Mitsubishi Electric MELPRO-HA Series
MGP-H1A Generator Protection Relay

Small relays providing comprehensive protection for large generators
Mitsubishi Electric
MELPRO-HA Series

MGP-H1A Generator Protection Relay
◆ All-in-one protection relay for large generators
◆ Versatile performance
◆ Flexible configuration based on extensive engineering experience

All-in-one protection relay for large generators

<table>
<thead>
<tr>
<th>Protection functions</th>
<th>VT fuse failure detection 60FL</th>
<th>Distance protection 21 (2 stages)</th>
<th>Under/Over frequency protection 81 (U/F: 3 stages, DF: 3 stages)</th>
<th>Overvoltage protection 32 (2 stages)</th>
<th>Negative sequence phase OC protection 59</th>
<th>Voltage-restricted OC 51V</th>
<th>Start-up OC 51PG</th>
<th>Generator differential protection 87</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60FL</td>
<td>21 (2 stages)</td>
<td>81 (U/F: 3 stages, DF: 3 stages)</td>
<td>32 (Forward: 2 stages, Reverse: 2 stages)</td>
<td>59</td>
<td>51V</td>
<td>51PG</td>
<td>87</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protection functions</th>
<th>Loss of field protection 40 (2 stages)</th>
<th>Field earth fault protection 64F</th>
<th>Out-of-step protection 78 (MHO/Quadrilateral)</th>
<th>CB failure protection 508F</th>
<th>Earth fault differential protection 87GD</th>
<th>Undervoltage protection 27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40 (2 stages)</td>
<td>64F</td>
<td>78 (MHO/Quadrilateral)</td>
<td>508F</td>
<td>87GD</td>
<td>27</td>
</tr>
</tbody>
</table>

Single line diagram

![Diagram of MGP-H1A Generator Protection Relay]
# Versatile performance

## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>MGP-H1A (Generator Protection Relay)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated frequency</td>
<td>50Hz/60Hz ※</td>
<td>Applicable range ±3%</td>
</tr>
<tr>
<td>Rated current</td>
<td>5A/1A ※</td>
<td></td>
</tr>
<tr>
<td>Control power supply</td>
<td>110V, 125VDC/220V±5VDC ※</td>
<td>Applicable range -15%↔10%</td>
</tr>
<tr>
<td>Number of DI</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Number of DO</td>
<td>15 + 15 (option)</td>
<td></td>
</tr>
<tr>
<td>Communication port</td>
<td>Front: 100BASE-TX (for laptop PC only) Option: Protocol: Modbus, (IEC61850) Rear: RS-485 Communication 2CH</td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>500VDC megger All electrical circuits to earth: 10MW or more Between independent circuits: 5MW or more</td>
<td>IEC60255-5 (IEC2500)</td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>All electrical circuits to earth: 2,000VAC 1min Between each contact: 1,000VAC 1min</td>
<td>IEC60255-5 (IEC2500)</td>
</tr>
<tr>
<td>Surge withstand (12/50 μs)</td>
<td>All electrical circuits to earth: 3kV Between each terminal: 3kV</td>
<td>IEC60255-6</td>
</tr>
<tr>
<td>Electrostatic discharge</td>
<td>Contact discharge: 8kV, Air discharge: 15kV</td>
<td>IEC60255-22 - Class 4</td>
</tr>
<tr>
<td>High frequency</td>
<td>2.5kV peak frequency: 1MHz±10% Damped oscillation 1/2 peak in 3~6 cycles</td>
<td>IEC60255-22 - Class 3</td>
</tr>
<tr>
<td>Square wave</td>
<td>Voltage: 1kV±10% 2s Pulse width: 100ms±30% Pulse rise time: 1ms±30%</td>
<td></td>
</tr>
<tr>
<td>Radio wave</td>
<td>Transceiver: 150/400/900MHz Mobile phone: 800MHz/1.8GHz Wireless LAN: 2.4/5GHz</td>
<td></td>
</tr>
</tbody>
</table>

※ Frequency, input current and control power voltage are selected when ordering.

## Standards

<table>
<thead>
<tr>
<th>International Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>- IEC60255 Electrical Relays</td>
</tr>
<tr>
<td>- IEC61000 EMC</td>
</tr>
<tr>
<td>- IEC61850 Communication (Option)</td>
</tr>
</tbody>
</table>

## Compliance

This mark verifies compliance with the safety standards of EU directives.

---

### Front

All-in-one compact body

![Front Diagram]

**Fault record function**

- **Waveform analysis tool**
  VT/CT input, circuit breaker status, protection function status, calculations and indications for characteristic values (e.g., symmetries, harmonics, impedance values)
  Recording duration: 4sec maximum (Sampling: Every 30 degrees of phase angle)

### Self-diagnostics function

- **Continuous monitoring**
  AI, process, settings, power supply, etc.

![Self-diagnostics Diagram]
Flexible configuration based on extensive engineering experience

Programmable Logic Controller (PLC)

Applicable to all "plant-specific" interlocks
Adjust input/output logic as desired

MGP-H1A
Fixed Algorithm
Protection functions
- TG
- TGd
- TP
- DI
- DI

PLC

Lockout Relay 1 (DO)
Lockout Relay 2 (DO)
LED (assigned by PLC logic)

Protection System Construction

Provide protection for main circuit with MGP-H2A
1. Includes generator step-up transformer, auxiliary transformer, excitation transformer and generator
2. MELPRO-HA Series MGP-H2A transformer protection relay

Settings

Settings provided considering protection

For inquiries, please contact one of the following offices.

Head Office: Tokyo Bldg., 2-7-3 Manincouchi, Chiyoda-ku, Tokyo 100-8310, Japan
Tel: +81(3)6218-3764

Hokkaido Branch: Hokkaido Bldg., 4-1 Kitorigawacho, Chiyoda-ku, Sapporo 060-8693, Japan
Tel: +81(11)272-3721

Tohoku Branch: Sendai Kaua Bldg., 1-17-7 Kaminagaseki, Sendadjshi-ku, Sendai 980-2011, Japan
Tel: +81(22)231-4531

Hokuriku Branch: Intec Bldg., 5-5 Ushijima-hyodachomachi, Toyama 930-0856, Japan
Tel: +81(76)443-1705

Chubu Branch: Nagoya Lucent Tower, 6-1 Ushijima-cho, Nishi-ku, Nagoya 451-8522, Japan
Tel: +81(52)265-3127

Kansai Branch: Grand Front Osaka, 4-20 Otenza-cho, Kita-ku, Osaka 530-8206, Japan
Tel: +81(6)448-0481

Chugoku Branch: Nissay Hiroshima Bldg., 7-32 Nakamachi, Naka-ku, Hiroshima 730-8657, Japan
Tel: +81(82)248-5255

Shikoku Branch: Hirose Electric Takamatsu Bldg., 1-4 Kikokubcho, Takamatsu 760-8444, Japan
Tel: +81(88)886-2003

Kyushu Branch: Tenpa Bldg., 2-10-1 Tenpa, Chuo-ku, Fukuoka 810-8866, Japan
Tel: +81(92)721-2130

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
http://www.mitsubishelectric.com

Safety Warning
To ensure proper use of the product listed in this brochure, please be sure to read the instruction manual prior to use.