269 Plus

MOTOR PROTECTION SYSTEM

Integrated protection and control for medium sized AC motors

KEY BENEFITS

- Enhanced Thermal Model including current unbalance and RTD biasing
- Temperature monitoring with programmable RTD inputs for Stator, Bearing and Ambient temperature protection
- Reduce troubleshooting time and maintenance costs – motor running and learned data, last trip data
- Simplify testing - Built in simulation features
- Cost Effective Access to information through standard RS485 serial ports using Modbus RTU
- Field upgradable settings and firmware
- Installation flexibility - Remote display and drawout case options

APPLICATIONS

- Medium size motors

FEATURES

Protection and Control

- Thermal model biased with RTD and negative sequence current feedback
- Stator winding & bearing overtemperature
- Motor multiple starts
- 8 standard overload curves
- User defined overload FlexCurve™
- Undercurrent for load loss
- Locked rotor
- Rapid trip/mechanical jam
- Unbalance/single phasing
- Short circuit
- Ground fault
- Phase reversal (meter option)
- Variable lock-out time
- Latched main trip relay, alarm relay
- 2 auxiliary relays
- Emergency restart capability
- Pre-trip alarm warnings

Monitoring and Metering

- Current & Thermal Capacity metering
- Data Logger
- Learned & Statistical Data
- Optional voltage, power metering

Inputs and Outputs

- 12 RTDs, programmable
- 5 factory programmed digital inputs
- 4 output relays
- 1 programmable analog output

EnerVista™ Software

- State of the art software for configuration and commissioning GE Multilin products
- Document and software archiving toolset to ensure reference material and device utilities are up-to-date
- EnerVista™ Integrator providing easy integration of data in the 269 Plus into new or existing monitoring and control systems

Multilin

Protection and Control

The 269 Plus is a digital relay designed to provide complete and accurate protection for industrial motors and their associated mechanical systems. Protection functions include:

Start and Running

The motor is protected under both acceleration and running conditions. An alarm or trip may occur based on acceleration time, the number of starts per hour, the time between starts, or motor overload conditions.

Overload

One of eight standard overload curves may be programmed based on manufacturer's locked rotor time capability. Alternatively the user may program a custom curve using the built-in FlexCurve™ function. The motor's service factor value is entered as the overload pickup level.

FlexCurve™

A smooth custom overload curve is created within a selected range using FlexCurve™. This curve can be used to protect motors with different rotor damage and stator damage curves, allowing total motor design capacity with complete protection.

Unbalance (Negative Sequence)

Unbalanced supply voltages means a large increase in the negative sequence current which can result in greatly increased rotor heating. The relay uses the ratio of the negative to positive sequence currents to bias the thermal model. Unbalance and phase loss protection is also provided.

Undercurrent (Minimum Load)

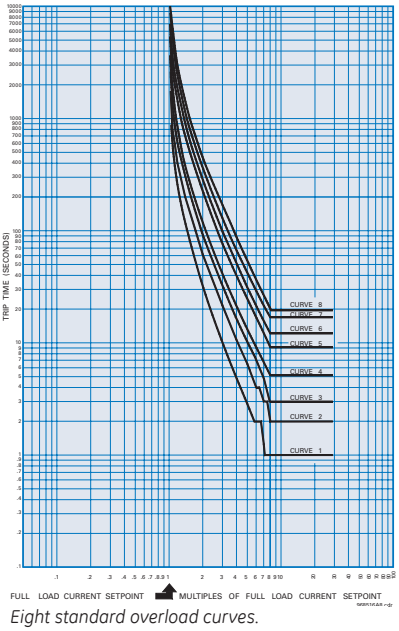
The undercurrent function is used to detect a decrease in motor current caused by a decrease in motor load. This is especially useful for indication of conditions such as loss of suction for pumps, loss of airflow for fans, or a broken belt for conveyors. A separate undercurrent alarm level may be set to provide early warning.

Ground Fault

For zero sequence ground fault protection, all three of the motor conductors must pass through a separate ground fault CT. CTs may be selected to detect either high impedance zero sequence ground faults or residual ground faults. The trip can be instantaneous or time delayed by up to 20 seconds. A low level of ground fault pickup is desirable for maximum stator winding protection. A 50:0.025 A CT or 5 A CT may be used for ground fault detection.

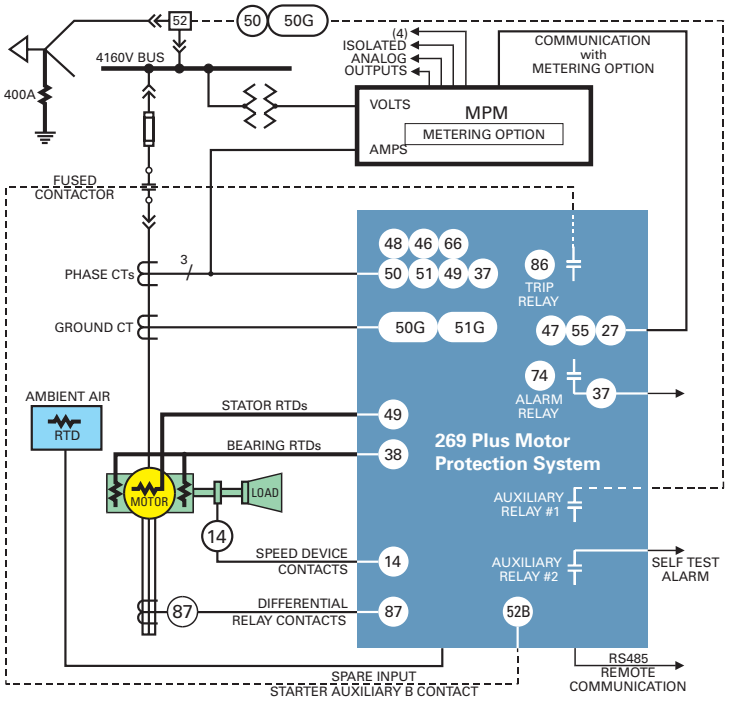
Rapid Trip/Mechanical Jam

Quick motor shut down can reduce damage to gears, bearings, and other mechanical parts associated with the drive combination. A current surge will cause the relay assigned to the rapid trip/mechanical



Eight standard overload curves.

Functional Block Diagram



ANSI Device Numbers & Functions

DEVICE	PROTECTION
14	Speed Device
37	Undercurrent/Minimum Load
38	Motor/Load Bearing Overtemperature
46	Unbalance - Negative Sequence
48	Multiple Starts/Locked Rotor
49	Stator Winding Overtemperature
49/51	Overload Curves/FlexCurve™
50	Short Circuit Mechanical Jam/RapidTrip
50G/51G	Zero Sequence Ground Fault
50N/51N	Residual Ground Fault
52B	Breaker
74	One Alarm Relay,Two Auxiliary Relays
86	Main Trip Latched Relay
	Auxiliary Relay No. 1
	Auxiliary Relay No. 2
87	Differential Relay Contact Input
66	Starts per Hour
47	Volts Phase Reversal (Meter Option)
27	Undervoltage (Meter Option)
	Frequency (Meter Option)
55	Power Factor (Meter Option)

Technical Specifications

PROTECTION

PHASE CURRENT INPUTS

Conversion: Calibrated RMS, sample 2 ms
Range: 0.05 to 12 x phase CT primary amps setpoint
Full scale: 12 x phase CT primary amps setpoint
Accuracy: ±0.5% of full scale
(0.05 to 2 x phase CT primary amps setpoint)
±1.0% of full scale
(over 2 x phase CT primary amps setpoint)
Frequency: 20 – 400 Hz

GROUND FAULT CURRENT INPUT

Conversion: Calibrated RMS, sample time 2 ms
Range: 0.1 to 1.0 x G/F CT primary amps setpoint
(5 A secondary C.T.)
1.0 to 10.0 A, 50:0.025 A (2000:1 ratio)
Full Scale: 1 x G/F CT primary amps setpoint
(5 A secondary C.T.)
10 A (2000:1 C.T.)
Accuracy: ±4% of G/F CT primary amps setpoint
(5 A secondary C.T.)
±0.3 A primary (2000:1 C.T.)
Frequency: 20 – 400 Hz, for 5 A CTs
20 to 150 Hz for 2000:1 CTs

OVERLOAD CURVES

Trip Time Accuracy:
±1 sec up to 13 sec
±8% of trip time over 13 sec
Detection Level:
±1% of primary CT amps

RELAY LOCK-OUT TIME

Accuracy: ±1 min with control power applied
±20% of total lock-out time with no control power applied

UNBALANCE

Display Accuracy:
±2 percentage points of true negative sequence unbalance (In/Ip)

EXPONENTIAL COOLDOWN

Accuracy: ±2% of true exponential

RUNNING HOURS COUNTER

Accuracy: ±1%

POWER SUPPLY

CONTROL POWER

Input: LO: 20 – 60 VDC
20 – 48 VAC: 50/60 Hz
HI:80 – 300 VDC
65 – 265 VAC: 50/60 Hz
Maximum power consumption:
20 VA
Holdup: 100 ms (@ 120 VAC/125 VDC)

INPUTS

RTD INPUTS

Sensor types: 10 Ω copper
100 Ω nickel
120 Ω nickel
100 Ω platinum
(specified with order)
Display accuracy: ±2° C
Trip/alarm setpoint range: 0 – 200° C
Dead band: 3° C
Maximum lead resistance: 25% of RTD 0° C resistance

OUPUTS

RELAY CONTACTS

Voltage		M/C cont.	M/C 0.2 sec	Break
AC resistive	30 VDC	10 A	30 A	10 A
	125 VDC	10 A	30 A	0.5 A
	250 VDC	10 A	30 A	0.3 A
DC inductive (L/R = 7 ms)	30 VDC	10 A	30 A	5 A
	125 VDC	10 A	30 A	0.25 A
	250 VDC	10 A	30 A	0.15 A
AC resistive	120 VAC	10 A	30 A	10 A
	250 VAC	10 A	30 A	10 A
AC inductive PF=0.4	120 VAC	10 A	30 A	4 A
	250 VAC	10 A	30 A	3 A
Configuration:	Form C NO/NC			
Contacts:	Silver Alloy			
Minimal permissible load:	5 VDC, 100 mA; 12VAC, 100 mA			

ANALOG CURRENT OUTPUT (4 – 20 MA STANDARD)

	PROGRAMMABLE		
Output	0 – 1 mA	0 – 20 mA	4 – 20 mA
Max load	2000 Ω	300 Ω	300 Ω
Max output	1.01 mA	20.2 mA	20.2 mA

Accuracy ±1% of full scale reading
Polarity Terminal 58 ("–") must be at ground potential (ie. output is not isolated)
Isolation Non-isolated, active source
Update time: 250 ms max

PRODUCTION TESTS

DIELECTRIC STRENGTH TEST

2200 VAC, 50/60 Hz, for 1 sec
Ground (terminal 42) to Output contacts (terminals 29 to 40)
Control power (terminals 41 and 43)
Current transformer inputs (terminals 72 to 83)

*Specifications subject to change without notice.

CT BURDEN DUE TO CONNECTION OF 269 PLUS RELAY

	CT input	Burden	
	(A) 1 A	(VA) 0.04	(mΩ) 43
Phase CT (1 A)	4 A	0.5	31
	13 A	4.8	28
Phase CT (5 A)	5 A	0.06	2.4
	20 A	1	2.5
	65 A	8.5	2.01
G/F CT (5 A)	5 A	0.08	3
	10 A	0.3	3
G/F CT (50:0.025)	0.025 A	0.435	696 Ω
	0.1 A	3.29	329 Ω
	0.5 A	50	200 Ω

ENVIRONMENTAL

Operating temperature range:
-25° C to +60° C
Humidity: Up to 95%, non-condensing
Altitude: Up to 2000 m
Pollution degree: 2

TYPE TESTS

Dielectric strength: 2.0 kV for 1 min to relays, CTs, power supply
Insulation resistance: IEC255-5, 500 VDC
Transients: ANSI C37.90.1 oscillatory 2.5 kV/1 MHz
ANSI C37.90.1 fast rise 5 kV/10 ns
Ontario Hydro A-28M-82
IEC255-4 impulse/high frequency disturbance
Class III level
Impulse test: IEC 255-5 0.5 J 5 kV
RFI: 50 MHz/15 W transmitter
EMI: C37.90.2 electromagnetic interference @ 150 MHz and 450 MHz, 10 V/m
Static: IEC 801-2 static discharge
Humidity: 95% non-condensing
Temperature: -25° C to +60° C ambient
Environment: IEC 68-2-38 temperature/humidity cycle
Dust/moisture: NEMA 12/IP53

PACKAGING

Weight: 8.6 lbs (3.9 kg)
Shipping Dimensions: 16" x 11" x 7"
(40.6 cm x 27.9 cm x 43.2 cm)

APPROVALS

ISO: Manufactured to an ISO9001 Certified Program
UL: Recognized under E83849
CSA: Approved under LR41286
CE: Conforms to IEC 947-1, 1010-1
Conforms to EN55011/CISPR11, EN50082-2

Dimensions

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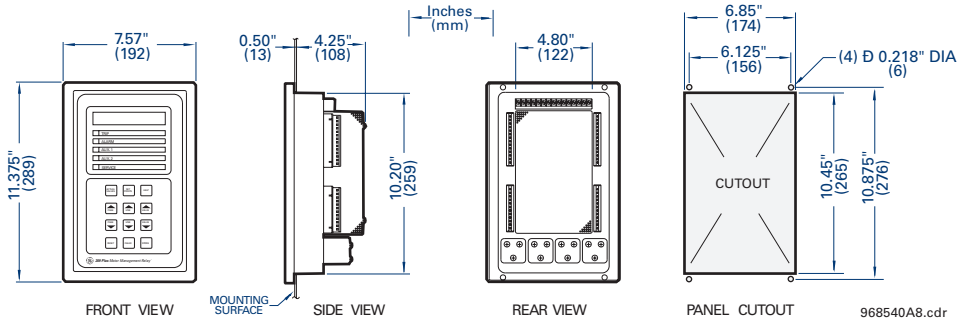

269 Plus Drawout