

META **MEC**

Digital Motor Protection Relay



Meta-MEC Series

DIGITAL EMPR

Digital Motor Protection Relay

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

-Real time processing and high precision

- **Multiple protection**

Protection	DMP□-S	DMP□-SZ	DMP□-SI	DMP□-T	DMP□-TZ	DMP□-T
Wiring	Screw type			Tunnel type		
Over current	■	■	■	■	■	■
Under current	■	■	■	■	■	■
Stsll	■	■	■	■	■	■
Lock	■	■	■	■	■	■
Phase failure	■	■	■	■	■	■
Revers phase	■	■	■	■	■	■
Asymmetry	■	■	■	■	■	■
Grount fault		■			■	
Short circuit			■			■

- **Install the Unit /Extension type in one body**

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



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

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

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



- **Standard:** IEC60947-1, IEC60947-4-1, IEC60947-5-1, UL508, KSC4504

- **Certification & approval:** CE, UL, cUL, Lloyd register, Korea legister, 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

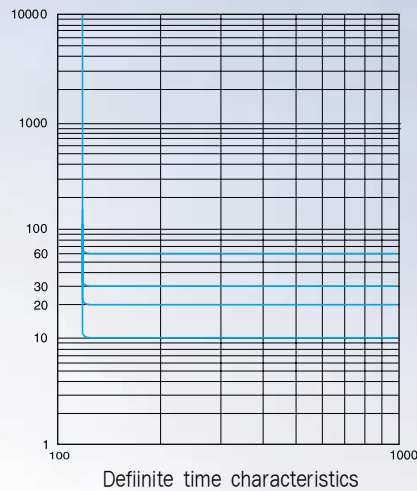
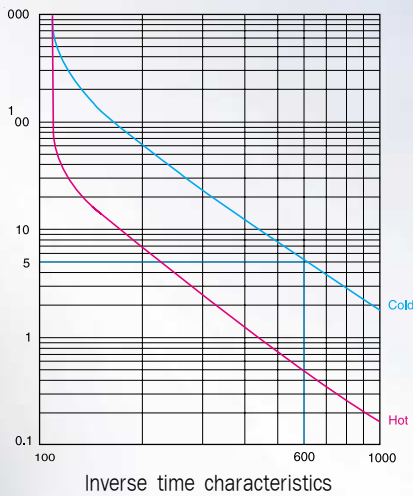


- **Motor load rate(%)**

Easy to check the motor load condition



- **Selectable either the inverse time or definite time characteristics**



- **Applicable to inverter control circuit**

LG 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





Specifications of D-EMPR

Digital EMPR



DMP□-S



DMP□-T



Model No.	DMP06-S		DMP60-S		DMP06-T		DMP60-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 (kW)	220~240V	0.09~0.75	1.1~11	0.09~0.75	1.1~11	380~440V	0.12~1.5	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 ^(Note3)	Voltage	AC 190~250V						
	Frequency	60Hz (50Hz)						
Aux. contact	OL	2-SPST	3A/250Vac Resistive load					
	AL	SPST	3A/250Vac Resistive load					
Insulation resistance	Over DC 500V 100MΩ							
Surge impulse voltage(IEC1000-4-5)	1.2×50μs 6kV (Apply standard wave form)							
Fast transient burst(IEC1000-4-4)	2.5kV/5min							
Environment	Temperature	Operation	-25~70°C					
		Storage	-30~80°C					
	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 part and mainbody 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



Setting

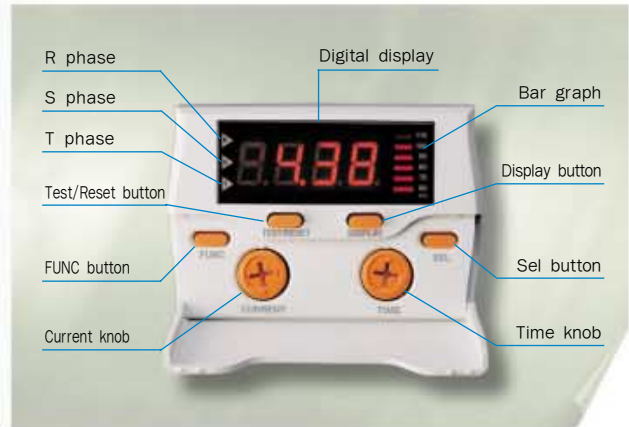
Digital EMPR

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	1 nu/dEF	Inverse or definite time characteristics	Default is inverse time characteristics
2. dEF	0~30	Set the 0-time (Definite time only)	For D-time setting, use the time knob
3. r.P	oFF/on	Reverse phasse protection	Default is "Off"
4. U nd	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 (Dafault 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 0-time) and go to the mode 3 (Reverse phase)



Setting

Digital EMPR

- 5) 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 swieched on and off and the AL relay(07-08) make close and open in 1sec interval until 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

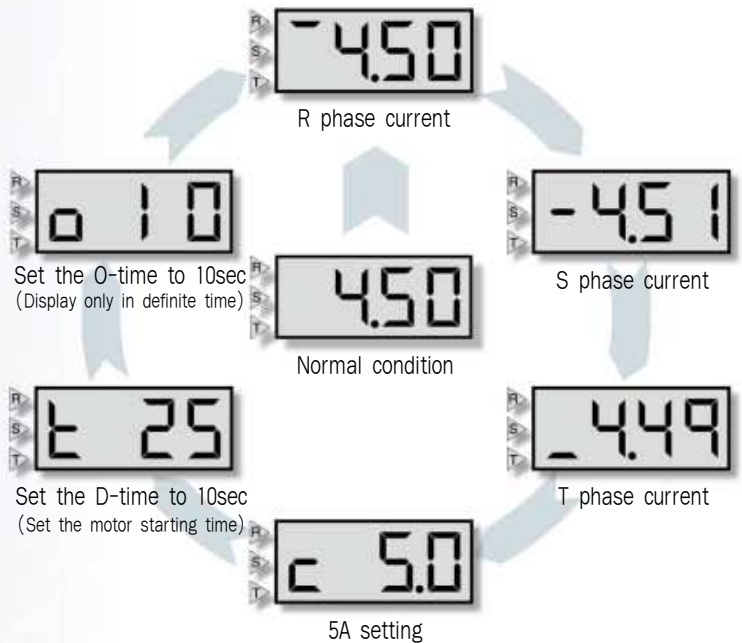
- 1) Select the definite in the 1. CHA mode, it is operated by the definite time characteristics
- 2) D-time means the time that delays the operating time when the motor is starting
- 3) The setting range of the operating time is 0~60sec. Set the time by considering the motor start time
- 4) Set the 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 discribed in the name plate.
Genneraly set the 110~115% of the real load current in the normal load condition
- 2) There ara 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)

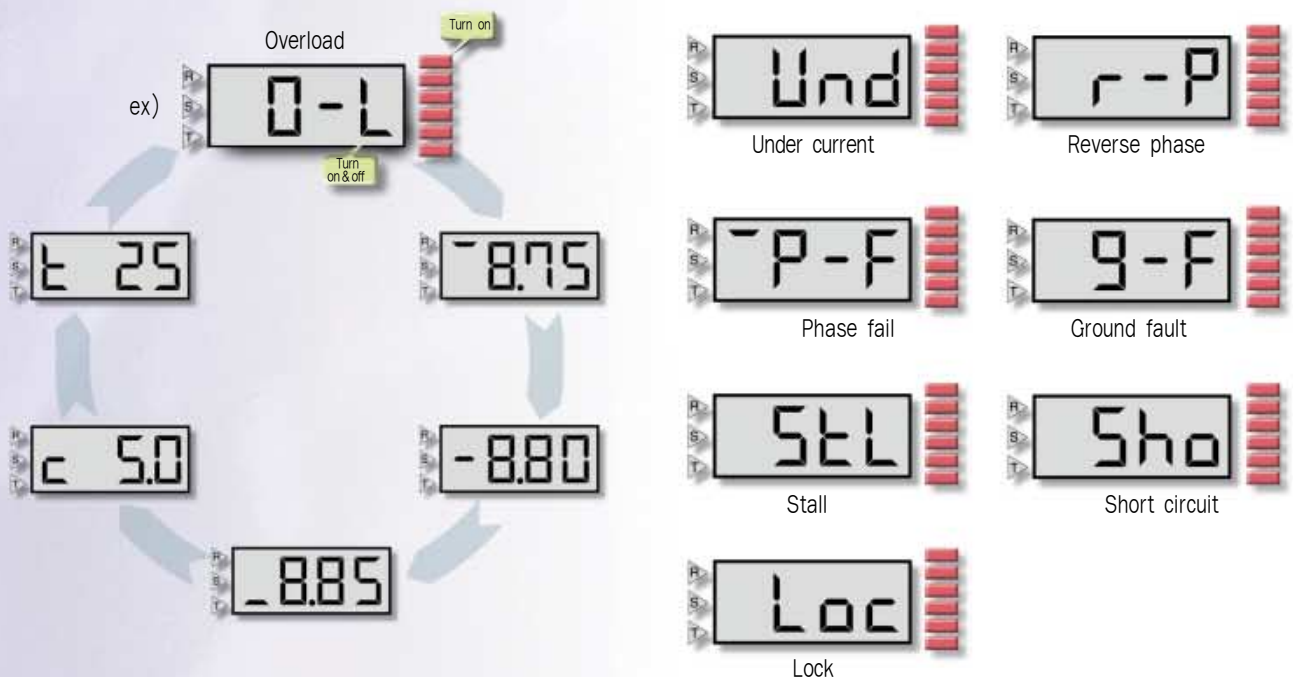
5. Check the setting state by the display key

- 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





Dimensions

Digital EMR

Type	Dimensions	Mounting dimensions															
<p>DMP□-S DMP□-SZ</p>	<p style="text-align: right;">0.7kg</p> <p>※ Aux. contact wire size : below 8 [mm²] ※ Torque : 0.5N</p>	<table border="1" data-bbox="1074 824 1305 992"> <tr> <td>R/1/L1</td> <td>S/3/L2</td> <td>T/5/L3</td> </tr> <tr> <td>A1</td> <td>A2</td> <td>95</td> </tr> <tr> <td>96</td> <td>97</td> <td>98</td> </tr> <tr> <td>07</td> <td>08</td> <td></td> </tr> <tr> <td>U/2/T1</td> <td>V/4/T2</td> <td>W/6/T3</td> </tr> </table>	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
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															
<p>DMP□-S DMP□-SZ & Extension cable</p>	<p style="text-align: right;">0.64kg</p>	<table border="1" data-bbox="1074 1529 1305 1697"> <tr> <td>R/1/L1</td> <td>S/3/L2</td> <td>T/5/L3</td> </tr> <tr> <td>A1</td> <td>A2</td> <td>95</td> </tr> <tr> <td>96</td> <td>97</td> <td>98</td> </tr> <tr> <td>07</td> <td>08</td> <td></td> </tr> <tr> <td>U/2/T1</td> <td>V/4/T2</td> <td>W/6/T3</td> </tr> </table>	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
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															
	<p>Panel mounting</p>	<p style="text-align: center;">Panel cutting size</p>															

Type	Dimensions	Mounting dimensions																		
DMP□-T DMP□-TZ	<p style="text-align: right;">0.56kg</p> <p>※ Wire size to penetrate a CT : below 22[mm²]</p>	<table border="1" data-bbox="1062 819 1294 987"> <tr> <td>R/1/L1</td> <td>S/3/L2</td> <td>T/5/L3</td> </tr> <tr> <td colspan="3" style="text-align: center;"> </td> </tr> <tr> <td>A1</td> <td>A2</td> <td>95</td> </tr> <tr> <td>96</td> <td>97</td> <td>98</td> </tr> <tr> <td>07</td> <td>08</td> <td></td> </tr> <tr> <td>U/2/T1</td> <td>V/4/T2</td> <td>W/6/T3</td> </tr> </table>	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
	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																		
DMP□-T DMP□-TZ & Extension cable	<p style="text-align: right;">0.5kg</p>	<table border="1" data-bbox="1062 1469 1294 1637"> <tr> <td>R/1/L1</td> <td>S/3/L2</td> <td>T/5/L3</td> </tr> <tr> <td colspan="3" style="text-align: center;"> </td> </tr> <tr> <td>A1</td> <td>A2</td> <td>95</td> </tr> <tr> <td>96</td> <td>97</td> <td>98</td> </tr> <tr> <td>07</td> <td>08</td> <td></td> </tr> <tr> <td>U/2/T1</td> <td>V/4/T2</td> <td>W/6/T3</td> </tr> </table>	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
	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																		
<p>Panel mounting</p>		<p style="text-align: center;">Panel cutting size</p>																		

Note1) In extension type, the digital EMPT is calibrated with combining the display unit and mainbody so, please cautious not to combine the display unit and mainbody with different part No.
 Note2) The 07-08 contacts are the ZCT input terminal (Digital EMPT with ground fault function)



DMP-S/T

Digital EMPR

DMP-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

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

Function selection

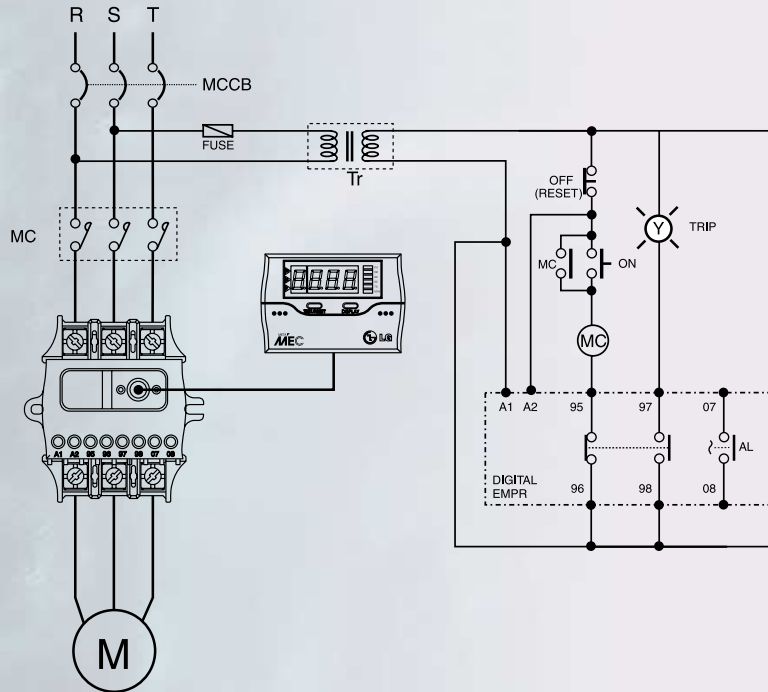
FUNC	Sel	Description
1. CHA	Inv/dEF	Operating characteristics setting(Inverse/definite time type)
2. dEF	0~30(S)	Setting the operating time(In definite type)
3. r.P	oFF/on	Phase reverse enable
4. Und	oFF/30~70(%)	Under current enable and setting
5. Alt	oFF/60~110(%)	Alerting enable and setting
6. Stl	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

☞ [2.dEF] is only displayed when [dEF] is selected in a [1.CHA] mode

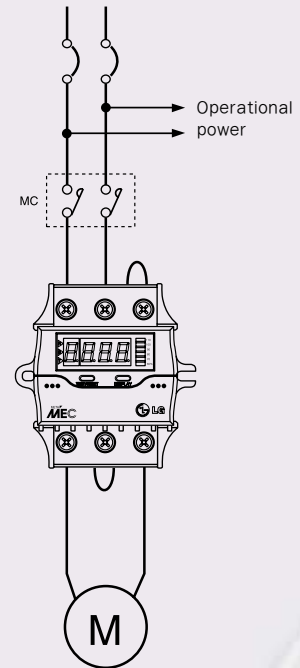
Ratings

Model		DMP□-S	DMP□-T
Type	Wiring method	Screw	Tunnel
	Panel mount	Unit or Extension	
Operating characteristics		Inverse/definite type	
Alerting function		Variable between 60 and 110%	
Current range(A)	DMP06-□	0.5~6	
	DMP60-□	5~60	
Setting time	Definite Delay(D-T)	0~60seconds	
	Operating(O-T)	0~30seconds	
	Inverse	0~60seconds	
	Reset type	Manual reset	
Operating voltage	Voltage	AC 190~250V	
	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 arrys	Load ratio (60~110%)	
Mounting		35mm Din-rail/Panel	

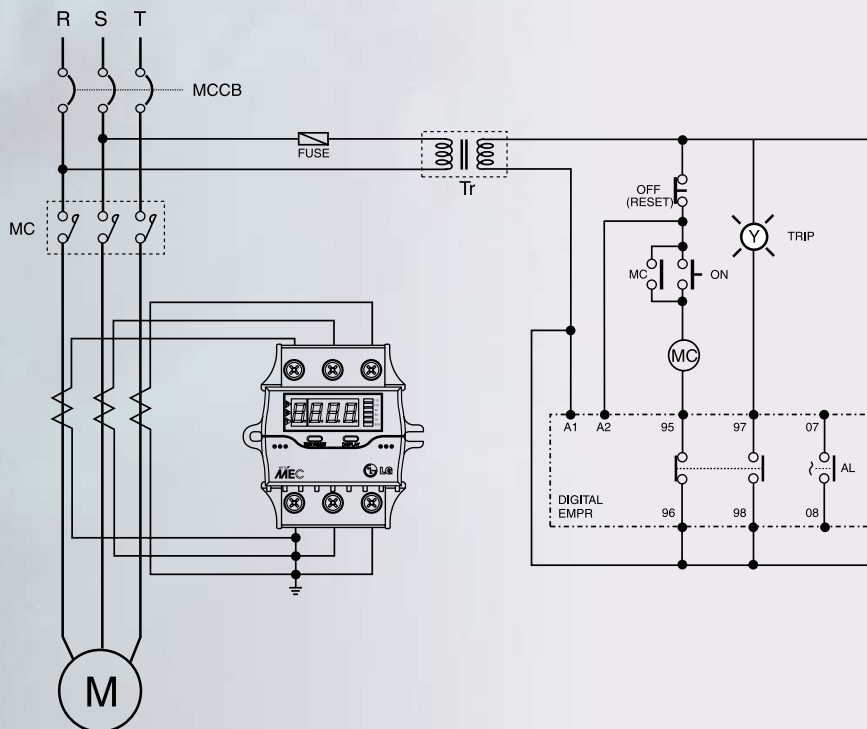
Wiring method



1 Phase motor Note1)



External CT combination



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



DMP-SZ/TZ

Digital EMPR

DMP-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)

☞ 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

☞ [2.dEF] is only displayed when [dEF] is selected in a [1.CHA] mode

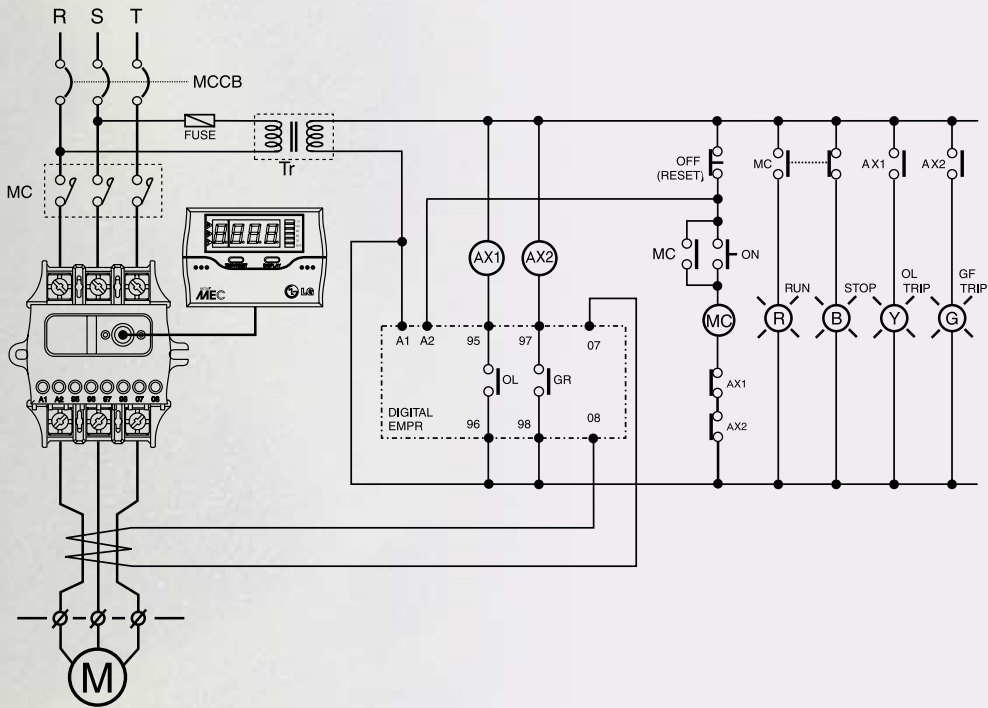
※ [2.dEF] : Refer to page 10

☞ Ground fault sensitive current selection : Refer to page 15

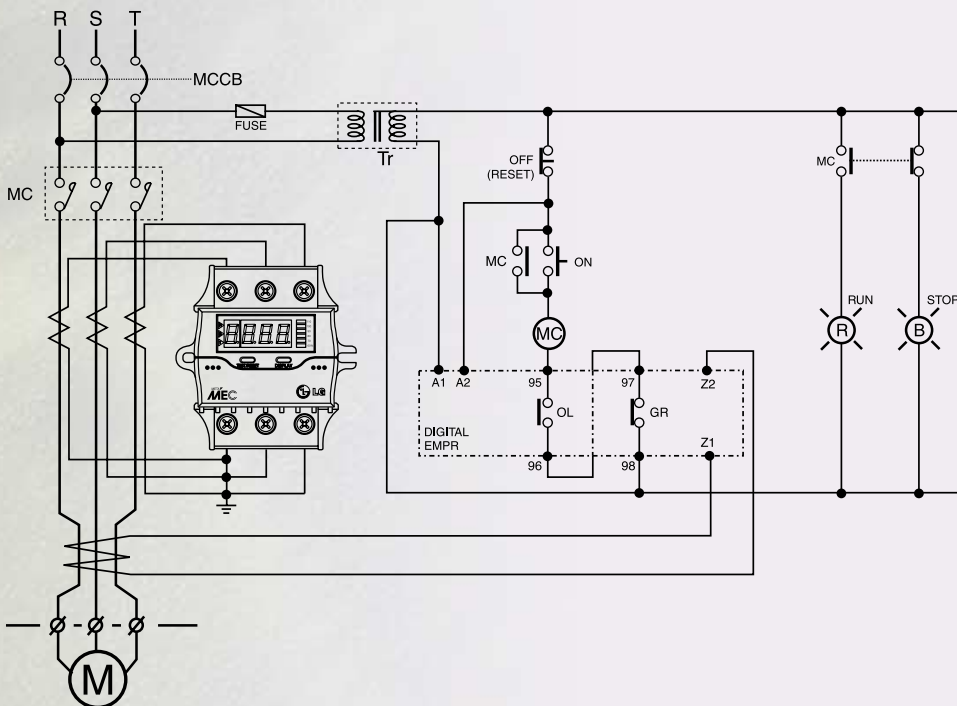
Ratings

Model	DMP□-SZ		DMP□-TZ
Type	Wiring method	Screw	Tunnel
	Panel mount	Unit or Extension	
Operating characteristics	Inverse/definite type		
Alerting function	Variable between 60 and 110%		
Current range(A)	DMP06-□	0.5~6	
	DMP60-□	5~60	
Setting time	Definite	Delay(D-T)	0~60seconds
		Operating(O-T)	0~30seconds
	Inverse	0~60seconds	
	Reset type	Manual reset	
Operating voltage	voltage	AC 190~250V	
	Frequency	60Hz (50Hz)	
	ZCT input (07-08)	200mA/110mV(ZCT) [30φ, 50φ, 65φ, 80φ]	
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



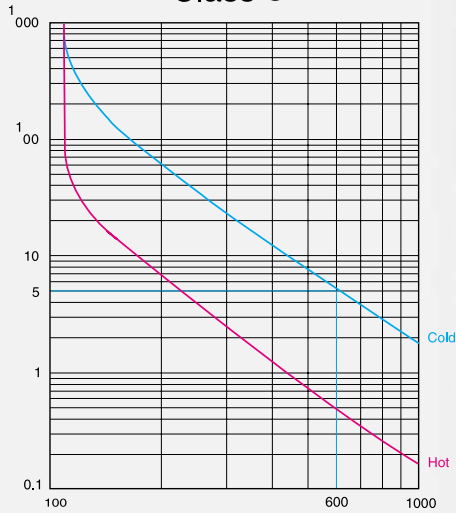


Characteristics curve

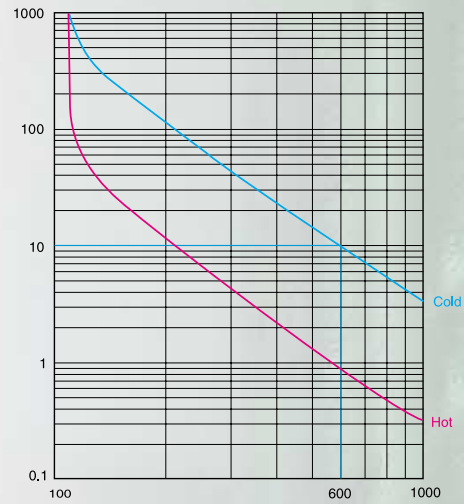
Digital EMR

Characteristics curve

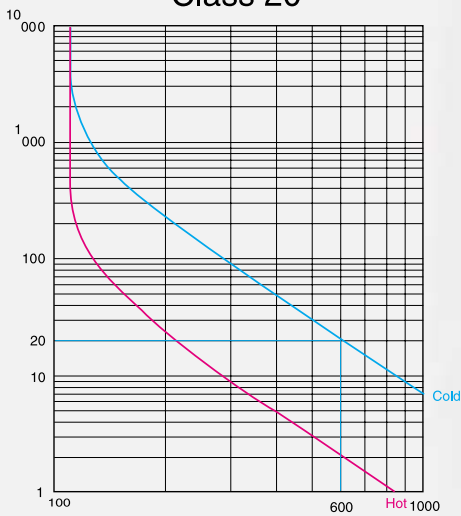
Class 5



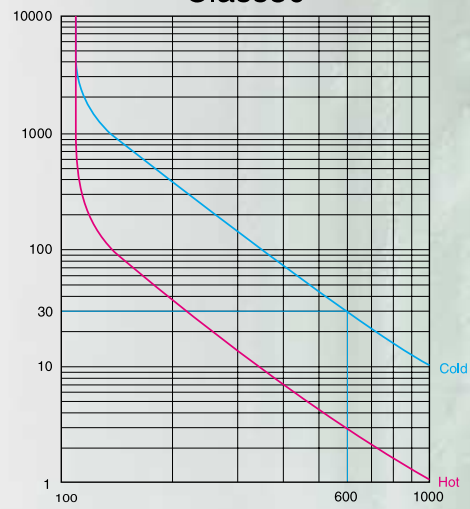
Class10



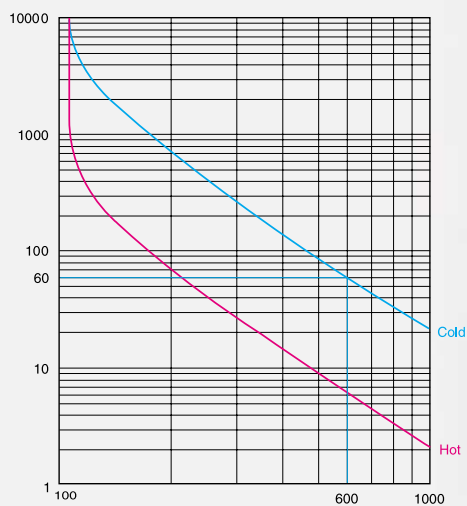
Class 20



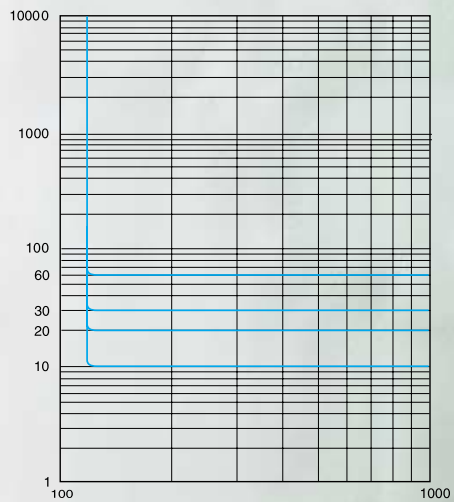
Class30



Class 60



Definite time characteristics





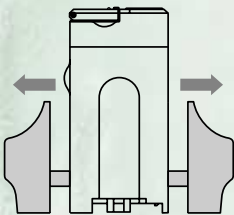
■ DMP06 - SZ 220

DMP - **06** **S** **Z** **220**

Current setting range		Wiring method		Option		Operational power	
06	0.5~6A	S	Screw	-	Standard	220	AC220V
60	5~60A	T	Tunnel	Z	Ground fault	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 LG 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 fault sensitive 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

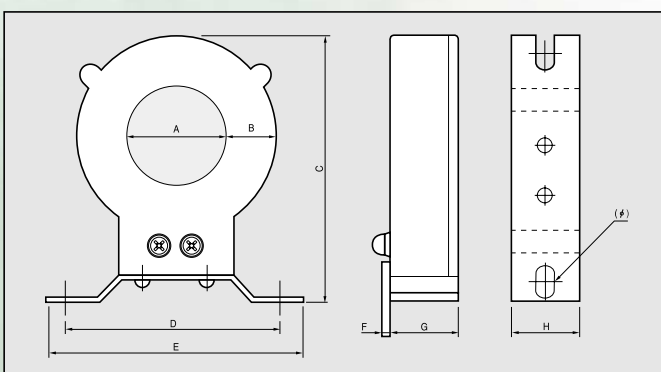
Note) High sensitive current(30~300mA) is optional

ZCT (Zero-phase Sequence Current Transformer)

■ Ratings

Type	Diameter(A)	Ratio	Weight(kg)	Model
ZCT, D30, DMP-Z	30	200mA/100mV	0.5	LZT-030
ZCT, D50, DMP-Z	50		0.7	LZT-050
ZCT, D65, DMP-Z	65		0.9	LZT-065
ZCT, D80, DMP-Z	80		1.5	LZT-080

■ Dimension



Unit (m/m)

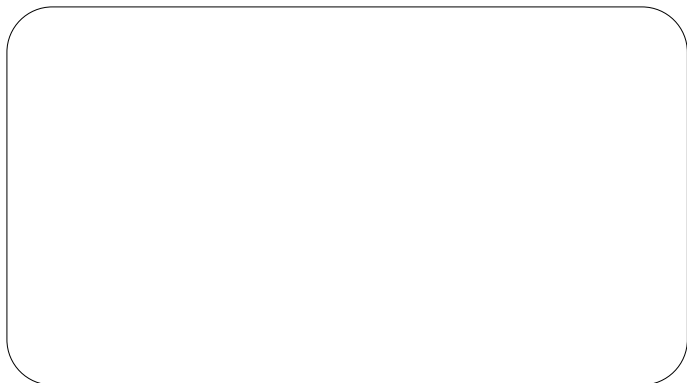
Model	A	B	C	D	E	F	G	H	φ
LZT-030	30	25	108	100	114	7	32	32	6
LZT-050	50	25	131	100	122	7	32	36	6
LZT-065	65	26	143	114	133	7	39	37	6
LZT-080	80	34	174	160	180	7	40	40	6



LG Industrial Systems

■ HEAD OFFICE

LG TWIN TOWERS, 20 Yoido-dong, Youngdungpo-gu,
Seoul, 150-721, Korea
Tel. (82-2)3777-4870
Fax. (82-2)3777-4713
<http://www.lgis.com>



Specifications in this catalog are subject to change without notice due to continuous product development and improvement.

▲ Safety Instructions

- For your safety, please read user's manual thoroughly before operating.
- Contact the nearest authorized service facility for examination, repair, or adjustment.
- Please contact qualified service technician when you need maintenance. Do not disassemble or repair by yourself!
- Any maintenance and inspection shall be performed by the personnel having expertise concerned.

Global network

■ Dalian LG Industrial Systems Co., Ltd China

- Address: No. 15 Liaohexi 3 Road, economic and technical development zone, Dalian, China
- Tel: 86-411-731-8210 ● Fax: 86-411-730-7560
- e-mail: youngeel@lgis.com

■ LG-VINA Industrial Systems Co., Ltd Vietnam

- Address: LGIS VINA Congty che tao may dien Viet-Hung Dong Anh Hanoi, Vietnam
- Tel: 84-4-882-0222 ● Fax: 84-4-882-0220
- e-mail: srjo@hn.vnn.vn

■ LG Industrial Trading (Shanghai) Co., Ltd China

- Address: Room1705-1707, 17th Floor Xinda Commerical Building No 318, Xian Xia Road Shanahai
- Tel: 86-21-6252-4291 ● Fax: 86-21-6278-4372
- e-mail: hgseo@lgis.com

■ LG Industrial Systems Beijing Office China

- Address: Room 303, 3F North B/D, EAS 21 XIAO YUN ROAD, Dong San Huan Bei Road, Chao Yang District, Beijing, China
- Tel: 86-10-6462-3259/4 ● Fax: 86-10-6462-3236
- e-mail: sclim@mx.cei.gov.cn

■ LG Industrial Systems Shanghai Office China

- Address: Room1705-1707, 17th Floor Xinda Commerical Building No 318, Xian Xia Road Shanahai, China
- Tel: 86-21-6278-4370 ● Fax: 86-21-6278-4301
- e-mail: sdhwang@lgis.com

■ LG Industrial Systems Guangzhou Office China

- Address: Room 303, 3F, Zheng Sheng Building, No 5-6, Tian He Bei Road, Guangzhou, China
- Tel: 86-20-8755-3410 ● Fax: 86-20-8755-3408
- e-mail: lgisgz@public1.guangzhou.gd.cn

■ LG Industrial Systems New Jersey Office USA

- Address: 1000 Sylvan Avenue, Englewood Cliffs, New Jersey 07632 USA
- Tel: 1-201-816-2985 ● Fax: 1-201-816-2343
- e-mail: younsupl@lgisusa.com

■ LG Industrial Systems Tokyo Office Japan

- Address: 16F, Higashi-Kan, Akasaka Twin Towers 17-22, 2-chome, Akasaka, Minato-ku Tokyo 107-0052, Japan
- Tel: 81-3-3582-9128 ● Fax: 81-3-3582-0065
- e-mail: snbaek@lgis.com