Digital motor protection relays, CGD

General digital type motor protection relays using MCU(Micro Controller Unit)

- Real time processing and high precision

Multiple protection

Protection	CGD…-S	CGD… -SZ	CGD… -SI	CGD…-T	CGD…-TZ	CGD…-T
Wiring	Screw type			Tunnel type		
Over current	■	■	■	■	■	■
Under current	■	■	■	■	■	■
Stall	■	■	■	■	■	■
Lock	■	■	■	■	■	■
Phase failure	■	■	■	■	■	■
Revers phase	■	■	■	■	■	■
Asymmetry	■	■	■	■	■	■
Ground fault		■			■	
Short circuit			■			■

Install the Unit /Extension type in one body

The display part may be separated from the body
You can check the values and the causes of the
fault without opening the distribution panel door

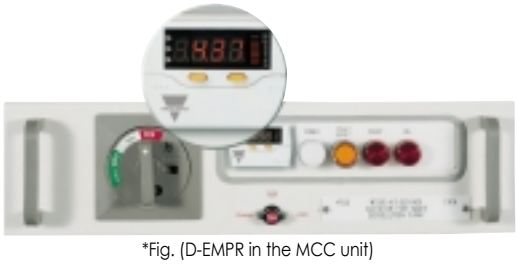


*Fig. (D-EMPR in the MCC unit)

Both screw type and tunnel type wirings are available in a CGD-E Type D-EMPR

Simply detach the screw terminal, you can use it by the tunnel type relay

IEC 60947

Standard :

IEC60947-1, IEC60947-4-1, IEC60947-5-1, UL508, KSC4504

Certification & approval :

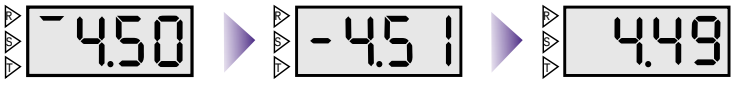
CE, UL, cUL, Lloyd register, Korea register, KS, ISO 14001,ISO 9001(Including proceedings)

Display the causes of the fault and the values

Prompt A/S by looking the LED panel which displays the causes of the fault and the values

3phase digital ampere-meter function (Digital ampere-meter)

Additional ampere-meter is not needed

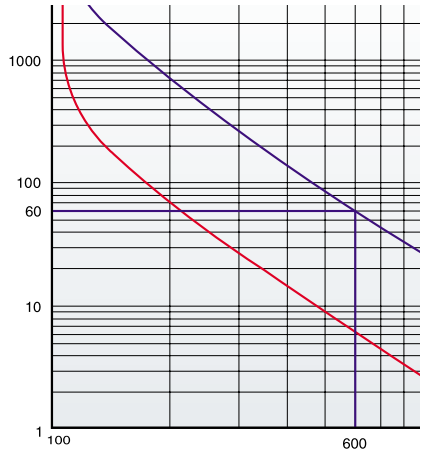


R phase current value | S phase current value | T phase current value

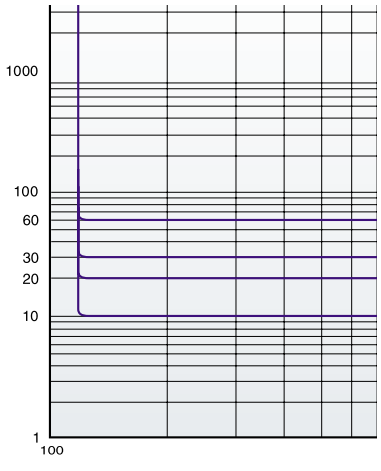
Motor load rate(%)

Easy to check the motor load condition

Selectable either the inverse time or definite time characteristics



Inverse time characteristics



Definite time characteristics

Applicable to inverter control circuit

CG DMPR has high performance under the harmonic noise and can be used in the Inverter control circuit (20~200Hz)

Elegant design

High class product image by the elegant design

Digital motor protection relays, CGD

Specifications of D-EMPR


CGD...-S


CGD...-T

Model No.			CGD06-S	CGD60-S	CGD06-T	CGD60-T
Wiring			Screw type		Tunnel type	
Panel mount			Unit or Extension Note1)			
Operation time			Select either reverse time characteristics or definite time characteristics			
Protection		Over current	According to the setting time			
		Phase failure	3 sec.			
		Reverse phase	Within 0.1 sec.			
		Asymmetry	5 sec.			
		Stall	5 sec.			
		Lock	Within 0.5 sec.			
		Under current	3 sec.			
		Ground fault	Within 0.05~1 sec. Selectable (0.05~1.0sec)			
		Short circuit Note2)	Within 50ms			
Alarm			Variable (60~110% of the setting current)			
Current setting range (A)			0.5~6	5~60	0.5~6	5~60
Motor capacity		220~240V	0.09~0.75	1.1~11	0.09~0.75	1.1~11
(kW)		380~440V	0.12~1.5	2.2~22	0.09~1.5	2.2~22
Time setting range (sec)	Definite time	Delay in starting	0~60sec			
		Delay in operating	0~30sec			
	Inverse time		0~60sec			
	Reset		Manual reset			
Tolerance		Current	±5%			
		Time	±5% (or±0.5sec)			
Operating power		Voltage	AC 190~250V			
Note3)		Frequency	60Hz (50Hz)			
Aux. contact	OL	2-SPST	3A/250Vac Resistive load			
	AL	SPST	3A/250Vac Resistive load			
Insulation resistance			Over DC500V 100㏁			
Surge impulse voltage(IEC1000-4-5)			1.2×50㎲ 6kV (Apply standard wave form)			
Fast transient burst(IEC1000-4-4)			2.5kV/5min			
Environment	Temperature	Operation	-25~70℃			
		Storage	-30~80℃			
	Humidity		30~90% RH (No freezing)			
Display		7-Segment	3 phase current, cause of a fault			
		Bar-Graph	60~110% of real load current			
Mounting type			35mm Din-rail/Panel			

Note1) In extension type, the digital EMPR is calibrated with combining the display past and main body so, please cautious not to combine the display part and main body with different part No.

Note2) Instantaneous short circuit protection is optional

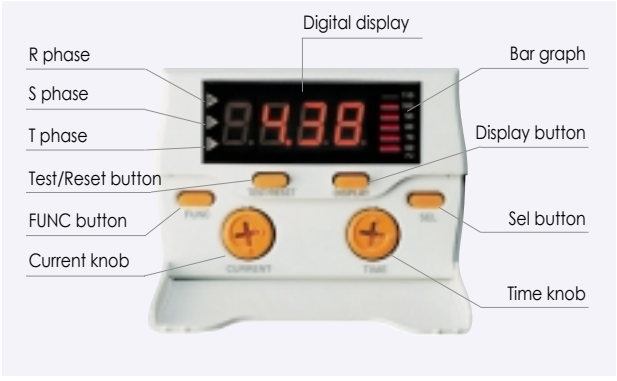
Note3) Operational voltage of AC 110V and 50Hz is optional

Before operating a motor, set the D-EMPR as follows

1. Check the operation of the Test/Reset button

- ❖ Check the operation when it is tripped
- 1) Check the wiring method (Refer to P13~14)
- 2) Press the Test/Reset button and then test is displayed on the LED and the DMPR is tripped
- 3) Press the Test/Reset button again and then it is reset

Note) In order to avoid the trip fault, the push operation of Test/Reset is not available when a motor is rotating.



2. Shift the mode by pressing the FUNC key and then select the values by press the Sel key

- ❖ You can finish the setting by pressing the Sel key in the Sto mode
- ❖ To protect the operation under the motor rotating, setting is allowed only in the test mode

FUNC	Sel	Functions	Note
1.CHA	Inu/dEF	Inverse or definite time characteristics	Default is inverse time characteristics
2.dEF	0~30	Set the O-time (Definite time only)	For D-time setting, use the time knob
3. rP	oFF/on	Reverse phases protection	Default is "Off"
4.Und	oFF/30~70(%)	Under current protection	Default is "Off" Note1)
5.ALt	oFF/60~110(%)	Alarm function (With pre-alarm function)	Default is "Off"
5.9-F	oFF/0.05~1(SEC)	Ground fault and Setting the operating time	Default is "Off" (Z type)
6.StL	oFF/on	Stall function	Default is "Off"
7.Loc	oFF/200~900(%)	Lock function	Default is "Off"
8. Ct	1~120	CT ratio	Default is 1:1 Note2)
9.P-F	on/oFF	Phase failure	Default is "On" to store
Sto	Sto	Store	Push the SEL button to store

Note1) Set the under current value from above 350mA
Note2) Do not change the CT ratio in 60 type (Default is 10:1)

1) First shift to the test mode by press the "Test/Reset" button and then set the functions by press the "FUNC" button

2) Each time you press the "FUNC" button, the function mode switches from 1.CHA mode to Sto mode.
When the mode that you want to change is displayed, push the "Sel" button to select the value you want.
After you select the value, press the "FUNC" button to finish the settings and it displays the next mode

3) If no button is pressed in the selection mode, it remains in that mode

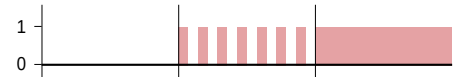
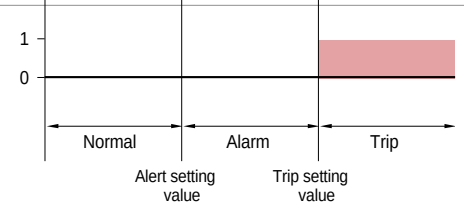
4) If you select the inverse time characteristics it skips the mode 2 (Definite O-time) and go to the mode 3 (Reverse phase)

Setting

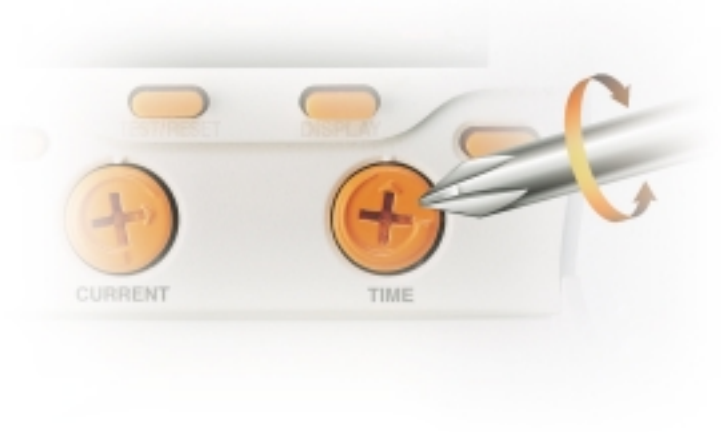
5) Alt is the alert setting mode. It displays the load rate of the current setting value by the bar LED (60~110%)
- If the current is higher than the setting value, the bar LED is switched on and off and the AL relay(07-08) make close and open in 1sec interval unit the EMPR is tripped (Pre-alarm function)
- If the 5. Alt mode is set to off, the AL relay make close after the EMPR is tripped (Normal open contact)

6) To finish the settings you have to press the "Sel"button in the Sto mode

Alarm signal (Alert function)

5.ALt	AL(07-08) contact operation
On	
Off	

3. Adjust the operating time by the time knob



▶ **Inverse time characteristics**

1) Select the inverse time in the 1. CHA mode, the default operating time is 600% of the rated current
2) The setting range of the operating time is 0~60sec. Set the time by considering the motor start time
3) When it is over the setting time, the EMPR operate in accord with the hot curve

▶ **Definite time characteristics**

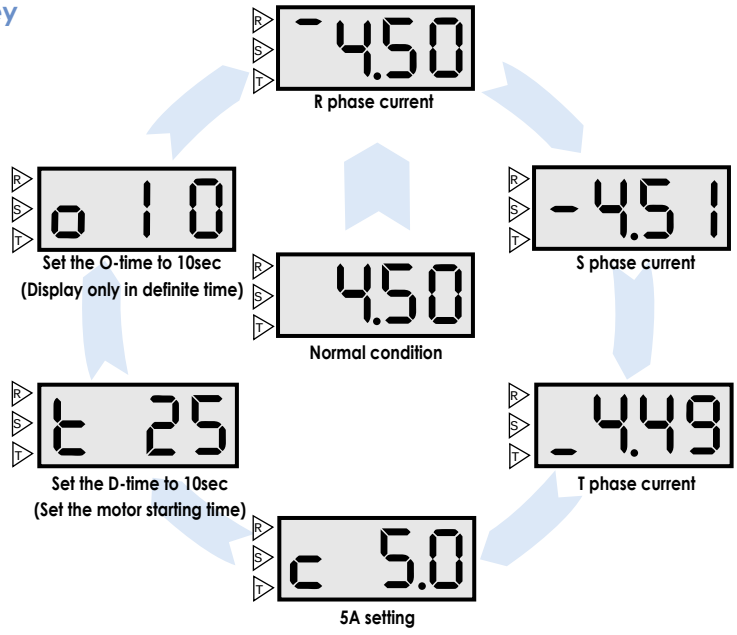
1) Select the definite in the 1. CHA mode, it is operated by the definite time characteristics
2) D-time means the time that delays the operating time when the motor is starting
3) The setting range of the operating time is 0~60sec. Set the time by considering the motor start time
4) Set the O-time at the setting mode 2. dEF and the range is 0~30sec

4. Adjust the operating current by the current knob

1) Set the operating current based on the rated current that is described in the name plate. Generally set the 110~115% of the real load current in the normal load condition
2) There are 2 CT types according to the current range (0.6 / 60). When you use the external CT you can see the real current by set the CT ratio (In 60CT type the default CT ration is 10:1)
3) You can easily set the current value by refer to the load rate which is displayed on the bar-graph (Approx. 90% load rate)

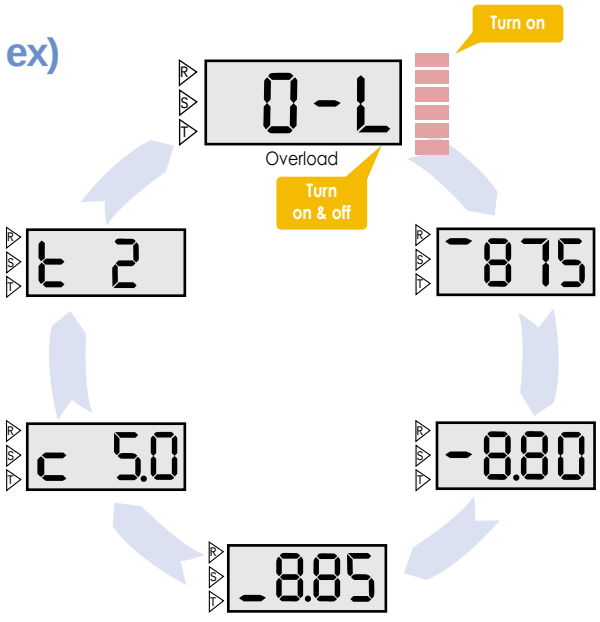
5. Check the setting state by the display key

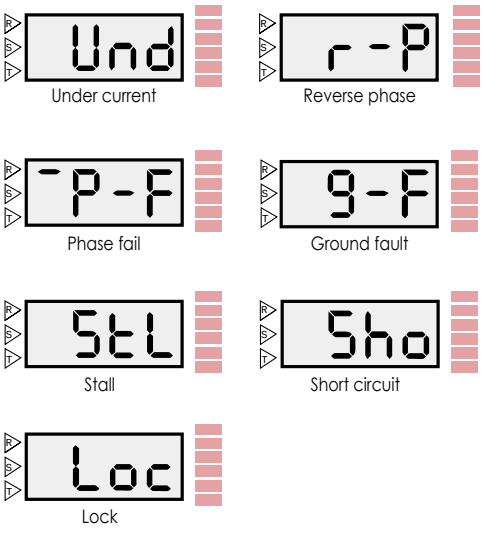
1) In normal condition it display the maximum current among the three phase current
2) Each time you press the "Display" button you can see the current and values as PIG X
3) If no button is pressed for 3~4 seconds. It returned to the normal condition



6. Check the causes of the fault by look at the display unit (7-segment)

❖ The causes of the fault is switched on and off for 0.5sec interval. If you press the "Display" button at this time, display you can see the values and the causes of the fault





Digital motor protection relays, CGD

CGD-S/T

Over-current/Under current/Phase failure/Asymmetry Stall/Lock/Instantaneous short circuit protection

- Unit type or extension type is available
- Extension type : Remotely mounts the display unit on the panel surface
- 3 phase ampere meter function : Check the 3 phase current and setting value by press the display button
- Select the inverse time or definite time
- Easy to operate : Set the most function by the operation button and knob
- Display the causes of the fault and the values
- Alarm setting : Load ratio is displayed up to setting current

Protect function

Over current	Depend on setting time	Selectable the inverse/definite
Phase loss	Within 3seconds	Over 70% of the rate of unbalance
Phase unbalance	Within 5seconds	Over 50% of the rate of unbalance
Phase reverse	Within 0.1seconds	Function enable
Stall	Within 5seconds	Over 180% of the setting current
Lock	Within 0.5seconds	Setting 200~900% of rated current
Under current	Within 3seconds	Setting 30~70% of rated current

Note) Lock protection is operated after setting D-time in case of definite time type

Function selection

FUNC	Sel	Description
1. CHA	Inv/dEF	Operating characteristics setting(Inverse/definite time type)
2. dEF	0~30(S)	Setting the operating time(In definite type)
3. r.P	oFF/on	Phase reverse enable
4. Und	oFF/30~70(%)	Under current enable and setting
5. Alt	oFF/60~110(%)	Alerting enable and setting
6. Stl	oFF/on	Stall enable
7. Loc	oFF/200~900(%)	Lock enable and setting
8. Ct	1~120	CT ratio setting
9. P.F	on/oFF	Phase fault enable
Sto	Sto	Store

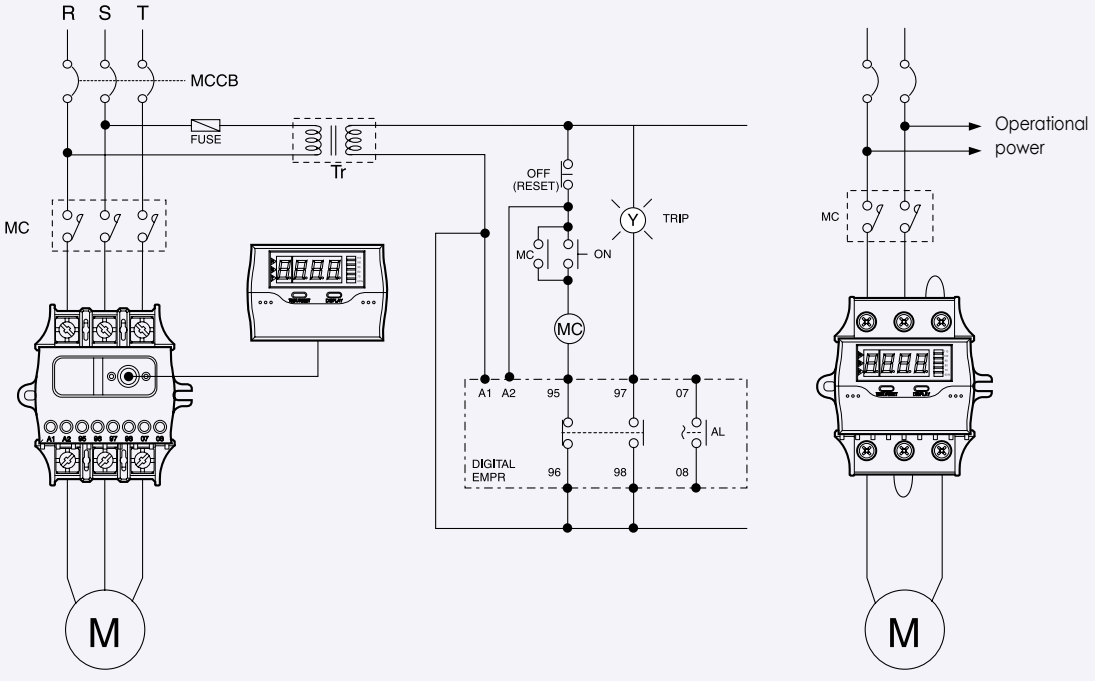
Note) 2.dEF is only displayed when dEF is selected in a 1.CHA mode

Ratings

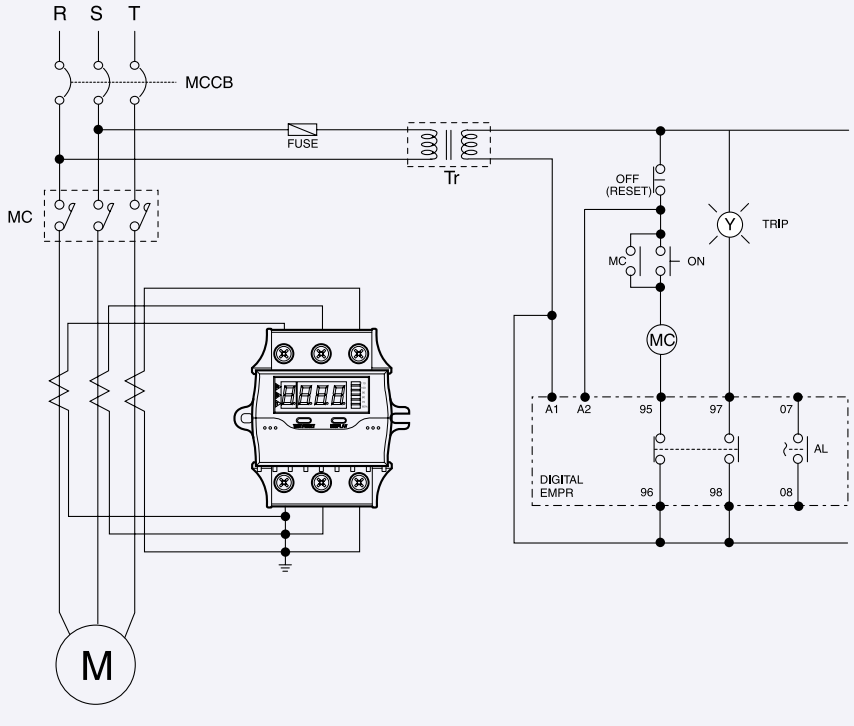
Model			CGD...-S	CGD...-T
Type	**Wiring method**		Screw	Tunnel
	Panel mount		Unit or Extension	
Operating characteristics			Inverse/definite type	
Alerting function			Variable between 60 and 110%	
Current	**CGD06-□**		0.5~6	
range(A)	**CGD60-□**		5~60	
Setting time	**Definite**	**Delay(D-T)**	0~60seconds	
		Operating(O-T)	0~30seconds	
	Inverse		0~60seconds	
	Reset type		Manual reset	
Operating	**Voltage**		AC 190~250V	
voltage	**Frequency**		60Hz (50Hz)	
Aux. contacts	**OL**	**2-SPST(95~98)**	3A/250Vac resistive load	
	AL	**SPST(07-08)**	3A/250Vac resistive load	
Indicate	**7-segment**		3-phase current value, fault cause	
	Bar-LED arrays		Load ratio (60~110%)	
Mounting			35mm Din-rail/Panel	

Wiring method

1 Phase motor Note1)



External CT combination



Note1) Please turn off the reverse phase function when it is used for 1 phase motor

Digital motor protection relays, CGD

CGD-SZ/TZ

Over-current/Under current/Phase failure/Asymmetry Stall/Lock/Ground-fault

- Unit type or extension type is available
  - Extension type:Remotely mounts the display unit on the panel surface
- 3 phase ampere meter function:Check the 3 phase current and setting value by press the display button
- Select the inverse time or definite time
- Easy to operate:Set the most function by the operation button and knob
- Display the causes of the fault and the values
- Ground fault protect function is added

Protect function

Over current	Depend on setting time	Selectable the inverse/definite
Phase loss	Within 3seconds	Over 70% of the rate of unbalance
Phase unbalance	Within 5seconds	Over 50% of the rate of unbalance
Phase reverse	Within 0.1seconds	Function enable
Stall	Within 5seconds	Over 180% of the setting current
Lock	Within 0.5seconds	Setting 200~900% of rated current
Under current	Within 3seconds	Setting 30~70% of rated current
Ground fault (Note1)	Selectable 0.05~1.0seconds	Grounded current setting by dip s/w (100~2500mA)

Note) Lock protection is operated after setting D-time in case of definite time type

Function selection

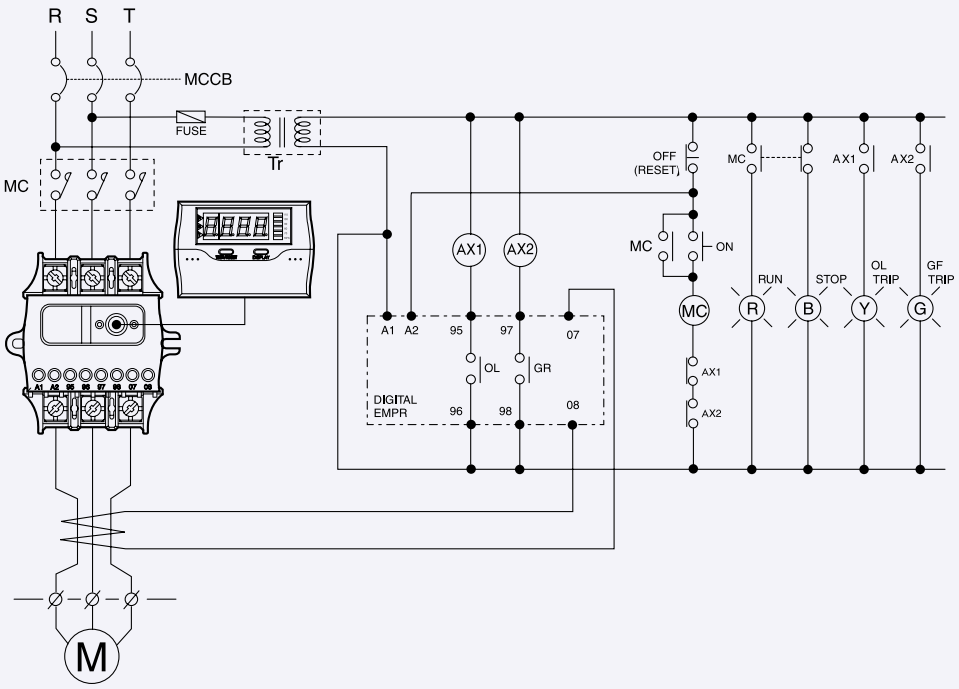
FUNC	Sel	Description
1. CHA	Inv/dEF	Operating characteristics setting(Inverse/definite time type)
2. dEF	0~30(S)	Setting the operating time(In definite type)
3. r.P	oFF/on	Phase reverse enable
4. Und	oFF/30~70(%)	Under current enable and setting
5. g-F	oFF/0.05~1.0(S)	Ground fault enable and setting
6. Stl	oFF/on	Stall enable
7. Loc	oFF/200~900(%)	Lock enable and setting
8. Ct	1~120	CT ratio setting
9. P.F	on/oFF	Phase fault enable
Sto	Sto	Store

Note1) 2.dEF is only displayed when dEF is selected in a .CHA mode ※ 2.dEF Refer to page 10
Note2) Ground fault sensitive current selection : Refer to page 114

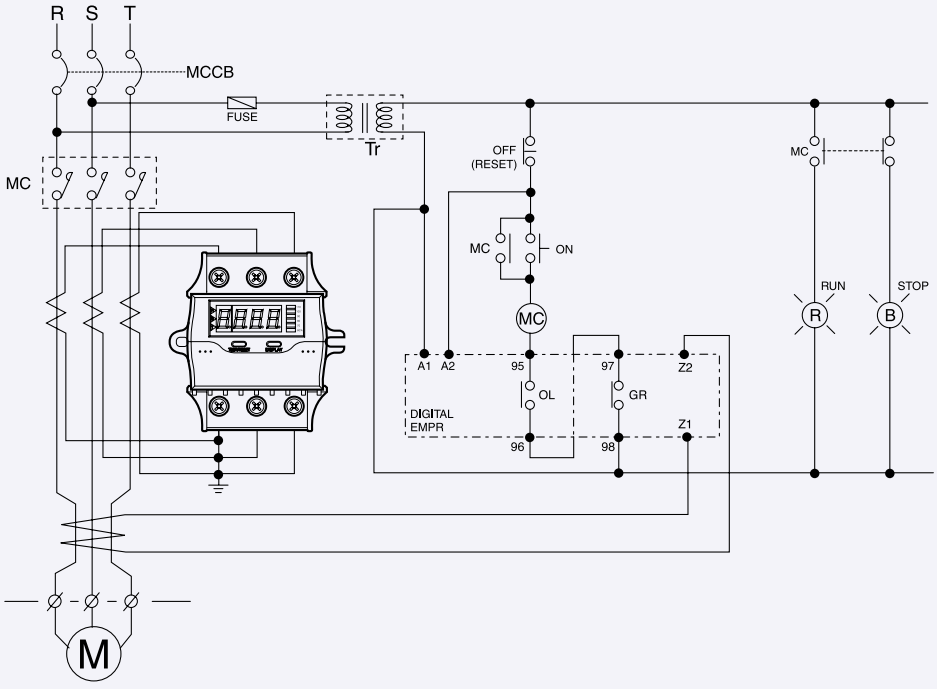
Ratings

Model			CGD…-SZ	CGD…-TZ
Type	**Wiring method**		Screw	Tunnel
	Panel mount		Unit or Extension	
Operating characteristics			Inverse/definite type	
Alerting function			Variable between 60 and 110%	
Current	**CGD06-…**		0.5~6	
range(A)	**CGD60-…**		5~60	
Setting time	**Definite**	**Delay(D-T)**	0~60seconds	
		Operating(O-T)	0~30seconds	
	Inverse		0~60seconds	
	Reset type		Manual reset	
Operating	**voltage**		AC 190~250V	
voltage	**Frequency**		60Hz (50Hz)	
	ZCT input (07-08)		200mA/110mV(ZCT) (30 ϕ, 50 ϕ, 65 ϕ, 80 ϕ)	
Aux. contacts(2a, 2b, 1a1b)	**OL, GR**	**2-SPST(95~98)**	3A/250Vac resistive load	
Indicate	**7-segment**		3-phase current value, fault cause	
	Bar-LED arrays		Load ratio (60~110%)	
Mounting			35mm Din-rail/Panel	

Wiring method



External CT combination



Digital motor protection relays, CGD

Ordering

CGD 06-SZ 220

CGD – 06 S Z 220

Current setting range	
06	0.5~6A
60	5~60A

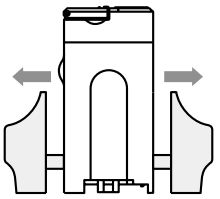
Wiring method	
S	Screw
T	Tunnel

Option	
-	Standard
Z	Ground fault

Operational power	
220	AC220V
110	AC110V

∗The standard length of a extension cable is 1.5m, 2m, 4m cable is optional
∗For ground fault protection, ZCT (30ϕ,50ϕ,65ϕ,80ϕ)made by CG is optionally required

1) Detach the screw terminal



Remove the 3 screws either in the line side or the load side and pull out the bus bar.
If you remove the screw terminal,
you can use it as a tunnel type digital EMPR,
assemble it to the opposite sequence

2) Select the ground faultsensitive current

Sensitive current (mA)	Dip s/w			
	1	2	3	4
100	○	○	○	○
200	1	○	○	○
500	○	1	○	○
1000	○	○	1	○
1500	○	○	○	1
2000	○	○	1	1
2500	1	1	1	1

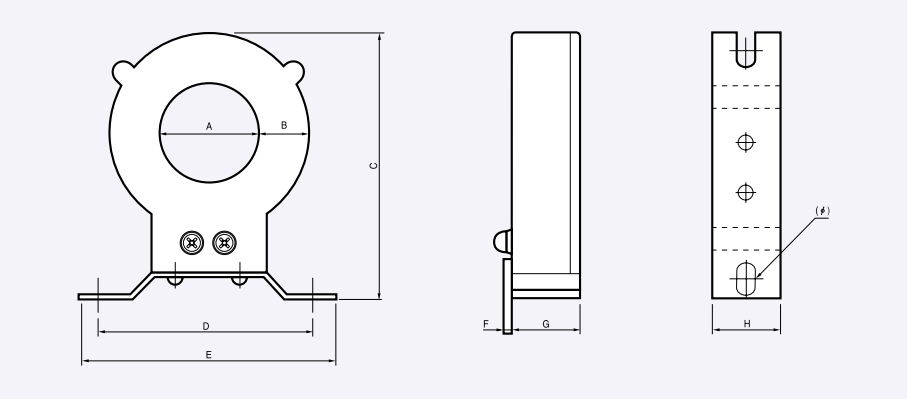
Note) High sensitive current(30~300mA)is optional

ZCT(Zero-phase Sequence Current Transformer)

Ratings

Type	Diameter(A)	Ratio	Weight(kg)	Model
CGD-ZCT30	30	200mA/100mV	0.5	LZT-030
CGD-ZCT50	50		0.7	LZT-050
CGD-ZCT65	65		0.9	LZT-065
CGD-ZCT80	80		1.5	LZT-080

Dimension



Unit : m/m

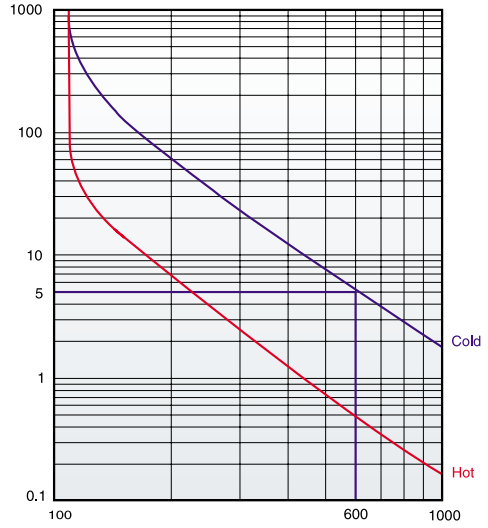
Model	A	B	C	D	E	F	G	H	ϕ
LZT-030	30	25	108	100	114	7	32	32	6
LZT-050	50	25	131	100	122	7	32	36	6
LZT-065	65	26	143	114	133	7	39	37	6

Technical informations

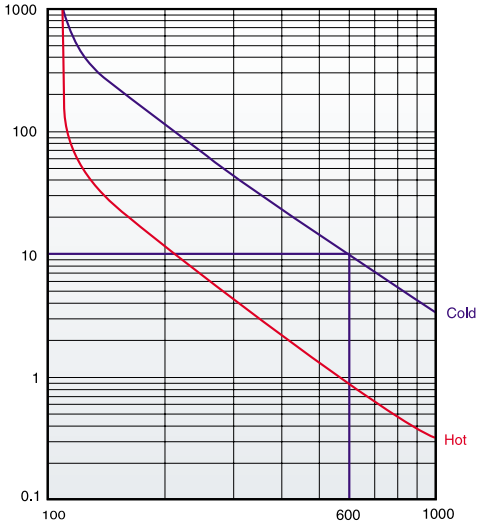
Trip curves for Digital motor protection relays

CGD

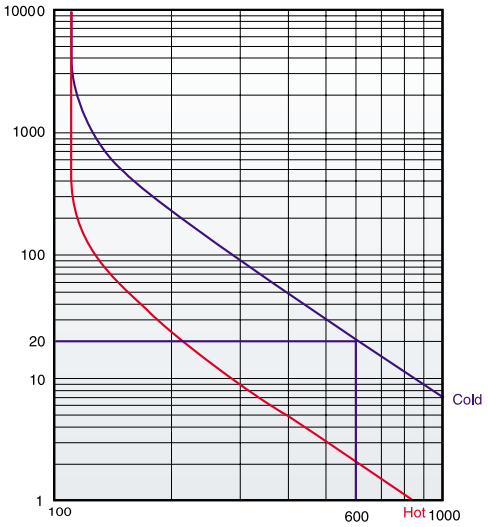
Trip class 5



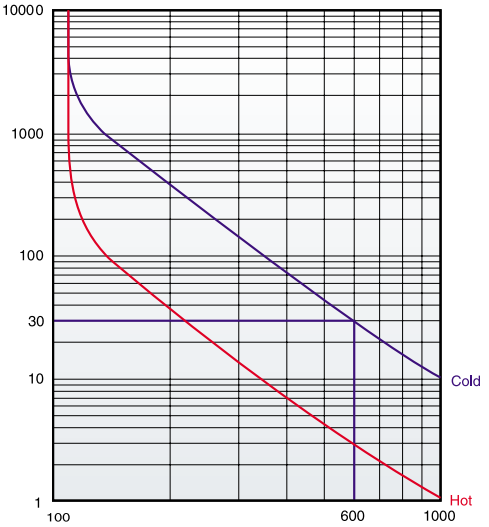
Trip class 10



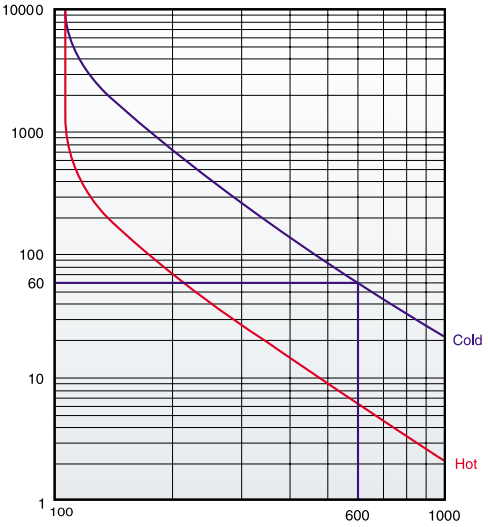
Trip class 20



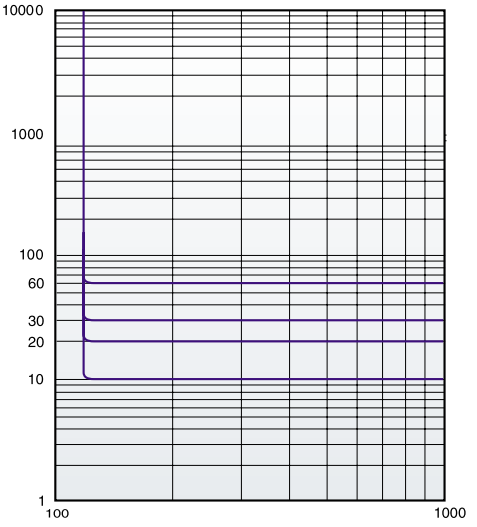
Trip class 30



Trip class 60



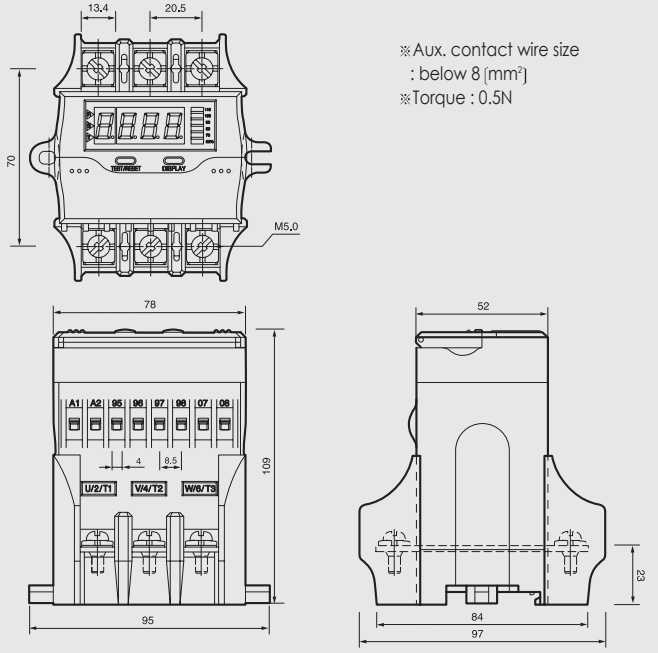
Definite time characteristics



Dimensions

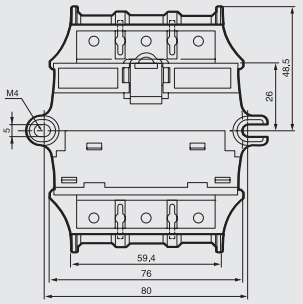
Digital motor protection relay

CGD...-S
CGD...-SZ



※Aux. contact wire size
: below 8 (mm²)
※Torque : 0.5N

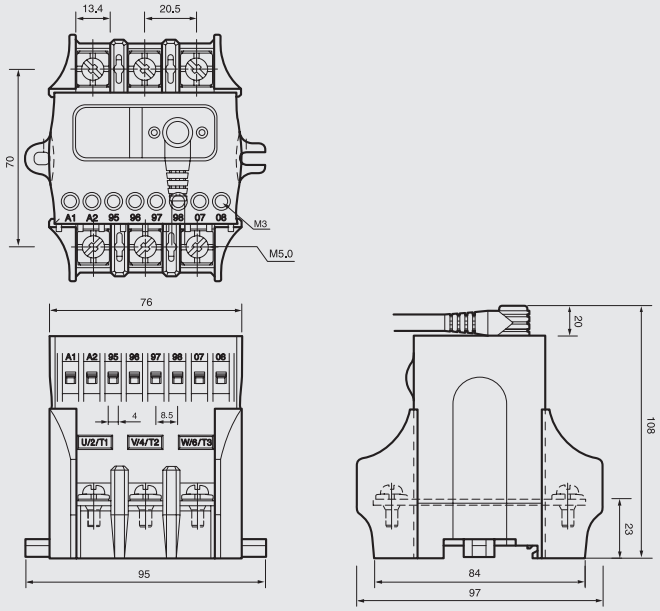
Mounting dimensions



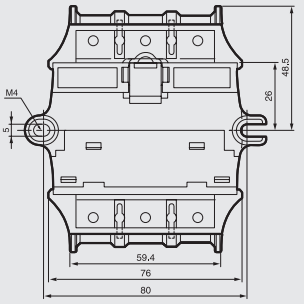
R/1/L1	S/3/L2	T/5/L3
A1 A2 95 96 97 98 07 08		
U/2/T1	V/4/T2	W/6/T3

0.7kg

CGD...-S
CGD...-SZ



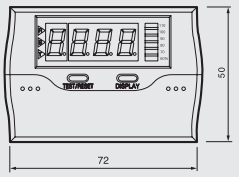
Mounting dimensions

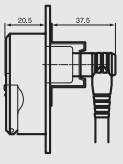


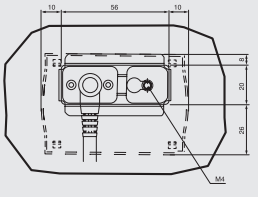
R/1/L1	S/3/L2	T/5/L3
A1 A2 95 96 97 98 07 08		
U/2/T1	V/4/T2	W/6/T3

0.64kg

Panel mounting

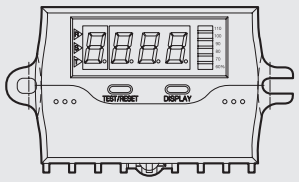




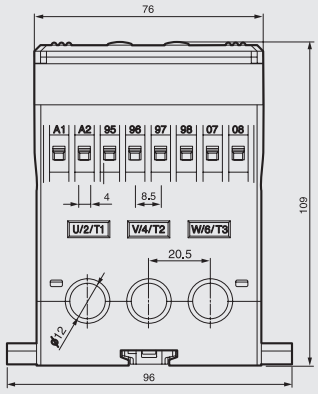


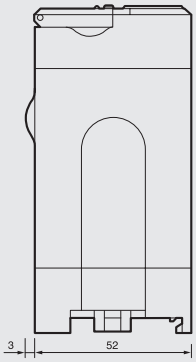
Panel cutting size

CGD...-T
CGD...-TZ



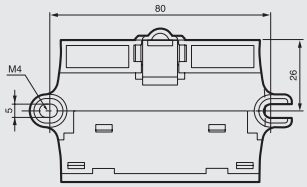
※ Wire size to penetrate a CT
:below 22 (mm²)

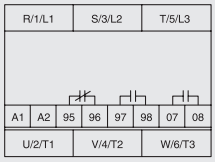




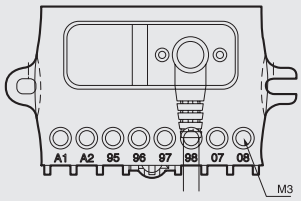
0.56kg

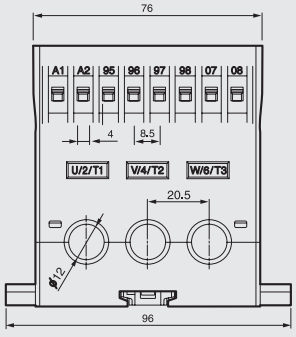
Mounting dimensions

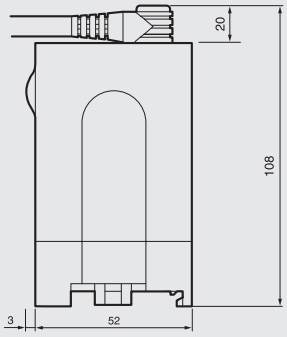




CGD...-T
CGD...-TZ

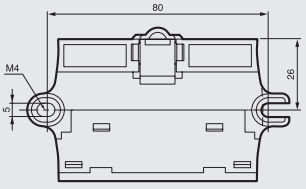


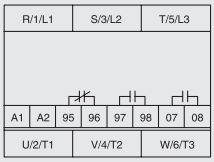




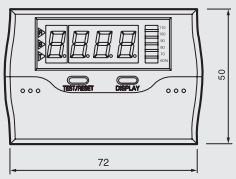
0.5kg

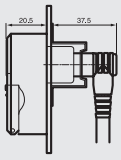
Mounting dimensions

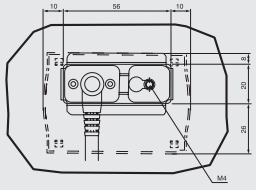




Panel mounting







Panel cutting size

Note) 1. In extension type, the digital EMPR is calibrated with combining the display unit and mainbody so, please cautious not to combine the display unit and mainbody with different part No.
2. The 07-08 contacts are the ZCT input terminal (Digital EMPR with ground fault function)