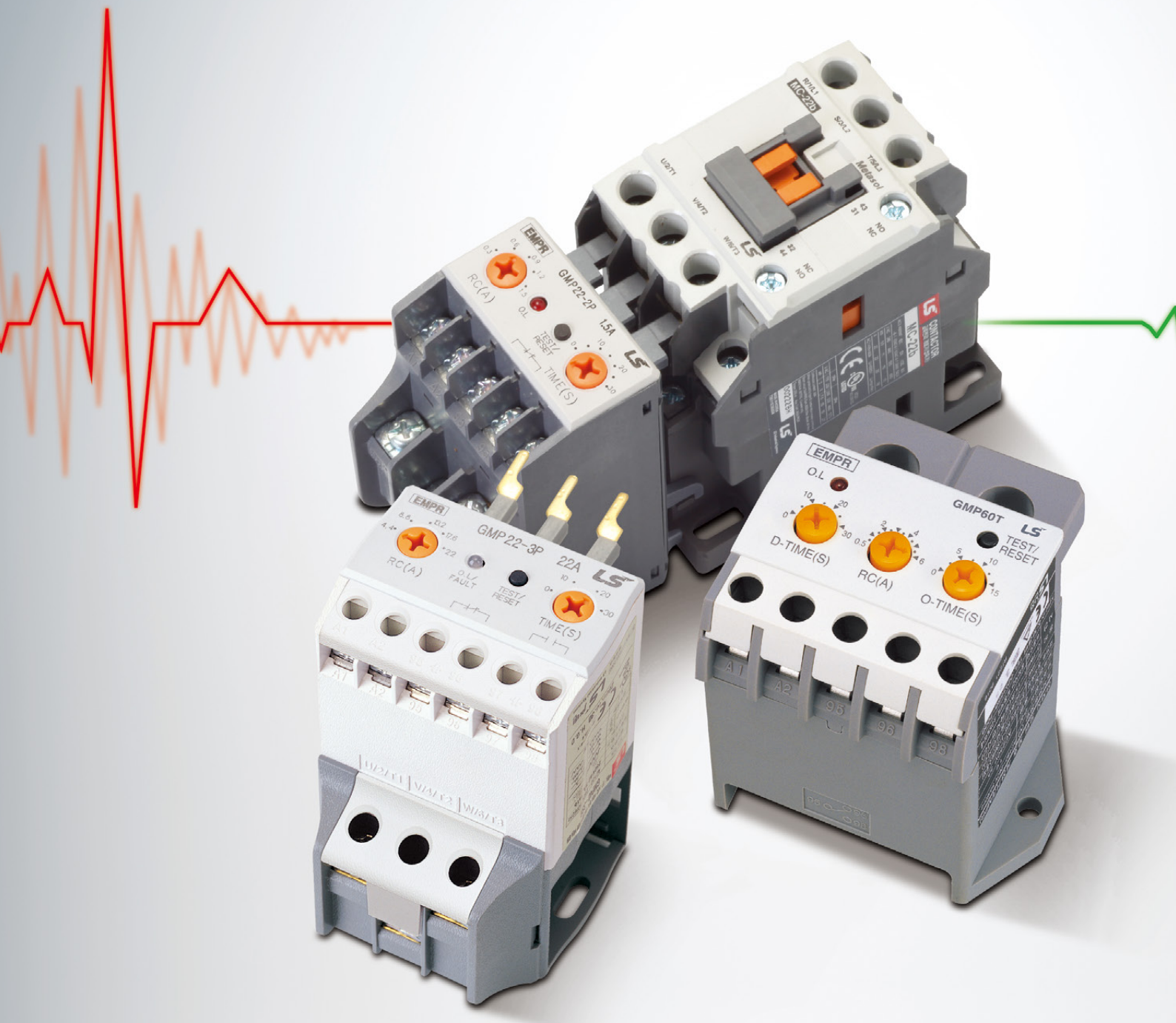
The new standard of next-generation motor protection relay!

With smart protection and safe control, we provide the cutting-edge digital total solution.



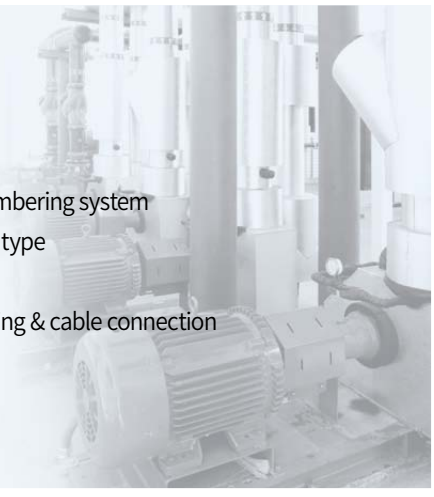
GMP Series

Electronic Motor Protection Relays

- Definite/inverse time protection of a variety of rating
- Ground fault protection model
- LED based display of failure cause
- MC direct coupling, penetration, and terminal types sharing

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13 Rated specifications & order type
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30 Dimensions



A list of standard models









Rated current	Connection method	Type name	over-current	Locked rotor	Phase failure	Phase unbalance	Reverse phase	low current	Ground Fault	Characteristic
0.3~1.5 1~5 4.4~22A	Pin type note 1)	GMP22-2P Sol	●	●	●	-	-	-	-	Inverse time
		GMP22-2PD Sol	●	●	●	-	-	-	-	Definite time
		GMP22-2P Sol	●	●	●	-	-	-	-	Inverse time
		GMP22-2PA Sol	●	●	●	-	-	-	-	Definite time/ Automatic return
		GMP22-3P Sol	●	●	●	●	-	-	-	Inverse time
		GMP22-3PR Sol	●	●	●	●	●	-	-	Inverse time
	Screw type	GMP22-2S	●	●	●	-	-	-	-	Inverse time
		GMP22-3S	●	●	●	●	-	-	-	Inverse time
		GMP22-3SR	●	●	●	●	●	-	-	Inverse time
	Tunnel types	GMP22-2T	●	●	●	-	-	-	-	Inverse time
		GMP22-3T	●	●	●	●	-	-	-	Inverse time
		GMP22-3TR	●	●	●	●	●	-	-	Inverse time
4~20 8~40A	Pin type note 1)	GMP40-2PD Sol	●	●	●	-	-	-	-	Definite time
		GMP40-2P Sol	●	●	●	-	-	-	-	Inverse time
		GMP40-2PA Sol	●	●	●	-	-	-	-	Inverse time/ Automatic return
		GMP40-3P Sol	●	●	●	●	-	-	-	Inverse time
		GMP40-3PR Sol	●	●	●	●	●	-	-	Inverse time
	Screw type	GMP40-2S	●	●	●	-	-	-	-	Inverse time
		GMP40-3S	●	●	●	●	-	-	-	Inverse time
		GMP40-3SR	●	●	●	●	●	-	-	Inverse time
	Tunnel types	GMP40-2T	●	●	●	-	-	-	-	Inverse time
		GMP40-3T	●	●	●	●	-	-	-	Inverse time
		GMP40-3TR	●	●	●	●	●	-	-	Inverse time
0.5~6 3~30 5~60A	Tunnel types	GMP60T	●	●	●	-	-	-	-	Inverse time
		GMP60TE	●	●	●	-	-	-	-	Inverse time
		GMP60TA	●	●	●	-	-	-	-	Definite time/ Automatic return
0.5~60A		GMP60TD	●	●	●	-	-	-	-	Definite time
		GMP60TDa	●	●	●	-	-	●	-	Definite time/ Automatic return
0.5~60A	Tunnel types	GMP60-3T	●	●	●	●	-	-	-	Definite time
		GMP60-3TR	●	●	●	●	●	-	-	Definite time
		GMP60-3TZ note 2)	●	●	●	●	-	-	●	Definite time
		GMP60-3TN	●	●	●	●	-	-	●	Definite time
		GMP60-3TZR	●	●	●	●	●	-	●	Definite time
		GMP60-3TNR	●	●	●	●	●	-	●	Definite time
0.5~60A note 3)	Screw type	GMP60-3S	●	●	●	●	-	-	-	Definite time
		GMP60-3SR	●	●	●	●	●	-	-	Definite time
		GMP60-3SZ	●	●	●	●	-	-	●	Definite time
		GMP60-3SN	●	●	●	●	-	-	●	Definite time
		GMP60-3SZR	●	●	●	●	●	-	●	Definite time
		GMP60-3SNR	●	●	●	●	●	-	●	Definite time
16~80A		GMP80-2S	●	●	●	-	-	-	-	Inverse time
		GMP80-2SA	●	●	●	-	-	-	-	Inverse time/ Automatic return
		GMP80-3S	●	●	●	●	-	-	-	Inverse time
		GMP80-3SR	●	●	●	●	●	-	-	Inverse time

Note) 1. Direct coupling type (Pin) supports direct coupling of Metasol MC. With your order, it is required to describe "Sol".
2. For GMP60-3TZ/3TZR, use ZCT (100mA/40~55mV) for EMPR only.
3. In case of GMP60-3S Series, it is required to purchase a terminal block separately.
4. This product is designed for protecting a low-voltage motor with 1,000V or less. Therefore, it should not be used in high voltage lines.

Convenience

Integrated Digital Motor Protection Relay using MCU(Microprocessor Control Unit)
It offers real time data processing and high precision.

Applicable to invertor circuits
It may be applied to the secondary inverter control circuit with its outstanding resistance to harmonic noise.
(Usable frequency range: 20~200Hz, except for phase reversal model)

Save the last fault cause
At the time of power recover after power failure, it is possible to check the final operation cause.
(Test/Reset Key 2-time operation) Some models only. (Check specifications table by model)

Sharing of terminal contact type and penetration type
It is possible to detach and attach a terminal block and conveniently apply the product to a variety of installation conditions.

Perfect connection with LS Digital Contactor Metasol MC

EMPR	Contactor model
GMP22-2P/3P/3PR	MC-9b, MC-12b, MC-18b, MC-22
GMP40-2P/3P/3PR	MC-32a, MC-40a

*In case of Metasol MC direct coupling type, it is required to describe "Sol" with your order.
*GMP80-Model is unable to direct-couple to Metasol MC.



Various Installation Ways
With the uses of screws and brackets for DIN-Rail, it is possible to install 35mm DIN-Rail.

Wide Current Control Range
Since this product has a wide current control range, it is more convenient than thermal overload relays.

Reliability

Acquired S-Mark (safety certification) first in the industry
What is S-Mark (safety)?
S-Mark is used to approve a product's safety, reliability, and safe design manufacturing in the way of reviewing the quality management system of its manufacturer. If a product complies with safety certification standards, it has safety certification (S-Mark). 'S-Mark (see Mark)' is applied to a product, a product package, or a product advertisement in order to show its safety.



Remarkable improvement in the characteristics of Nois
- This product solves the malfunction made by electromagnetic waves and surges which are the biggest problem of digital motor protection relays.
- With the application of highly-reliable Toroidal CT, the product safely protects digital contactors, radio devices, lightning surges, impulses, etc. against external influence.

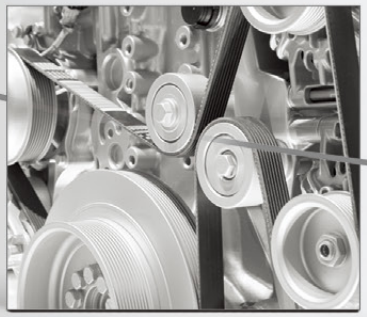
Inverse time characteristic good for motor protection
Thanks to the inverse time characteristic in which a running time is determined by a size of overcurrent, the product is excellent at motor protection.



Revolutionary development of motor protection relays

Complete motor protection is realized with real time data processing and high precision.











DMPi Series

Intelligent Digital Motor Protection Relays

- Definite/Inverse time option and various protection methods
- Storage of failure causes
- Separated display part using cables
- MODBUS communication, 4~20mA DC output
- Operating time displayed for each model

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A list of standard models

A list of standard models

Rated current	Connection method	Model No.	Over-current	Stall/ Locked rotor	Phase fail current	Phase un-balance	Reverse phase	Under current	Ground fault	Instant short circuit	Remarks
0.5~6A	Terminal type	DMP06i-S	●	●	●	●	●	●	-	-	• If there is the function of RS485 communication, 'M' is appended to its type name. If there is the function of 4~20mA DC output, 'A' is appended to its type name. • RS485 communication function and 4~20mA DC output function are not supported at the same time.
		DMP06i-SZ, SB	●	●	●	●	●	●	●	-	
		DMP06i-SI	●	●	●	●	●	●	-	●	
		DMP06i-SZI, SBI Note1)	●	●	●	●	●	●	●	●	
	Penetrated type	DMP06i-T	●	●	●	●	●	●	-	-	
		DMP06i-TZ, TB	●	●	●	●	●	●	●	-	
		DMP06i-TI	●	●	●	●	●	●	-	●	
		DMP06i-TZI, TBI Note1)	●	●	●	●	●	●	●	●	
5~65A	Terminal type	DMP65i-S	●	●	●	●	●	●	-	-	
		DMP65i-SZ, SB	●	●	●	●	●	●	●	-	
		DMP65i-SI	●	●	●	●	●	●	-	●	
		DMP65i-SZI, SBI Note1)	●	●	●	●	●	●	●	●	
	Penetrated type	DMP65i-T	●	●	●	●	●	●	-	-	
		DMP65i-TZ, TB	●	●	●	●	●	●	●	-	
		DMP65i-TI	●	●	●	●	●	●	-	●	
		DMP65i-TZI, TBI Note1)	●	●	●	●	●	●	●	●	

Note) 1. It is possible to set up ground fault and instantaenous trip contacts separately.

Convenience



Integrated Digital Motor Protection Relay based on MCU(Microprocessor Control Unit)
Real Time Processing and High Precision are implemented.



Applicable to invertor circuits
It may be applied to the secondary inverter control circuit with its outstanding resistance to harmonic noise. Permissible frequency range is 10~200Hz. When the percentage of harmonic is more than 30%, a harmonic filter is installed. (However, the ground fault protection function should be switched off.)



Function to store the cause(s) of failure / Fault
Up to 5 motor failure events may be saved in the system, so that the failure history can be easily identified.



Integrated system for user convenience
The display part is separated and attached to the front panel, so that information on current/operating time and setup can be viewed without taking out the unit. With the separated display, motor protection can be performed. The display part is controlled by a separate MCU(Microprocessor Control Unit), so it can be used for all DMPi types.



Communication function
General-purpose RS485/MODBUS communication mode is offered for various system and communication network configurations. Models with analog current signal (4~20mA DC) output are compatible with systems that uses the existing TD (Transducer).



A wide range of reset functions
Manual/Automatic/Electrical reset functions are provided for user convenience.



Date information display
When a failure occurs, the date and time of failure occurrence are saved in the system to accurately identify the date of motor failure.



Password setting
When changing the set values, a password must be inserted.



Total operating time and operating time setting
When the predefined operating time has elapsed, related information is displayed so that operators may replace the motor bearing and check the refueling cycle.



Terminal/Penetrated types are shared for application in various installation environments
Terminal blocks are detachable, which makes them applied to various installation environments.

Reliability



Thermal Inverse Time, Inverse Time and Definite Time Modes
According to user's needs, the motor can be protected in the inverse time mode or definite time mode.



Three-phase digital ampere-meter
Three-phase current is displayed in cycle at intervals of 2 seconds for operators to check the motor state.



Various protection elements and additional functions
Single/3-phase is optional, and output contact as well as the operating time can be set.
Free Voltage power connection (AC/D85~260V) is possible with ZCT built-in option.



High Reliability
The current relay error is reduced from 5% to 3% and the minimum sensible current is lowered from 70% to 30% of the minimum rating. Phase fail/phase unbalance protection relay correction and delay time can be set.



Inverse time characteristic good for motor protection
Thanks to the inverse time characteristic in which a running time is determined by a size of overcurrent, the equipment is excellent at motor protection.

Innovative Upgrade of Motor Control Panel!

More compact and Safer! We implement perfect motor protection.



- Power, Voltage, Current (measurement error: 1%)
- Power, Voltage, Current, Power Factor Protection
- Harmonic measurement (1st to 16th)
- Diverse motor starting types
  (Full voltage, Y-D, Reversible, Reactor, Inverter Starting)
- Modbus communication and 4~20mA

One model with various motor starting types

One S-EMPR model is applicable to various motor staring types, such as full voltage starting, Y-△ starting, reversible staring, Reactor starting, and Inverter starting.

A variety of SCADA functions based on sequence structure

With a simple sequence, it is possible to not only control local operation panel (LOP) and MCC panel, but conduct Supervisory Control And Data Acquisition through SPLC or DCS based auto operation and communication.



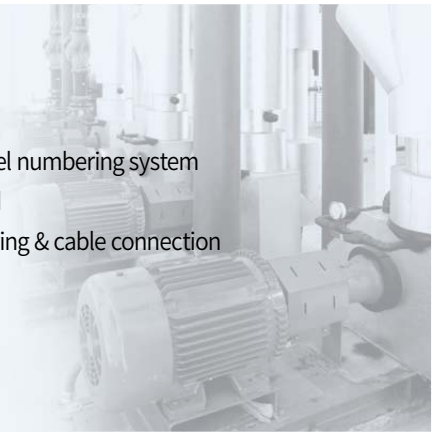
MMP Series

Smart Electronic Motor Protection Relays

- Current, Voltage, Power Measurement and Power Factor Protection
- Instantaneous interruption compensation and restarting
- Harmonic measurement (1st to 16th)
- Modbus communication and 4~20mA

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Product characteristics

Convenience



Comprehensive Digital Motor Protection Relay with the MCU (Microprocessor Control Unit)
Providing real-time processing and high precision



Applicable to invertor circuits
It can be installed in the downstream of a speed driver where harmonic noise exists. The allowable frequency range is 10 to 400Hz.
A harmonic filter must be used if THD (Total Harmonic Distortion) is over 30%.
* Set the ground fault mode off to avoid the trip due to current unbalace.
* Voltage parameters are not available. Power measurement accuracy is not guaranteed.



Function to store the cause(s) of failure / Fault
Up to 5 motor failure events may be saved in the system, so that the failure history can be easily identified.



Communication function (RS485 Modbus and 4~20mA output)
With universal RS485/Modbus communication types, it is possible to establish various system and communication networks.
Analog current signal (4~20mA) output is compatible with conventional TD(Transducer) based system.



A wide range of reset functions
Manual/Automatic/Electrical reset functions are provided for user convenience.



Date information display
When a failure occurs, the date and time of failure occurrence are saved in the system to accurately identify the date of motor failure.



Password setting
When changing the set values, a password must be inserted.



Total operating time and operating time setting
When the predefined operating time has elapsed, related information is displayed so that operators may replace the motor bearing and check the refueling cycle.



Quick Setup
Same setting for another devices in different panels can be done simply via the display unit.

Reliability



Thermal heat build-up inverse time/inverse time/definite time selection function

It is possible to select one of two types of inverse time and definite time in order to protect a motor perfectly.



Wide setting range and Dual protection

Providing Ground fault protection by dual detections -Zero-phase current and Residual current levels.



Up to 100A the device can be used without external CT to providing convenience and cost-effective solution.



Various Motor Starting Modes

In a Single Device several starting modes of operation available : Full voltage start, Y-△ start, Reversible start, Reactor start, Inverter start.



Metering of Current, Voltage and Energy (with 1% accuracy for A & V)

Real-time energy metering with high accuracy to support energy-saving Current / Voltage THD measurements (16 harmonic)



Carrying out complex relay functions related to Current, Voltage, Energy and Power Factor

Overpower alarm supported for energy monitoring



Self-diagnosis and Sequence monitoring

Providing a self-diagnosis function such as internal memory check in order to check fault conditions quickly



Power loss and Restarting

Device restarts after the momentary power loss for less than 30 seconds and returns to the former state. Time-delay setting between 0 to 300 sec. is available to prevent overload from all the motors' restarting at the same time.



Frequent-Starting Protection

The number of automatic resets for the set time (20 minutes) is settable to provide frequent-starting protection.

Digital motor protection control device is suited for multiple motor starting method with a single model



IMC-III

Intelligent Motor Controller

- 1 model can be used on various motor start methods
- Wide range of protection functions
- Variety of remote surveillance control functions according to the sequence structure

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IMC-III

Intelligent Motor Controller



1 model can be used on various motor starting methods

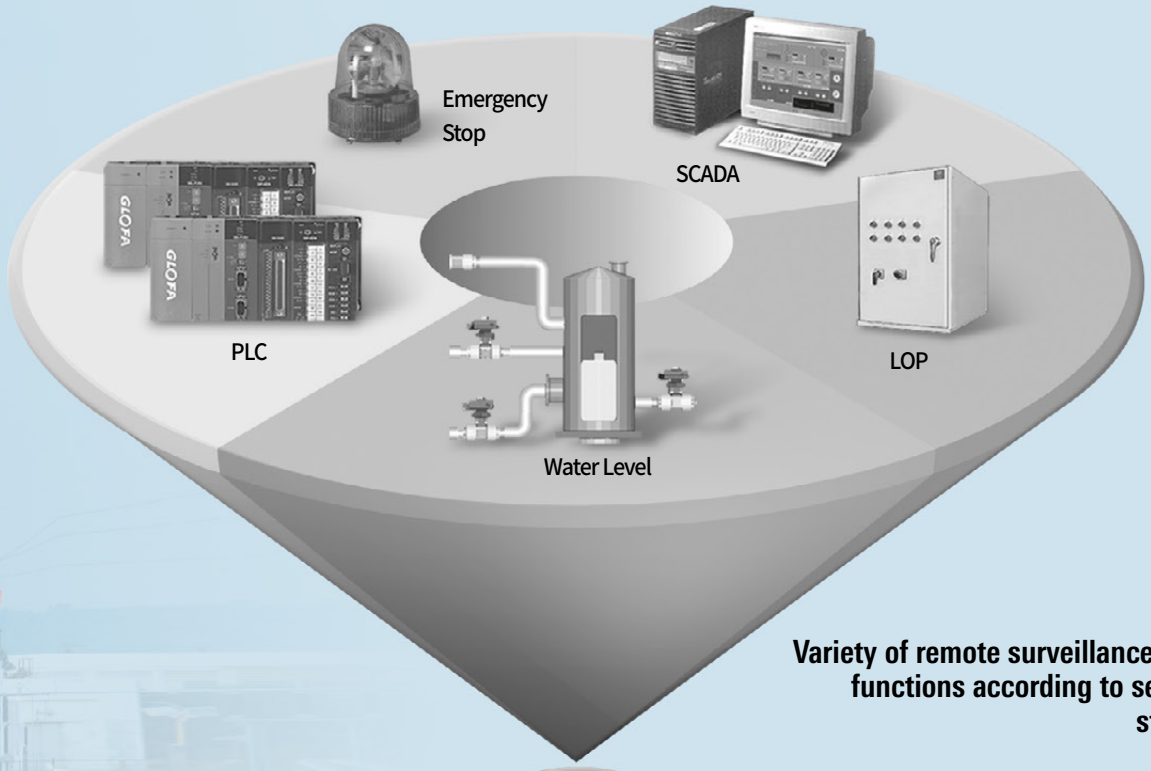
1 IMC-III model can be applied on direct input drive, Y-△ drive, reversible drive, reactor drive, inverter drive and S/V drive, and it is also easy to respond to sequence changes.

Direct start
Y-△ start
Reactor start
For/Rev start
INVERTER start
S/V valve start

Overcurrent
Under current
Unbalance
Stall/Locked rotor
Phase failure
Reverse phase
Ground fault

Wide range of protection functions

Overcurrent, undercurrent, open phase, reverse phase, unbalance, stall/lock, ground fault protection and alarm functions protect the motor safely.



Variety of remote surveillance control functions according to sequence structure

Simple sequence structures can not only enable local operation (LOP) and MCC control, but this also enables remote surveillance control using PLC or DCS-based auto operation and auto-operation and communication according to level changes.



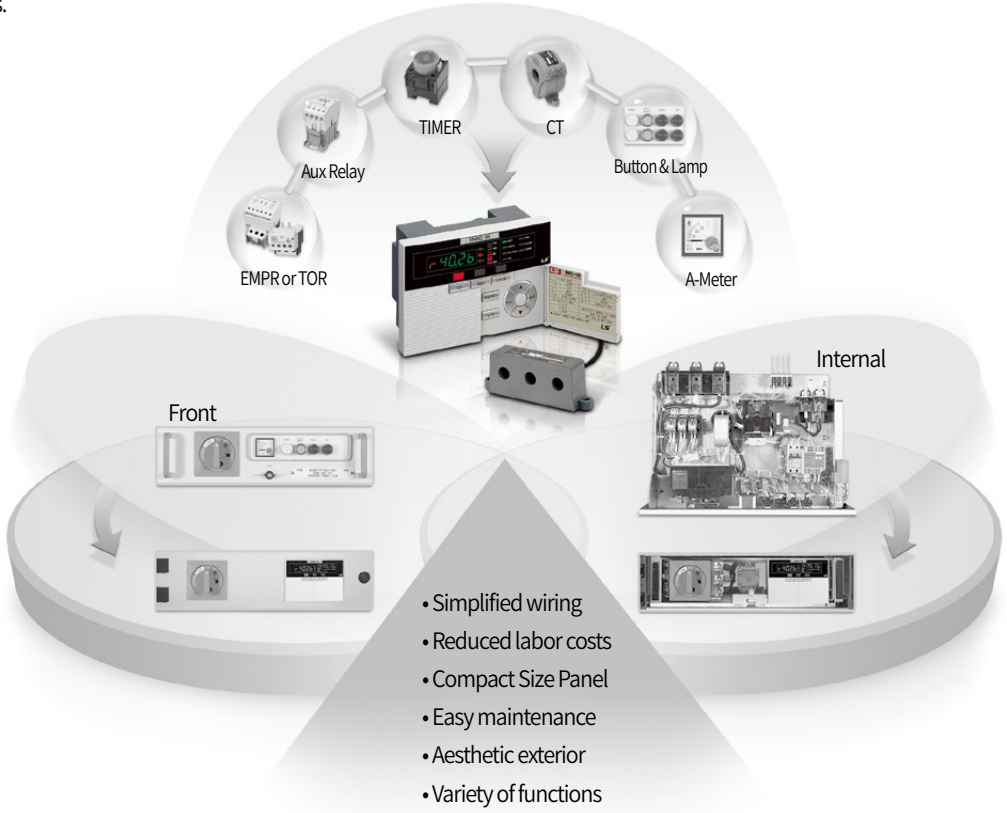




Product characteristics

Ease of Use and Installation

By separating the main body with MCT and inserting it in the front panel, it allows the user to check various fault causes/fault current value as well as operating the motor, and it also allows current/operation time and various functions to be set with simple button controls without taking out the MCC unit. Furthermore, minimized installation space and simplified wiring creates a compact MCC unit and achieves easy maintenance and reduced labor costs.

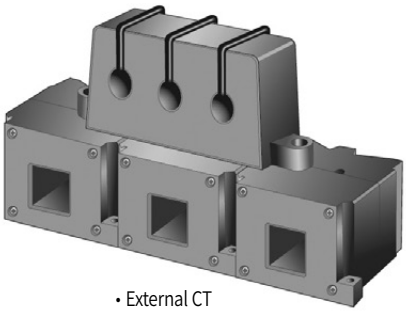


Available on Inverter Circuits

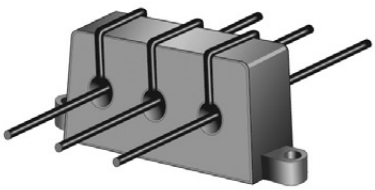
Due to the outstanding current detection capabilities according to frequency change, the system can be used on secondary circuits of inverters.
The operable frequency range is 20~200Hz, and for details of other specifications, please contact the manufacturer.
However, ground fault protection function is only available at 50/60Hz, so if the ground fault protection function is enabled, it cannot be used with an inverter.
If the start frequency is 20Hz, the system may malfunction.

Wide Current Adjustment Range: 1 model is capable of covering 0.125-1000A

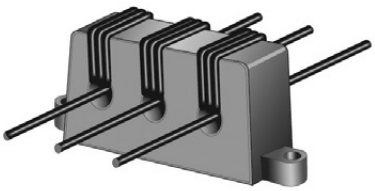
Adjust the Dip S/W to modify the current adjustment range from 0.5-6A to 5-60A, and depending on the MCT wire penetration count, the current can be adjusted up to 0.125A. If a separate external CT is used, it can be adjusted up to 1000A.



• External CT



• 2times(0.25 ~ 3A)



• 4 times(0.125 ~ 1.5A)

* External CT: Refer to supplementary devices (sold separately)
* MCT: Molded Current Transformer(must be purchased separately)

The moment stopping of power supply compensation and Restart

- **The moment stopping of power supply compensation**
  - Line current reduces under 65% of rated voltage.
  - When the moment stopping of power supply within 10S, IMC-IIIa makes it restart same as before condition.
- **Restart delayed time(0 ~ 300S)**
  - When the line voltage recovers over 75% rated voltage, it can be restarted.
  - when it restarted, IMC-IIIa makes it sequence restart 0~300s for prohibition overload.
  - Indication of Restart delayed time countdown.
- **Operating condition and maintain operation mode**
  - It can be maintained before the moment stopping power supply condition(Local, MCC, Auto, Remote)

Ex) Incase of restarting delayed time 30S

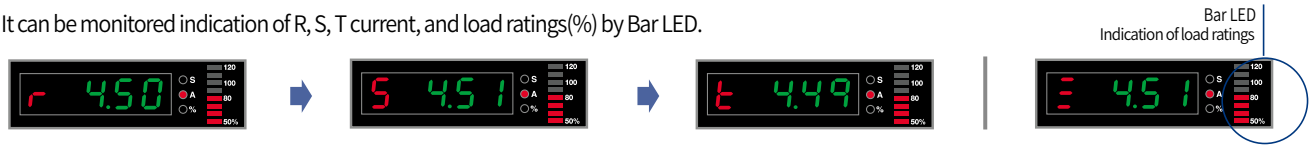


Information

- It can be changed operation mode (ON, OFF) and count time during countdown
- Changed operation mode can be applied after finishing count.
- When the short stopping power supply generates under 100ms, IMC-IIIa dose not detect, so the motor will maintain normal condition

Digital Ampere-Meter

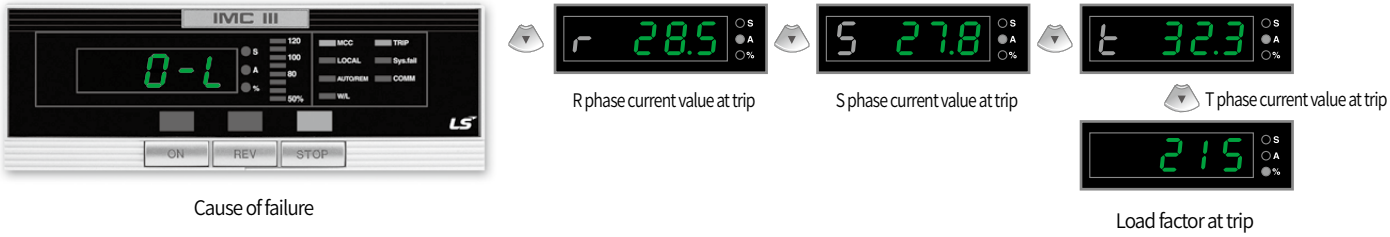
It can be monitored indication of R, S, T current, and load ratings(%) by Bar LED.



R-phase S-phase T-phase Max current

Fault analysis and Recording

It can be indicated fault cause and fault current value by 7-segment and LED.
At the moment of instantaneous stopping of power supply, it can solve the problem. Because of the fault storage.



Cause of failure

R phase current value at trip

S phase current value at trip

T phase current value at trip

Load factor at trip

Self-supervision and contactor failure function

IMC-IIIa can be checked self-supervision like a memory fault. When the motor starts/stops, that indicates Error.No and turn on Sys.Fail LED by supervising Input/output condition.

Total operation time setting and storage

The total time the motor has been operated is stored for up to 10 years, so it is easy to manage the motor by checking the total operation time of the motor, Continuous operation time can be stored and set for up to one year (8760 hours) without stopping, and the contact output and "OrH" are displayed when the set operation time has elapsed It can be conveniently used for maintenance such as replacing the bearing of the motor and oiling cycle.

Information

When the user contact mode is normal mode, even if indicating “OrH Alarm, motor operates in normal condition

Communication function

It’s possible to communicate with other system and organize various communication Network by MODBUS/RS-485. And it’s also possible to communicate with system by Analog current signal(4 ~ 20mA). So that makes it possible to interchange by using TD(Transducer).

- **4 ~ 20mA output**

0.5 ~ 6A TYPE		External current transformer (Secondary Current)		5 ~ 60A TYPE	
Under 0.35A	Over 6A	Under 0.35A	Over 5A	Under 3.5A	Over 60A
4mA	20mA	4mA	20mA	4mA	20mA