



Three phase protection for small generators.

Features and Benefits

- I1, I2, I0 metering and last trip data
- Part of a modular system
- Independent 4" modules
- 1/4 standard 19" rack cases available
- 3 digit display and reset button

Applications

- Small generators
- Component for bigger generator packages

Protection and Control

- Unbalance or current reversal
- Thermal protection
- Phase and ground faults



Description

The MGC1000 are microprocessor based, digital type, generator protection relays which provide thermal protection for three phase generators, phase fault, ground fault, and unbalanced current protection.

Applications

The basic functions performed by the MGC are:

- 46-protection against unbalanced current or current reversal (negative sequence)
- 49-thermal protection
- 51-protection against phase faults
- 51G-protection against ground faults

The thermal image unit also provides protection against excessive starts, given that once a trip has been produced, the thermal unit does not reset until the temperature of the generator decreases below a given value.

Construction

- accurate and reliable, with low power consumption

- rack mounting (case is 1/4 of a rack wide, or 6.33")
- LED indicators for Pick-Up, Trip, and System Availability
- three digit display, where the following information is displayed:
 - F0. present state of the equipment
 - F1. thermal state (%)
 - F2. positive sequence current (xIs)
 - F3. negative sequence current (xIs)
 - F4. zero sequence current (xInGRN)
 - F5. last trip (cause)
 - F6. positive sequence current during the trip
 - F7. negative sequence current during the trip
 - F8. zero sequence current during the trip
- anti-shock, flame resistant, sealed plastic cover, which allows the trip indicator to be reset from outside the cover
- elevated anti-seismic waveform response of the output relays
- high reliability, solid state components
- microprocessor system

Standard Functions

Thermal Image Unit

Adjustable between 0.55 and 1.3 times I_n in steps of 0.05 times I_n , through microswitches located on the front of the relay.

Selectable operating curves as a function of the time constant (t_1), adjustable between 1 and 20 min in steps of one min.

Negative Sequence compensation (K1), adjustable from 1 to 6.

Cold time constant (t_2) adjustable from 1 to 6 times the warm time constant.

Positive Sequence Unit (I1)

Adjustable between 1 and 8 times the value selected for the thermal image unit.

Time delay of 0.05 to 10 sec in 0.05 sec steps.

Negative Sequence Unit (I2)

The unit can operate either as an instantaneous (adjustable time delay) or according to an inverse time curve; where the operating mode can be selected by the user.

Instantaneous Mode (adjustable time delay): 0.5-8 x I_s in steps of 0.1 x I_s with time delay of 0.05 to 10 sec in 0.05 sec steps.

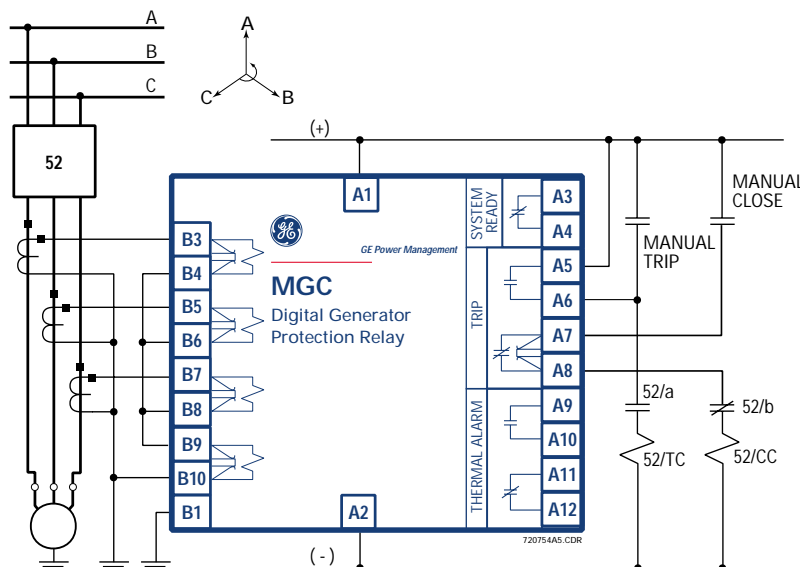
Inverse Time Mode: Per the family of curves in Fig. 3, truncated for selectable pick up settings between 0.1-1.0 x I_s in steps of 0.1 x I_s .

Zero Sequence Unit (I0)

Adjustable between 0.06 and 0.24 x I_nGRN in steps of 0.01 x I_nGRN ($I_nGRN = 5, 1$ or 0.02 A).

Time Delay: 0.05 - 10 sec, adjustable in steps of 0.05 sec.

Typical Wiring



Contact Characteristics

MGC relays have two trip contacts, one is normally open, and the other, electrically separate, is normally closed. The relays incorporate two pre alarm temperature contacts, electrically separate and with the same characteristics as the trip contacts. They also include a normally closed contact for equipment alarm.

Trip Contacts

Closing: 3000 W resistive for 0.2 sec with a max of 30 A and 300 VDC.

Opening: 50 W resistive, with a max of 2 A and 300 VDC.

Continuous: 5 A.

Alarm Contacts

Closing: 5 A DC for 30 sec, at 250 VDC maximum. Opening: 25 W inductive and 250 VDC max.

Continuous: 3 A.

Settings

With the exception of the current tap Is, the rest of the settings can be made through three push buttons located on the front of the relay: ENTER; +; -; the selected setting value can be seen on the display. A feature common to all the units is the possibility for the user to disable them.

MGC Technical Specifications

MONITORING	
REPEATABILITY	
Operating Value:	1%
Operating Time:	2% or 0.025 sec, whichever is greater
RATINGS	
Nominal Frequency:	50 or 60 Hz, selectable by the user
Nominal Phase Current (I_n):	1 A or 5 A
Nominal Ground Current (I_{GRN}):	5, 1 or 0.02 A (This last setting is recommended when used with toroidal current transformers)

METERING	
ACCURACY	
Operating Value:	5%
Operating Time:	5% or 0.025 sec, whichever is greater
Class E Error Index, Per BS142 for Current and Operating Times:	Class E-5

INPUTS	
BURDENS	
Burden:	Less than 1.5 W at all voltages
THERMAL CAPACITY OF THE CURRENT CIRCUITS	
Current Capacity:	
Continuous:	$2 \times I_n$
3 Sec:	$50 \times I_n$
1 Sec:	$100 \times I_n$
Burdens:	
For Models: $I_n = 5$ A:	0.3 VA
$I_n = 1$ A:	0.3 VA
$I_n = 0.2$ A:	0.08 VA

POWER SUPPLY	
Auxiliary Voltage:	24-48 VDC/VAC, 48-125 VDC/VAC, 110-240 VDC/110-220 VAC (three models)

ENVIRONMENTAL	
Temperature:	
Operating:	-10 to +55°C
Storage:	-40 to +70°C
Relative Humidity:	to 95% without condensing

TYPE TESTS	
Insulation:	
Between Each Terminal and the Chassis:	2000 VAC for one min at industrial freq.
Between Independent Circuits:	2000 VAC for one min at industrial freq.
Between Terminals of Each Output Circuit:	1000 VAC for one min at industrial freq.
Interference Test:	2.5 kV longitudinal, 1 kV transversal, class 111, per IEC 255-4
Impulse Test:	5 kV peak, 1.2/50 ms, 0.5 J, per IEC 255-4
Electrostatic Discharge:	Per IEC 801-2, class III
Radio Interference:	Per IEC 801-3, class III

PACKAGING	
Approximate Weight:	
Net:	8.8 lbs (4 kg)
Shipping:	11 lbs (5 kg)

APPROVALS	
CE Compliant	UL - UL listed for USA and Canada

*Specifications subject to change without notice.

Ordering

To order select the basic model and the desired features from the Selection Guide below.

MGC10	*	OD010	*	00	*
MGC10					Three-pole tripping; 8 rack unit case
	0				5 phase sec, 5 ground sec
	1				5 phase sec, 1 ground sec
	2				5 phase sec, 0.02 ground sec*
	3				1 phase sec, 1 ground sec*
		F			24 - 48 VDC/VAC place auxiliary voltage
		G			48 - 125 VDC/VAC place auxiliary voltage
		H			110 - 240 VDC/110-220 VAC place auxiliary voltage
			C		Individual drawout housing
			S		As part of a MID† drawout system

* This model should be used only with toroidal current transformers for the neutral current signal. For more details, refer to the instruction book.

† Modular Industrial Protection System

Example: Microprocessor generator protection relay, with nominal phase current of $I_n = 5$ A, ground current $I_{GRN} = 1$ A, standard type, with thermal alarm contact, and auxiliary voltage of 48-125 V.

