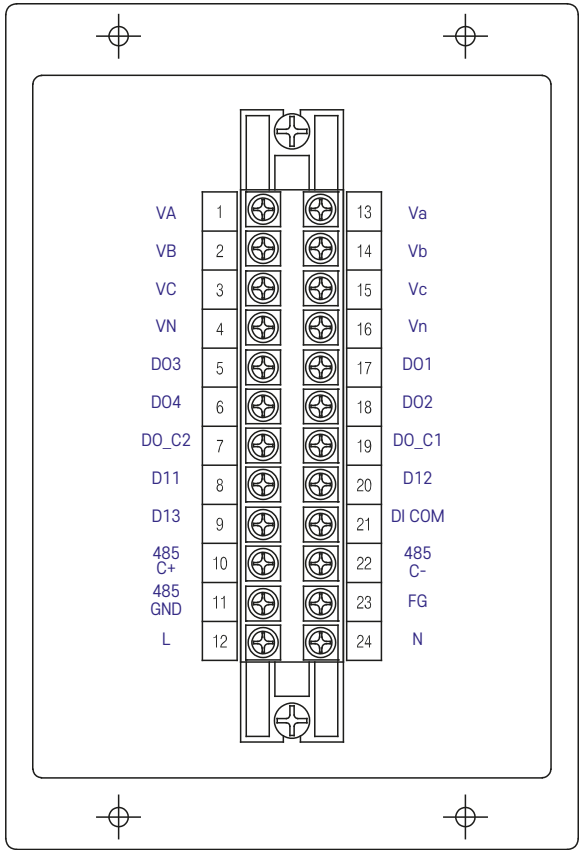
Measurement display function [METERING]

Add-on Function		
Meas. Item	Display range (Based on device display value)	Error (Based on device input rating)
Phase V (V)	0.000V ~ 999.999kV (Less than 5V Cut-off)	±0.5[%] at Vn , ±0.5[%] or ±1[%] at Other Voltage range
Zero Phase V (Vo)	0.000V ~ 999.999V (Less than 5V Cut-off)	±0.5[%] or ±1[%]

DO Default Setting

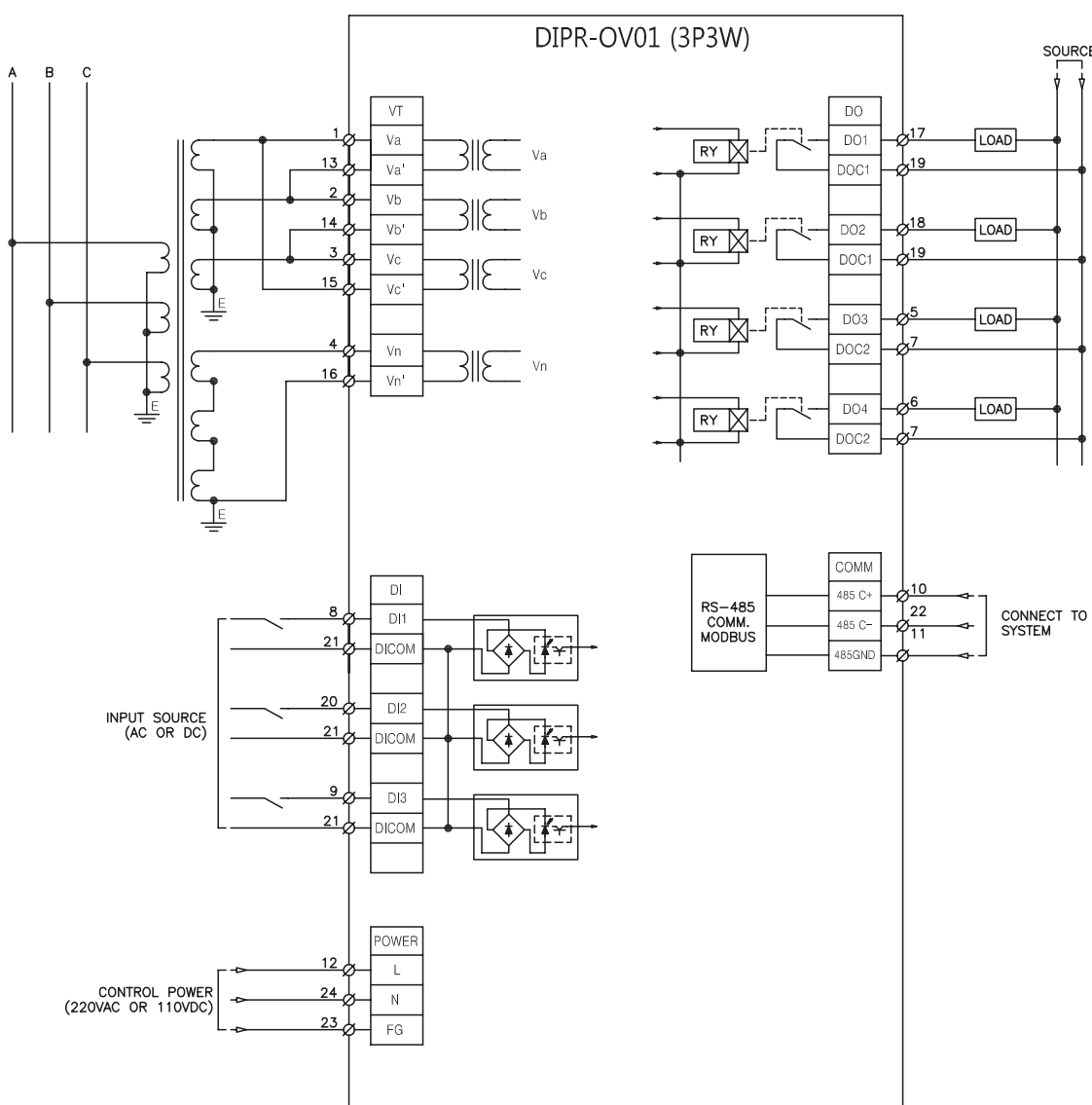
Add-on Function		
DEVICE	ITEMS	SETTING
DIPR-OV01	DO 01	UVR, OVR, OVGR
	DO 02	OVR
	DO 03	OVGR
	DO 04	UVR

Terminal Configuration

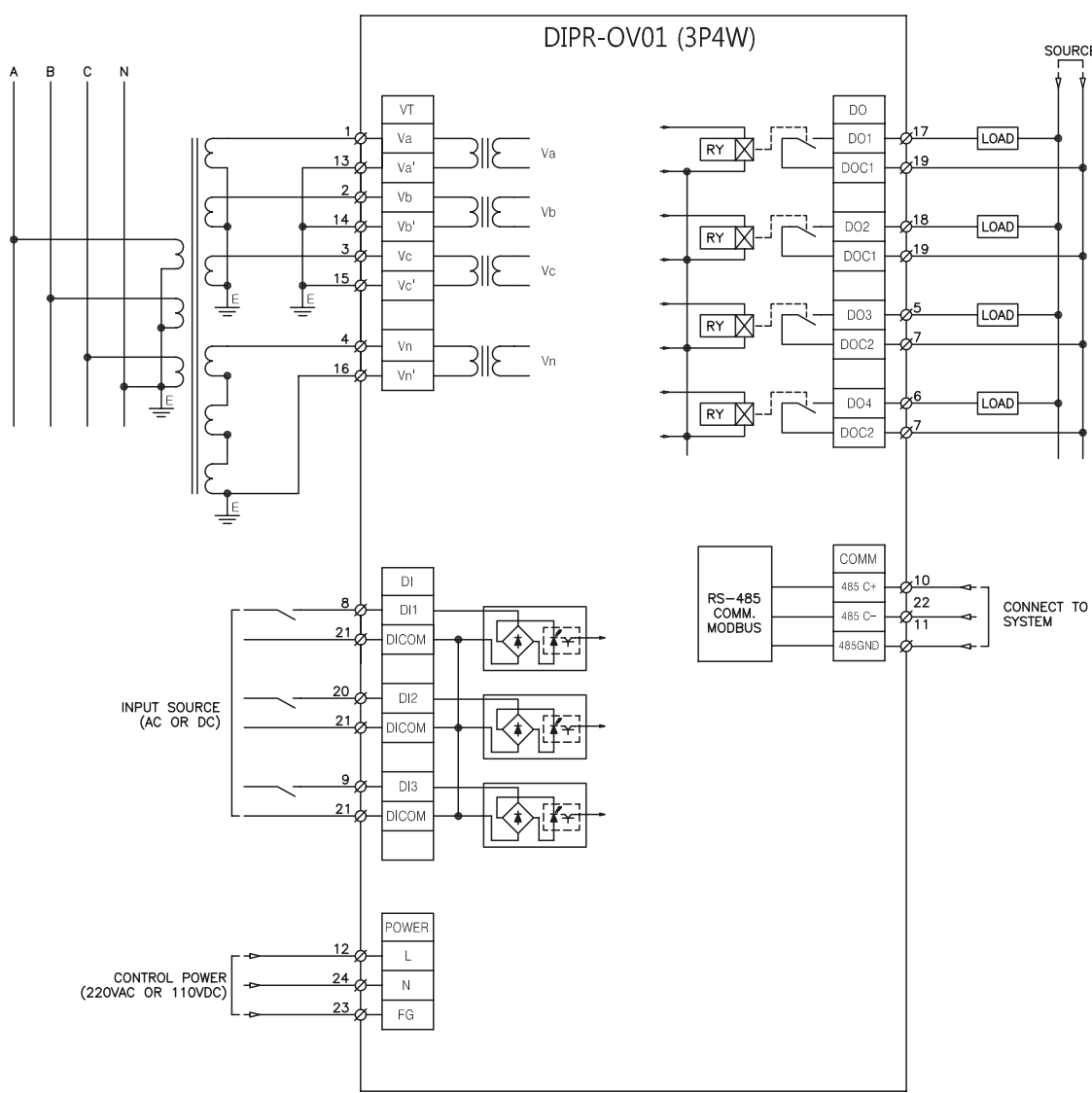


Items	Description
VA-Va ~ VN-Vn	Connect the current input terminal and PT.
DO1 ~ DO4 DO_C1 ~ _2 OVR/OVGR	Digital Output terminal. Output Trip/Alarm signal in case of accident DO_COM1(COM)-DO1(NO),DO2(NO) : CONTACT for TRIP(40A) DO_COM2(COM)-DO3(NO),DO4(NO) : CONTACT for ALARM(16A) DO1 ~ 4 : Custom Setable
DI1 ~ 3/DI_COM	Digital Input Terminal. In the case of DI_1 and DI_2, the ON/OFF signal of the circuit breaker can be input and all DI terminals can be set arbitrarily by the user.
485C+/C-/GND	Communication Terminal. Comm. is RS-485/MODBUS method.
FG	FGound Terminal
L/N	Power Input Terminal. Rating : AC 85 ~ 240V

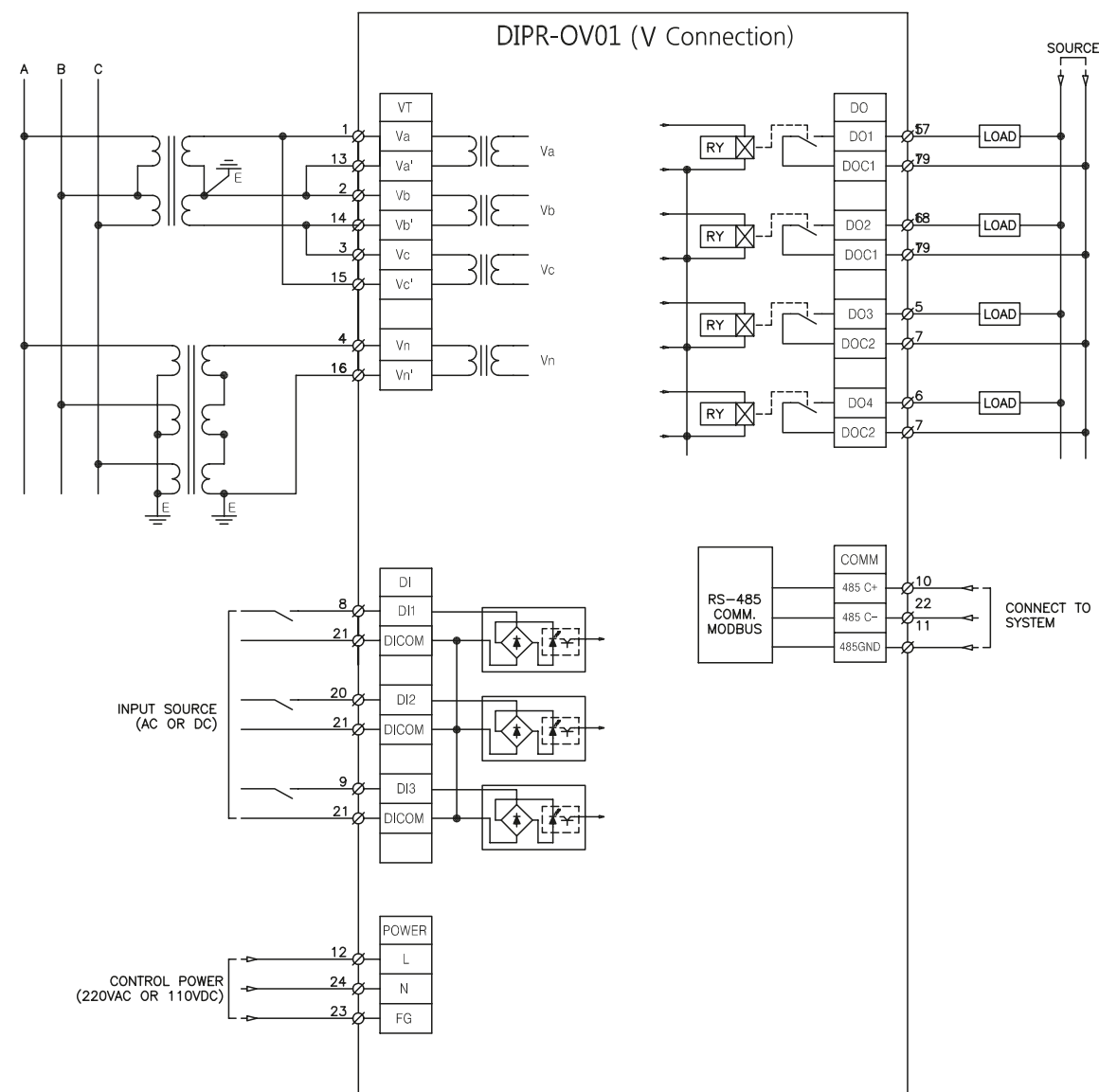
Wiring Diagram (3P 3W)



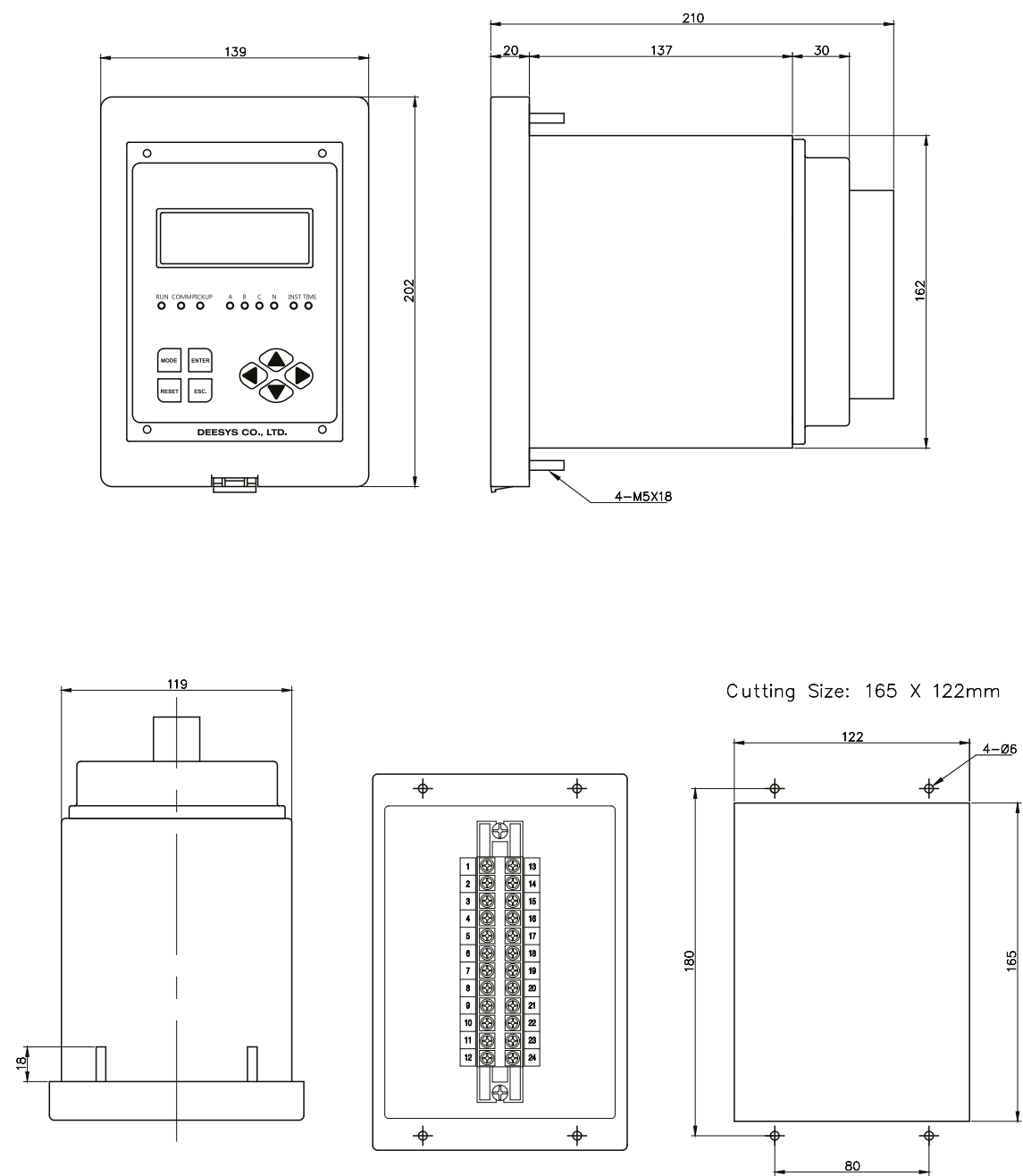
Wiring Diagram (3P 4W)



Wiring Diagram (V Connection)



Dimensions



Digital Intelligent Protective Relay
- Selective & Directional Ground



- ◆ It is a digital complete arithmetic relay equipped with DSP, and various operating times and operating voltages can be easily corrected.
- ◆ Powerful calculation function and 32 sampling per channel, 4×20 LCD provides convenient MIMIC function and various types of display.
- ◆ FAULT VIEW program provided Easy system design using soft PLC function, free application to PMS system by applying MOD-BUS RTU protocol, and stable system operation by enhancing EMC performance for application to high and low voltage switchboards.
- ◆ As a voltage type relay that selectively detects ground faults in grounded and ungrounded systems, logic can be configured with a simple PLC program for input/output contacts, and can be applied to various sequences and easily configured for specific purposes.
- ◆ Various monitoring and measurement functions are supported, and 16 Faults, 128 System Events, 16 Waves and maximum waveform data can be saved, making accident analysis easier. And the self-diagnosis function is performed during operation, and an alarm is output when an error occurs.
- ◆ Through the operating program for PC interface, all protection elements can be set and monitored, and various functions supported by the product can be set and checked.

Specification Overview

- ▶ By storing 128 events, information in case of line failure is stored in real time, including accident time.
- ▶ Built-in Fault Recording function to save the accident waveform in case of an accident (up to 16)
- ▶ Instantaneous and limited time, IEC 60225 standard 2 TIME CURVE built-in (definite time, inverse time)
- ▶ The set value and LOGIC configuration of the relay are permanently stored regardless of the presence or absence of control power.

Use Envirnmant

Store Temp. Range	-10℃ ~ 55 ℃
Use Temp. Range	-25 ℃ ~ 70 ℃
Use Humidity Range	Daily 30 ~ 80%
Elevation	Low than 1,000m Sea level
etc	Place no vibration and shock
Applicable Standard	KEMC 1120, IEC60255

Case

Type	Rectangular Drawout Type
Color	Munsell No. N1.5 (Black)
Material	LUPOY

Ratings

Rated Input	Frequency	60Hz/50Hz
	Input Votage	GVT : 110/190V
	Rated Current	CT : 5A, ZCT : 200mA /1.5mA
	Control Power	AC/DC 100V ~ 240V
	Power Consumption	Stand by : less than 10W/ Run : less than 20W
Contact Capacity	Input Burden	GVT : 0.5VA, CT : 0.5VA
	Digital Input (DI)	Digital Input : AC/DC 100V ~ 240V
	Output Contact (Relay 2Ports for DO Trip) Output Contact (Relay 2Ports for DO ALARM)	AC 240V 30A, DC 28V 30A: Resistive Load AC 240V 10A, DC 30V 10A : Max. switching voltage/ current

Selective Ground Fault Element [67G]

RUN	Zero Phase Current Correction(Io)	0.1A ~ 1.0A (0.01A STEP) , Acurracy ±5% or ±10mA
	Zero Phase Voltage Correction(Vo)	10V ~ 80V(1V STEP) , Acurracy ±5% or ±1V
	Reference phase Correction (Ang)	-90º ~ +90 º (1.0º STEP) , Acurracy ±5º
	Operation Phase Correction (Ang)	기준 위상각 ± 90º (1.0º STEP) , Acurracy ±5º
	Operation time correction	0.10 ~ 60.0s (0.01s STEP) , Acurracy ±5% or ±35ms
	Operation time Characteristic	DT
RETURN	Return value	95% and more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00s (0.01 STEP)

Directional Grond Fault Element [67N]

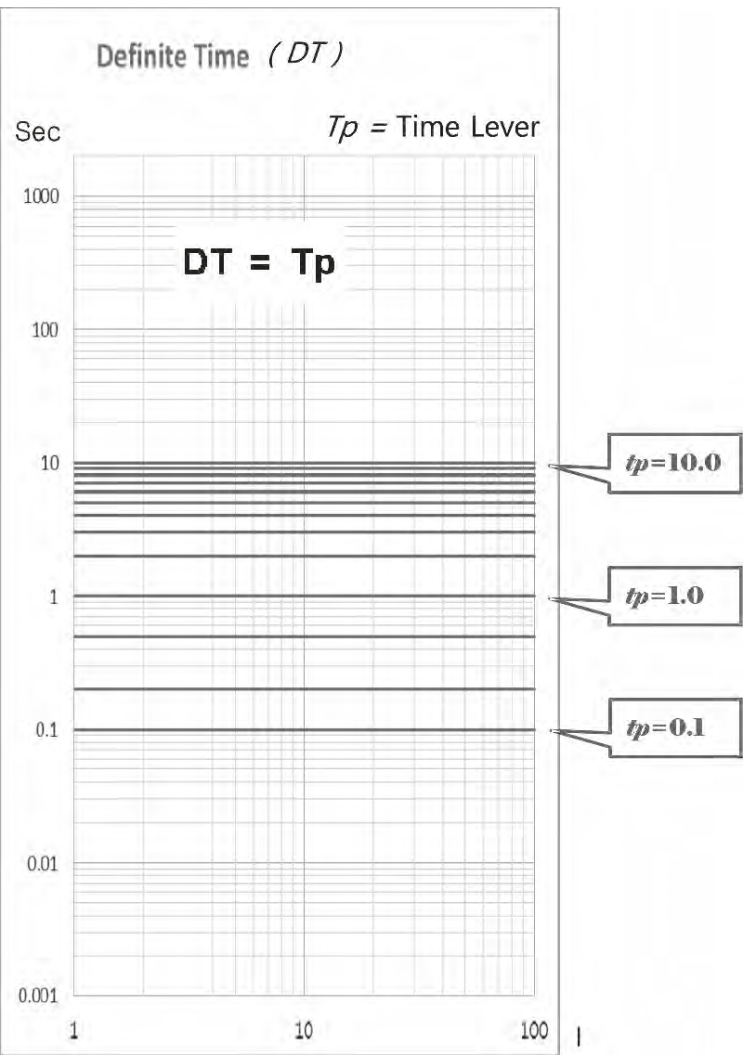
RUN	Zero Phase Current Correction(Io)	Instantaneous: 3A~40A(1.0A STEP)
		Limit-time: 0.2A~5A(0.1A STEP)
	Zero Phase Voltage Correction(Vo)	10V ~ 80V(1V STEP) , Acurracy ±5% or ±1V
	Reference phase Correction (Ang)	-90º ~ +90º (1.0º STEP) , Acurracy ±5º
	Operation Phase Correction (Ang)	기준 위상각 ± 90º (1.0º STEP) , Acurracy ±5º
	Operation time correction	0.10 ~ 60.0s (0.01s STEP) , Acurracy ±5% or ±35ms
RETURN	Operation time Characteristic	DT
	Return value	95% and more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00s (0.01 STEP)

Ground Fault Over Voltage Element [64]

RUN	Zero Phase Voltage Correction(lo)	10 ~ 80V (1V STEP), Accuracy ±5% or 1V
	Operation Time Correction	0.10 ~ 60.0s (0.01s STEP), Accuracy ±5% or ±35ms
	Operation time Characteristic	DT, NI
RETURN	Return value	95% and more of correction value
	Return time	Less than 100ms
	Output holding time	0.00 ~ 30.00s (0.01 STEP)

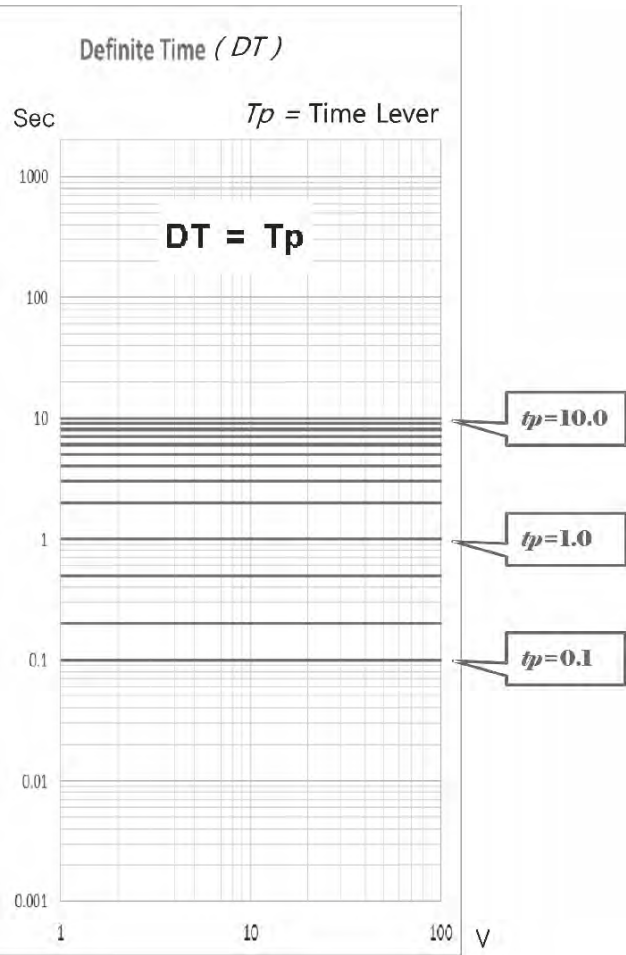
Protection Relay Characteristic Curve

IEC DT Curve (Selective / Directional Ground Fault)

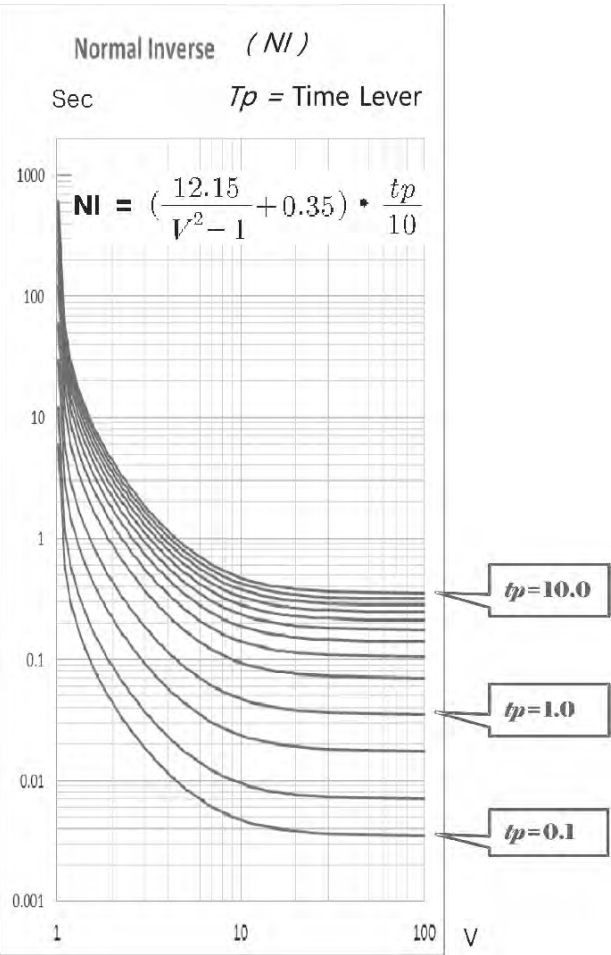


Protection Relay Characteristic Curve

IEC DT Curve



IEC NI Curve



Continuous monitoring function [Self-diagnosis]

Add-on Function

CT/PT Calibration	It monitors whether CT/PT Calibration is performed, and if it is not valid data or calibration is not performed, it is recorded in the SYSTEM event.
Watch Dog	It judges whether DSP operates normally, and if the DSP does not operate normally, the external monitoring IC forcibly resets the DSP and peripheral devices and boots in the same order as when the first power is booted. In this case, there is no separate indication. Determining whether the DSP operates normally,
Memory and correction value abnormal monitoring	Monitors external memory errors. If the external memory does not operate normally, "FRAM ERROR" is displayed on the LCD, and if the correction value is abnormal, "MEMORY ERROR" is displayed and recorded in the SYSTEM event.

EVENT Function [EVENT RECORDING]

Add-on Function

Fault Event : 16 count	
Trigger	Pickup, Operation
Time Tag	Time of occur event
Main Information	Fault voltage or current
Sub Information	DI/DO Status
System Event : 128 count	
Trigger	Power ON, Setting changed, DI/DO Status change
Time Tag	Time of occur event
Wave : 16 count	
Trigger	Operation
Sample/Cycle	32
Saving Cycle	30 Cycle(50/60Hz common)
Time Tag	Time of occur operation

Measurement display function [METERING]

Add-on Function

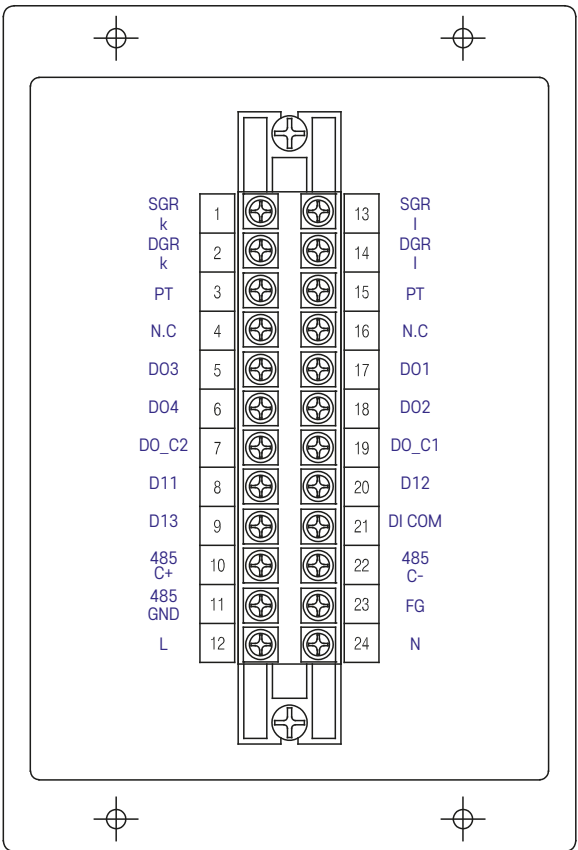
Metering Items	Display range(Based on device display value)	Error (Device input rating standard)
Phase Current(A)	0.000A ~ 999.999kA (Cut-off less than 2% of rated value)	±0.5[%] at In, ±0.5[%] or ±0.05[A] (Rated 5A)
Zero Phase Current(N)	0.000A ~ 999.999kA (Cut-off less than 2% of rated value)	±0.05 or ±0.05 (Rated 5A)

DO Default Setting

부가 기능

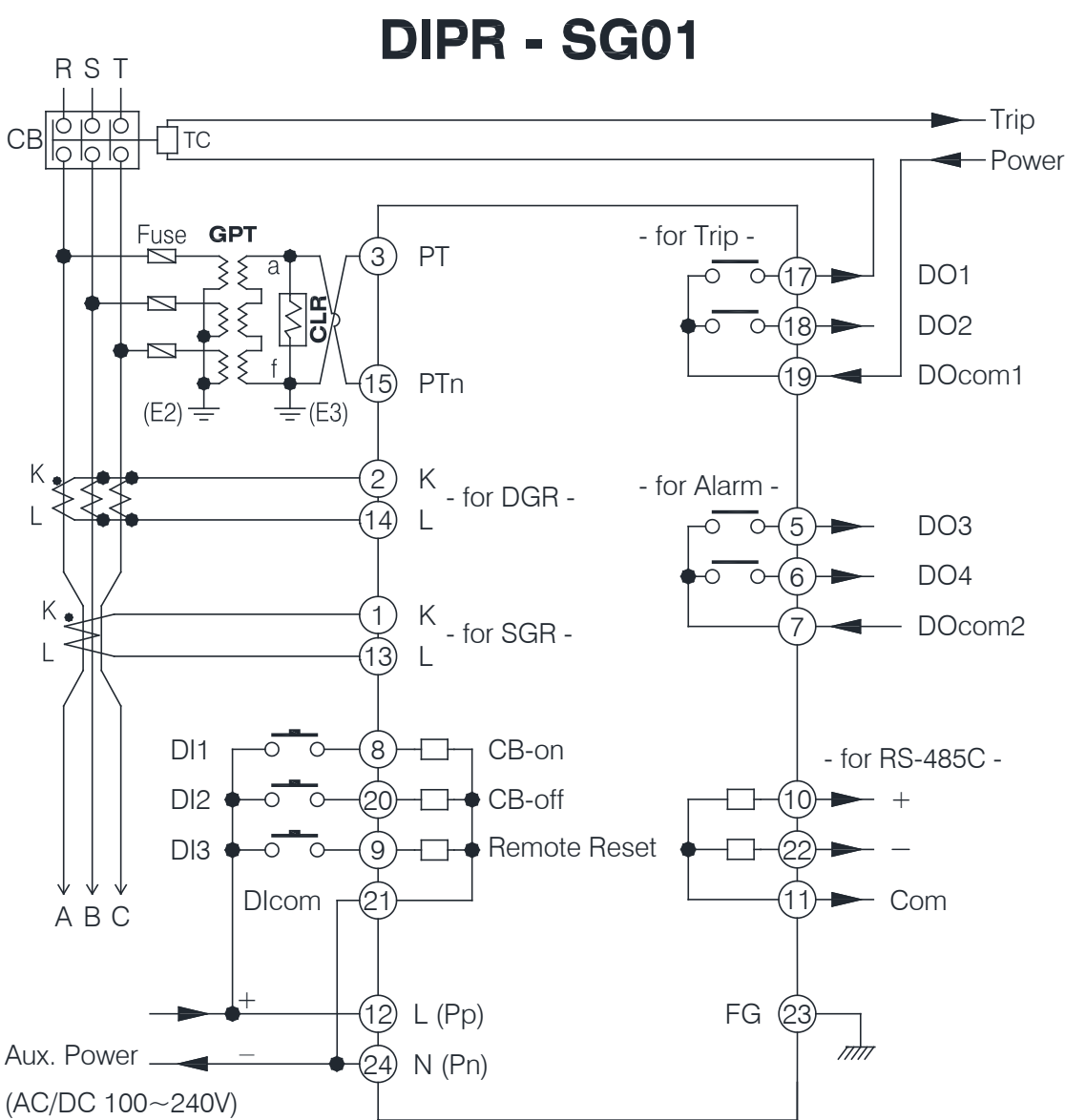
DEVICE	ITEMS	SETTING
DIPR-SG01	DO 01	TRIP(SGR, DGR, OVGR)
	DO 02	SGR ALRAM
	DO 03	DGR ALRAM
	DO 04	OV GR ALRAM

Terminal Configuration



ITEMS	DESCRIPTION
SGR(K-L)	Connect the Zero-phase current input terminal and ZCT.
DGR(K-L)	Connect the Zero-phase current input terminal and CT.
PT(G1-G2)	Connect the Zero-phase voltage input terminal and GVT.
D01 ~ D04 DO_C1 ~ _2	Digital Output terminal. Output Trip/Alarm signal in case of accident
	DO_COM1(COM)-D01(NO),D02(NO) : Contact for Alarm (16A)
	DO_COM2(COM)-D03(NO),D04(NO) : Contact for TRIP (40A)
	D01 ~ 4 : Custom Setting
Di1 ~ 3/DI_COM	Digital Input Terminal. In the case of DI_1 and DI_2, the ON/OFF signal of the circuit breaker can be input and all DI terminals can be set arbitrarily by the user.
485C+/C-/GND	CommunicationTerminal. Comm. is RS-485/MODBUS method.
FG	FGound Terminal
L/N	Power Input Terminal. Rating : AC 85 ~ 240V

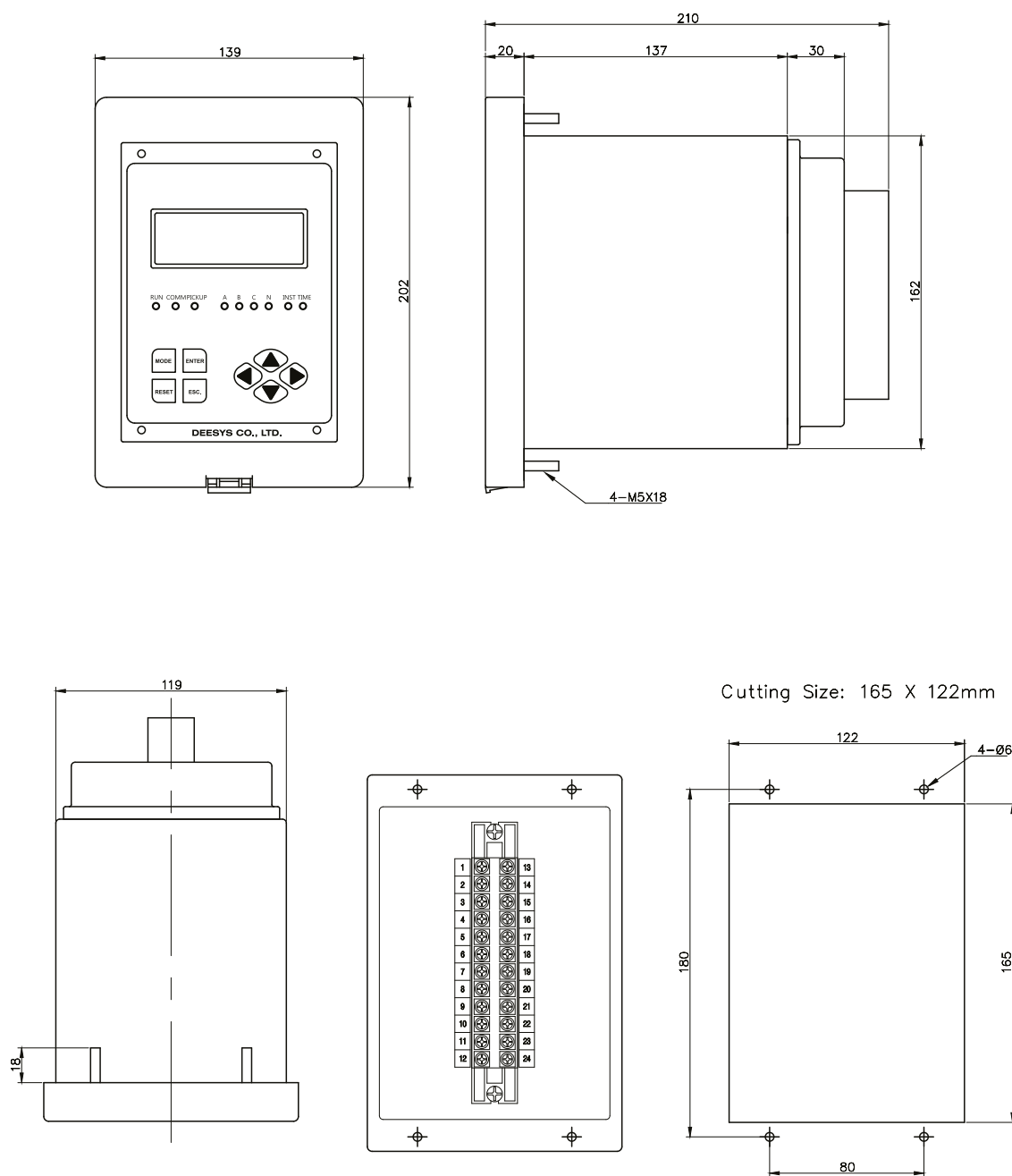
Wiring Diagram



Made in KOREA

DEESYS CO., LTD.

Dimensions



DEEsys[®]

Digital Multi-Channel Ground Faulty Protective Relay



DSG-D08R



DDG-D08R

Digital Selective Ground Relay

- Digital 8 Channel Relay



◆ This relay is a multi-channel (8ch) selective earth fault relay. In the event of a ground fault in a 3-phase 3-wire distribution line or electrical equipment, the zero current through the zero phase current transformer (ZCT) and the zero phase voltage of the By comparing and detecting phases, it selectively blocks or alarms the faulty line to prevent healthy devices and circuits. It is a digital fully calculated relay designed and manufactured for the purpose of protection. It is a highly reliable relay that can accurately correct various operating times, voltages and currents, and can store and analyze data in case of failure.

◆ For ground fault protection in an ungrounded system with multiple loads, it is necessary to provide as many optional ground fault relays as the number of loads.

◆ By using one multi-channel selective earth fault relay, it is possible to safely protect the sound load in the event of a ground fault in the distribution line and electrical equipment, and to selectively cut off only the faulty line for stable facility operation.

Use Enviroment

ITEM	DESCRIPTION
Storing Temp. Range	-10℃ ~ 55℃
Operating Temo. Range	-25℃ ~ 70℃
Operation Humidity Range	Daily everage 30 ~ 80%
Elevation	Less than 1000m sea level
Etc	A place no abnormal vibration and shock

General Information

ITEM	DESCRIPTION
Minimum sensing current	0.5mA and more (ZCT secondary current)
Minimum sensing voltage	5V and more (GPT tertiary voltage)
Fault Event	Record the last event for each circuit (occurrence date, time, current, time)

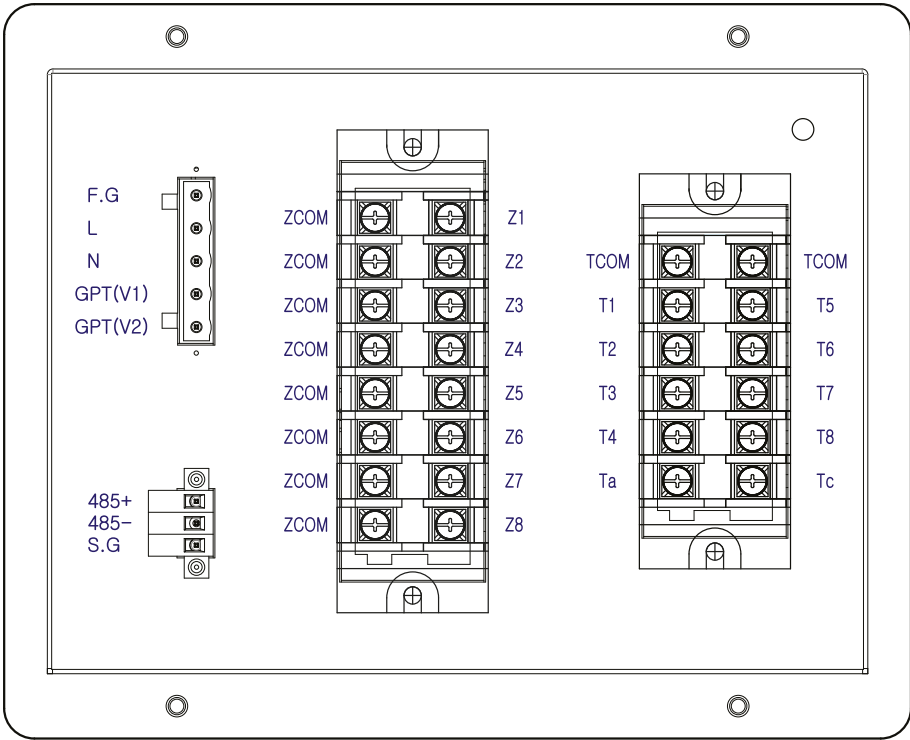
Rating Specifications

ITEM	DESCRIPTION
Rated Input V/A	ZCT : 200mA/100mV(or 200mA/1.5mA) , GPT : 110V, 190V
Operation Error	Current ±5%(Less than100mA±30mA), Time ±5%(or ±35ms), Reference Phase Error (±5°)
Input Burden	GPT : 0.5VA
Rated control power	AC/DC 100~240V
Control power Burden	20VA
Rated frequency	50Hz/60Hz
Count of circuits	8ch
Output contact	Common 1port(DC125V, 5A) , Circuit(8port DC125V, 5A)
Return Method	Auto / Manual Setting
COMM.	RS 485 Modbus

Relay Element Setting

ITEM	DESCRIPTION
Zero Phase Voltage Setting (Vo)	110 / 190V
Zero Phase Voltage Setting (Io)	0.1 ~ 1.0A (0.01A step)
Reference Phase Setting (Ang)	-90° ~ +90° (1.0° step)
Operation Phase setting (Ang)	Reference Phase ±60 ~ ±90°(1.0° STEP)
Operation time Setting (S)	0.05 ~ 10s (0.05s step)
Operation time Charateristic(Curve)	Time-limit (DT)

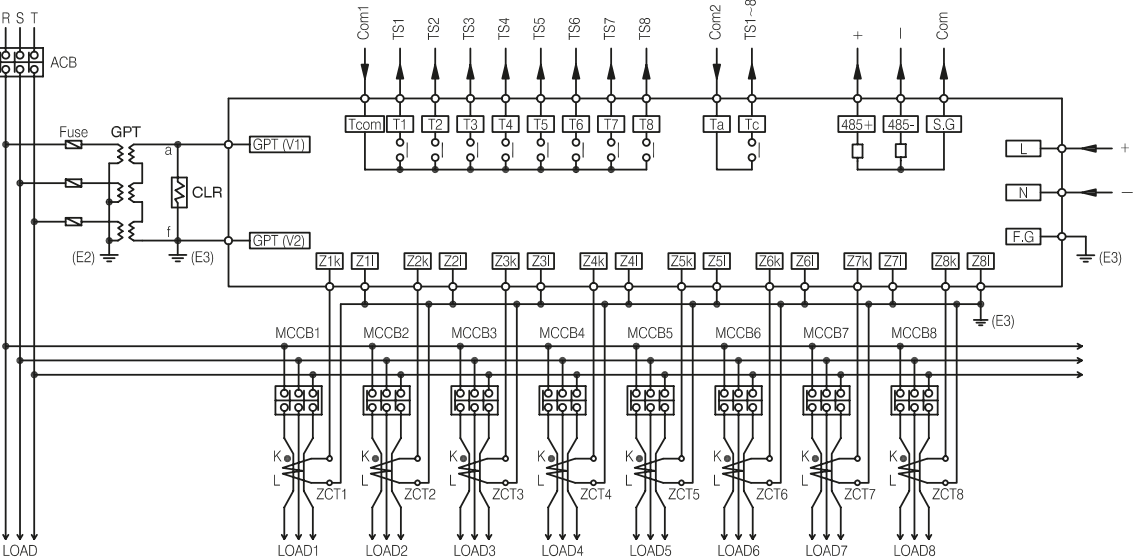
Terminal Configuairon



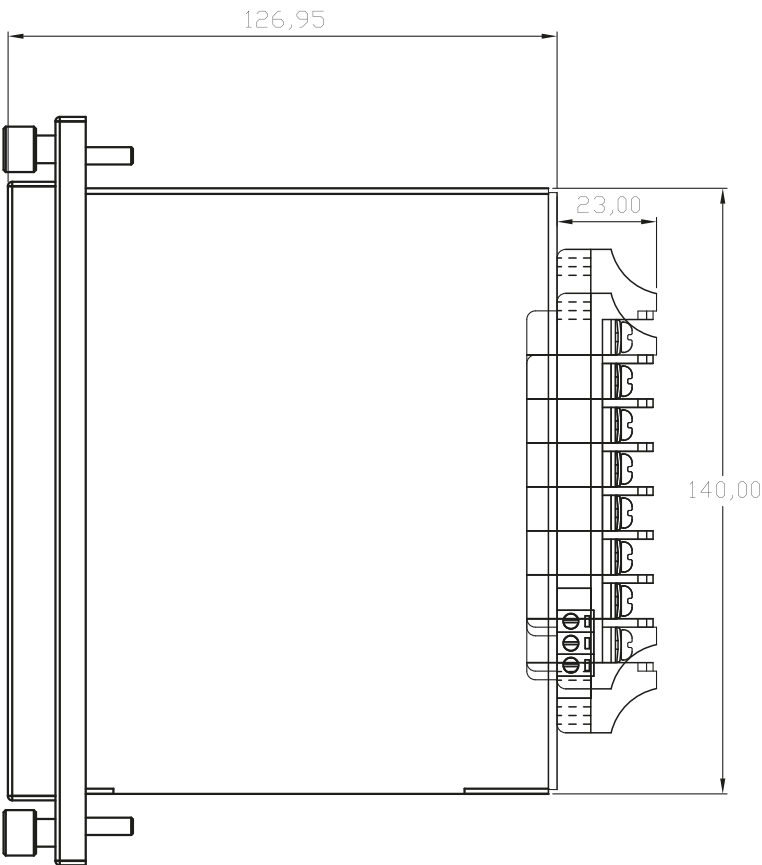
ITEM	DESCRIPTION
FG	Enclosure ground terminal
L, N	Aux. Power(AC/DC 100~240V)
GPT(V1), GPTV2)	GPT Input terminal
485(C+), 485(C-), S.G	Rs485 comm. and ground terminal
Z1-k - Z1-l ~ Z8-k - Z8-l	ZCT input terminal
TCOM, T1 ~ T8	each circuit Trip output contact terminal
Ta - Tc	ALARM common output terminal

Wiring Diagram

■ DSG-D08R External Wiring Diagram ■

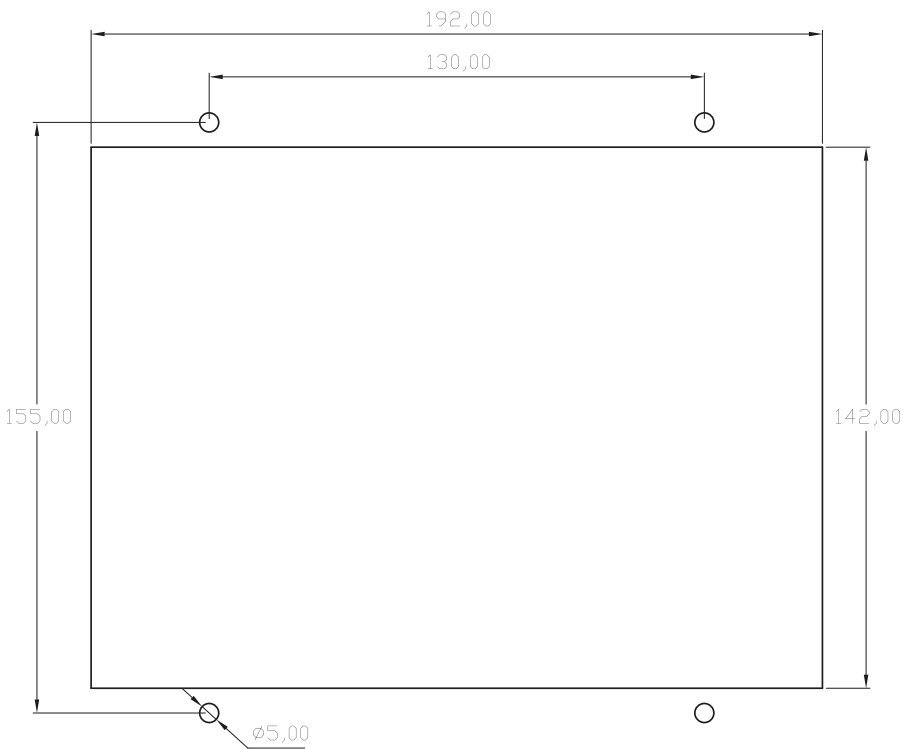
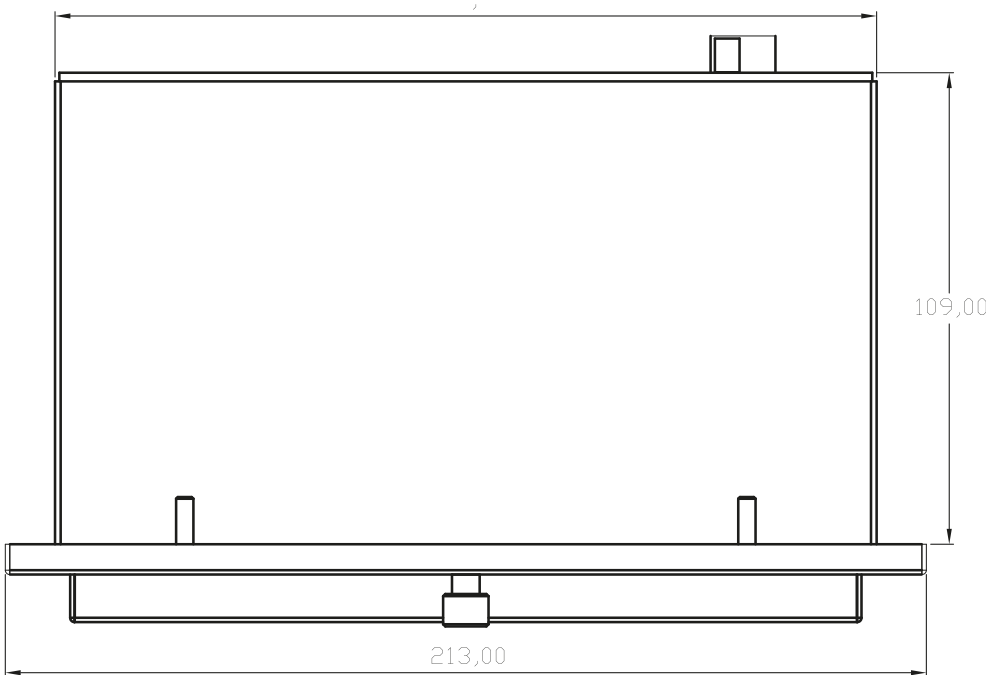


Dimensions



Dimension

PANNEL CUTTING SIZE





Digital Directional Ground Relay - Digital 8 Channel Relay

- ◆ This relay is a multi-channel (8ch) directional ground fault relay. In the event of a ground fault accident of a 3-phase 4-wire distribution line or electrical equipment, the phase of the zero current through the current transformer (CT) and the zero phase voltage of the zero phase transformer are compared and detected. Therefore, it is a digital complete operation type relay designed and manufactured for the purpose of selectively blocking or alarming faulty lines to protect sound devices and circuits. This relay is a highly reliable product that can accurately correct various operating times, voltages and currents, and can store and analyze data in the event of a failure.
- ◆ For earth fault protection in a grounding system with a large number of loads, it is necessary to provide as many anti-fault relays as the number of loads.
- ◆ Using one multi-channel directional relay, In the event of a ground fault, it can safely protect against a healthy load, and it can selectively cut off only the faulty line for stable facility operation.

Use Enviroment

ITEM	DESCRIPTION
Storing Temp. Range	-10℃ ~ 55℃
Operating Temo. Range	-25℃ ~ 70℃
Operation Humidity Range	Daily everage 30 ~ 80%
Elevation	Less than 1000m sea level
Etc	A place no abnormal vibration and shock

General Information

ITEM	DESCRIPTION
Minimum sensing current	0.5mA and more (ZCT secondary current)
Minimum sensing voltage	5V and more (GPT tertiary voltage)
Fault Event	Record the last event for each circuit (occurrence date, time, current, time)

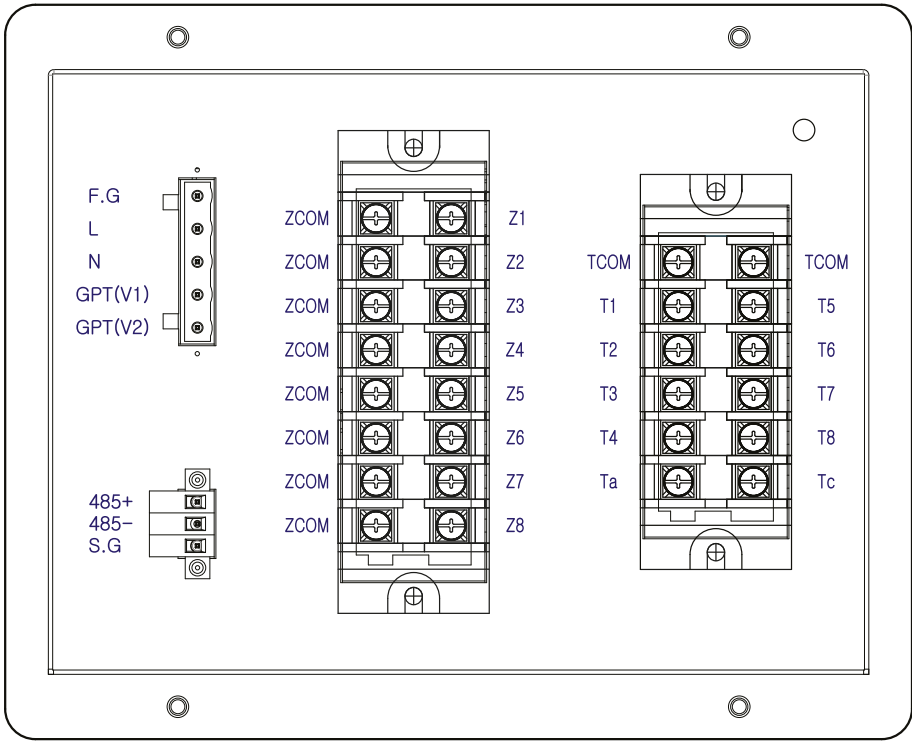
Rating Specifications

ITEM	DESCRIPTION
Rated Input V/A	CT : 5A / GVT : 110V, 190V
Operation Error	Current ±5%(Less than100mA±30mA), Time ±5%(or ±35ms), Reference Phase Error (±5°)
Input Burden	GPT : 0.5VA
Rated control power	AC/DC 100~240V
Control power Burden	20VA
Rated frequency	50Hz/60Hz
Count of circuits	8ch
Output contact	Common 1port(DC125V, 5A), Circuit(8port DC125V, 5A)
Return Method	Auto / Manual Setting
COMM.	RS 485 Modbus

Relay Element Setting

ITEM	DESCRIPTION
Zero Phase Voltage Setting (Vo)	110 / 190V
Zero Phase Voltage Setting (Io)	0.1 ~ 1.0A (0.01A step)
Reference Phase Setting (Ang)	-90° ~ +90° (1.0° step)
Operation Phase setting (Ang)	Reference Phase ±60 ~ ±90°(1.0° STEP)
Operation time Setting (S)	0.05 ~ 10s (0.05s step)
Operation time Charateristic(Curve)	Time-limit (DT)

Terminal Configuairon



ITEM	DESCRIPTION
FG	Enclosure ground terminal
L, N	Aux. Power(AC/DC 100~240V)
GPT(V1), GPTV2]	GPT Input terminal
485(C+), 485(C-), S.G	Rs485 comm. and ground terminal
Z1-k - Z1-l ~ Z8-k - Z8-l	ZCT input terminal
TCOM, T1 ~ T8	each circuit Trip output contact terminal
Ta - Tc	ALARM common output terminal

DEEsys®

Digital Protective Ralaly for Ships



DFR-021D



MCT-A31

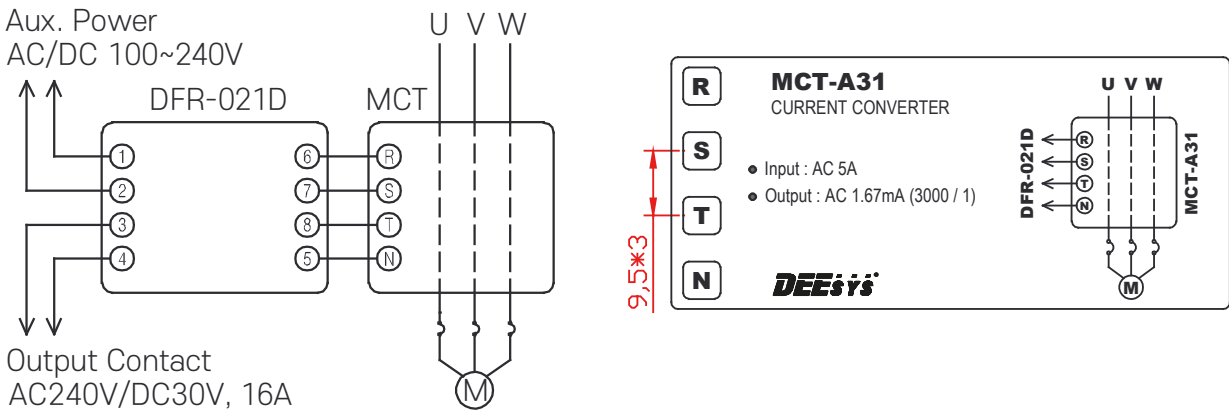


Digital Phase Fail Relay - 021D

◆ This relay is a digital phase loss relay used to protect the equipment line by blocking or alarming the phase loss or phase imbalance through the 3-phase phase loss detection device (MCT-A31) as a ship-only relay. In addition, by applying advanced digital control technology, it is possible to correct various operating times and operating currents, and it is a digital protection relay that can accurately analyze the causes of failures by storing accident records.

*Use together with the three-phase detection device MCT-A31.

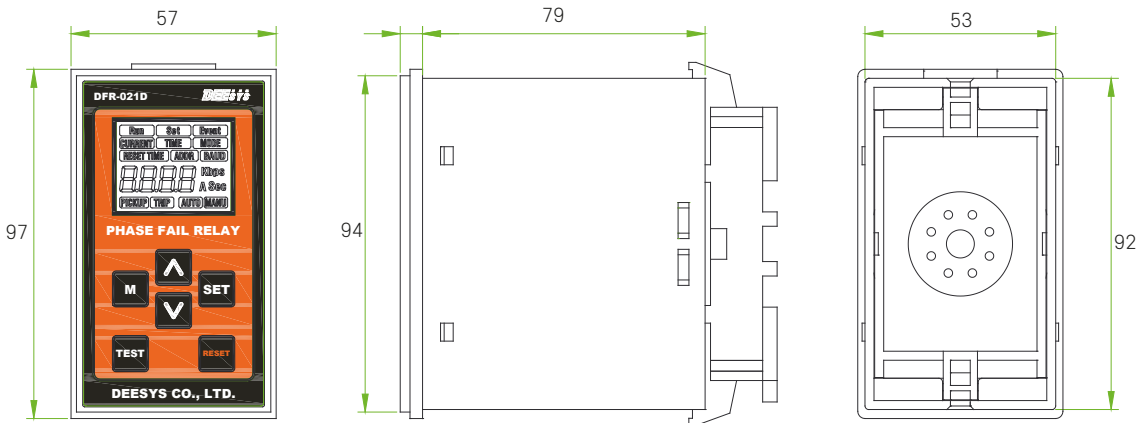
Wiring Diagram



Specification

Classification		Rating	
Device Name		DFR - 021D	
Control Power		AC/DC 100 ~ 240V, 50/60Hz, < 3VA	
Rated Input		AC1 ~ 160A (1'ry current of MCT), 3Phase, 50/60Hz	
Reference Current Setting		1.0 ~ 10.0A (0.1 step)	
Unbalance Ratio Setting		10 ~ 90% (1 step)	
Start-lock Time Setting		1.0 ~ 60.0sec (0.5 step)	
Alarm Duration Setting		1.0 ~ 60.0sec (0.5 step)	
CT Ratio Setting		5 ~ 1,000A (5 step)	
Alarm Reset Setting		Auto	Manual
Output Pulse Set	Operation Mode	Pulse	Latch
	Pulse Holding Time	0.1 ~ 10.0sec (0.1 step)	—
Operation Accuracy		± 10% at setting value	
Operation Indicator		LCD 적색 점멸	
Insulation Resistance		More than 100MΩ with DC 500V Megger	
Dielectric strength		2,000V AC rms 1 minute	
Surge / Impulse		IEC255- 4 : 5kV (1.2X50μs) / IEC255- 22- 1 : 2.5kV (1MHz)	
Case material		LUPLOY (Black Color) resin	

Dimensions



Classification		Rating	
Device Name		MCT- A31	
Rated Input		AC 1 ~ 5A (2nd current of CT), 3Phase, 50/60Hz	
Rated Output		5A : 1.667mA (3,000 : 1)	
Insulation Resistance		More than 100MΩ with DC 500V Megger	
Dielectric strength		2,000V AC rms 1 minute	
Case material		LUPLOY (Black Color) resin	



Current Converter

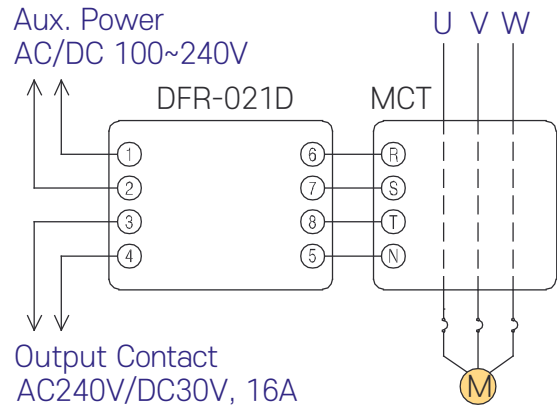
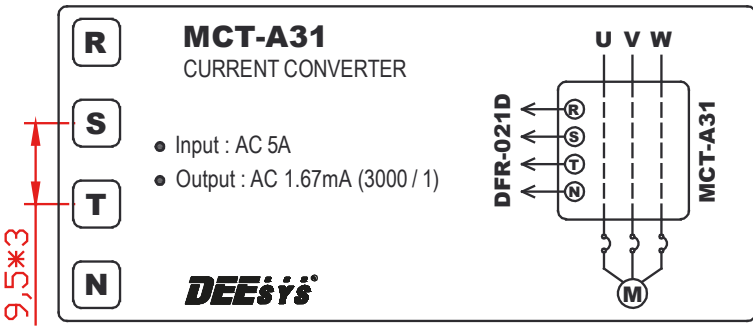
◆ This product is a ship-specific phase loss detection device that detects and converts each phase imbalance of the line. With precise design and manufacturing, it is possible to detect the unbalanced state of a three-phase load at all times.

*Please use it together with the ship protection relay DFR-021D.

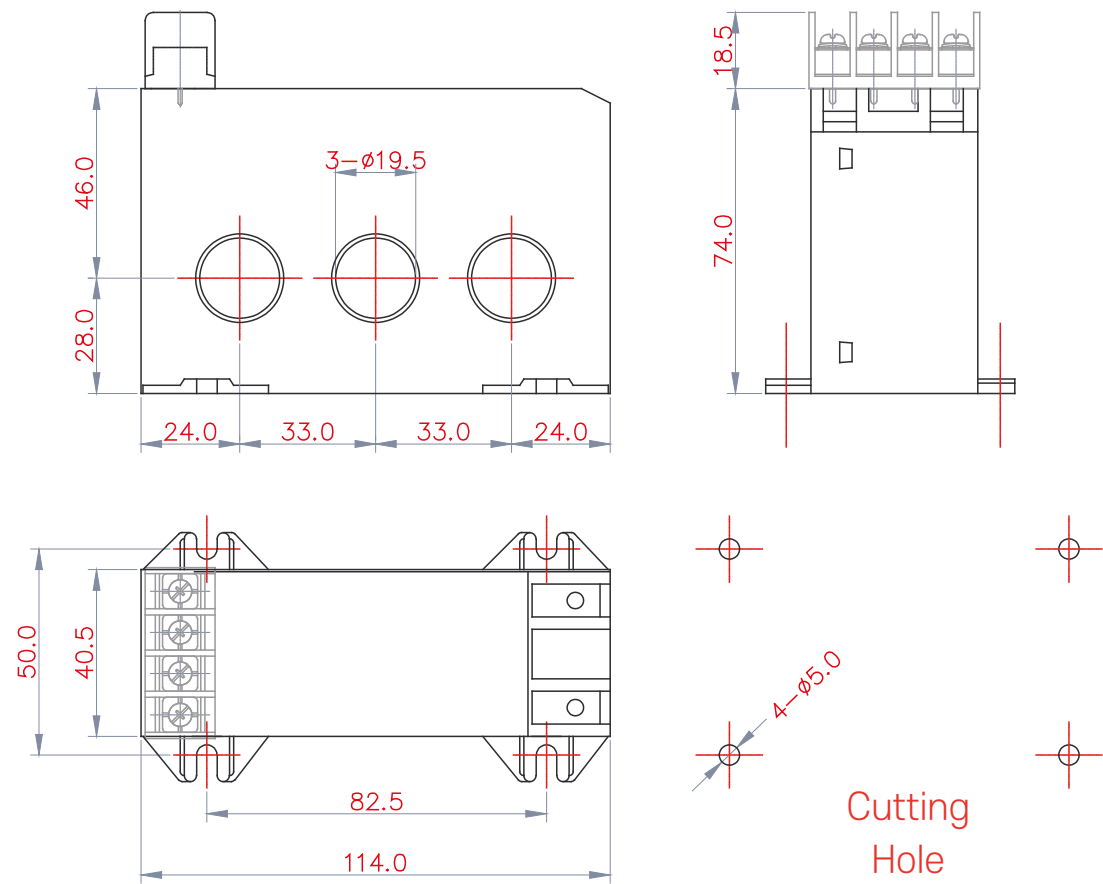
Specification

Classification	Rating
Device Name	MCT-A31
Rated Input	AC 1 ~ 5A (2nd current of CT), 3Phase, 50/60Hz
Rated Output	5A : 1.667mA (3,000 : 1)
Insulation Resistance	More than 100MΩ with DC 500V Megger
Dielectric strength	2,000V AC rms 1minute
Case material	LUPOY (Black Color) resin

Wiring Diagram



Dimensions





Digital Earth Leakage Detector Ground faulty Relay



DED-FD16



DED-LD10C



DGF-D16R



DGF-D11F



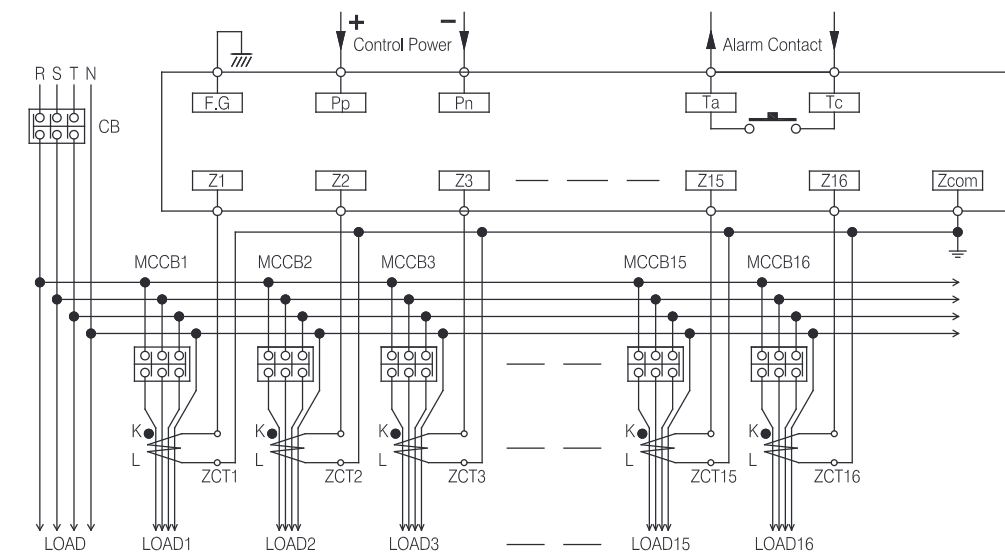
Digital Earth Leakage Detector -FND Type 06/10/16 Channel

- ◆ This product satisfies the EMC (KN101 electromagnetic compatibility) test.
- ◆ By extending the leakage current measurement area up to 10A and displaying it, it provides convenience in measurement compared to existing products.
- ◆ When installing a panel, the built-in depth of the product is reduced to 72mm, so it can be installed in a smart switchboard or small power distribution box.
- ◆ It is a product that applies software-type filtering technique to suppress harmonics generated from inverter load by digital measurement method.
- ◆ With the fault current recording function, the most recent leakage current value is displayed through the event menu.
- ◆ It has the best cost-performance ratio among domestic products.
- ◆ It is manufactured with the same panel perforation size as the basic product.

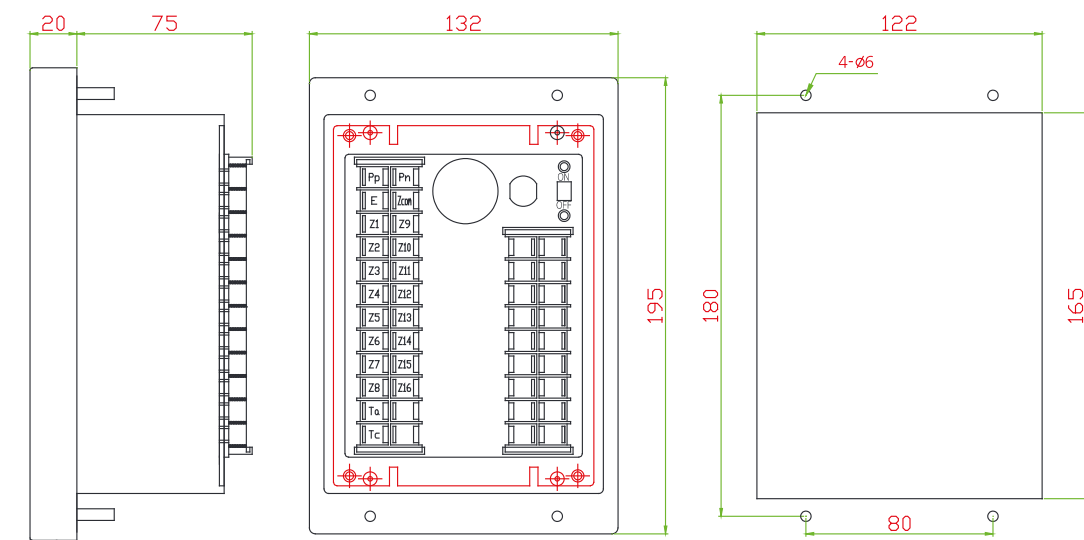
Rating

MODEL		DED-FD16	DED-FD10	DED-FD6
Count of Input Circuit		16 circuit	10 circuit	6 circuit
Control Power	Rated Freq.	50/60 Hz		
	Rated Volt.	AC/DC 110~220V		
	Operation Volt.	AC/DC 85~240V		
Output Contact	Common contact	for Alarm "1a" Dry-Contact		
	Contact capacity	AC 125V, 5A / DC 30V, 5A		
Operation Current	Nominal op. volt.	AC 100mA/45mV		
	Sensitivity adj. curr.	OFF, 0.1 ~ 1.0A [0.1A Step]		
	Nominal op. volt.	53% ~ 75% of correction value		
	Measuring Range	0.05 ~ 10.00A, Once over 2A , display 'over'		
Op. Time	Op. Characteristic	[Definite Time]		
	Delay Time	0.05 ~ 9.95sec [0.05sec Step]		
Return Setting	Quiescent Current	52% and less of correction value		
	Return Time	within 100msec return		
	Return Manner	Auto / Manual		
Event	No. of Saving	Each circuit latest 1 time, First-in-first-out manner		
App. Standard	Function Test	KOFEIS 0308		
	EMC	KN 101		

Wiring Diagram



Dimensions



Digital Earth Leakage Detector -LCD Type 6Ch/10Ch/16Ch

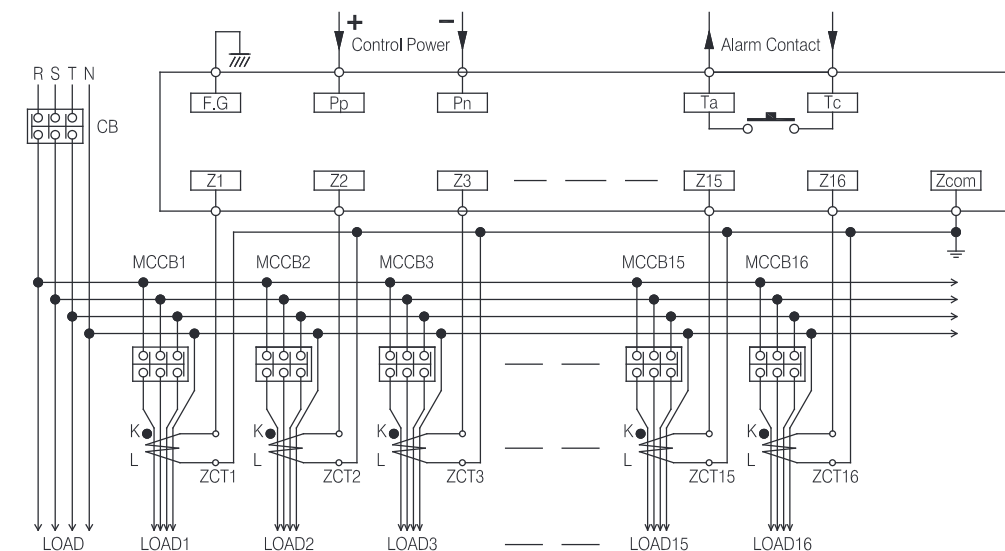


- ◆ This product satisfies the EMC (KN101 electromagnetic compatibility) test.
- ◆ By extending the leakage current measurement area up to 10A and displaying it, it provides convenience in measurement compared to existing products.
- ◆ When installing a panel, the built-in depth of the product is reduced to 72mm, so it can be installed in a smart switchboard or small power distribution box.
- ◆ It is a product that applies software-type filtering technique to suppress harmonics generated from inverter load by digital measurement method.
- ◆ With the fault current recording function, the most recent leakage current value is displayed through the event menu.
- ◆ It has the best cost-performance ratio among domestic products.
- ◆ LD Series is equipped with a standard protocol to enable communication with all PLCs.
- ◆ It is manufactured with the same panel perforation size as the basic product.

Rating

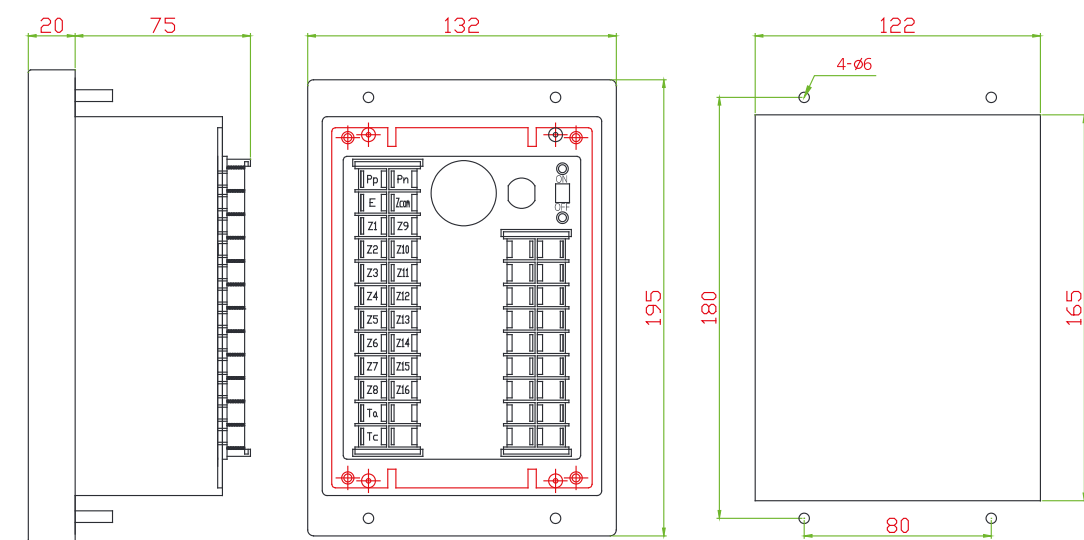
MODEL		DED-LD16C	DED-LD10C	DED-LD6C
Count of Input Circuit		16 circuit	10 circuit	6 circuit
Control Power	Rated frequency	50/60 Hz		
	Rated Volt.	AC/DC 110~220V		
	Operation Volt.	AC/DC 85~240V		
	Consumption burden	Max 6VA		
Output Contact	Common contact	for Alarm "1a" Dry-Contact		
	Contact capacity	AC 125V, 5A / DC 30V, 5A		
Operation Current	Nominal Op. voltage	AC 200mA/100mV		
	Sensitivity adj.curr.	LOCK, 0.1 ~ 1.0A [0.1A Step]		
	Nominal Op. range	53% ~ 75% of correction value		
	Meas. range	0.04 ~ 10.00A, once over 10A, display 'over'		
Op. Time	Op. characteristic	Definite Time		
	Delay time	0.05 ~ 10.00sec [0.05sec Step]		
Return Setting	Quiescent Current	within 52% of correction value		
	Return Time	within 100msec Return		
	Return Manner	Auto / Manual		
Comm. Setting	Protocol	RS-485C Modbus RTU		
	Address	ID : 1~32		
	Baud-Rate	Speed : 9,600 / 19,200bps		
Event	No. of saving	10		
	Saving Data	Each circuit latest 1 time, First-in-first-out manner		
	Storing Method	latest 1 time, First-in-first-out manner		
App. Standard	Function Test	KOFIS 0308		
	EMC	KN 101		

Wiring Diagram



72mm Depth

Dimensions





Digital Ground Fault Relay - Digital 8 / 16 Channel Relay

◆ This relay is an earth leakage (earth fault) relay and is composed of a circuit with high reliability and high functionality by adopting a digital method. It is an integrated type relay that accommodates a number of circuits (16 circuits / 8 circuits) of the conventional single circuit ground fault detection relay in one unit. It is possible to set a wide range of functions such as high and low locks. It is used for the purpose of protecting the ground fault of the circuit below 600V, and in the event of a ground fault in the power circuit load, it is a digital earth fault relay that detects the flowing earth fault current through ZCT (Zero Phase Transformer) and trips or alarms the circuit to protect the device and the circuit. . The digital earth fault relay applies advanced digital control technology, and it is possible to cooperate with the protection of the power system, and it is possible to correct the operation time and operation current more accurately. In addition, since accident information can be recorded and stored, accident analysis is possible, which makes power management very easy.

General Information

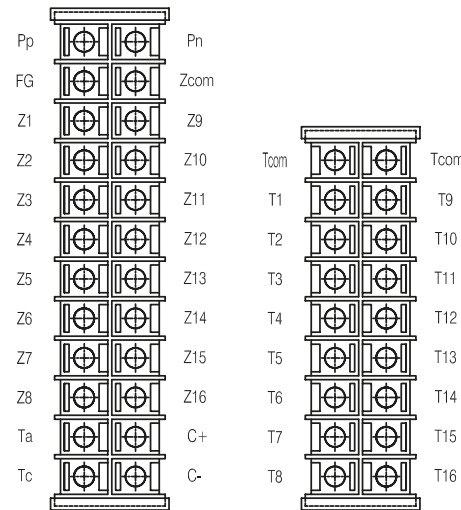
Standard Enviromant	Operation Temp.	-10℃ ~ 50℃
	Storing Temp.	-20℃~ 50℃
	Relative humidity	Less than 80% [No Condensing]
	Elevation	Less than 2,000m sea level / Place no vibration and shock
제어전원	정격주파수	50 / 60Hz [±5%]
	정격전압	AC / DC 110 ~ 220V
	동작전압	AC 85 ~ 240V
ZCT	정격	AC 200mA / 100mV
	출력 오차	AC 75 ~ 125mV / Load resistance 2 kΩ

Rating and Specificatin

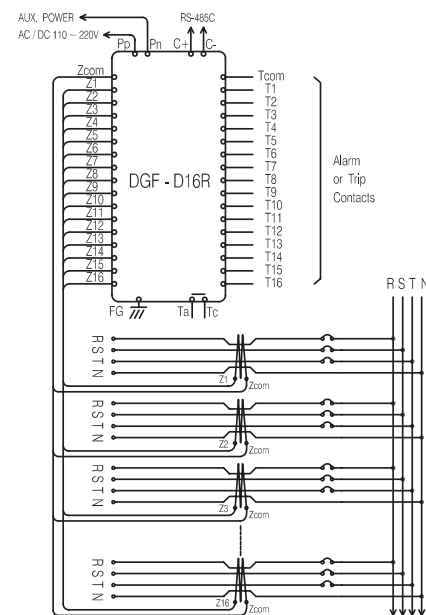
MODEL		DGF - D16R	DGF - D08R
Input Circuit		16 circuit	8 circuit
Output Contact	Individual contact	16a Contact	8a Contact
	Common contact	1a Contact	
	Contact capacity	AC 250V, 10A / DC 30V, 10A (rev.2)	
Operation Current	Current TAP	LOCK, 0.1 ~ 10.0A [0.1A Step]	
	Measuring range	0.01 ~ 12.0A (rev.2)	
	Operation range	80~100% of each correction value	
Operation Time	Op. characteristic	Definite Time	
	LEVER	0.05 ~ 10.00sec [0.05sec Step]	
	Op. time error	0.05 ~ 0.20sec : within ±25ms / 0.20 ~ 10.00sec : within ±10%	
Return	Return current	firmly return at 90% of each correction value	
	Return time	within 100ms	
	Return method	Auto / Manual	
H.M.I	LED	[GREEN] : Power [YELLOW] : Current Set / Time Set / Fault View / Comm [RED] : Auto / each circuit Alarm	
Communication		RS-485C Isolation 1Port / Protocol : Modbus RTU / Speed : 9,600 / 19,200bps	
Applicable Standard		KS C8328 Earth leakage relay	

Terminal Configuration

DGF-D16R

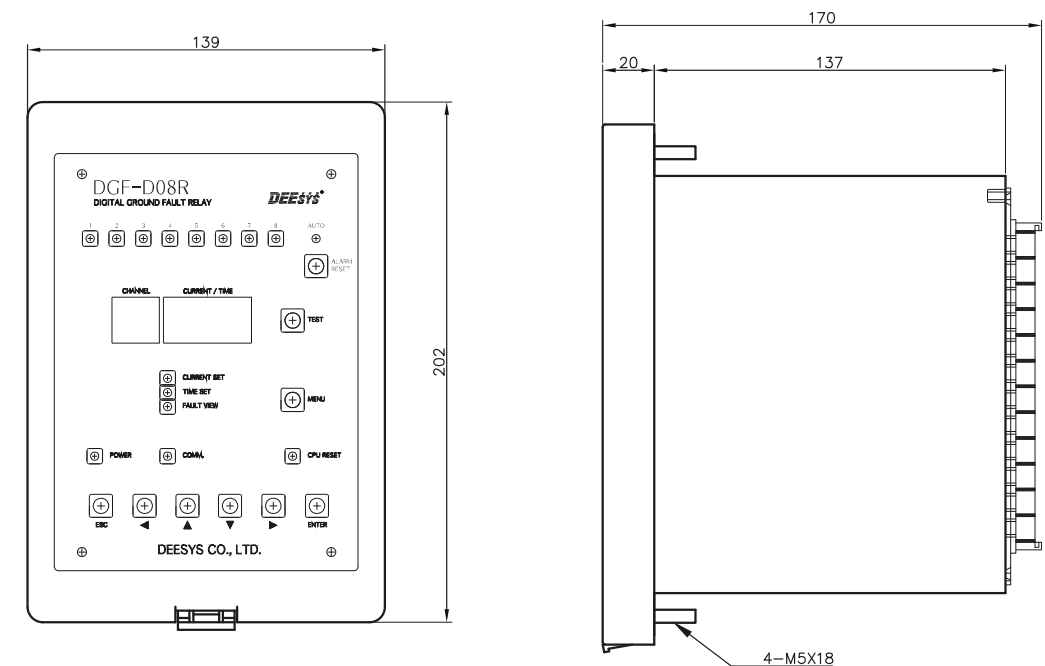


Wiring

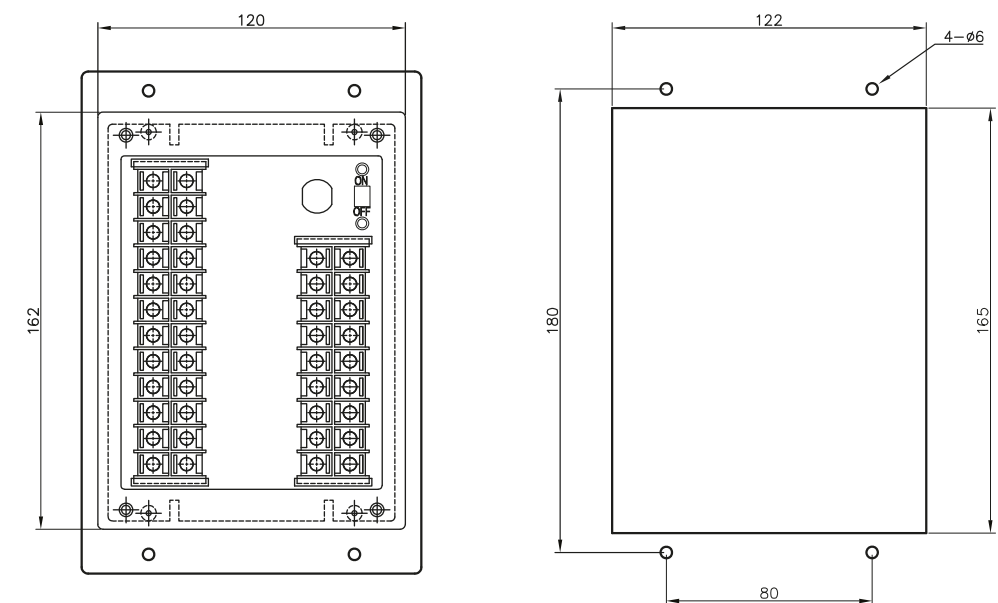


Dimensions

DGF-D16R / D08R

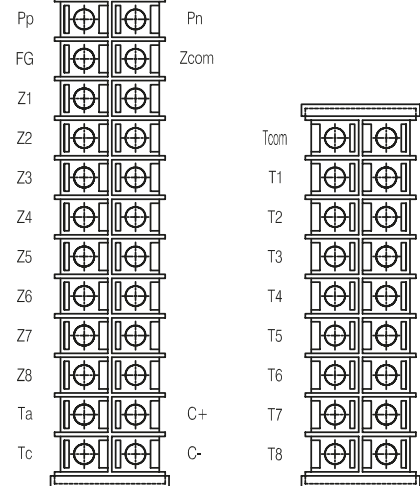


Cutting Size : 165X122mm

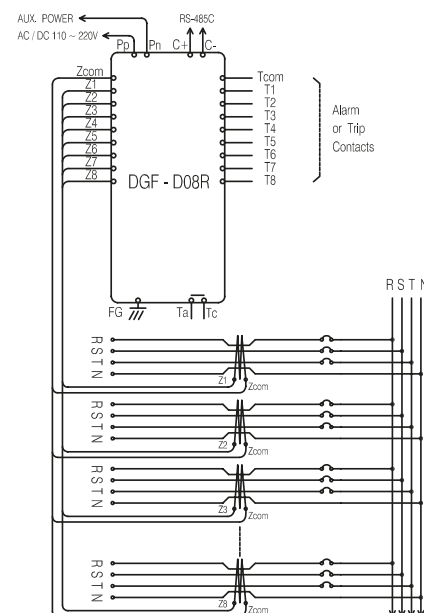


Terminal Configuration

DGF-D08R



Wiring



Application Examples

- Pp : Control power (+)
- Pn : Control power (-)
- E : Ground connect
- C+ : Comm. port (+)
- C- : Comm. port (-)
- Z1~Z16 : Analog input per circuit (+)
- Zcom : Analog input per circuit (-) (common)
- T1~T16 : Output contact per circuit (+)
- Tcom : Output contact per circuit (-) (common)
- TA : Common output contact (+)
- TC : Common output contact (-)



Vertical model
for general MCC panel

Digital Ground Fault - Digital 11F / 11P / 11H Relay

This digital earth fault relay is a device that detects grounded and ungrounded systems using a zero-phase current transformer. It can precisely measure the value input from the ZCT. Malfunction can be prevented against harmonic components and various noises.

- The ground fault (leakage) status of the electric line is alarmed and displayed for each circuit, and the ground fault current in the event of a ground fault is displayed on the LCD display.
- It stores the ground fault current value at the time of an accident and can be used as data for condition analysis after a fault.
- Built-in communication port enables remote monitoring. (Optional function)
- Provides convenient HMI through Key Interface.

Verical Type

Specification								
MODEL	DGF-D11F	DGF-D11F-C	DGF-D11FA	DGF-D11FA-C	DGF-D11P	DGF-D11P-C	DGF-D11PA	DGF-D11PA-C
Rated Input	ZCT Input AC200mA/100mV		ZCT Input AC200mA/1.5mA		ZCT Input AC200mA/100mV		ZCT Input AC200mA/1.5mA	
Mount	Flush mounted type				Socket type			
Display	LCD Display							
Frequency	60Hz / 50Hz							
Control power	AC/DC 100V ~ 240V							
Consumption	Standby : less than 5W, Run : less than 7W							
Output Contact	1a Contact (AC 250V 10A, DC 30V 10A)							
Comm.		RS-485 ModeBus		RS-485 ModeBus		RS-485 ModeBus		RS-485 ModeBus
FAULT MEMORY			When a fault current occurs, the fault current value is displayed on the LCD. Check the latest fault current value through the fault current check function					
Fault recovery			LCD BACKLIGHT and Output contact [Auto return setting possible]					
Output Contact	Common Cotact		1a Contact					
	Contact capacity		AC 250V, 10A / DC30V, 10A					
Operation Current	Current TAP		LOCK, 0.1 ~ 10.0A [0.1A Step]					
	Metering range		0.01 ~ 12.5A [abnormal current input : OvC (Over Current) display]					
	Operation range		within 75~100% of each correction value					
Operation time	Op. charateristic		Definite Time					
	Op. Lever		INST ~ 5.00sec [0.1sec Step]					
	Accuracy		INST ~ 0.20sec : within ±40ms / 0.20 ~ 5.00sec : within±10%					
Return	Return current		firmly return at 90% of each correction value					
	Return time		NST - 0.1 - 30.0sec (under 1sec :0.1 Step, over 1sec: 1 Step)					
	Return Method		Auto (Return time applied) / Manual					
H.M.I	KEYPAD		Manu, ▲, ▼, SET, TEST, RESET					
	LCD BACKLIGHT		OFF : RUN Green [GREEN] : Normal / Red [RED] : Alarm					
Applicable Standard			KS C 8328					



Horizontal model
for smart distribution board MCC panel

Horizontal Type

Specification								
MODEL	DGF-D11H-F	DGF-D11H-F-C	DGF-D11H-FA	DGF-D11H-FA-C	DGF-D11H-P	DGF-D11H-P-C	DGF-D11H-PA	DGF-D11H-PA-C
Rated Input	ZCT Input AC200mA/100mV		ZCT Input AC200mA/1.5mA		ZCT Input AC200mA/100mV		ZCT Input AC200mA/1.5mA	
Mounting	Flush mounted type				Socket type			
Display	LCD Display							
Frequency	60Hz / 50Hz							
Control power	AC/DC 100V ~ 240V							
Power consumption	Stand by : less than 5W, RUN : less than 7W							
Output contact	1a Contact (AC 250V 10A, DC 30V 10A)							
Communication		RS-485 ModeBus		RS-485 ModeBus		RS-485 ModeBus		RS-485 ModeBus

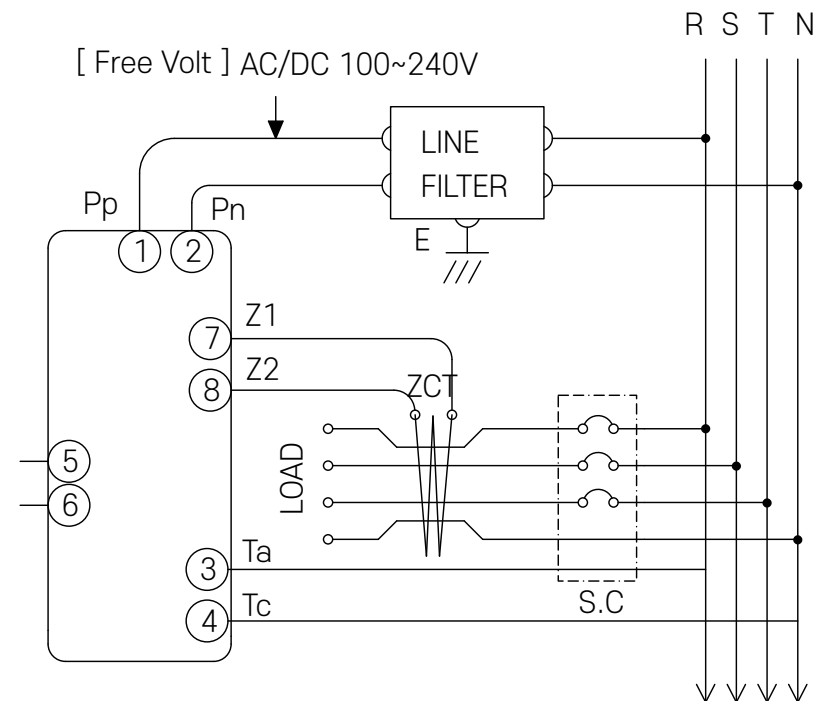
*The general rating specifications of the horizontal/vertical type are same.



DGF-D11F (vertical type) case of ground fault relay installation switchboard

Wiring Diagram

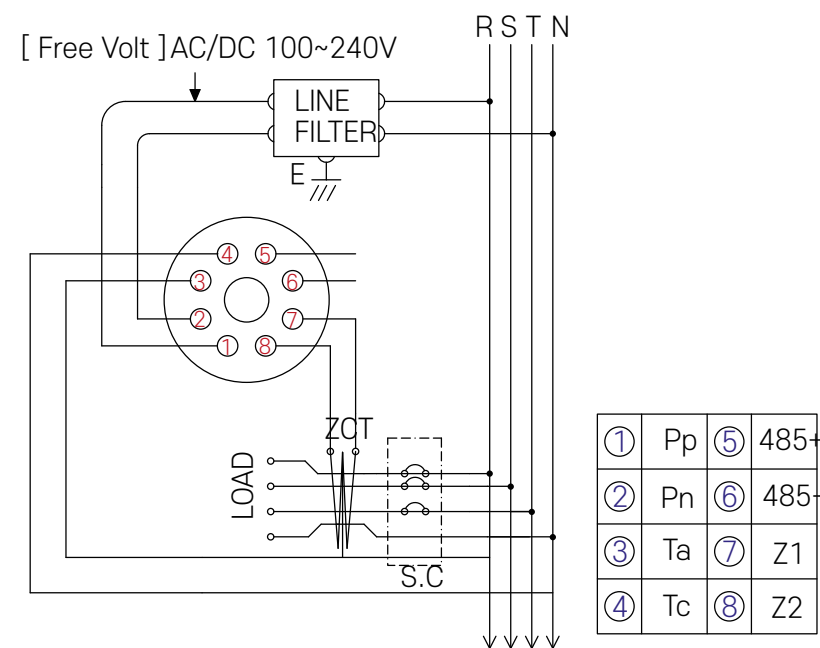
Terminal number wiring of vertical type and horizontal type is the same



Install the line filter when there are many harmonic components in the power line.

Flush mounted type

Terminal number wiring of vertical type and horizontal type is the same

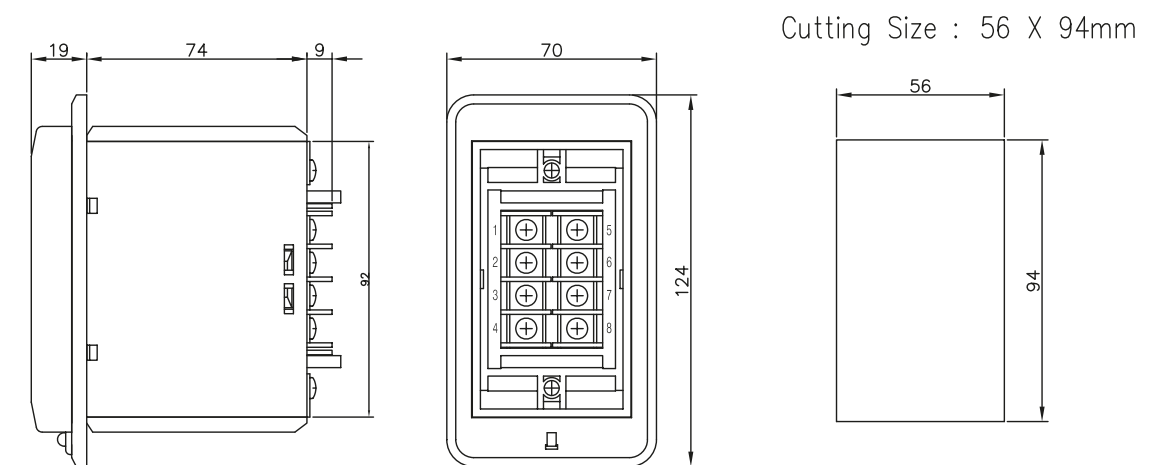


Install the line filter when there are many harmonic components in the power line.

Socket type

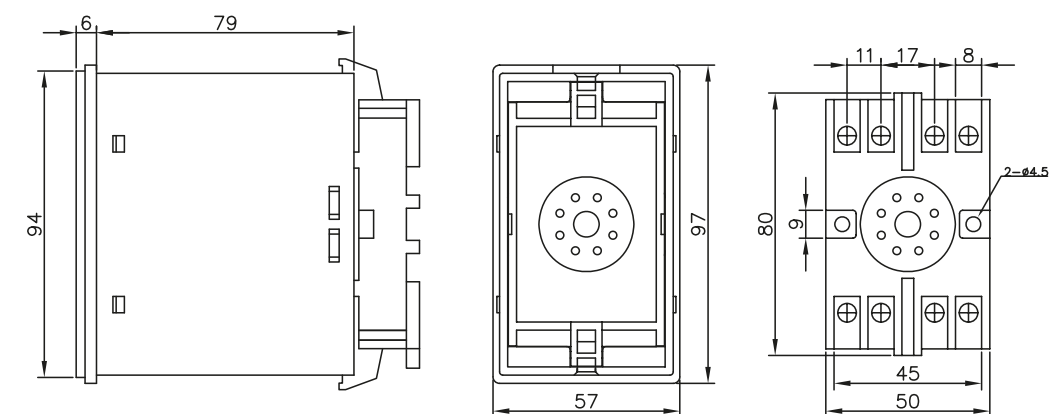
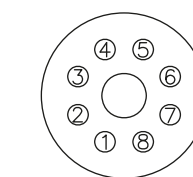
Dimensions

The external dimensions of vertical type and horizontal type are same



Flush mounted type

The external dimensions of vertical type and horizontal type are same



Socket type

DEEsys[®]

Digital Multi Meter



IDPM-DS II



IDPM-AV200



IDPM-AV



IDPM-VFR100



IDPM-DM100



Intelligent Digital Power Meter

- Voltage, current, power, Energy

- ◆ Measure the voltage, current, power (apparent, active, reactive), wattage (active, reactive), power factor, and frequency of each phase.
- ◆ It has a measurement accuracy of 0.2% for voltage and current, and 0.5% for power and wattage.
- ◆ Based on the rated current, the load usage rate is displayed from 40 to 110% by bar LED.
- ◆ It judges the phase rotation of the voltage and displays an alarm in case of phase loss or reverse phase.
- ◆ Modbus protocol is provided as RS485 communication type.

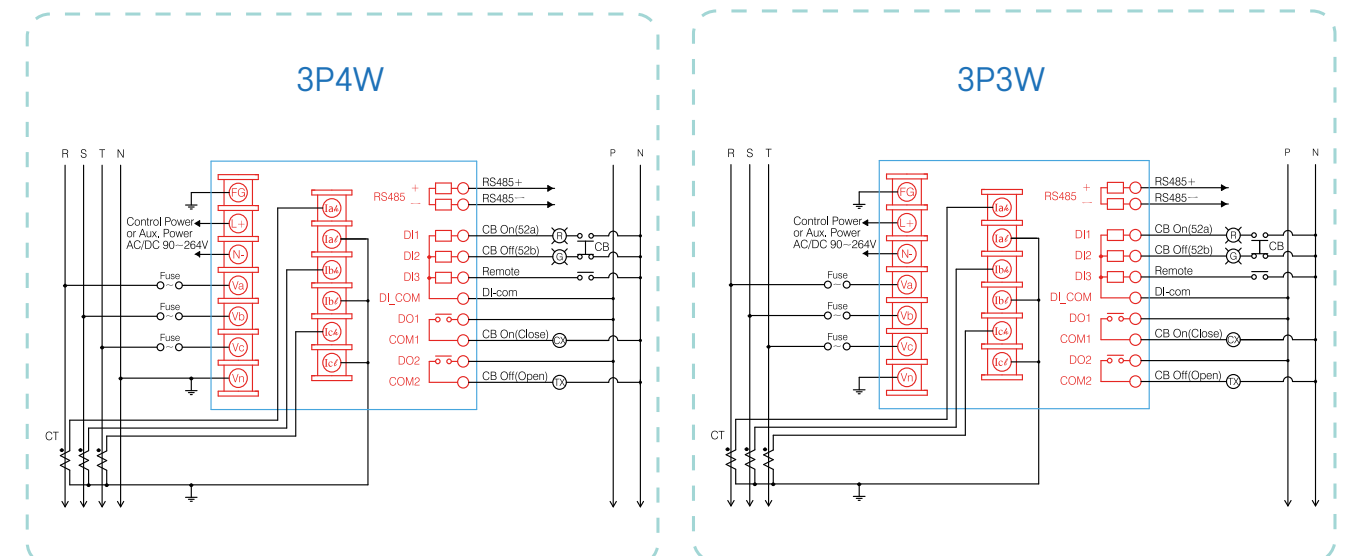
Rating

Classification	Applicable range	Note
Wiring Method	3P4W, 3P3W(Y), 3P3W(Δ), 1P3W, 1P2W	
Rated frequency	60Hz or 50Hz	
Metering volt. range	AC 10 ~ 380V	
Metering curr. range	AC 0.05 ~ 10A	
PT / CT Input burden	0.5VA and less, each	
Control power	AC/DC 90~265V	
Power consumption	Full time 2W and less	

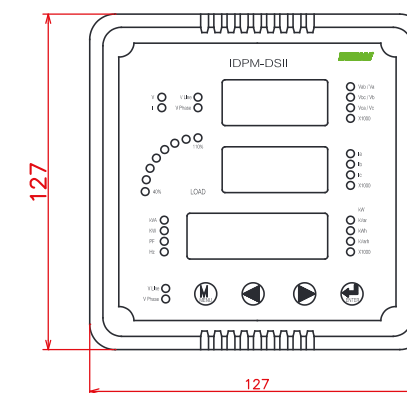
Measurement Element

Classification	Measuring element	Detailed Metering	Accuracy (%)	Note
Voltage	Line voltage	Vab, Vbc, Vca	0.2% of reading	
	Phase voltage	Va, Vb, Vc		
Current	Phase current	Ia, Ib, Ic	LED indication	
	Load factor current	average load factor		
Power	Active power	W	Class 0.5	
	Reactive power	Var		
	Apparent power	KVA		
Energy	Effective energy	Wh		
	Reactive energy	Varh		
Frequency	Frequency	Hz	0.02 Hz	
Power factor	Total element	PF	According to phase error	

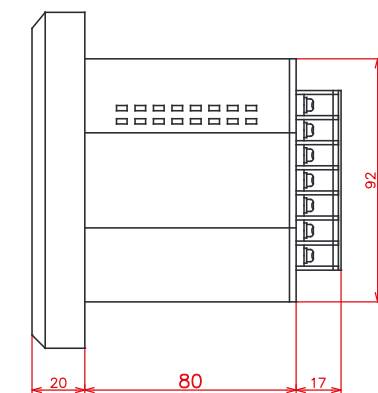
Wiring Diagram



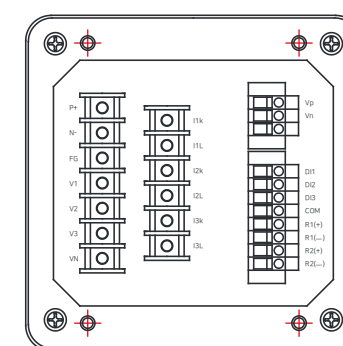
Dimensions



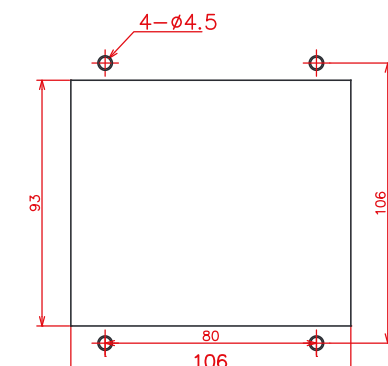
< Front >



< Right view >



< Back >



< PANEL HOLE >



Intelligent Digital Power Meter - 3-phase voltage, current, power, energy

◆ This is a low-end digital power meter that displays 3-phase voltage, current, power, and wattage.

◆ As the panel depth is 65mm, space efficiency is improved and installation cost is reduced.

◆ Voltage is displayed by pressing the ▲ arrow key, current is using the ▼ arrow key, and power is displayed by operating the ■ arrow key.

◆ This product provides RS485 communication Modbus protocol as an option.

Rating

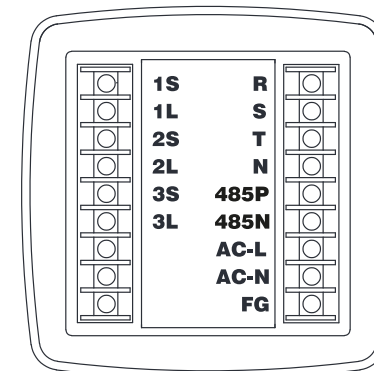
MODEL		IDPM-AV200
Measurement element		3-phase voltage, current, power, Energy, frequency, power factor
Control power	Rated frequency	50/60 Hz
	Rated voltage	AC/DC 110~220V
	Operating voltage	AC/DC 80~260V
	Consumption burden	Max 5VA [Rated 2VA]
Input current	Rated current	AC 5A / AC 1A
	Input burden	0.5VA / 1phase at 10A
	Measurement range	AC 0.1 ~ 10.0A
	Measurement error	1.0% of reading
Input voltage	Rated voltage	AC 110V / 220V / 380V
	Input burden	0.5VA / 1phase at 220V
	Measurement range	AC 10.0 ~ 500.0V
	Measurement error	2.0% of reading
Comm. [option]	Protocol	RS-485C Modbus RTU
	Baud-Rate	9,600 / 19,200bps
Applicable Standard	function test	IEC 62053-22
	Environmental test	IEC 60255

LED Display Classification

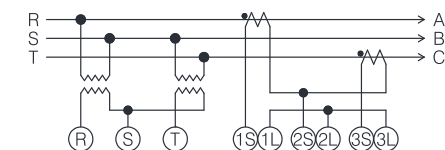
Indicate LED		
Voltage	R / S / T	Phase voltage indication
	RS / ST / TR	Line voltage display
Current	R / S / T	Phase current indication
power	kW	Active power display
	kVA	Apparent power display
Energy	kWh	Active power display
frequency	Hz	R-phase frequency display
power factor	PF	R-phase power factor display

Wiring Diagram

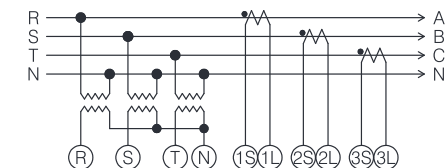
- Terminal Arrange -



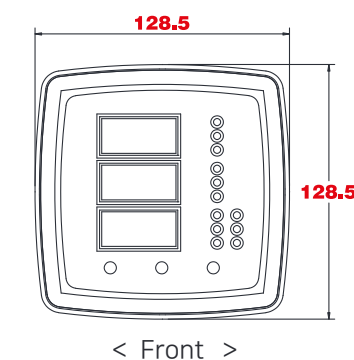
- 3P3W Connection -



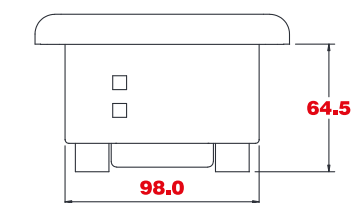
- 3P4W Connection -



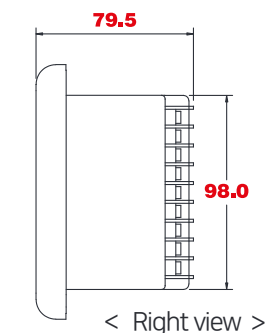
Dimensions



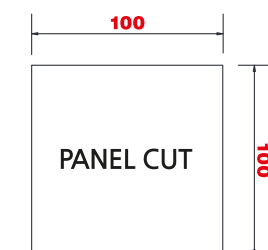
< Front >



< Side >



< Right view >



< PANEL Cut >



Intelligent Digital Power Meter - 3phase voltage, current

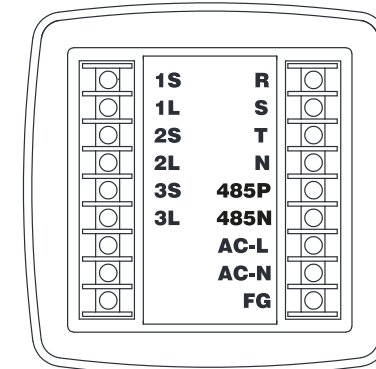
- ◆ As a 3 phase voltage and current all-in-one product, it is more cost effective than installing multiple single-phase products.
- ◆ As the panel depth is 65mm, space efficiency is improved and installation cost is reduced.
- ◆ For voltage, use the ▲ arrow key and for current, use the ▼ arrow key to display the measured values for each phase.
- ◆ This product provides RS485 communication Modbus protocol as an option.

LED Display Classification

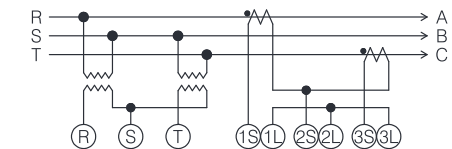
Indicate LED		
Voltage	R / S / T	Phase voltage indication
	RS / ST / TR	Line voltage indication
Current	R / S / T	Phase current indication

Wiring Diagram

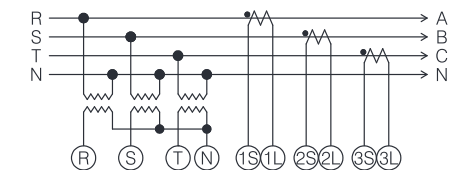
- Terminal Arrange -



- 3P3W Connection -



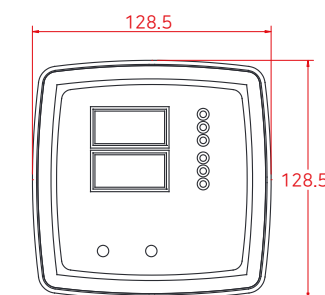
- 3P4W Connection -



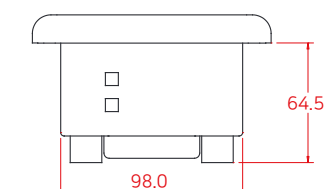
Rating

Classification		Element
Measurement element		3-phase voltage, current
Control power	Rated frequency	50/60 Hz
	Rated voltage	AC/DC 110~220V
	Operating voltage	Max 5VA [Rated 2VA]
Input current	Rated current	AC 5A / AC 1A
	Input burden	0.5VA / 1phase at 10A
	Measurement range	AC 0.1 ~ 10.0A
Input voltage	Measurement error	1.0% of reading
	Rated voltage	AC 110V / 220V / 380V
	Input burden	0.5VA / 1phase at 220V
Comm. [option]	Measurement range	AC 10.0 ~ 500.0V
	Measurement error	2.0% of reading
	Protocol	RS-485C Modbus RTU
Applicable Standard	Baud-Rate	9,600 / 19,200bps
	function test	IEC 62053-22
	Environmental test	IEC 60255

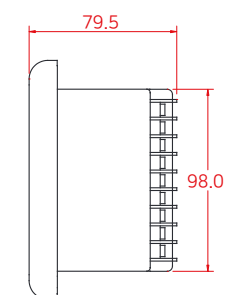
Dimensions



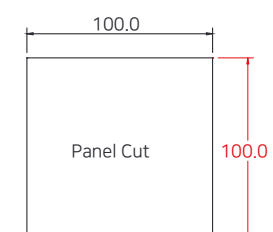
< Front >



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< PANEL Cutting >



Intelligent Digital Power Meter
- Voltage-Frequency Relay

- ◆ Single-phase voltage, current, and input frequency are all-in-one products, so it is more cost effective than installing multiple single-phase products.
- ◆ As the panel depth is 65mm, space efficiency is improved and installation cost is also reduced.
- ◆ Provides a warning alarm function for the upper and lower limits of voltage and frequency.
- ◆ This product provides RS485 communication Modbus protocol as an option.

Rating

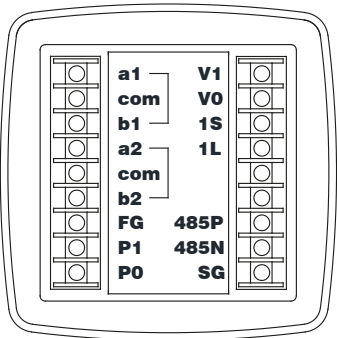
MODEL		IDPM-VFR100
Wiring Method		1P2W
Control power	Rated voltage	AC/DC 90~260V
	Power Consumption	Full-time 2W and less
Input voltage	Rated input	AC 100~500V [0.5VA]
	Measuring range	AC 50.00~600.0V
	Measuring error	0.5% of F.S (Full-Scale)
	High/low limit volt. set	100~600V / 1V step
	Delay-time setting	0.1~5.0sec / 0.1sec step
Input current	Rated Input	AC 5A [0.5VA]
	Measuring range	AC 0.05~6.00A
	Measuring error	0.5% of F.S (Full-Scale)
Input frequency	Rated input	60Hz (50Hz Option)
	Measuring range	45.00~65.00Hz
	Measuring error	0.1% of F.S (Full-Scale)
	High/low limit Hz set	45.0~65.0Hz / 0.1Hz step
	Delay-time setting	0.1~5.0sec / 0.1sec step
Output contact	Contact capacity	AC 250V/2A, DC 30V/2A
	No. of contact	"a" Contact 2ea / "b" Contact 2ea
	Return method	Hold on (Manually return) / Hold off (Auto-return)
Comm. [option]	Protocol	RS-485C Modbus RTU
	Baud-Rate	9,600bps

LED Display Classification

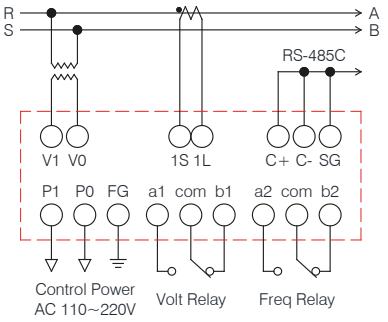
Indicate LED		
Voltage	High / Low	Voltage high/low limit alarm
	Comm	Comm. indication
Frequency	High / Low	Frequency high/low limit alarm

Wiring Diagram

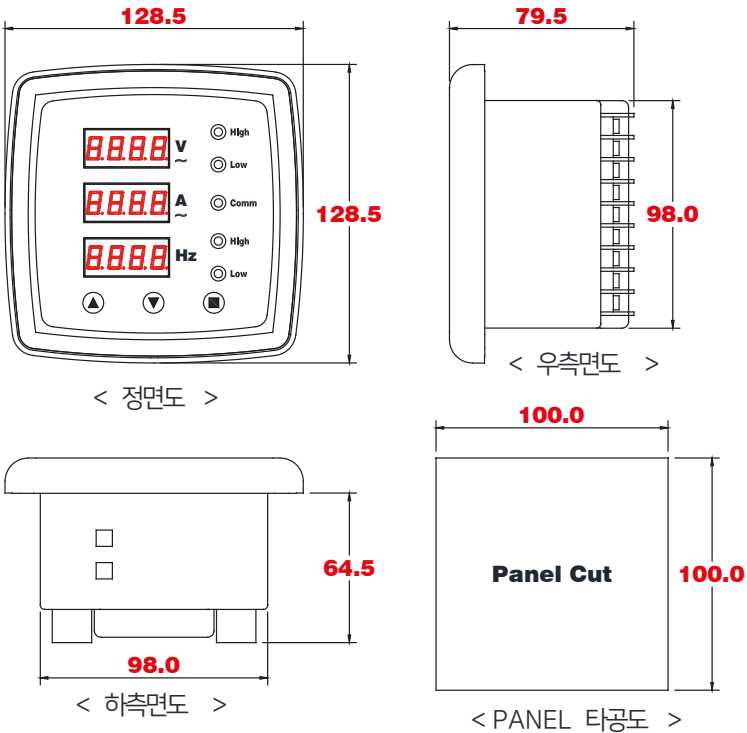
- Terminal Arrange -



- Connection -



Dimensions





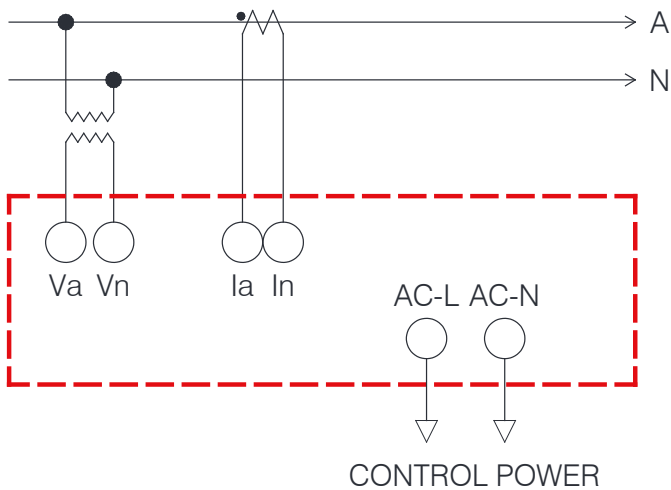
Intelligent Digital Power Meter
- Voltage, Current, Energy

- ◆ Displays single-phase voltage, current, power, frequency and power factor.
- ◆ Since all measurement values are displayed with one product, the cost reduction effect is greater than the case of installing multiple single-phase products.

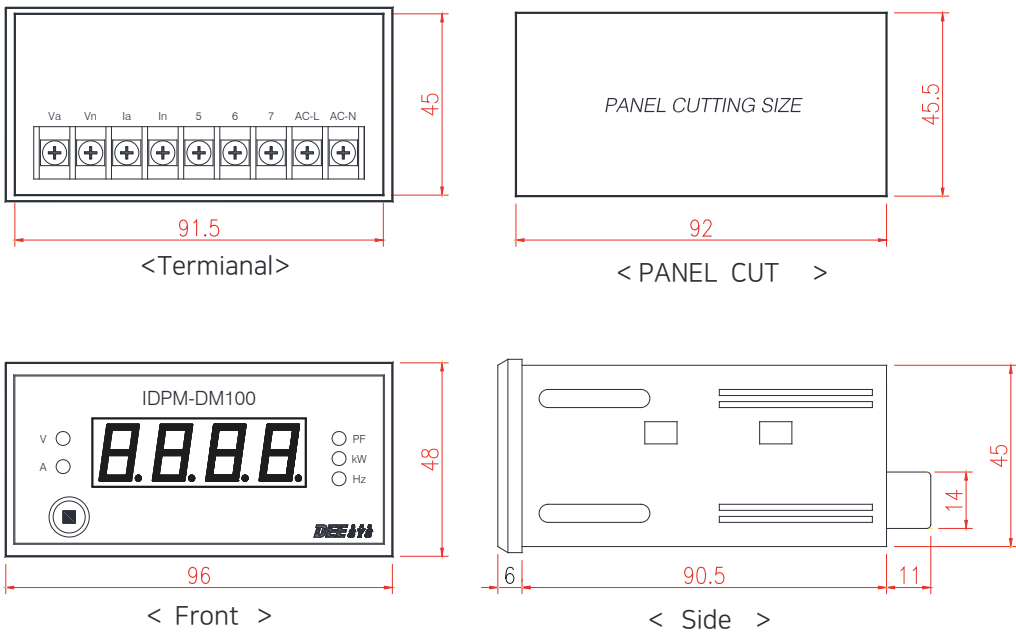
Rating

Classification		Standard
Measuring items		Single-phase voltage, current, power, energy, frequency, power factor
Control power	Rated frequency	50/60 Hz
	Rated voltage	AC/DC 110~220V
Input current	Measurement range	AC 0.1 ~ 10.0A
	Measurement error	1.0% of reading
Input voltage	Measurement range	AC 10.0 ~ 500.0V
	Measurement error	0.5% ± 1digit

Wiring Diagram



Dimensions



DEEsys[®]

Digital Auto Power Factor Controller



ADPF-MAC-06/12



Auto Digital Power Factor Controller
- 06Bank / 12Bank

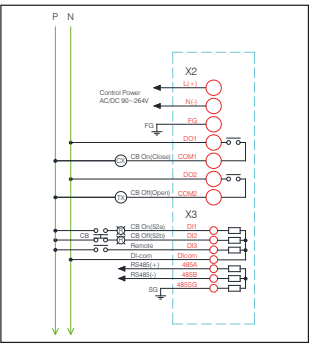
- ◆ Measure voltage, current, power (apparent, active, reactive), wattage (active, reactive), power factor, and frequency of each phase.
- ◆ Based on the rated current, the load usage rate is displayed from 40 to 110% by bar LED.
- ◆ It judges the phase rotation of the voltage and displays an alarm in case of phase loss or reverse phase.
- ◆ Capacitor bank control can input capacitors sequentially, cyclically, automatically or manually when the power factor is out of the set range.
- ◆ Unnecessary power factor control at low load current can be suppressed.
- ◆ Direct CB status control from the device is possible.
- ◆ RS485 communication and Modbus protocol are provided.

Rating

Classification		Applicable range	Note
Wiring Method		3P3W(Delta), 3P4W	
Control Power	Frequency	60Hz or 50Hz	
	Input volt.	AC/DC 90 ~ 264V	
	Input burden	Full-time 2W and less	
VT	Input volt.	AC 0 ~ 380V	Based on phase voltage
	Meas. range	AC 10 ~ 380V	
	Input burden	0.5VA and less	
CT	Input current	AC 0 ~ 5A	
	Meas. range	AC 0.05 ~ 10A	
	Input burden	0.5VA and less	
Digital Input	Coltro Volt.	AC/DC 90 ~ 265V	
	DI1	CB On (52a) Input	
	DI2	CB Off (52b) Input	
	DI3	Remote Status input	
Digital Output	Contact capacity	AC 250V/5A, DC 125V/5A	
	BANK	RY1 ~ 6 / RY1 ~ 12	
	ALARM	A1, A2	6 Circuit / 12 circuit
	DO1	CB Close output	CB control
	DO2	CB Open output	
BANK control	No. of BANK	6ch or 12ch / a contact (AC250V/5A)	
	ALARM	2ch / a contact (AC250V/5A)	
Capacitor Setting	Capacity setting	1uF ~ 999,000F	
	Delay Time	3 ~ 3,000sec	
	Dead Time		
Power factor setting	Min. power factor	50 ~ 95%	
	Max power factor	95 ~ 100 ~ -96%	
		5 ~ 90%	Auto control
	Control Method	STEP / ROTATE / AUTO	Manual control
		MANUAL ON/OFF, TEST	

Power factor and CB control

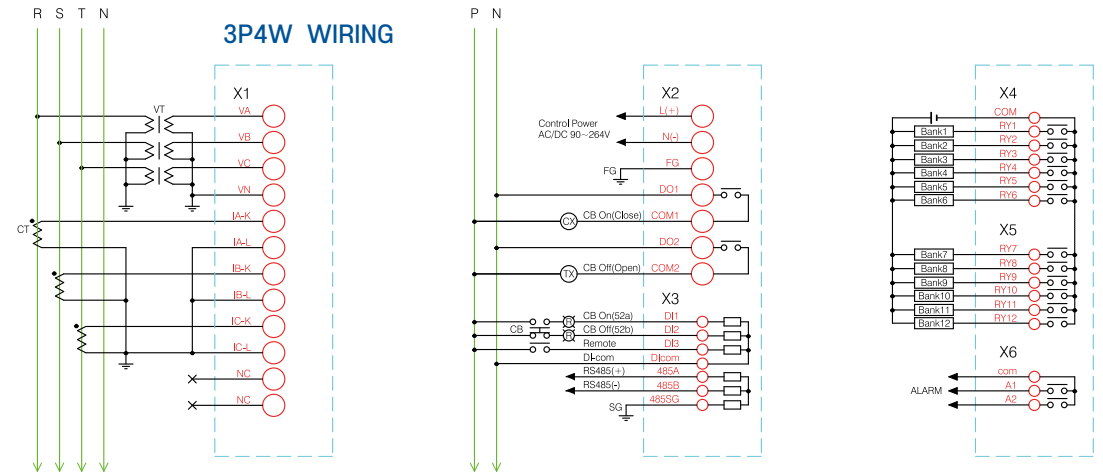
Classification		Applicable range	Note
BANK Control	No. of BANK	6ch or 12ch / a contact (AC 250V/5A)	
	ALARM	2ch / a contact (AC 250V/5A)	
Condensor setting	Capacity setting	1uF ~ 999,000F	
	Delay Time	3 ~ 3,000sec	Bank stabilization time Charge/discharge time
	Dead Time		
Power factor Setting	Min. Power factor	50 ~ 95%	
	Max. Power factor	95 ~ 100 ~ -96%	
	Unresponsive zone	5 ~ 90%	
	Control Method	STEP / ROTATE / AUTO	Auto control
		MANUAL ON/OFF, TEST	Manual control



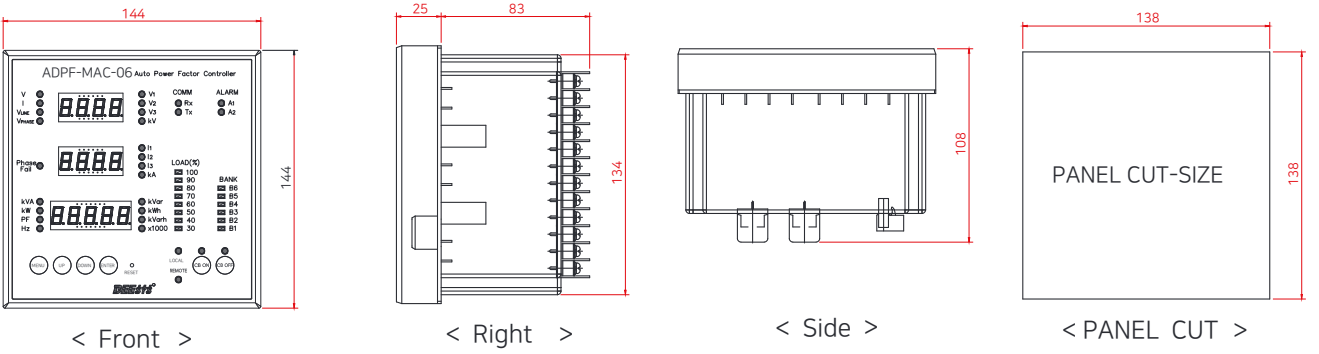
STATUS	CB Status change control order	Terminal I/O	Display
CB ON⇒Off	CB On (52a) in case of input	DI1 Input	CB On
	Press CB Off ⇒ Open change	DO2 Output	
CB OFF⇒On	CB Off (52b) display as input	DI2 Input	CB Off
	CB Off (52b) in case of input	DI2 Input	CB Off
	Press CB On ⇒ Close change	DO1 Output	
	CB On (52a) display as input	DI1 Input	CB On

STATUS	CB Remote Control Status Display	Terminal I/O	Display
Local / Remote	Display remote control and field control status	DI3 Input	Local Remote

Wiring Diagram



Dimensions



DEEsys[®]

Analog Scale Meter



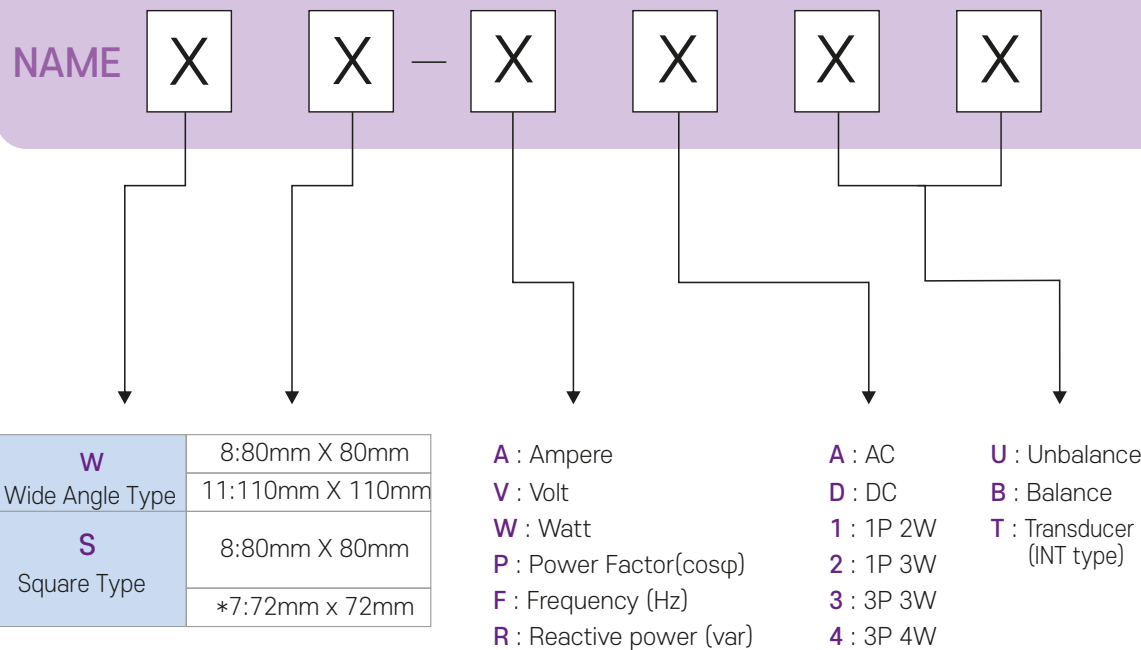
W8 / W11 / S7 / S8



Analog Meter Common Features

- ◆ It has high reliability for the surrounding environment.
- ◆ It is designed for easy installation on the panel.
- ◆ The instrument is a PIVOT type, and there are 80x80mm, 110x110mm, and 80x80mm, 72x72mm for wide angle types.
- ◆ Unaffected by external magnetic fields.
- ◆ The wide-angle meta front cover is specially made with the cover protrusion to double the efficiency of the wide angle.
- ◆ The instrument's enclosure assembly is made into a bolt insert to achieve a longer product lifespan than the existing instrument.
- ◆ A protective cover is installed on the terminals to prevent safety accidents in advance.

How to select a model



DIN SIZE

※ In case of double scale scale, the outer scale is displayed in black and the inner scale is displayed in red.

Product Category

Type	Model	Operating Method	Class
DC Ampere Meter & Volt Meter	W11 (W8) - AD / VD	Moving Coil Type	1.0% / 1.5%
	S8 - AD / VD		2.5%
	S7- AD / VD		1.5%
AC Ampere Meter & Volt Meter	W11 (W8) - AA / VA	Rectifier Type	1.0% / 1.5%
	S8 - AA	Moving Iron Type	2.5%
	S8 - VA	Rectifier Type	2.5%
	S7 - AA	Moving Iron Type	1.5%
	S7 - VA	Rectifier Type	1.5%
AC Watt & Var Meter	W11 - W / R	Transducer Type (INT)	1.5%
	W8 - W / R	Transducer Type (EXT)	1.5%
AC Power Factor Meter	W11 - P	Transducer Type (INT)	3.0% / 5.0%
	W11 - P	Transducer Type (EXT)	3.0% / 5.0%
AC Frequency Meter	W11 (W8) - F	Transducer Type (INT)	1.0%

Standard Specification

Scale	Type	W8/S8 Type	W11 Type
Scale Length(mm)		122/68	176
Number of Division		24 ~ 52	
Angle of Deflection		240 ° ~ 90 °	
material : Case/Cover		ABS Resin/Poly cabonate Resin	
colour : Case		Munsell n1.5 (black), Munsell 7.5(blue-gray)	
Name Plate		White	
Position of Use		Vertical(⊥)	
Stand ard Pointer		"W" Type Standard "S" Type Standard	
Ambient Temperture		0℃ ~ 40℃	

W type Total scale range

Full	1	1.2	1.3	1.4	1.5	2	2.4	2.5	3	3.8	4	4.5	4.8	5	6	5.2	7.5	8	9	31.2	1.6
Graduation	50	24	26	28	30	40	48	50	30	38	40	45	48	50	30	52	37.5	40	45	31.2	32

※ The actual indication range is a value of 10n multiples of the marked scale table.

S type Total scale range

Full	1	1.2	1.5	2	2.4	2.5	3	4	4.5	5	6	7	7.5	*17.5	8	*28	*39
Graduation	20	24	30	20	24	25	30	20	22.5	25	30	35	37.5	15	40	16	45

※ The actual indication range is a value of 10n multiples of the marked scale table. * Remark: 1.2 applies to S8 type

- Standard scale of power factor meter (cos φ)
- The standard scale of the frequency meter (Hz) is displayed as 45-55, 55-65



S7-VA

S7-AA

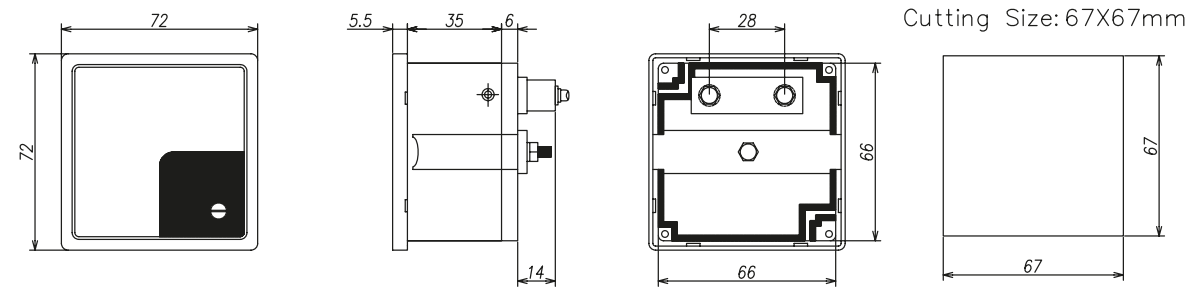
PANEL BOARD METER - DIN TYPE
S7-AA / S7-VA

- ◆ When using in a motor circuit, consider the starting current and use an excess scale meter equivalent to 150~300% of the rated current.
- ◆ For instrument use when line voltage (measurement target voltage) exceeds 300V.
- ◆ It is convenient to install on the panel.
 - For S7 type, use a "c" type band and tighten it with a nut.

Ratings

Type	Size	Rating	Freq(Hz)	Principle	Class	Weight(Kg)
S7-AA	72 X 72mm	AC 5A	50/60	Moving Iron	1.5	0.22
S7-VA		AC 150, 300V	50/60	Rectifier		0.18

Dimensions



W11-AA

S8-AA

PANEL BOARD METER - AC/DC Amperemeter

AC Amperemeter

- ◆ If the current exceeds 5A, the rated secondary current is 5A (1A). Use a combination of current transformers (C, T) for instruments.
- ◆ For circuit voltage exceeding 500V and current of 5A or less, use a current transformer in combination for reliable insulation.
- ◆ When using a motor, use an excess scale meter equivalent to 150~500% of the rated current in consideration of the motor's starting current for the full scale of the ammeter. (The error of the overscale is $\pm 10\%$.)

DC Amperemeter

- ◆ For currents below 30A, a shunt can be built into the meter, but for currents over 30A, use an external shunt (50mV).
- ◆ When connecting the shunt, install it on the negative (-) side.

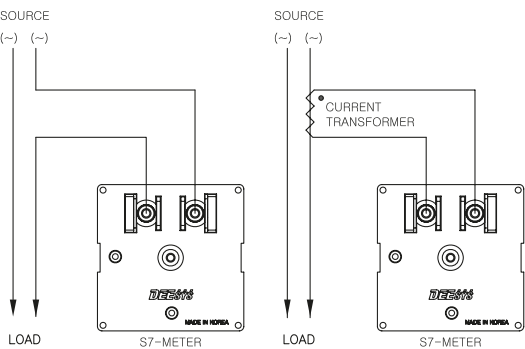
Rating

Type	Size	Rating	Freq(Hz)	VA	Class	Weight(Kg)
W8-AA	80X80mm	5A	50/60	1.5	1.0 or 1.5	0.40
W8-AD		50mV	-	50mV Drop		
W11-AA	110X110mm	5A	50/60	1.5	1.0 or 1.5	0.52
W11-AD		50mV	-	50mV Drop		
S8-AA	80X80mm	5A	50/60	1.5	2.5	0.25
S8-AD		50mV	-	50mV Drop		

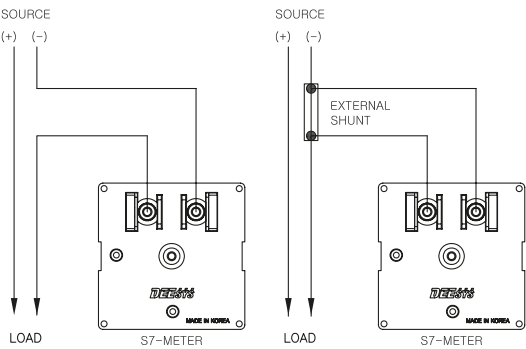
※ When ordering, select frequency.

Wiring Diagram

● AC Ammeter



● DC Ammeter





W11-VA

S8-VA

PANEL BOARD METER - AC/DC Voltmeter

AC Voltmeter

◆ Use a 150V voltmeter in combination with a P.T. for a circuit with an input voltage of AC 300V or higher. (600V voltmeter is by order)

DC Voltmeter

- ◆ If the input voltage is over DC 750V, use an external multiplier.
- ◆ Connect the multiplier to the (+) side.
- ◆ Current sensitivity of DC Voltmeter is 1mA (1KΩ /V).

Type	Size	Rating	Freq(Hz)	VA	Class	Weight(Kg)
W8-VA	80X80mm	150, 300V	50/60	0.5	1.0 or 1.5	0.40
W8-VD		150, 300V	-	1KΩ/V		
W11-VA	110X110mm	150, 300V	50/60	0.5	1.0 or 1.5	0.52
W11-VD		150, 300V	-	1KΩ/V		
S8-VA	80X80mm	150, 300V	50/60	0.5(0.5)	2.5	0.25
S8-VD		150, 300V	-	5KΩ/V		

- ※ VA:AC, VD:DC, W:Wide Angle Types:Square Type
- ※ The value of () in for rectifier type
- ※ When ordering, select Hz



W11-W3T

PANEL BOARD METER - Watt Meter

- ◆ When using in excess of the rating, Use PT and CT in combination.
- ◆ The operating voltage range is within ±10% of the rated voltage.
- ◆ Refer to the Standard Full Scale Table above for the maximum scale.
- ◆ There are two types of Watt Meter Transducer: internal (INT.) or external (EXT.).
- ◆ In case of 4 phase wires, it is displayed as phase voltage ($V1 / \sqrt{3}$).
- ◆ Calibration power = $\frac{\text{MAX. scale value}}{\text{PT ratio} \times \text{CT ratio}}$

Rated Specification

Type	Size	Circuit	Rated			VA			Remark		Hz	Class	Weight (Kg)	REF
			V	A		V	A		V	A				
W8-W1	(wide angle) 80x80mm	1P2W	110. 220	5	0.5	0.5	-	-	-	-	60	1.5	0.65	EXT. T/D
W8-W2		1P3W	110	5	0.5	0.5	-	-	-	-	60	1.5	0.75	
W8-W3		3P3W	110. 220	5	0.5	0.5	B	U	B	U	60	1.5	0.75	
W8-W4		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	B	U	B	U	60	1.5	0.85	
W8-W4U		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	U	U	U	U	60	1.5	0.90	
W11-W1	(wide angle) 110x110mm	1P2W	110. 220	5	0.5	0.5	-	-	-	-	60	1.5	0.70	EXT. T/D
W11-W2		1P3W	110	5	0.5	0.5	-	-	-	-	60	1.5	0.85	
W11-W3		3P3W	110. 220	5	0.5	0.5	B	U	B	U	60	1.5	0.85	
W11-W4		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	B	U	B	U	60	1.5	0.95	
W11-W4U		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	U	U	U	U	60	1.5	1.00	
W11-W1T		1P2W	110. 220	5	0.5	0.5	-	-	-	-	60	1.5	0.60	INT. T/D
W11-W2T		1P3W	110	5	0.5	0.5	-	-	-	-	60	1.5	0.85	
W11-W3T		3P3W	110. 220	5	0.5	0.5	B	U	B	U	60	1.5	0.85	
W11-W4T		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	B	U	B	U	60	1.5	0.90	
W11-W4UT		3P4W	$190/\sqrt{3}$. $380/\sqrt{3}$	5	0.5	0.5	U	U	U	U	60	1.5	0.90	

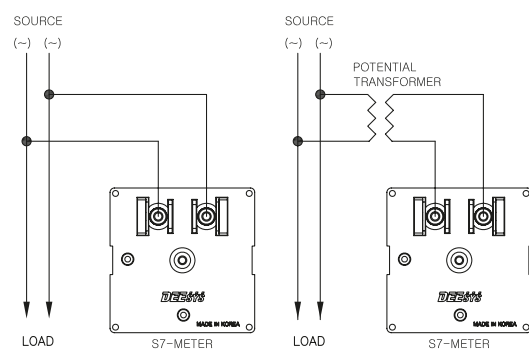
※ U:Unbalance, T:Int. Transducer, W:Watt

※ EXT. T/D: Transducer external installation type
INT. T/D: Built-in transducer

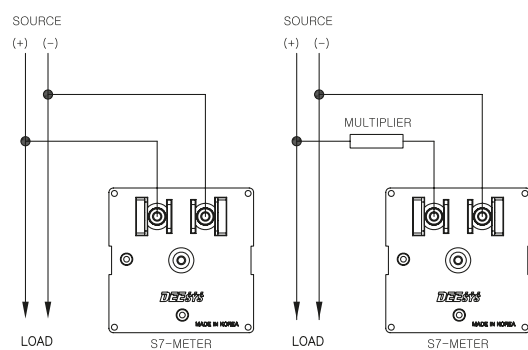
※ The specification of rating current 1A is based on ordering

Wiring Diagram

● AC Voltmeter



● DC Voltmeter



EXT. Watt meter



EXT. T/D



PANEL BOARD METER - Wattmeter

Standard full scale table(Watt Meters)

Standard Scale Meter scheme

Phase Wire	1P 2W	1P 3W	3P 3W								3P4W				
P.T. ratio(V)	110	110	220	380 /110	440 /110	3300 /110	6600 /110	22000 /110	22900 /110	154kV /110	208/√3	380/√3 190/√3	380 /√3	11400/√3 190/√3	22900/√3 190/√3
C.T ratio	Calibrating watts	0.6kW	1.0kW	2.0kW	1.158kW	1.0kW	1.0kW	1.0kW	0.961kW	1.0kW	2.0kW	2.0kW	4.0kW	1.666kW	1.666kW
5/5	0.6	1	2	4	4	30	60	200	200	1400	2	4	4	100	200
10/5	1.2	2	4	8	8	60	120	400	400	2800	4	8	8	200	400
15/5	1.8	3	6	12	12	90	180	600	600	4200	6	12	12	300	600
20/5	2.4	4	8	16	16	120	240	800	800	5600	8	16	16	400	800
25/5	3.0	5	10	20	20	150	300	1000	1000	7000	10	20	20	500	1000
30/5	3.6	6	12	24	24	180	360	1200	1200	8400	12	24	24	600	1200
40/5	4.8	8	16	32	32	240	480	1600	1600	11.2MW	16	32	32	800	1600
50/5	6.0	10	20	40	40	300	600	2000	2000	14.0	20	40	40	1000	2000
60/5	7.2	12	24	48	48	360	720	2400	2400	16.8	24	48	48	1200	2400
75/5	9.0	15	30	60	60	450	900	3000	3000	21.0	30	60	60	1500	3000
80/5	9.6	16	32	64	60	480	960	3200	3200	22.4	32	64	64	1600	3200
100/5	12.0	20	40	60	80	600	1200	4000	4000	28.0	40	80	80	2000	4000
120/5	14.4	24	48	96	96	720	1440	4800	4800	33.6	48	95	95	2400	4800
150/5	18.0	30	60	120	120	900	1800	4800	6000	42.0	60	120	120	3000	6000
200/5	24.0	40	80	160	160	1200	2400	8000	8000	56.0	80	160	160	4000	8000
250/5	30.0	50	100	200	200	1500	3000	10MW	10MW	70.0	100	200	200	5000	10MW
300/5	36.0	60	120	240	240	1800	3600	12	12	84.0	120	240	240	6000	12
400/5	48.0	80	160	320	320	2400	4800	16	16	112.0	160	320	320	8000	16
500/5	60.0	100	200	400	400	3000	6000	20	20	140	200	400	400	10MW	20
600/5	72.0	120	240	480	480	3600	7200	24	24	168	240	480	480	12	24
750/5	90.0	150	300	600	600	4500	9000	30	30	210	300	600	600	15	30
800/5	96.0	160	320	640	640	4800	9600	32	32	224	320	640	640	16	32
1000/5	120.0	200	400	800	800	6000	12MW	40	40	280	400	800	800	20	40
1200/5	144.0	240	480	960	960	7200	14.4	48	48	336	480	960	960	24	48
1500/5	180.0	300	600	1200	1200	9000	18.0	60	60	420	600	1200	1200	30	60
2500/5	240.0	400	800	1600	1600	12MW	24.0	80	80	560	800	1600	1600	40	80
2500/5	300.0	500	1000	2000	2000	15	30.0	100	100	700	1000	2000	2000	50	100



W11-R4UT

PANEL BOARD METER - VAR Meter

- ◆ When using exceeding the rating, use a combination of AC 110V, 5A PT and CT.
- ◆ The operating voltage range is within ±10% of the rated voltage.
- ◆ Refer to the Standard Full Scale Table above for the maximum scale.
- ◆ There are two types of var meter transducers: internal (INT.) and external (EXT.).
- ◆ In case of 3-phase 4-wire, it is displayed as phase voltage ($V1/\sqrt{3}$).
- ◆ Refer to the Standard Full Scale Table above for the maximum scale.
- ◆ Calibration power = $\frac{\text{MAX. scale value}}{\text{PT ratio} \times \text{CT ratio}}$

Type	Size	Circuit	Rated		VA			Remark		Hz	Class	Weight (Kg)	REF
			V	A	V	A		V	A				
W8-R1	80x80mm	1P2W	110. 220	5	0.5	0.5		-	-	60	1.0/1.5	0.65	EXT. T/D
W8-R2		1P3W	110	5	0.5	0.5		-	-	60	1.0/1.5	0.75	
W8-R3		3P3W	110. 220	5	0.5	0.5	B	U		60	1.0/1.5	0.75	
W8-R4		3P4W	190/√3. 380/√3	5	0.5	0.5	B	U		60	1.0/1.5	0.85	
W8-R4U		3P4W	190/√3. 380/√3	5	0.5	0.5	U	U		60	1.0/1.5	0.90	
W11-R1	110x110mm	1P2W	110. 220	5	0.5	0.5		-	-	60	1.0/1.5	0.70	EXT. T/D
W11-R2		1P3W	110	5	0.5	0.5		-	-	60	1.0/1.5	0.85	
W11-R3		3P3W	110. 220	5	0.5	0.5	B	U		60	1.0/1.5	0.85	
W11-R4		3P4W	190/√3. 380/√3	5	0.5	0.5	B	U		60	1.0/1.5	0.95	
W11-R4U		3P4W	190/√3. 380/√3	5	0.5	0.5	U	U		60	1.0/1.5	1.00	
W11-R1T		1P2W	110. 220	5	0.5	0.5		-	-	60	1.0/1.5	0.60	INT. T/D
W11-R2T		1P3W	110	5	0.5	0.5		-	-	60	1.0/1.5	0.85	
W11-R3T		3P3W	110. 220	5	0.5	0.5	B	U		60	1.0/1.5	0.85	
W11-R4T		3P4W	190/√3. 380/√3	5	0.5	0.5	B	U		60	1.0/1.5	0.90	
W11-R4UT		3P4W	190/√3. 380/√3	5	0.5	0.5	U	U		60	1.5	0.90	

- ※ Specification of rating current 1A meter is based on order
- ※ U: Unbalance, T: Int. Transducer, R:VAR
- ※ EXT. T/D: Transducer for external installation, INT. T/D: Built-in transducer

Indicator scale example



- ※ The standard scale in lag scale
- ※ set the var meter to lead in left side and to lag in right side from point if the var meter in used for the power factor

ex) 3P 3W
full scale wattmeter : 600KW
P. T ratio : 3300V/110V
C. T ratio : 100A/5A
Calibrating Watts = $\frac{600KW}{(3300/110) \times (100/5)}$
= 1.0KW

ex) 3P 3W
full scale wattmeter : 2000KW
P. T ratio : $\frac{22900V}{\sqrt{3}} / \frac{190V}{\sqrt{3}}$
C. T ratio : 50A/5A
Calibrating Watts = $\frac{2000KW}{(\frac{22900V}{\sqrt{3}} / \frac{190V}{\sqrt{3}}) \times (50/5A)}$ = 1.666KW

PANEL BOARD METER - VAR Meter

Standard full scale table(1/2 VAR Meters)

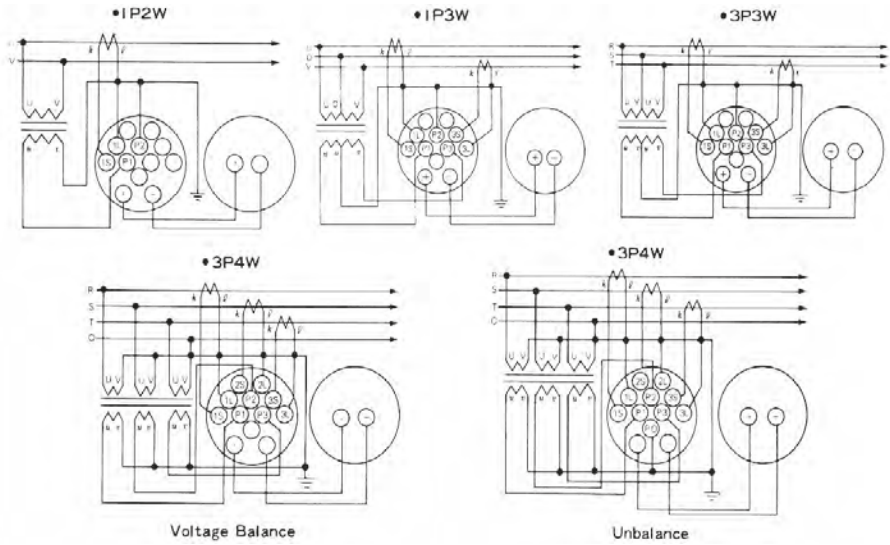
Standard Scale Meter scheme																
Phase Wire	1P 2W	1P 3W	3P 3W								3P4W					
P.T. ratio(V)	110	110	220	380 /110	440 /110	3300 /110	6600 /110	22000 /110	22900 /110	154kV /110	208/√3	380/√3 190/√3	380 / √3	11400/√3 190/√3	22900/√3 190/√3	
C.T ratio	Calibrating Var	0.3Kvar	0.5Kvar	1.0Kvar	0.579Kvar	0.5Kvar	0.5Kvar	0.5Kvar	0.480Kvar	0.5Kvar	1.0Kvar	1.0Kvar	2.0Kvar	0.833Kvar	0.833Kvar	
5/5		0.3	0.5	1	2	2	15	30	100	100	700	1	2	2	20	100
10/5		0.8	1	2	4	4	30	60	200	200	1400	2	4	4	100	200
15/5		0.9	1.5	3	6	6	45	90	300	300	2100	3	6	6	150	300
20/5		1.2	2	4	8	8	60	120	400	400	2800	4	8	8	200	400
25/5		1.5	2.5	5	10	10	75	150	500	500	3500	5	10	10	250	500
30/5		1.8	3	6	12	12	90	180	600	600	4200	6	12	12	300	600
40/5		2.4	4	8	16	16	120	240	800	800	5600	8	16	16	400	800
50/5		3.0	5	10	20	20	150	300	1000	1000	7000	10	20	20	600	1000
60/5		3.6	6	12	24	24	180	360	1200	1200	8000	12	24	24	600	1200
75/5		4.5	7.5	15	30	30	225	450	1500	1500	105Mvar	15	30	30	750	1500
80/5		4.8	8	16	32	32	240	480	1600	1600	11.2	16	32	32	800	1600
100/5		6.0	10	20	40	40	300	600	2000	2000	14.0	20	40	40	1000	2000
120/5		7.2	12	24	48	48	360	720	2400	2400	16.3	24	48	48	1200	2400
150/5		9.0	15	30	60	60	450	900	3000	3000	21.0	30	60	60	1500	3000
200/5		12.0	20	40	80	80	600	1200	4000	4000	28.0	40	80	80	2000	4000
250/5		15.0	25	50	100	100	750	1500	5000	5000	35.0	50	100	100	2500	5000
300/5		18.0	30	60	120	120	900	1800	6000	6000	42.0	60	120	120	3000	6000
400/5		24.0	40	80	160	160	1200	2400	8000	8000	56.0	80	160	160	4000	8000
500/5		30.0	50	100	200	200	1500	3000	10Mvar	10Mvar	70	100	200	200	5000	10Mvar
600/5		36.0	60	120	240	240	1800	3600	12	12	84	120	2400	240	56000	12
750/5		45.0	75	150	300	300	2250	4500	15	15	105	150	300	300	7500	15
800/5		48.0	80	160	320	320	2400	4800	16	16	112	160	320	320	8000	16
1000/5		60.0	100	200	800	800	3000	6000	20	20	140	200	400	400	10Mvar	20
1200/5		72.0	120	240	480	480	3600	7200	24	24	168	240	480	480	12	24
1500/5		90.0	150	300	600	600	4500	9000	30	30	210	400	600	600	150	30
2500/5		120.0	200	400	800	800	6000	12Mvar	40	40	280	400	800	800	20	40
2500/5		150.0	250	500	1000	1000	7500	15	50	50	350	500	1000	1000	25	50

ex) 3P 3W
full scale wattmeter : 300KW
P. T ratio : 3300V/110V
C. T ratio : 100A/5A
Calibrating Watts = $\frac{300Kvar}{(3300/110) \times (100/5)}$
= 0.5Kvar

ex) 3P 3W
full scale wattmeter : 1000KW
P. T ratio : $\frac{22900V}{\sqrt{3}} / \frac{190V}{\sqrt{3}}$
C. T ratio : 50A/5A
Calibrating var = $\frac{1000KW}{\left(\frac{22900V}{\sqrt{3}} / \frac{190V}{\sqrt{3}}\right) \times (50/5A)}$ = 0.833KW

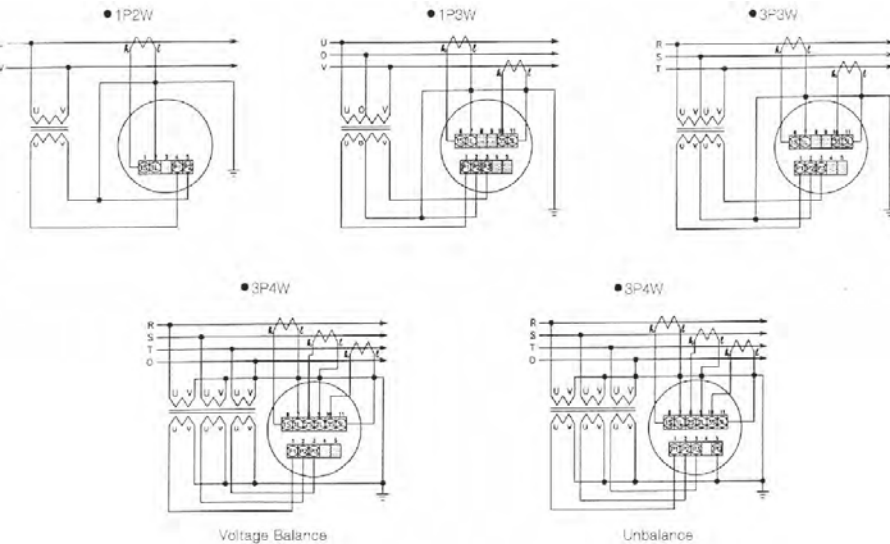
Wiring Diagram

EXT. T/D type



Wiring Diagram

INT. T/D type





W8-P4U

PANEL BOARD METER - Power Factor(COS ϕ) Meter

- ◆ In case of exceeding the rating, PT of AC 110V, 5A. Use CT in combination.
- ◆ Operating voltage range is within ±10% of the rated voltage.
- ◆ There are two types of power factor meters and transducers, internal (INT.) and external (EXT.), and they are divided into balanced and unbalance types.
- ◆ In case of 3-phase 4-wire, it is displayed as phase voltage ($V1/\sqrt{3}$).
- ◆ In the case of a small load of 10% of the secondary rated current of 5A, the normal indication of the power factor cannot be expected, and an accurate error is guaranteed when it is more than 1/3 of the rated current.
- ◆ Standard scale of countercurrent meter is LEAD 0.5~1.0~0.5 LAG.

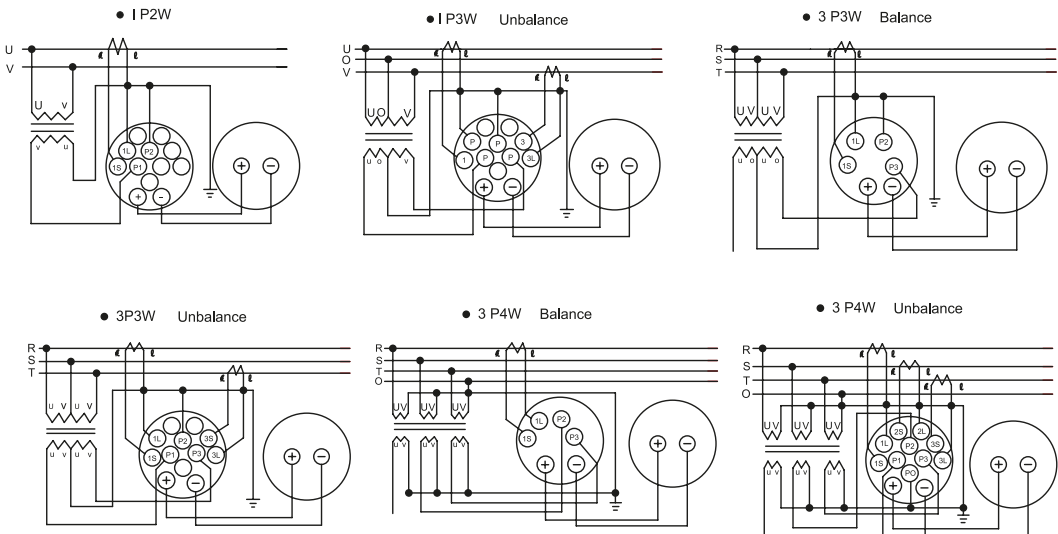
Rated Specification

Type	Size	Circuit	Rated		VA		Remark	Hz	Class	Weight (Kg)	REF
			V	A	V	A					
W8-P1	80x80mm	1P2W	110. 220	5	0.5	0.5	-	60	3.0/5.0	0.65	EXT. T/D
W8-P2		1P3W	110	5	0.5	0.5	-	60	3.0/5.0	0.75	
W8-P3B		3P3W	110. 220	5	0.5	0.5	B	60	3.0/5.0	0.75	
W8-P3U		3P3W	110. 220	5	0.5	0.5	U	60	3.0/5.0	0.85	
W8-P4B		3P4W	190/√3. 380/√3	5	0.5	0.5	B	60	3.0/5.0	0.90	
W8-P4U		3P4W	190/√3. 380/√3	5	0.5	0.5	U	60	3.0/5.0	0.90	
W11-P1	110x110mm	1P2W	110. 220	5	0.5	0.5	-	60	3.0/5.0	0.70	EXT. T/D
W11-P2		1P3W	110	5	0.5	0.5	-	60	3.0/5.0	0.85	
W11-P3B		3P3W	110. 220	5	0.5	0.5	B	60	3.0/5.0	0.85	
W11-P3U		3P3W	110. 220	5	0.5	0.5	U	60	3.0/5.0	0.95	
W11-P4B		3P4W	190/√3. 380/√3	5	0.5	0.5	B	60	3.0/5.0	1.00	
W11-P4U		3P4W	190/√3. 380/√3	5	0.5	0.5	U	60	3.0/5.0	1.00	
W11-P1T		1P2W	110. 220	5	0.5	0.5	-	60	3.0/5.0	0.60	INT. T/D
W11-P2T		1P3W	110	5	0.5	0.5	-	60	3.0/5.0	0.85	
W11-P3BT		3P3W	110. 220	5	0.5	0.5	B	60	3.0/5.0	0.85	
W11-P3UT		3P3W	110. 220	5	0.5	0.5	U	60	3.0/5.0	0.90	
W11-P4BT		3P4W	190/√3. 380/√3	5	0.5	0.5	B	60	5.0	0.90	
W11-P4UT		3P4W	190/√3. 380/√3	5	0.5	0.5	U	60	5.0	0.90	

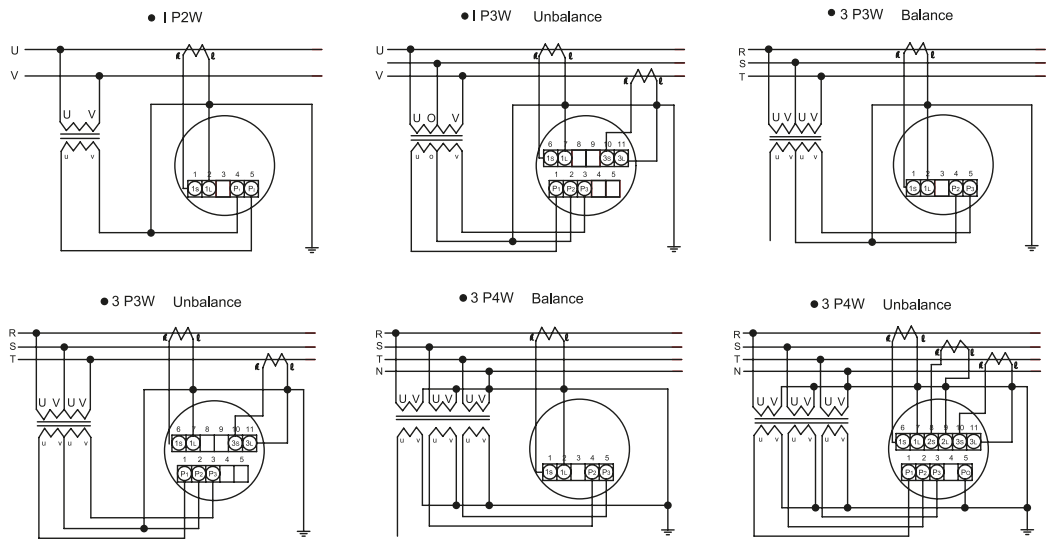
※ B:Balance, U:Unbalance, T:Int. Transducer, P:Power Factor.
※ EXT. T/D: External transducer, INT. T/D: Built-in transducer
※ Order made is rating current 1A of meter

Wiring Diagram

EXT. T/D type



INT. T/D type





W11-F

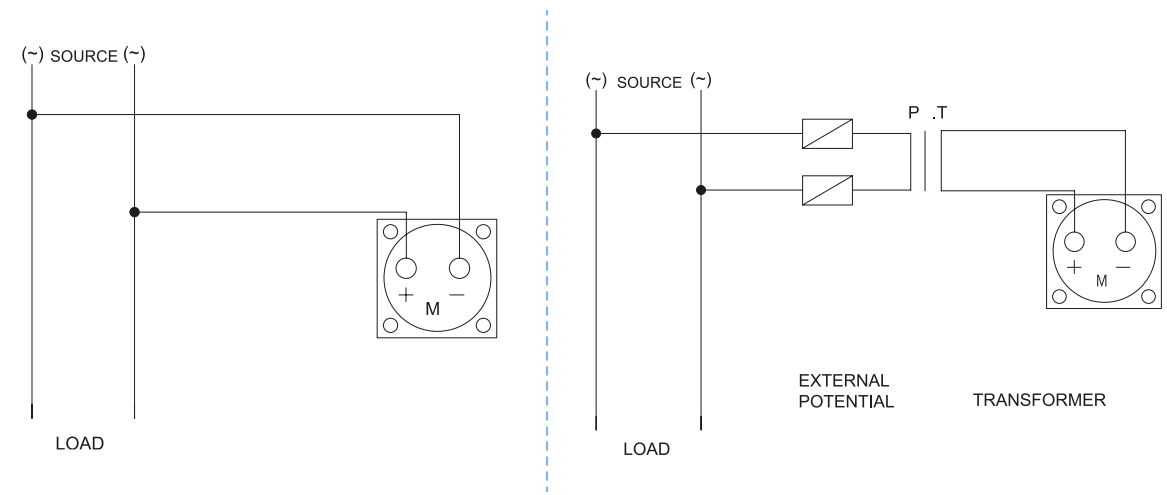
PANEL BOARD METER - Frequency (Hz) Meter

- ◆ There are two types of standard full scaled frequency: 45Hz~55Hz and 55Hz~65Hz.
- ◆ If the rated voltage is exceeded, use an external P.T..
- ◆ The operating voltage range is AC 110V: 80~120V, AC220V: 160~240V.
- ◆ The pointer of the frequency meter is a needle type.

Rated Specificaton

Type	Size	Rated Voltage(V)	VA	Class	Weight(Kg)
W8-F	80 X 80mm			1.0	0.33
W11-F	110 X 110mm			1.0	0.45

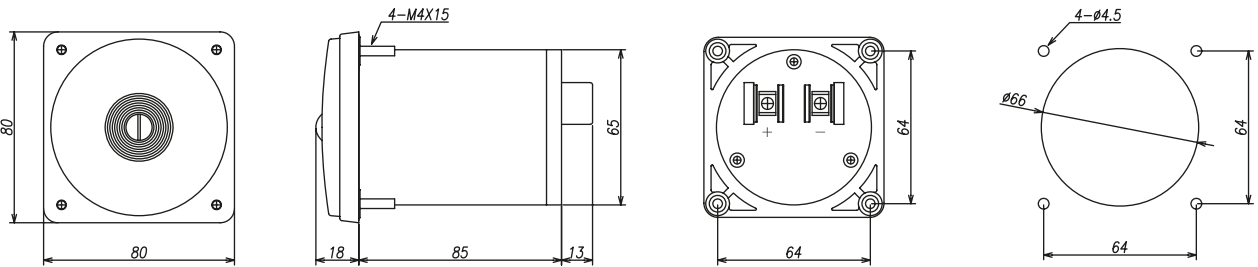
Wiring Diagram



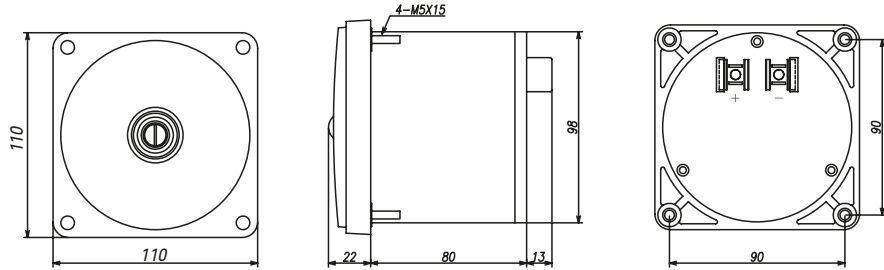
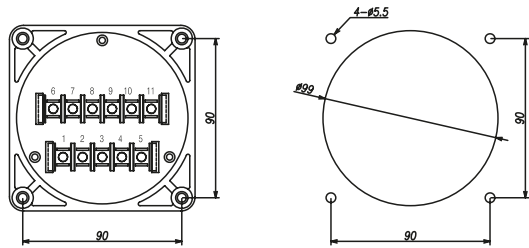
PANEL BOARD METER [W11, W8, S8 TYPE]

Dimensions

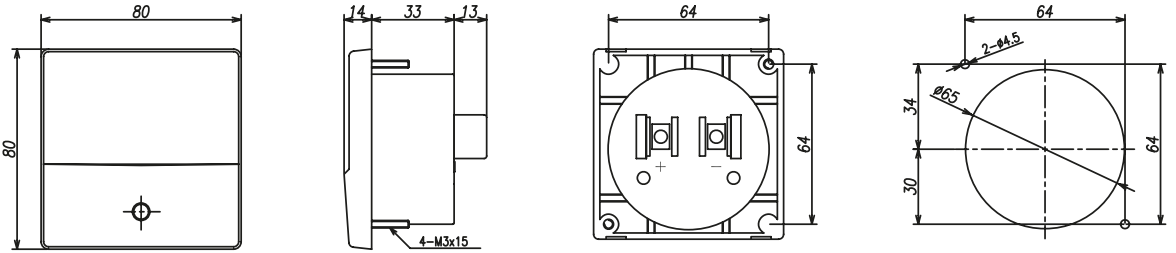
W8 TYPE



W11 TYPE



S8 TYPE



DEEsys[®]

Zero Phase Current Transformer



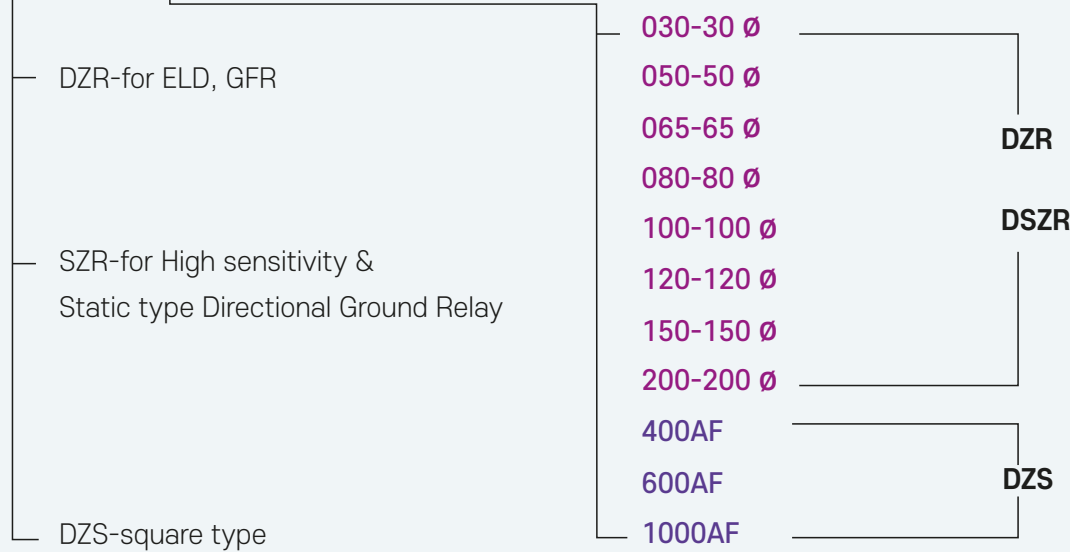
Round Type ZCT / Square Type ZCT



Type-approved product for Korea firefighting inspection construction

Model selection classification

DZR - 030



※ DZR is a new product with improved structure and improved straightness and stability.

※ CAUTION: The above Series ZCT has a voltage type secondary output that can be applied to ELD and Static Type Realy, and cannot be applied to induction relays.



* For products approved by Korea Fire Industry and Technology Institute [Rated 200mA/100mV]

DEESYS Round type ZCT

- ◆ High permeability core is used to improve straightness and stability.
- ◆ As a Round Type, it is composed of various models according to the capacity of the load.
- ◆ This is a type-approved product by the Korea Fire Industry and Technology Institute.

Ratngs

Model	Rated Current(A)	Inside Dia(mm)	Through wire(EV)mm			Zero phasecurrent ratio Pri./Sec	Weight(kg)
			1/2W	1/3W, 3/3W	3/4W		
DZR-030/DSZR-030	100	30	60	14	8	DZR / ZR Type 200mA/100mV (75~125mV/at 2kΩ)	0.2
DZR-050/DSZR-050	250	50	150	80	38		0.3
DZR-065/DSZR-065	400	65	325	150	100		0.4
DZR-080/DSZR-080	600	80	400	250	200		0.8
DZR-100/DSZR-100	800	100	500	325	250	DSZR / SZR Type 30mA/50mV	1.0
DZR-120/DSZR-120	1000	120	-	850	725		1.2
ZR-150, SZR-150	1400	150		1000	850		4
ZR-200, SZR-200	2000	200					7.5

Model classification



Operation overview

Z.C.T Operation Principle



I_g: The difference between incoming current is generated by ground fault, earth leakage current, and ground fault current to generate an output in the secondary ZCT, and the output displays an earth leakage circuit and alarms.

* For rated secondary output [200mA/1.5mA]



Ratings

Model	Rated Current(A)	Inside Dia(mm)	Through wire(EV)mm			Zero phase current ratio Pri./Sec	Weight(kg)
			1/2W	1/3W, 3/3W	3/4W		
DZR-A030/DSZR-A030	100	30	60	14	8	200mA/1.5mA	0.2
DZR-A050/DSZR-A050	250	50	150	80	38		0.3
DZR-A065/DSZR-A065	400	65	325	150	100		0.4
DZR-A080/DSZR-A080	600	80	400	250	200		0.8
DZR-A100/DSZR-A100	800	100	500	325	250		1.0
DZR-A120/DSZR-A120	1000	120	-	850	725		1.2

Model Classificaion

Factory Name DEESYS
Product Name Zero-Phase CT
Shape Rounded: R / Square : S

DZR - A030

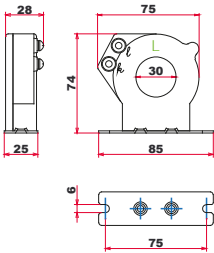
I.D.(mm) 30 / 50 / 65



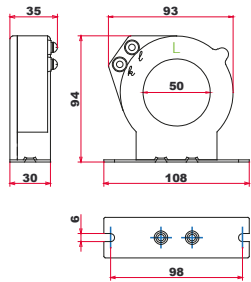
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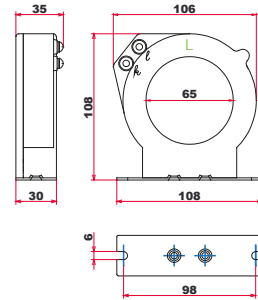
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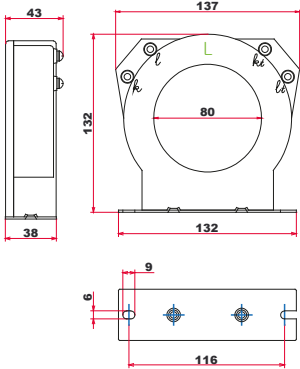
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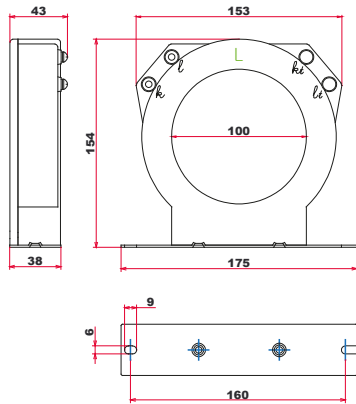
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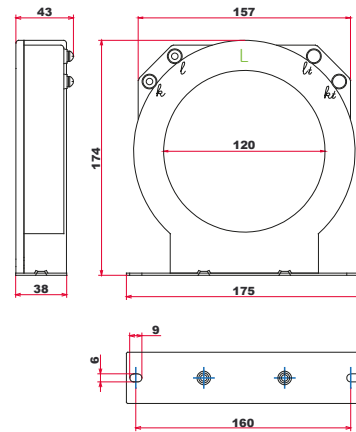
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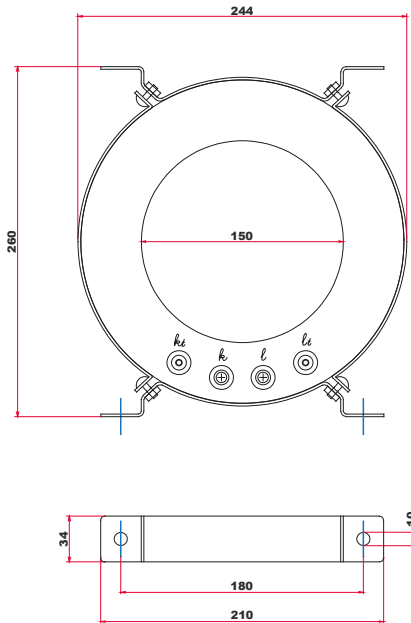


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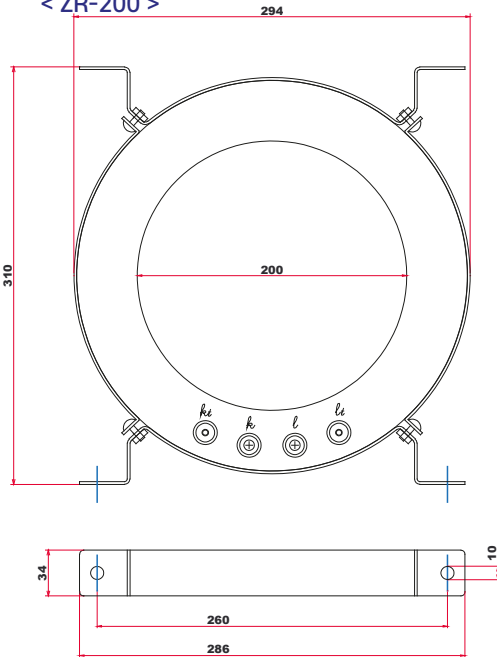


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< ZR-150 >



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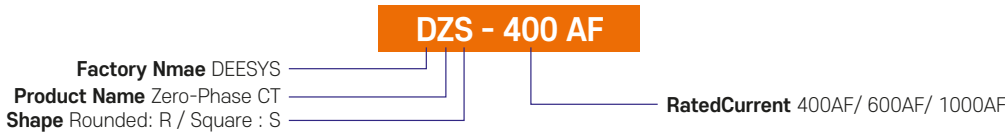
Deesys Square ZCT

- ◆ High permeability core is used and straightness and stability are improved.
- ◆ It is installed in a square type, passing through a bus bar, and consists of 3 models according to the load capacity.
- ◆ It is a type-approved product by the Korea Fire Protection Industry and Technology Institute.

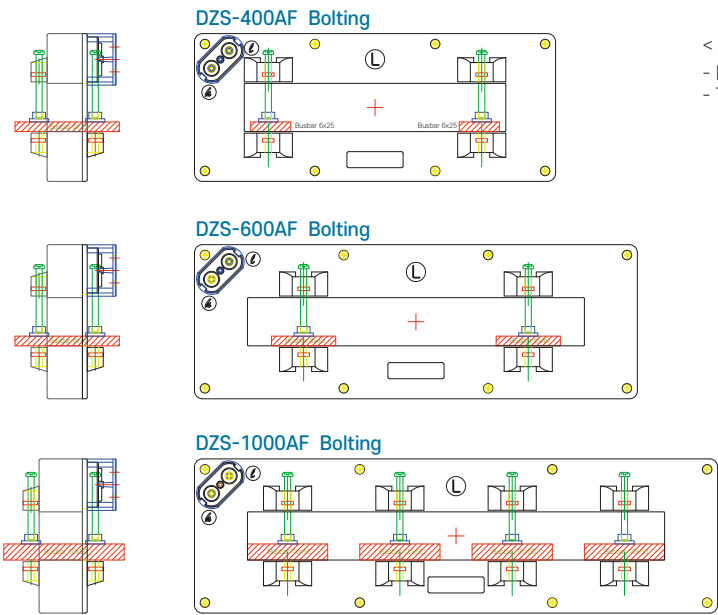
Ratings

Model		Rated Current(A)	Inside Dia(mm)	Through wire(EV)mm			Zero phasecurrent ratio Pri./Sec	Weight(kg)
				1/2W	1/3W, 3/3W	3/4W		
Busbar Through Type	DZS-400AF	400	30 x 163	6T x 25			200mA/100mV (75~125mV/at 2kV)	2.8
	DZS-600AF	600	30 x 210	8T x 30				3.5
	DZS-1000AF	1,000	30 x 260	8T x 30				3.8

Model Classificaion



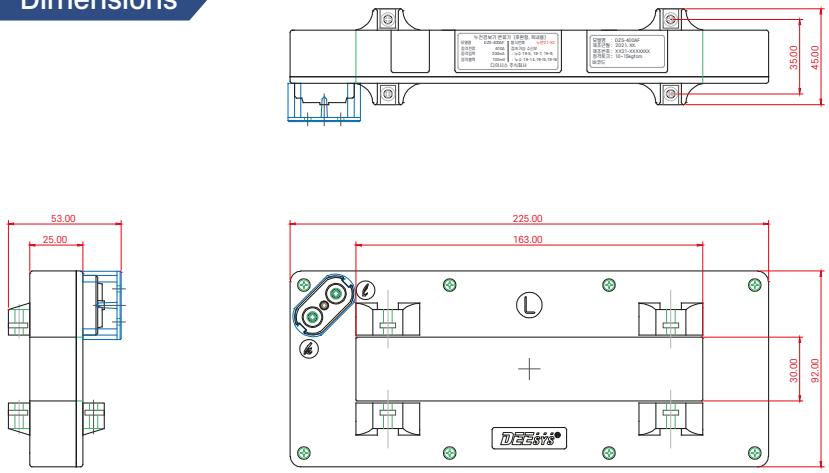
Busbar Mount Bolting Size



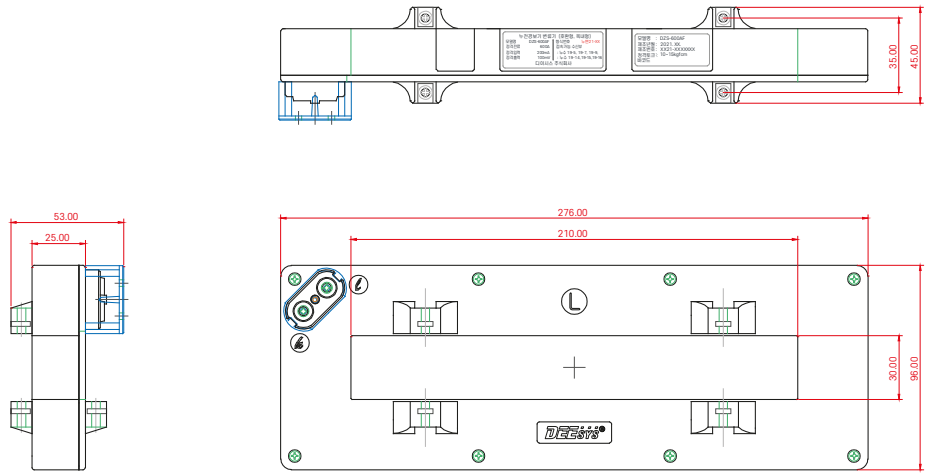
< Bolt & Torque Standard >

- Bolt : M4.0*40.0mm 4ea
- Torque : 10~15kgfcm

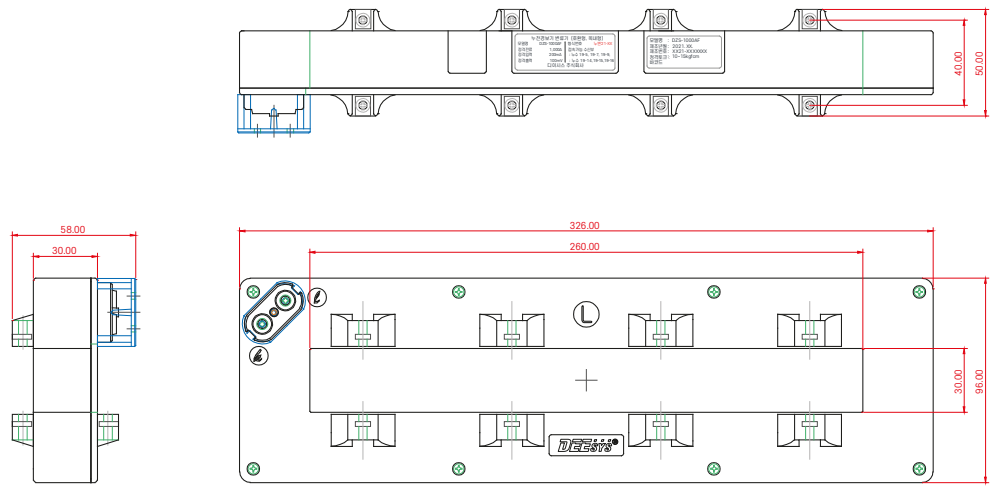
Dimensions



DZS-400AF



DZS-600AF



DZS-1000AF

DEEsys®

Potential Transformer



Potential Transformers



3PHASE C.T
- DW-40/41/42/43/44

- ◆ It is possible to select according to the pole of the breaking period, and it is a product that is easy to install on a distribution board and a low voltage board.
- ◆ For general metering (for Metering)
- ◆ 3-phase integrated current transformer that combines 3 CT.

Ratings

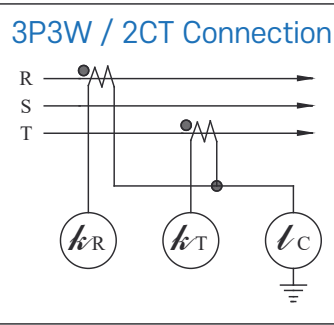
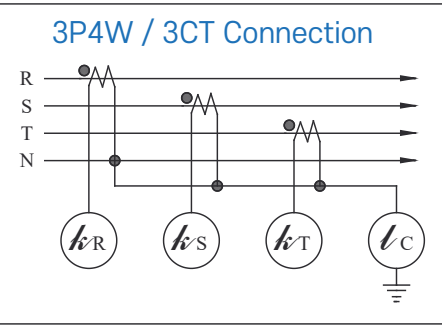
Classification	Applicable range
Max. Voltage	1150V
Frequency	60Hz
Class	1.0~3.0%
Phase	3P3W, 3P4W
Over Voltage Factor	40In / 1Sec

1150V Window Type C.T
(DW-30 Series 3P3W 2C.T / DW-40 Series 3P4W 3C.T)

Specificaions

Model	Pri. Cur.(A)	Sec. Cur.(A)	Class(%)	Burden(VA)	MCCB & ELCB
DW-30/40	50-75	5	3.0	2.5	50 AF
DW-31/41	100-150		1.0 / 3.0	5 / 15	100 AF
DW-32/42	120-250		1.0 / 3.0	5 / 15	255 AF
DW-33/43	300-400		1.0	15	400 AF
DW-34/44	500-1200		1.0	15	600 / 800 AF

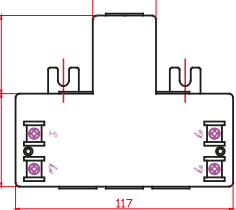
Wiring Diagram



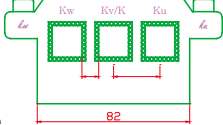
Dimensions

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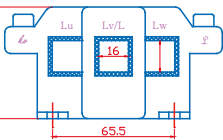
Top



K - Side

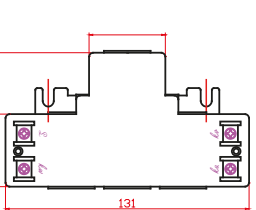


L - Side

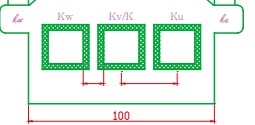


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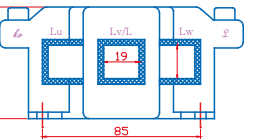
Top



K - Side

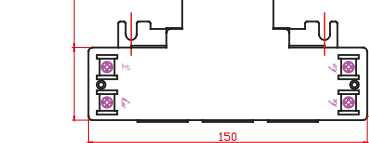


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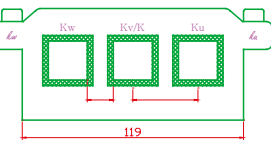


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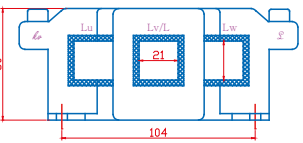
Top



K - Side

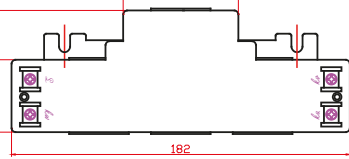


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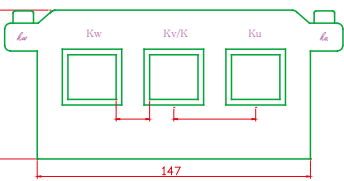


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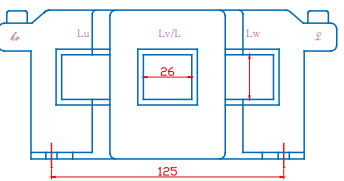
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K - Side

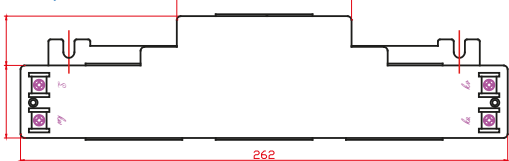


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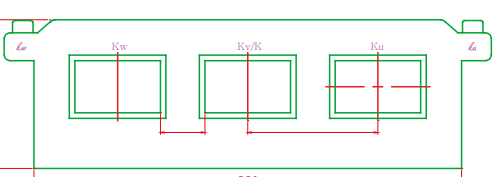


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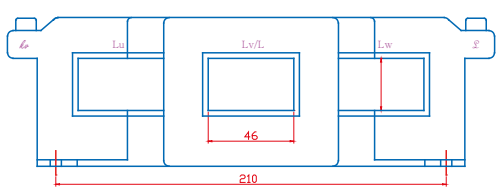
Top



K - Side



L - Side





SINGLE PHASE ROUND TYPE CURRENT TRANSFORMER

- ◆ Cable-through type
- ◆ ABS flame retardant case
- ◆ Indoor use
- ◆ For general instruments
- ◆ 90 rotation is possible in the mounting direction

Round Type C.T

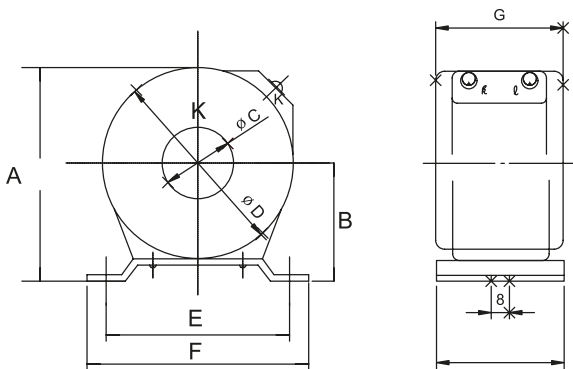
This low-pressure current transformer is small and lightweight, so it is easy to handle, has sufficient electrical and mechanical durability, and is highly reliable. The mounting direction can be rotated 90 degrees, so it is convenient to install, and it can be used with different current ratios for the same AT depending on the number of primary conductor penetrations.

Specification

Type	Rated (AT)	Burden (VA)	Class (%)	over curr. strenght (times)	Frequency (Hz)	Weight (kg)
DR-18	75 100 120 150 200	5	1.0	40In	50/60	0.55
DR-1	100 120 150 160 180	5	1.0			
	200 240 250 300	5 or 15	1.0			
DR-2	240 250 300 400 500 600	15 15 or 40	1.0			0.75
DR-3	500 600 750 800 1000 1200 1500	40	1.0			1.10

Dimensions

Type	A	B	ΦC	ΦD	E	F	G
DR-18	84	48	18	64	65	80	50
DR-1	95	55	27	70	75	94	40
DR-2	108	65	40	87	75	94	40
DR-3	134	77	60	114	75	94	40



ROUND TYPE CURRENT TRANSFORMER[1.15KV]

DR CT Current ratio and primary conductor cross-sectional area according to the number of passes through the primary conductor

The following table lists the rated primary current, the number of penetrations of the primary conductor, and the maximum nominal cross-sectional area of a 600V vinyl wire (600V IV wire) that can be penetrated. The values in this table indicate the allowable current of the wire at an ambient temperature of 40°C.

5VA				15VA				40VA			
DR-1 / DR-18				DR-2				DR-3			
Rated (AT)	1ry current (A)	Turns (T)	1ry cable (mm ²)	Rated (AT)	1ry current (A)	Turns (T)	1ry cable (mm ²)	Rated (AT)	1ry current (A)	Turns (T)	1ry cable (mm ²)
75	5	15	()	240	15	16	5.5	500	50	10	38
	15	5	8		20	12	14		100	5	125
	25	3	14		30	8	22		125	4	125
	75	1	50		60	4	80		250	2	250
100	5	20	()	250	120	2	125	600	500	1	500
	10	10	8		240	1	500		75	8	60
	20	5	14		25	10	4		100	6	60
	25	4	14		50	5	60		150	4	125
150	50	2	22	300	125	2	125	750	200	3	150
	100	1	200		250	1	500		300	2	250
	15	10	8		30	10	22		600	1	500
	25	6	14		50	6	38		75	10	38
160	30	5	14	400	75	4	80	800	150	5	125
	50	3	38		100	3	80		250	3	250
	75	2	50		150	2	125		400	2	250
	100	1	200		300	1	500		800	1	500
180	10	16	8	500	40	10	14	1000	100	10	38
	20	8	14		50	8	22		200	5	125
	40	4	38		100	4	80		250	4	125
	80	2	50		200	2	200		500	2	250
200	160	1	200	600	50	10	14	1200	1000	1	500
	10	18	8		100	5	60		100	12	38
	20	9	14		125	4	80		200	6	125
	30	6	22		250	2	125		300	4	125
250	60	3	50	300	500	1	500	1500	400	3	()
	90	2	60		75	8	22		600	2	80X3()
	180	1	200		100	6	60		1200	1	250X3()
	20	10	14		150	4	80		1500	10	38
300	25	8	22	600	200	3	100	1500	300	5	125
	40	5	22		300	2	125		500	3	250
	50	4	38		600	1	500		750	2	80X3()
	100	2	200						1500	1	250X3()

Relationship between the inner diameter of DR CT and the outer diameter of the penetrating wire

(Ex) In case of DR-1 type CT and 3 turns of 38mm², the length of the 38mm² external cross is 11.5mm. The error 120 & 100AT is 0.3 class, and the internal cross length of DP-50FCT is 27mm, and CT can be used.

WINDING TYPE CURRENT TRANSFORMER[1.15KV]



DRW C.T

DRB C.T

DRW-15, DRW-40, DRB-1, DRB-2

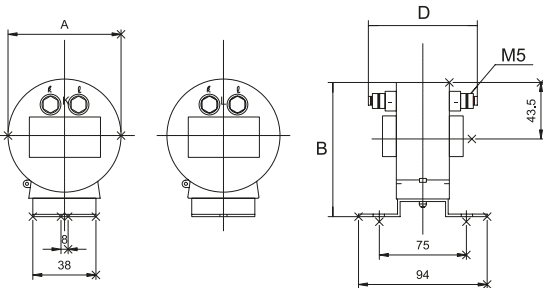
- ◆ Wire-wound type
- ◆ Indoor use
- ◆ ABS flame retardant case
- ◆ For general instruments

Single ratio C.T

Specification

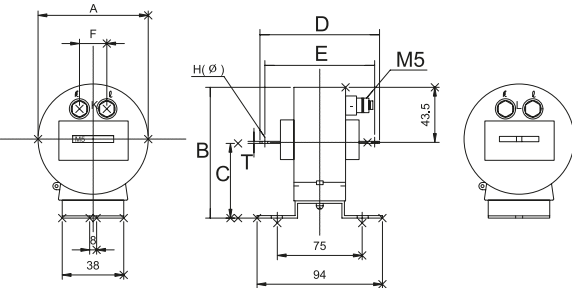
Type	Primary (AT)	Secondary(A)	Burden (VA)	Class (%)	over curr. strenght (times)	Dimension	Weight (kg)	Remark
DRW-15	5~30	5 or 1	15	1.0	40in		0.70	Terminal Type
DRB-1	40~150						0.85	Busbar Type
	200~300							
	400~500							
DRW-40	5~30	5 or 1	40	1.0	40in		1.0	Terminal Type
DRB-2	40~150						1.2	Busbar Type
	200~300							
	400~500							

Dimensions



Unit : m/m

Type	Primary current	A	B	C
DRW-15	5~30	80	100	80
DRW-40		100	120	95

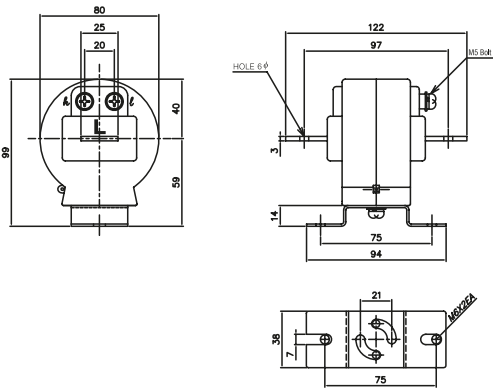


Unit : m/m

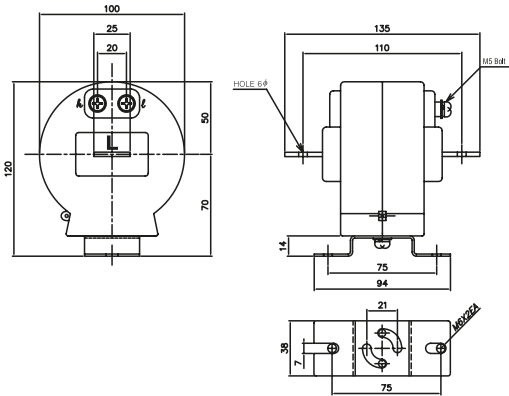
Type C	Primary current(A)	Dimension							
		A	B	C	D	E	F	G	H(Φ)
DRB-1	40~150	80	100	60	125	100	25	3.2	6
	200~300	80	100	60	135	105	30	6	10
	400~500	80	100	60	155	115	30	6	12
DRB-2	40~150	100	118	70	135	110	25	3.2	6
	200~300	100	118	70	145	115	30	6	10
	400~500	100	118	70	165	130	40	6	12

Dimensions

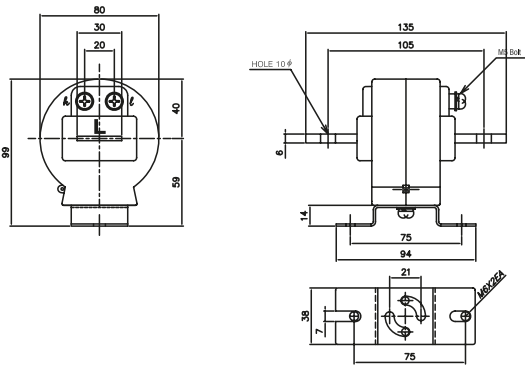
DRB-1 [40A~150A] DIMENSION



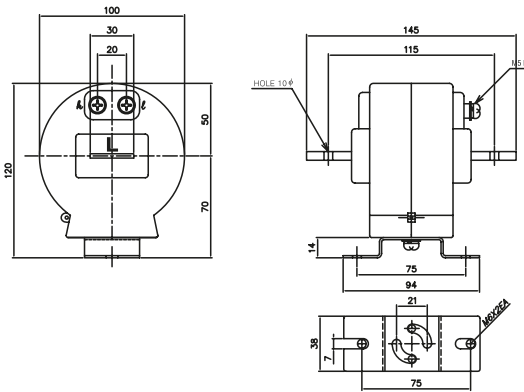
DRB-2 [40A~150A] DIMENSION



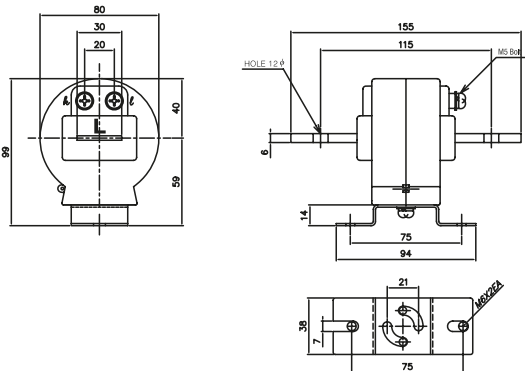
DRB-1 [200A~300A] DIMENSION



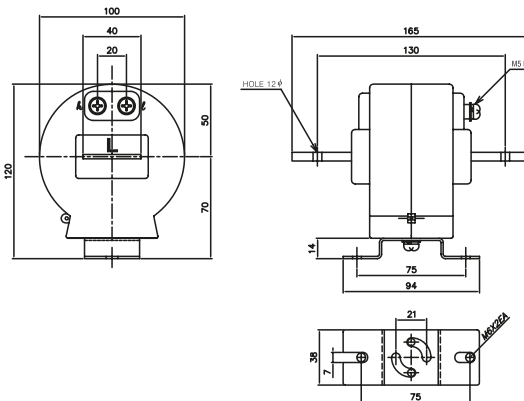
DRB-2 [200A~300A] DIMENSION



DRB-1 [400A~500A] DIMENSION



DRB-2 [400A~500A] DIMENSION



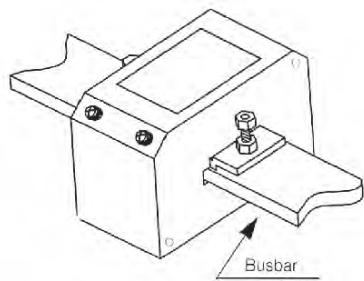


SQUARE TYPE C.T. [1.15KV] PANEL 취부용
DS-1, DS-2, DS-3, DS-4, DS-5, DS-6

- ◆ Primary Bus-Bar Through Type (Though Type)
- ◆ For general instruments
- ◆ Indoor use
- ◆ ABS flame retardant case
- ◆ Installation is convenient as it can be directly mounted on the bus-bar.
- ◆ Since the installation is strong, it is advantageous to install it in a place where there is a lot of vibration.

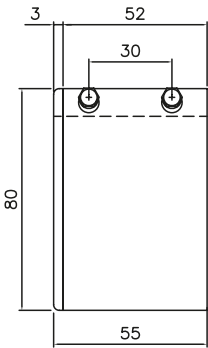
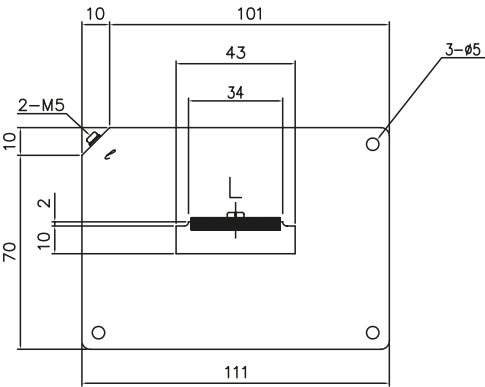
Specification

Type	Primary (A)	Secondary (A)	Burden (VA)	Class (%)	over current strenght (times)	Frequency (Hz)	Weight (kg)
DS-1	100	5 or 1	5 or 15	1.0	40In	50/60	1.3
	150~200		5 or 15				
	250~300		5 or 15				
	300		5 or 15				
DS-2	400	5 or 1	15	1.0	40In	50/60	1.5
	500~600		15~40	0.5			1.5
DS-3	600~1000		15~40	1.0			1.6
DS-4	750~2000		40	0.5			1.9
DS-5	1000~4000			0.3			4.8
DS-6	2500~6000						

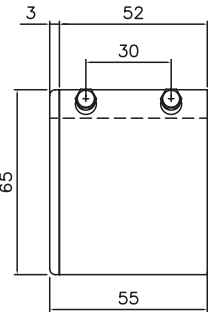
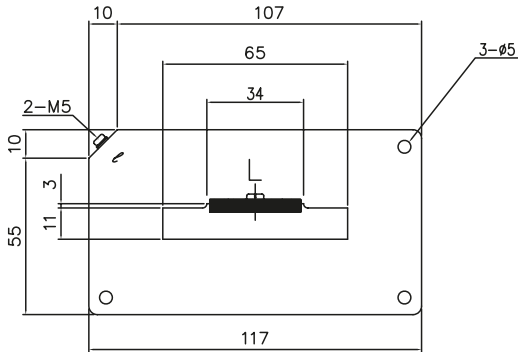


Dimensions

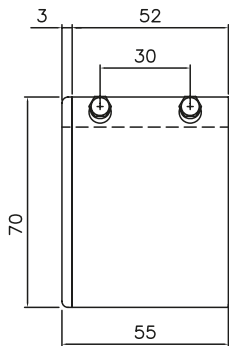
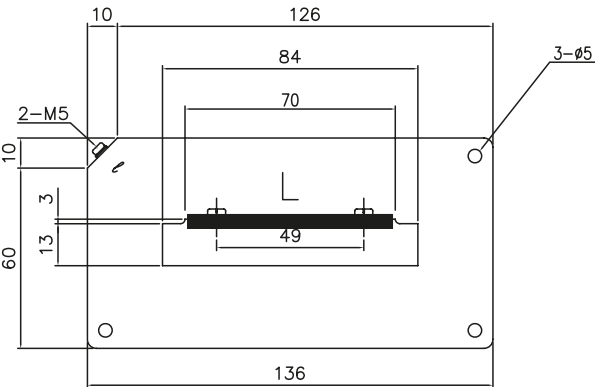
DS-1



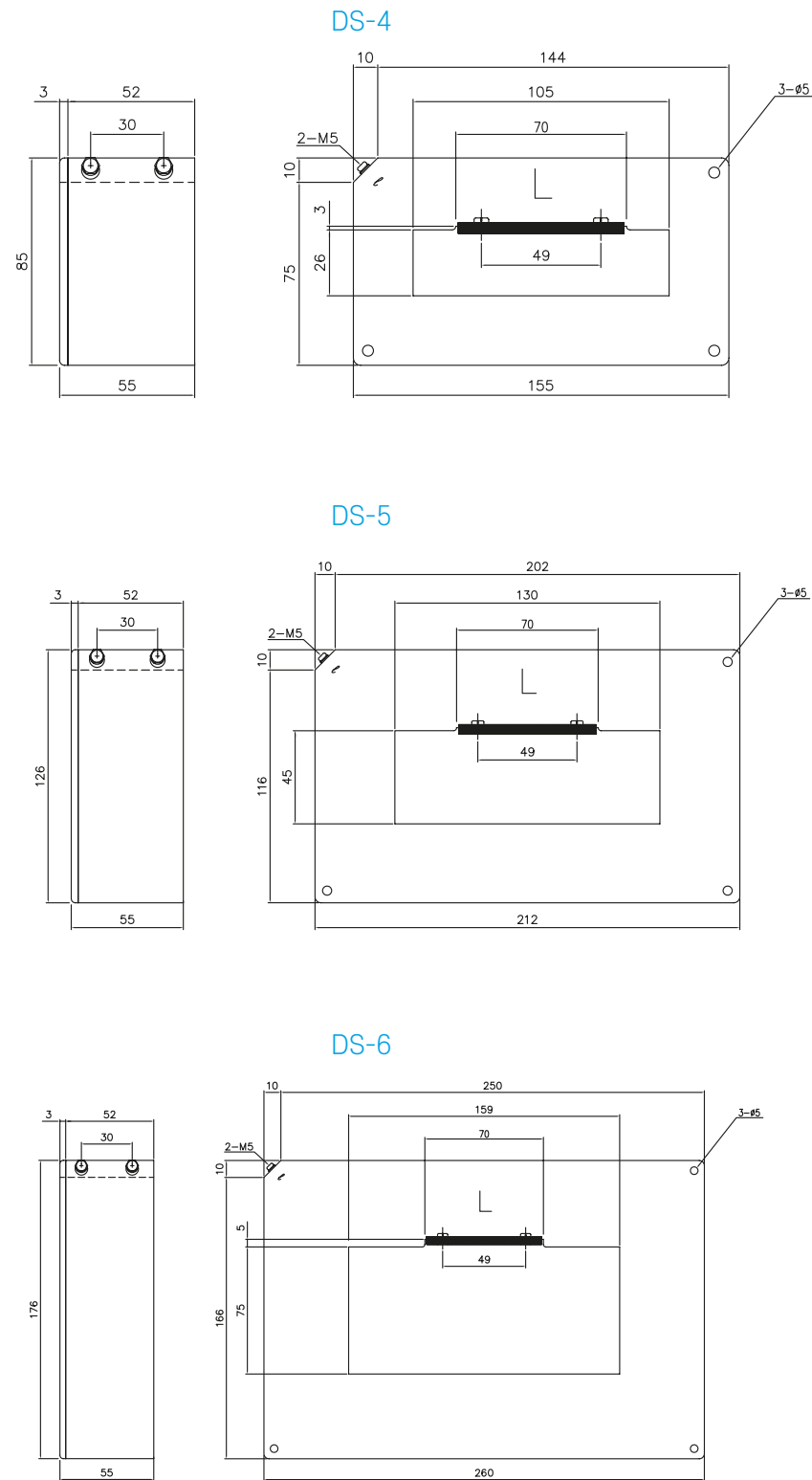
DS-2



DS-3



Dimesions



Single Phase Square Type C.T (Relay Type)



Current Transformer for Low Voltage [Relay Type]
DS-S4R/DS-S41R/DS-SW4R/DS-SW41R/DS-S21R
DS-S61R/DS-S7R/DS-S91R/DS-S101R/DS-S6R
DS-S8R/DS-S9R/DS-S10R

Maximum circuit voltage 0.72kV to 1.2kV

- ◆ Square / Window type
- ◆ Relay function compatibility
- ◆ Flame-retardant ABS case
- ◆ Indoor use
- ◆ Busbar penetration type
- ◆ 60Hz (Option: 50Hz), 40In/Is

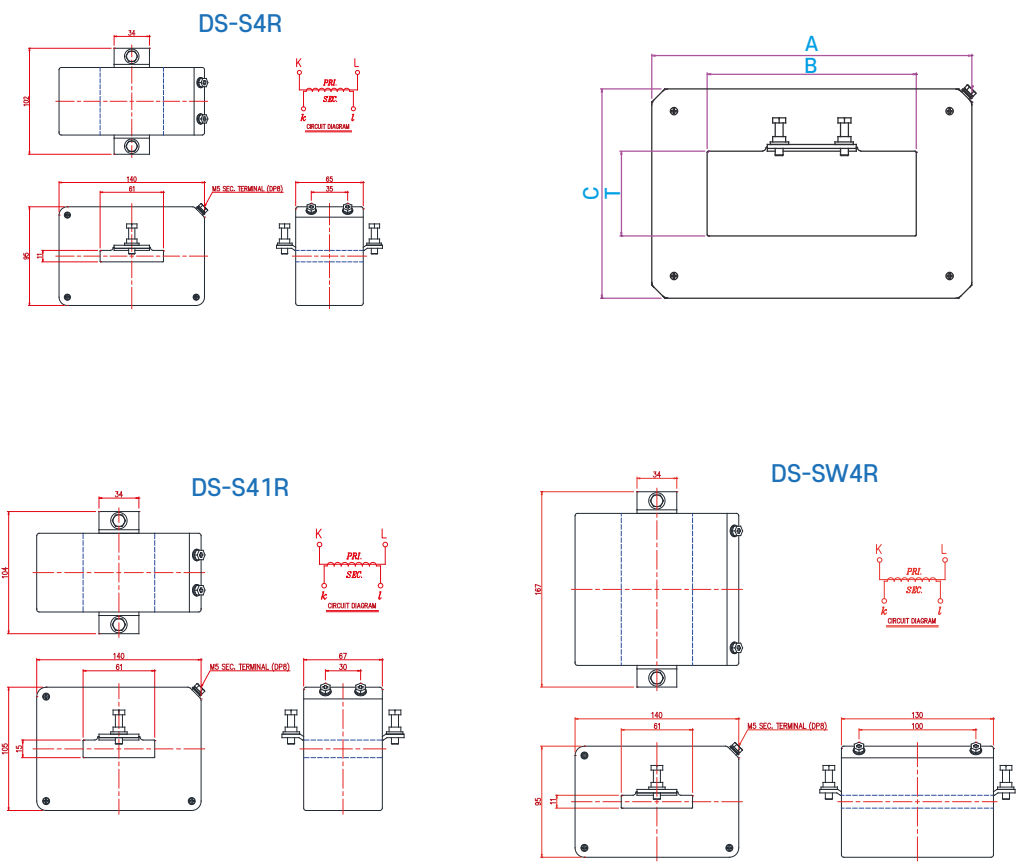
Specification

Model	Primary Current (A)	Secondary Current(A)	Class	Burden (VA)	Over Cur. Fac.	Weight (kg)	Dimension (mm)			
							A	B	C	T
DS-S4R	150~600	5 / 1	5P10	5	n>10	3.5	140	95	61	11
	400~600			15						
	300		5P20	5	n>20					
	400~500			7.5						
	600			10						
DS-S41R	150~600	5 / 1	5P10	5	n>10	3.5	140	105	61	15
	400~600			15						
	300		5P20	5	n>20					
	400~500			7.5						
	600			10						
DS-SW4R	400~800	1	5P20	15	n>20	6.5	140	95	61	11
DS-SW41R	400~800						140	105	61	15
DS-S21R	200~300	5 / 1	5P10	5	n>10	3.0	115	153	65	35
	400~600			10						
	750~1000			20						
	1200~2000			30						
DS-S61R	750~2000	5 / 1	5P10	5/15/40	n>10	3.0	170	123	102	35
	750~2000		5P20	5/15	n>20					
DS-S7R	500~1000	5 / 1	5P10	15	n>10	4.0	175	175	125	35
	1200~2000			30						
	2500~4000			40						
DS-S91R	2500~6000	5 / 1	5P10	10	n>10	5.0	245	190	153	95
	2500~6000		5P20	5/15/40	n>20					
DS-S101R	4000~8000	1	5P20	40	n>20	12	310	220	210	80

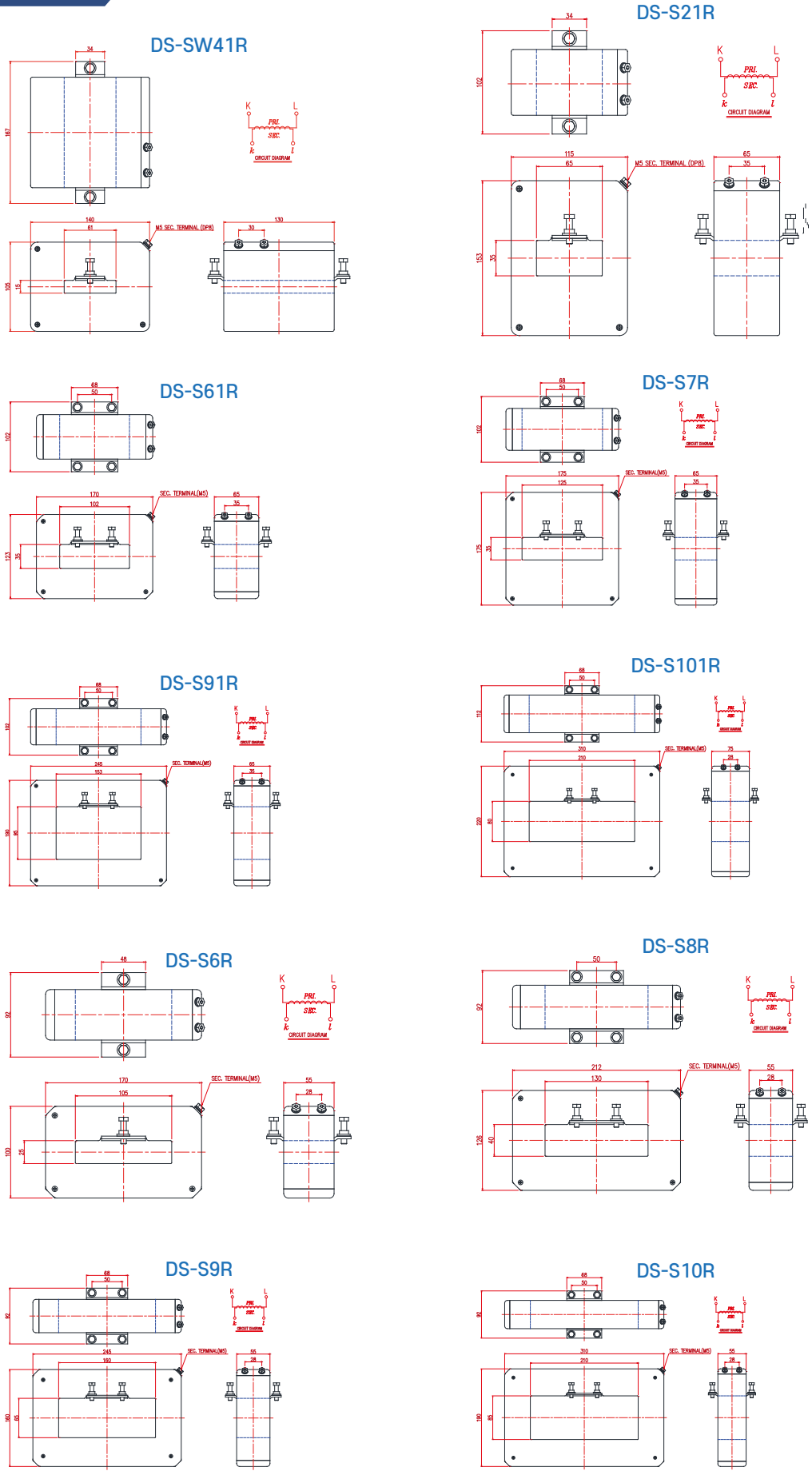
Specification

Model	Primary Current (A)	Secondary Current(A)	Class	Burden (VA)	Over Cur. Fac.	Weight (kg)	Dimension (mm)			
							A	B	C	T
DS-S6R	300~3000	5/1	5P10	5	n>10	2.0	170	100	105	25
	750~3000			15						
	750~2000	5/1	5P20	5	n>20					
DS-S8R	250~4000	5/1	5P10	5	n>10	4.8	212	126	130	40
	400~4000			15						
	1200~4000			40						
	400~4000	5/1	5P20	5	n>20					
DS-S9R	300~5000	5/1	5P10	5	n>10	4.8	245	160	160	65
	900~5000			15						
	2500~5000			40						
	800~5000	5/1	5P20	5	n>20					
DS-S10R	250~8000	5/1	5P10	5	n>10	7.0	310	190	210	85
	700~8000			15						
	1800~8000			40						
	600~8000	5/1	5P20	5	n>20					
	1800~8000			15						

Dimensions



Dimensions





3Phase Potential Transformer DP-350F / DGP-350F

- ◆ With simple wiring, there is no misconnection element and installation is very easy.
- ◆ It is inexpensive and very economical when manufacturing a switchboard.
- ◆ Three-phase instrument transformer is a transformer that can be installed simply by designing and manufacturing an innovative single-phase transformer.

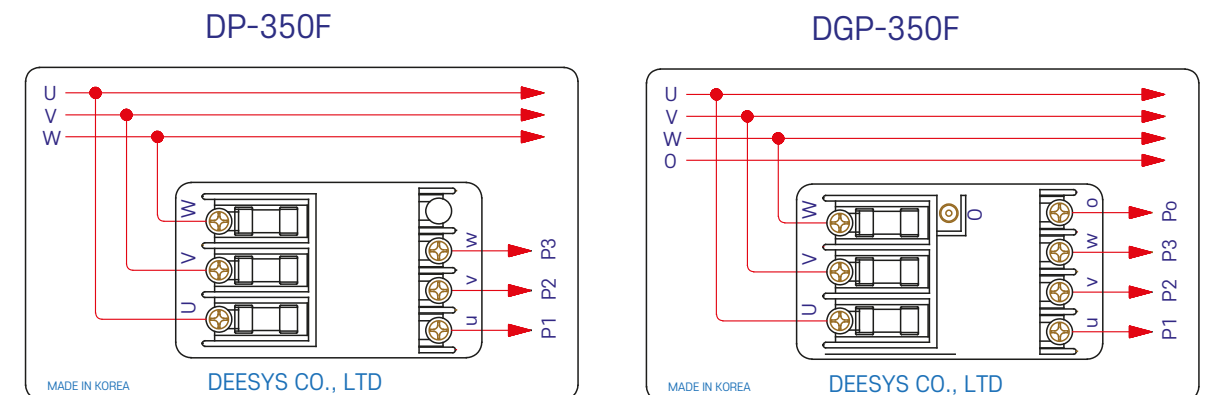
Ratings

Classification	Applicable Range
Max. Voltage	0.72kV
Frequency	60Hz
Class	1.0%
Phase	3ϕ
Over Voltage Factor	1.2Vn Continuos

Specification

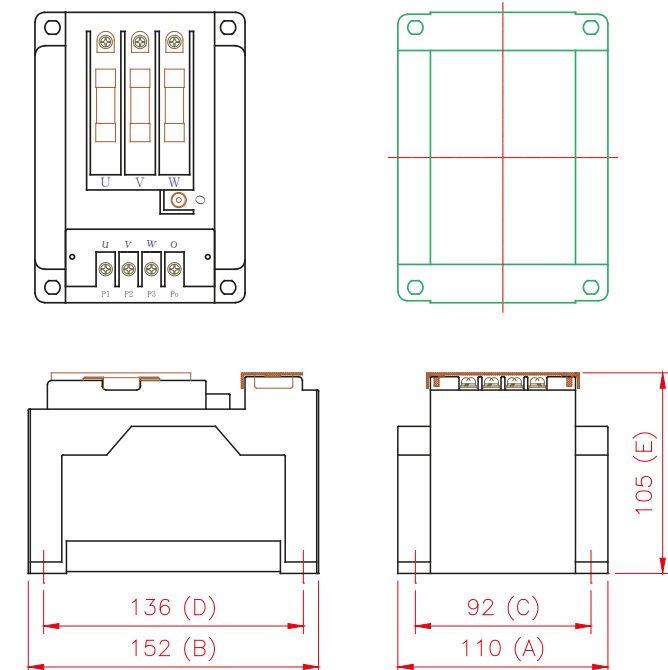
Model	Pri. Volt	Sec. Volt	Class(%)	Burden
DP-350F (3P3W)	220-600V	110-220V	1.0	50VA
DGP-350F (3P4W)	208/R3-440/R3	190/R3V	1.0	50VA

Wiring



*1차 N(O)상을 결선 하지 마십시오.

Dimensions



Model	Primary Voltage	Secondary Voltage	Class(%)	Burden	Weight Kg	Dimension (mm)				
						A	B	C	D	E
DP-350F	220-600V	110-220V	1.0	50 VA (25*2)	3.6	110	152	92	136	105
DGP-350F	208/√3 V-440/√3	190/√3 V	1.0	50 VA (17*3)	4.0	110	152	92	136	105



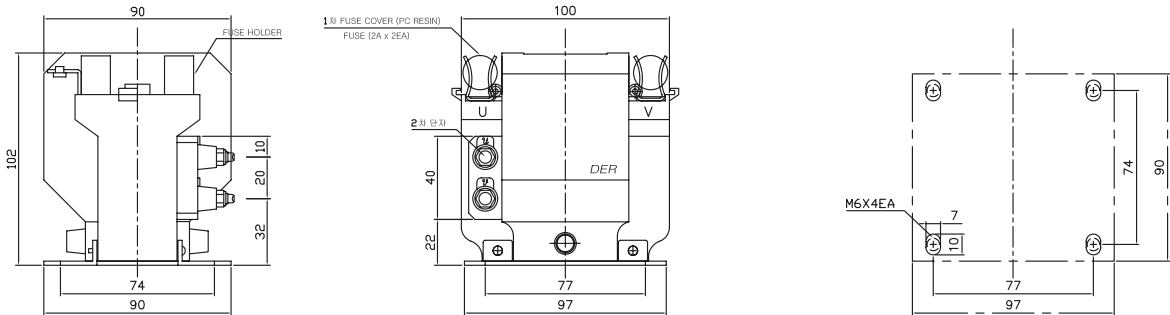
Potential Transformer

- ◆ single phase
- ◆ For instruments and relays
- ◆ Flame-retardant ABS case
- ◆ Indoor use

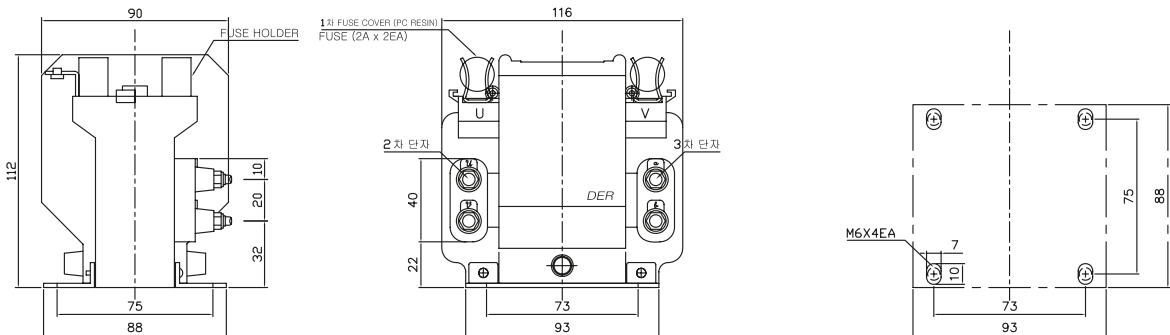
Caution: If the load between the open terminals of the tertiary winding is much smaller than the rated load, residual voltage may be generated, which may cause malfunction of the relay. Please make sure that the usage burden is 100~70% of the rated load.

Dimensions

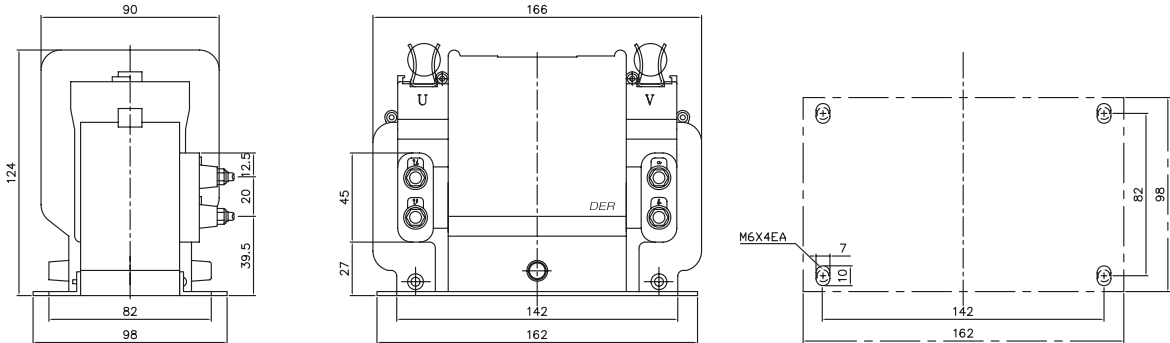
DP-50



DP-100 / DGP-100



DP-200 / DGP-200



Specification												
Name	Type	Rated voltage(V)			Accuracy Class		Burden(V)		Frequency-(Hz)	Voltage Factor (IEC-186)	Weight (kg)	
		1' ry	2' ry	3' ry	2' ry	3' ry	2' ry	3' ry				
V.T	DP-50 DP-50F	220 380 440	110 or 190 or 220	-	1.0	-	50	-	50/60	1.2Vn cont	2.5	
	DP-100 DP-100F						100				3.2	
	DP-200 DP-200F						200				5.8	
GPT	DGP-100 DGP-100F	$220/\sqrt{3}$ $380/\sqrt{3}$ $440/\sqrt{3}$	$190/\sqrt{3}$ or $110/\sqrt{3}$	-	1.0	-	50	-	50/60	$1.2Vn$ cont $1.9Vn$ 30sec	3.2	
	DGP-200 DGP-200F						100				5.8	
	DGP-100T DGP-100TF			190n or 110n		3p	50	100			3.2	
	DGP-200T DGP-200TF						100	200			5.8	

MEMO

DEEsys[®]

