

1Class Earth Leakage Detector User's manual

TYPE : GD6-L05A
GD6-L05R

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Version 1.00



Kyongbo Electric Co., Ltd.

Safety Precautions

This document is for the safety of the user, and to prevent property damage.
Be sure to read the user manual carefully, and use the product accordingly.
The user manual must be kept in a place where it can be easily seen by the product user.



WARNING

This symbol indicates the possibility of death or serious injury.



CAUTION

This symbol indicates the possibility of injury or damage to properties only.

SYMBOLS



Be sure not to do.



Be sure to follow the instruction.



WARNING



- **Do not perform any wiring work while the power is on or the product is in operation.**

It may cause an electric shock.



- **Must verify the status of the grounding connection before starting the operation.**

Otherwise, it may cause an electric shock, damage, or a fire.



- **Do not operate the product with wet hands.**

It may cause an electric shock.



- **Do not use if the clothing of the cable is damaged.**

It may cause an electric shock.



- **Do not perform any wiring work when the main cable is live.**

It may cause an electric shock, and a damage or a fire by the charged voltage of the converter.



- **Do not disassemble the product even if the power is not on, except for wiring or maintenance.**

It may cause an electric shock by the charged current in the product.



- **Let the electrical technician to perform wiring, test run, and maintenance.**

Otherwise, it may cause an electric shock or a fire by a wrongful operation.



- **Perform terminal work when cutting a cable.**

Otherwise, it may cause an electric shock from the naked part of the cable.



- **Place the terminal cover on the terminal in the back after the wiring work.**

Otherwise, it may cause an electric shock.



CAUTION



- **Apply the rated power to the power source terminal.**

Otherwise, it may cause a damage to the product or a fire.



- **P+, P-, F.G terminals enclose surge protection circuit inside the ELD, so do not withstand voltage test.**



- **Prevent screws, metal parts, water, or oil from entering the product.**

It may cause a damage to the product or a fire.



- **Extract and insert Case on a leveled surface.**

Otherwise, it may cause a damage to the product.



- **Do not store the product in a humid or a dusty area.**

It may cause a damage to the product.

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1. General Features

This Earth Leakage Detector (GD6-L05A, GD6-L05R) is used protect to leakage fault of less than AC600V line.

Operation produces earth fault to ZCT Primary line flowing earth current do detection through ZCT and is digital arithmetic type earth leakage detector that is used to check fault's extension breeding alarm.

Features

- ❑ 6 Circuit Digital Total arithmetic type Earth Leakage Detector
- ❑ The Earth Leakage Detector and ZCT are convenient handling through compatibility.
- ❑ Display the measured values and leakage line (7-Segment)
- ❑ Each circuit setting : Current detect sensitivity
- ❑ Malfunction Prevented through over input protection and filter circuit
- ❑ Inspect the equipment of leakage circuit conveniently, because can be select the restore method.
- ❑ Can control for more Buzzer installation or Display through output contact.
(GD6-L05R Type only)
- ❑ Convenience of the ZCT selection by various ZCT types for equipment capacity
- ❑ Enhanced EMC / EMI performance.
- ❑ Non Drawing - out Type

2. Technical Data

2.1 Rated Voltage & Current

AC/DC 110~ 220V, 15VA

2.2 Rated Frequency

60Hz (Sine Waveform)

2.3 Output Contacts

Signal contacts (Ta, Tc)	
Continuous Flow Electricity Capacity	10A at AC 250V
Closing Capacity	1200VA
Material	Silver Alloy
Trip contacts (1a ~ 6a)	
Continuous Flow Electricity Capacity	5A at AC 250V
Closing Capacity	750VA
Material	Gold-clad Silver Alloy

Trip contacts (1a~6a) is only GD6-L05R Type

2.4 Case

Structure	Non Drawing-out Type
Color	Munsell No. N1.5 (black)
Material	ABS Resin

2.5 Ground Element

Operation Current	<ul style="list-style-type: none"> • 0.2 - 0.5 - 1A (3 level setting) • Operation to 53 ~ 75%
Operation Time	<ul style="list-style-type: none"> • Operate within 1.0 sec by 75% nominal operation current

2.6 Insulation Tests

Insulation Resistance	Over 5MΩ, 500Vdc
Commercial Frequency Withstand Voltage	2.2kV, 50/60Hz, 1min
Impulse Withstand Voltage	6kV, 1.2×50μs

2.7 Mechanical Tests

Vibration	Applying Status	10~150 Hz, 0.981 m/s ² , axis 3, 1 octave/min, axis per 1
	Non Applying Status	10~150 Hz, 4.950 m/s ² , axis 3, 1 octave/min, axis oper 20
Shock	Applying Status	500g, 15 Times
	Non Applying Status	50g(Shock acceleration), 5 times, In any direction

2.8 Temperature Tests

Temperature Range	-10 °C ~ +50 °C
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2.9 Other Operating Conditions

Altitude	1000m or less
Condition where there is no abnormal vibration, shock, slope or influence of the magnetic field.	
Place where there is no explosive dust, flammable dust, or flammable / rusty gas, or salt	

2.10 ZCT Specifications

Type	ZL02	ZL03	ZL05	ZL06	ZL08	ZL10	ZL12	ZL15	ZL20	ZL16	ZL21	ZL26
	Cable Winding Type (The Inside Type)									Bus-Bar Winding Type (The Inside Type)		
Type Approval Number	누변 01-1						누변 01-3			누변 01-2		
	누변 01-1-1			누변 01-1-2			누변 01-3-1			누변 01-2-1		
Rated primary current	80A less	100A less	250A less	400A less	600A less	800A less	1000A less	1500A less	2000A less	400A less	500A less	600A less
Bore (mm)	Φ25	Φ30	Φ50	Φ65	Φ80	Φ100	Φ120	Φ150	Φ200	160×30	210×30	250×30
Temp.	-10℃ ~ +60℃											
Rated Output	When Zero sequence primary current 200mA, Rated output voltage is 100mV (Load Resistance 1.2 kΩ)											
Insulation Resistance	Between secondary coil and case, over DC500V, 5 MΩ											
Insulation Withstand Test	Between secondary coil and case, Input AC2200V, 60Hz, during 1min											
Shock wave Withstand voltage	Between primary and case, 1.2 × 50 μs, 6kV, positive pole, negative pole each 1times											
Vibration	10~150 Hz, 10 m/s ² , axis 3, 1 octave/min, axis per 20											
Shock	50g shock, 5times Steel wire of Length 300mm, Thickness 3mm hang the 1kg pendulum. 15times drop to ZCT mounting board											
Weight(kg)	0.3	0.4	0.5	0.6	0.8	1.0	1.5	4.5	7.5	2.5	3.5	4.5
Case Material	Flame-resisting ABS resin						Epoxy resin			Flame-resisting ABS resin		

3. Functional Description

3.1 Construction

This ELD(GD6-L05A, GD6-L05R) is arithmetic type earth leakage detector, This have been manufactured for the alarm activated when setting-current over detection.

Leakage detector input current signal(see appended 2) been the digitalization of current signal through the 12 sampling after go through such as over input protection circuit, sample & hold, multiplexer, and it measured the RMS current of fundamental frequency element through the DFT(Discrete Fourier Transform), and it has no effect by harmonic and DC-offset.

3.2 Functions

Earth Dectecting Function

This element can be fire accident spread minimization through alarm on expectation situation of fire accident when earth leakage ocured on power system line of AC 600V or less.

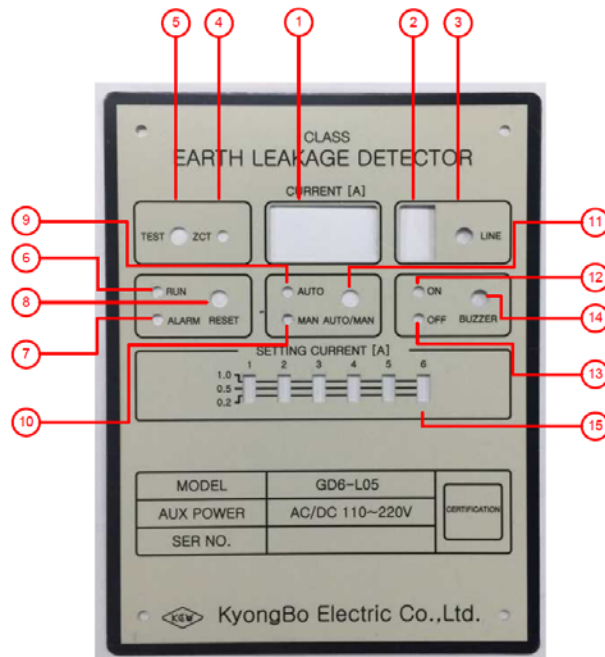
Metering Function

Displayed value display ZCT primary zero sequence current value input to ELD as a current RMS display function.

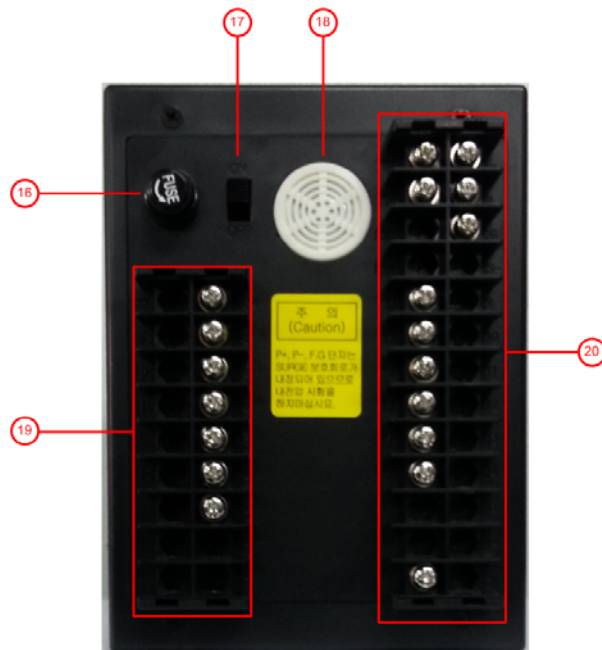
Measurement Range	<ul style="list-style-type: none">• 0 ~ 5A• Over 5A Current display 7-Segment as “HHH”
Measurement Accuracy	<ul style="list-style-type: none">• $\pm 10\%$

3.3 Product Structure

Front has the 7-segment, 7 LEDs, 5 Push button S/W and 6 of 3 level S/W, such as **【Figure 1.】** . And rear is see the **【Figure 2.】** .



【Figure 1】



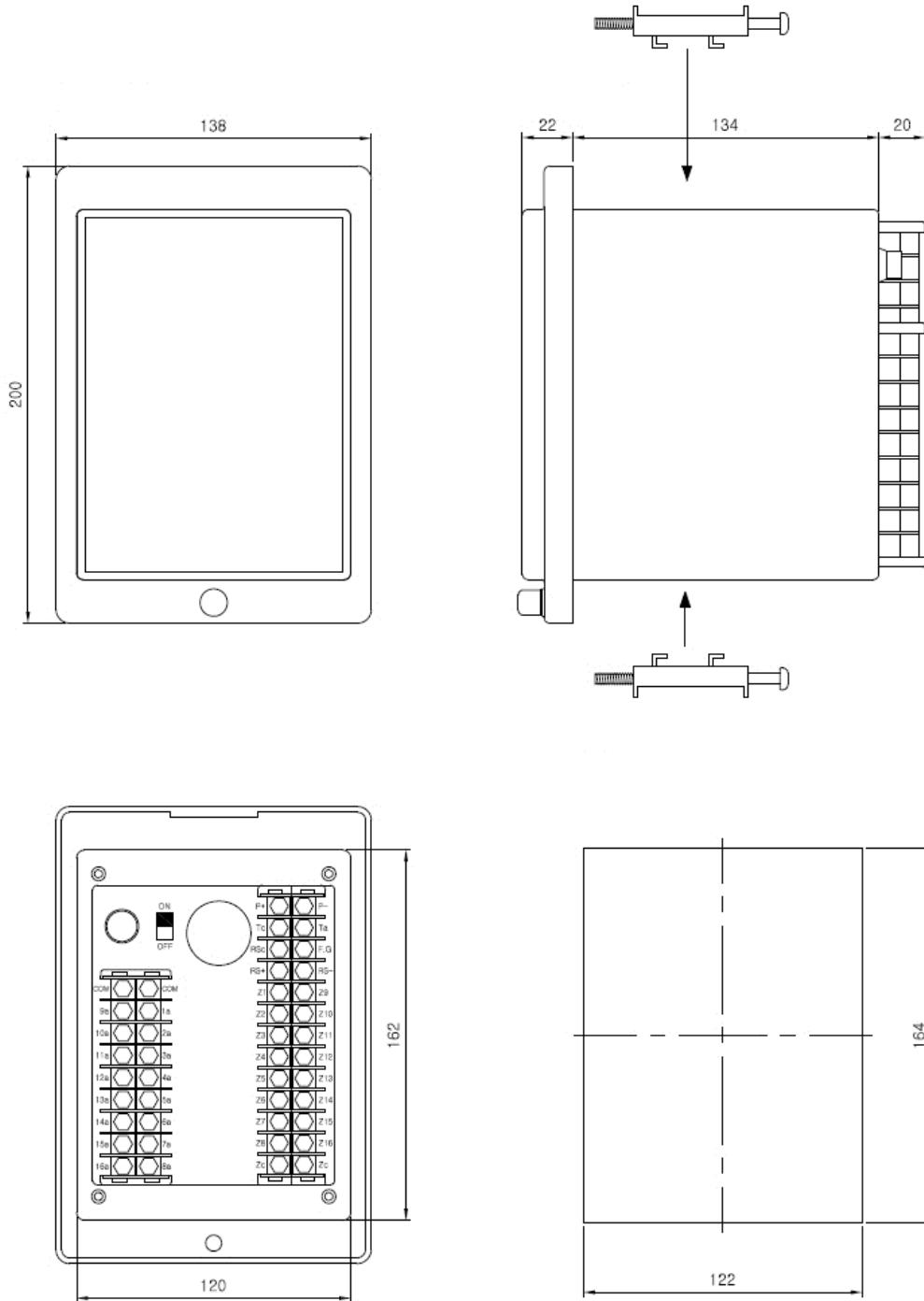
【Figure 2】

1Class Digital Earth Leakage Detector (GD6-L05A, GD6-L05R) User's Manual(V1.00)

No	Contents	Description	
1	Measurement display	ZCT primary earth leakage current RMS of each power system line is displayed on 7-segment.	
2	Circuit display	Applied power system line is displayed on 7-segment when ZCT connection test and earth leakage detector operate test. Applied power system line is displayed when Earth leakage fault occurred.	
3	Circuit selection Switch	Applied power system line selection when ZCT connection test and operation test. The circuit switch for checking the earth leakage detector operated power system line after occurring of earth leakage fault.	
4	Connection status LED	When press the test switch, turn on the LED(yellow), if connection of ZCT with earth leakage detector was correct.	
5	Test Switch	The test switch that is tested the ZCT connection status and earth leakage detector operation of each circuit.	
6	Power LED	Turn on the power LED(green) when earth leakage detector power supply voltage is supplied.	
7	Alarm LED	Turn on the alarm LED(red) when earth leakage detector operated.	
8	Reset Switch	The Auto/Manual switch set to manual, and even if the earth leakage of power system line became to recover when the earth leakage detector operated, the operation status is continuous. if you want to restore, use this switch.	
9	Auto LED	Turn on the Auto LED(green) when Auto/Manual switch be Auto.	
10	Manual LED	Turn on the Manual LED(yellow) when Auto/Manual switch be Manual.	
11	Auto/Manual Switch	Auto	If earth leakage power system line is recover, earth leakage detector operation status is recover automatically.
		Manual	Operation status is continuous even if earth leakage power system line became recovered. If want to recover, must press the reset switch.
12	Buzzer ON LED	Turn on the ON LED(green) when Buzzer ON/OFF switch be ON.	
13	Buzzer OFF LED	Turn on the OFF LED(yellow) when Buzzer ON/OFF switch be OFF.	
14	Buzzer ON/OFF Switch	Buzzer ON	Alarm sound is operate when the earth leakage fault occurred on state of Buzzer ON.
		Buzzer OFF	Alarm sound is not operate when the earth leakage fault occurred on state of Buzzer OFF.
15	Detection sensitive setting Switch	The nominal operating current of each circuit can be control until 0.2-0.5-1.0A(3 level control).	
16	Fuse Holder	Fuse for protection	
17	Power ON/OFF Switch	Use when want to power ON/OFF of the earth leakage detector.	
18	Buzzer	Buzzer for alarm	
19	External relay contacts	The external Relay a contacts(1a~6a) and COM contacts of the each circuit. (GD6-L05R only)	
20	External connection contacts	<ul style="list-style-type: none"> · P+, P- : Power supply voltage connection contacts. · Ta, Tc : Dry contacts for output. · Z1~Z6 : ZCT secondary input contacts of each circuit. · Zc : ZCT secondary circuit common contacts. · F.G : Frame Ground 	

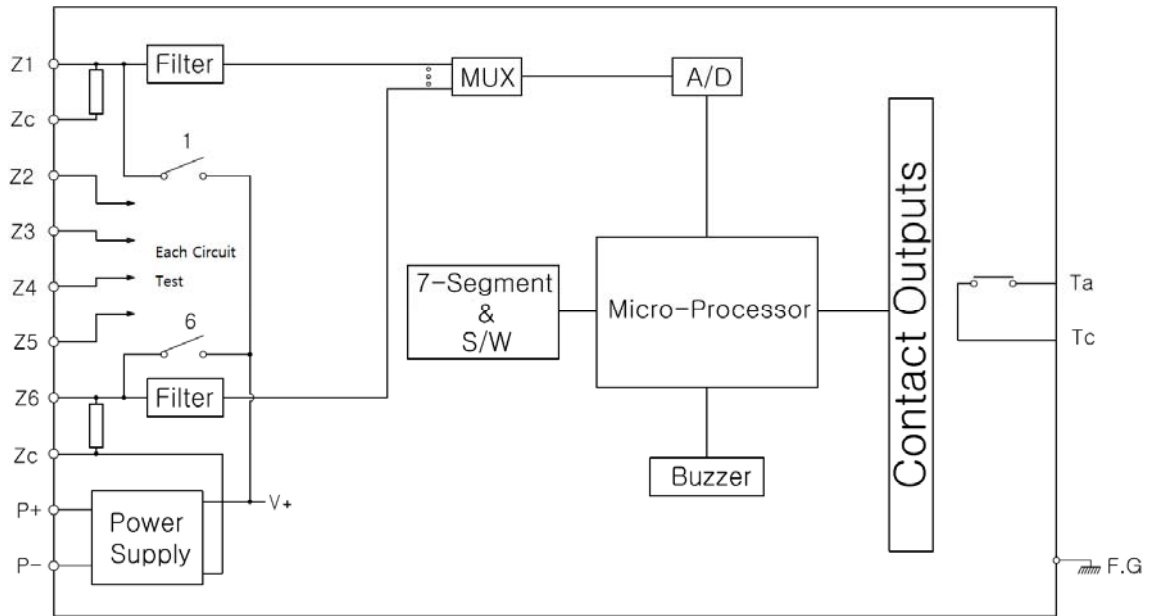
Appended 1. Dimensioned Drawings

● GD6-L05A/R

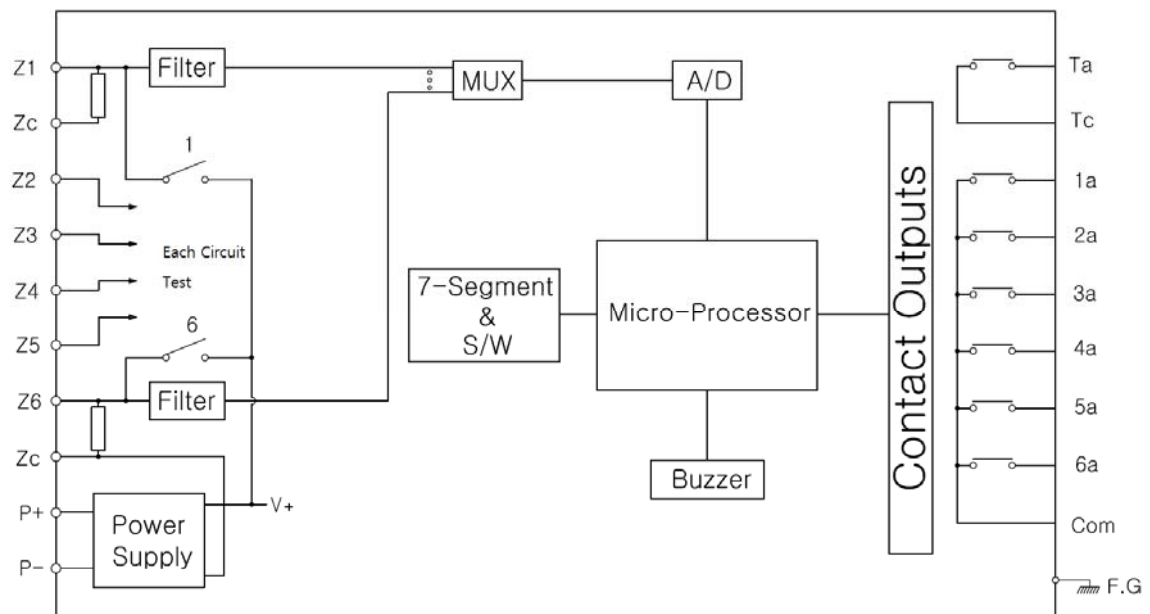


Appended 2. Internal Block Diagram

● GD6-L05A

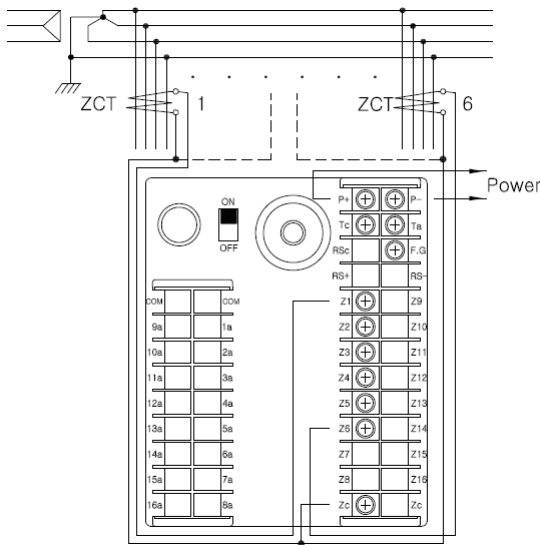


● GD6-L05R

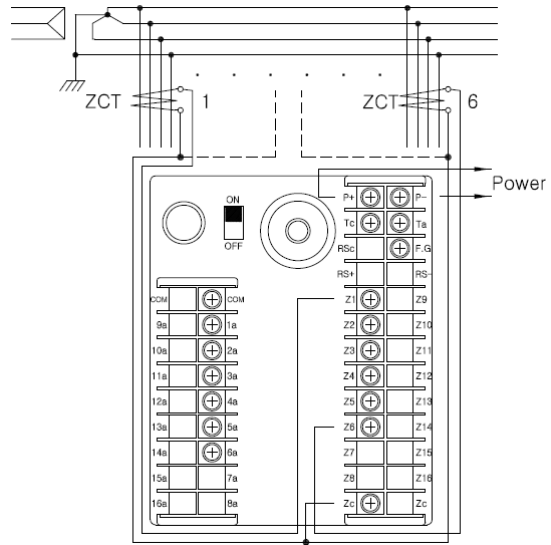


Appended 3. External Connection

● GD6-L05A



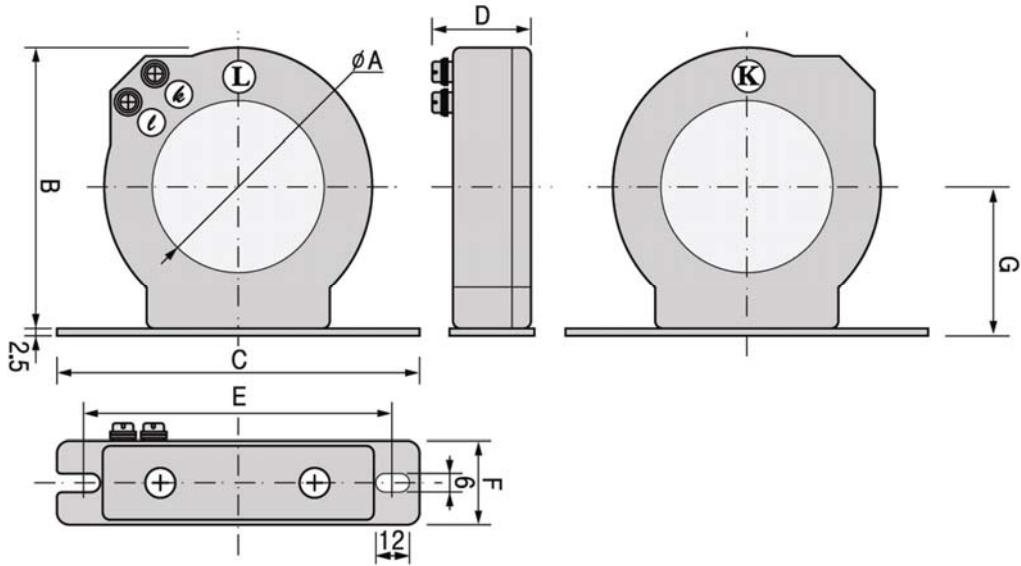
● GD6-L05R



- Caution)
1. This Connection is Example, User can set as needed
 2. Dry contacts Ta, Tc, 1a~6a can be used if necessary
But, 1a ~6a is GD6-L05R Type only
 3. If connection is 3p4w, 4wire penetrate to ZCT.
 4. Fuse capacity is 0.5[A]×1, 1[A]×1.

Appended 4. ZCT Dimensioned Drawings

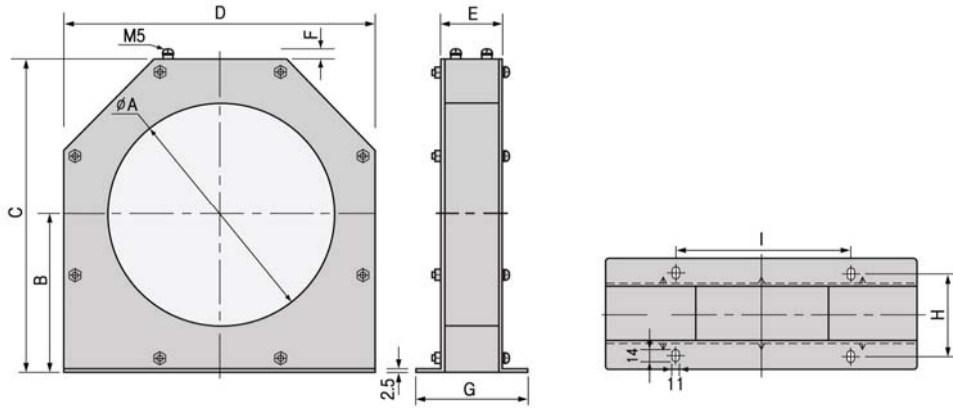
- ZCT(ZL 02, 03, 05, 06, 08, 10, 12)



unit : mm

Type \ Size	ZL02	ZL03	ZL05	ZL06	ZL08	ZL10	ZL12
A	Φ25	Φ30	Φ50	Φ65	Φ80	Φ100	Φ120
B	70	75	91	108	123	140	160
C	100		130		150	180	
D	40					50	
E	80				130	160	
F	30					40	
G	37.5	40	48	56.5	64	72.5	82.5

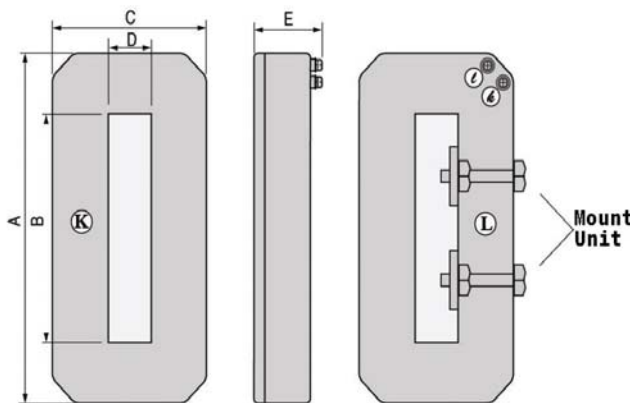
● ZCT(ZL 15, 20)



unit : mm

Size \ Type	Type	
	ZL 15	ZL 20
A	150	200
B	112	143
C	222	284
D	220	282
E	55	55
F	10	10
G	100	100
H	80	80
I	180	180

● ZCT(ZL 16, 21, 26)



unit : mm

Size \ Type	Type		
	ZL16	ZL 21	ZL 26
A	240	290	340
B	160	210	260
C	110		
D	30		
E	50		