M Family

Modular Microprocessor Relays

An economical choice for standard

digital relaying applications.

Features and Benefits

- Advanced 16-bit microprocessor
- Configurable logic, curves, digital I/Os _NEW = enerVista.com compatible (see page 275) and LEDs
- Flash memory for field upgrades
- Two settings groups
- Modular construction for serviceability and reduced spare costs

Applications

- Feeder protection, any voltage level
- Main protection for small generators and motors
- Backup/auxiliary protection for transformers, motors, generators and busbars
- Overload protection
- Automatic transfer equipment
- Load shedding and restoration schemes

- Backup directional overcurrent protection
- Directional power protection

Monitoring and Metering

- Current, voltage, frequency, thermal image
- Analog/digital oscillography (optional)
- Event recording up to 32 events
- Self-diagnostics

User Interfaces

- M+PC software for setting, monitoring
- RS232 port, faceplate accessible (19,200 bps, ModBus® RTU)
- RS485 rear port (19,200 bps, ModBus[®] RTU)
- LED dot matrix display and keypad
- Target LED indicators



2

Protection

Multiple Settings Groups

Two separate settings groups are stored in the nonvolatile memory, with only one group active at a given time. Switching between setting groups 1 and 2 can be done by means of a setting, a communication command or contact input activation.

This allows users to have access to main relay functionalities in an extremely simple, user-friendly way by entering only main settings. Access to complete functionality for more complex use is available through advanced settings.

Features and Benefits

Event Recording

Events consist of a broad range of change of state occurrences, including pickups, trips, contact operations, alarms and self-test status. M Family relays store up to 32 events, time tagged to the nearest millisecond. This information is invaluable in determining power system and relay operations. A user can inhibit the logging of selected events to aid in post-event analysis.

Oscillography

M Family relays capture current waveforms and digital channels at eight samples per cycle. One oscillography record with a maximum length of 32 cycles is stored in memory. Oscillography is triggered either by internal signals or external contacts.

Configurable I/Os

M Family products have two configurable contact inputs and four configurable contact outputs. The configurable outputs can be latched. These units also have a fixed Trip and Service contact output. I/O and LED configurations are programmed using M+PC software.

1993 1997 1997	0 10			ľ	5			
	In-Conference in a	-		1.00		-	-	-
	Firmers high	11	-11				- 10	
	Second 19	-		1.0			10	
114	***	-	-	1.1	10		1.0	1.0
+0+	Palage	-			1.00		- 10	
10 PC	an Lastrador Anno 199			-	-			
49.01	B118			21	18			
April 1	and and		•	2	11	-	_	× .

Breaker Failure Protection (optional)

A simple "breaker has not opened" feature is standard. A more complex breaker failure scheme can be easily implemented through the use of a digital input and configurable output logic (logic gates and timers).

Breaker Health (optional)

The breaker health threshold is set by the user to achieve "just in time" maintenance. When the cumulative l^2 value exceeds the threshold, an alarm occurs.

Configurable Logic (optional)

Up to four programmable logic schemes can be implemented by means of a set of four logic gates and timers, using the graphical user interface provided. The outputs from programmable logic can operate contact outputs or faceplate LEDs.

Metering

Phase and ground current, voltage, frequency and thermal image are measured with a maximum error of $\pm 3\%$ across the range.

User Interfaces

Faceplate LEDs

Six LEDs are provided on the relay faceplate. Two are assigned to indirect trip status and relay in service. Four LEDs are userconfigurable, and can be assigned to various duties (trips, alarms, etc.) LEDs can be set to flash onoff and to be latched.

Keypad and Display

A three button keypad allows user access for easy relay interrogation and change of settings. Metering data, last trip information and settings are displayed through the LED dot matrix display. Note that full access to the event and oscillography records and unit configuration is possible only through PC communication.

Self-Test Diagnostics

Comprehensive self-test diagnostics occur at power up and continuously during relay operation. Any problem found by self-tests causes an alarm and an event is logged.

Communications

A front mounted RS232 and a rear RS485 port allow easy user interface via a PC. ModBus® RTU protocol is used for all ports. The relay supports baud rates from 300 to 19,200 bps. Up to 32 M Family relays can be addressed on a single communications channel. A unique address must be assigned to each relay via a setting when multiple relays are connected.

M+PC Software

A single PC software package is required to access, configure, and monitor all relays in the M Family regardless of their model, application, or available options. The M+PC software extracts the model number, version, and configuration parameters from the connected relay to display only the relevant data and options for the relay with which it is communicating. This eliminates having to manually configure the relay within the software and provides a simple and easy to use operator user interface.

All M Family products are supplied with Windows®-based M+PC software. M+PC allows communication among M Family relays for monitoring, setting changes, information and configuration. Keep track and react to all relay status data with ease.



The M+PC software program may be run on a PC with the Windows[®] 95/98/NT operating systems. The program may be used locally on the RS232 front serial port or remotely on the RS485 port. It provides full access to the relay data with the following features:

- View actual values
- View relay status
- View/edit settings on-line/off-line
- View event recorder for troubleshooting
- Configure inputs, outputs and LEDs through programmable logic
- Utilize a custom protection curve
- Upgrade relay firmware

All status information such as target messages and digital I/O states may be viewed with the M+PC software.

Evaluation

M+PC software may be used offline to simulate the connection to any M Family relay. This mode allows the user to:

- View status, settings and protection units incorporated in the selected model
- Create setting files for future download to the physical relay

M Family Feature Comparison

	FEATURES	DEVICE	MIF	MIG	MIN	MIP	MIV	MIW
	Phase Undervoltage	27P						
	Directional Low Forward Power	32LF						
	Directional Reverse Power	32RP						
	Loss of Excitation	40						
	Current Unbalance	46						
	Voltage Unbalance	47						
	Thermal Image Unit	49						
	Ground Overvoltage	59N						
	Ground IOC	50NH/50NL						
	Phase IOC	50PH/50PL						
	Ground TOC	51N						
_	Phase TOC	51P						
N	Phase Overvoltage	59						
E	Fuse Failure	VTFF						
E	Ground Directional	67N						
PRC	Isolated Ground Directional	67IG						
	Petersen Coil Ground Directional	67PC						
	Loss of Mains	78						
	Overfrequency	810						
	Underfrequency	81U						
	Starts per Hour and Locked Rotor							
	Undercurrent							
	Restricted Earth Fault	87R						
	Breaker Failure Protection		0					
	Programmable I/O and LEDs		0					
	Breaker Arcing Current		0					
	Programmable Logic		0					
	Multiple Settings Groups							
DN DI	Event Recorder		0					
AND	Oscillography		0					
M	Thermal Capacity							
NS	Alphanumeric Display							
ATIO	Three-Button Keypad							
NIC .	ModBus [®] Communications							
MM	RS232 Serial Port							
8	RS485 Serial Port							

Dimensions

The M Family of products have a drawout construction in four-inch wide modules for relays including current channels or in two-inch wide modules for relays including only voltage channels. These drawout modules may be mounted in standard 19" racks, half racks, individual cases, or supplied with depth reducing collar for space efficiency.



2

M Family Common Technical Specifications

PROTECTION	
PHASE TIME OVERCURREN	NT (51P)
Pickup level:	10 - 240% of CT rating
Curve shapes:	Definite time, inverse, very inverse,
Time multiplier	extremely inverse, custom
Definite time	Un to 99 99 sec (10 msec steps)
Accuracy:	
Level:	±3% in the complete range
Time:	Greater of ±3% or ±25 ms
GROUND TIME OVERCURR	ENT (51N)
Pickup level:	10 – 240% of CT rating
Curve shapes:	Definite time, inverse, very inverse,
Time multiplies	extremely inverse, custom
Definite time	Un to 99 99 sec (10 msec steps)
Accuracy:	
Level:	±3% in the complete range
Time:	Greater of ±3% or ±25 ms
PHASE INSTANTANEOUS	50PH & 50PL)
Pickup level:	10 – 3000% of CT rating
Definite time:	Up to 99.99 sec (10 msec steps)
Accuracy:	+3% in the complete range
Time:	Greater of ±3% or ±25 ms
GROUND INSTANTANEOU	S (50NH & 50NL)
Pickup level:	10 - 3000% of CT rating
Definite time:	Up to 99.99 sec (10 msec steps)
Accuracy:	2% in the complete range
Level: Time	rain the complete range Greater of +3% or +25 ms
	0100101 01 ±0/0 01 ±20 1115
GROUND DIRECTIONAL (6)	(N)
Torque angle: Direction	-ou , +ou (1 steps) Forward/back (rew)
Loss of voltage polarizatio	n logic:
3	Enable/disable
ISOLATED CROUND DIREC	TIONAL (67IC) (MIN OPTION S)
Voltage pickup levels:	Vh 2 – 70 V in steps of 0.01 V
5	Vi 2 – 70 V in steps of 0.01 V
Current pickup levels:	I low 5 – 400 mA in steps of 1 mA
Definite time:	I ni 5 – 400 mA in steps of 1 mA
Instantaneous trin deviatio	0 - 99.99 Sec III steps of To Hisec
instantaneous aip uoviatio	0 – 99.99 sec in steps of 100 msec
Torque angle:	-90°, +90° (1° steps)
PETERSEN COIL GROUND	DIRECTIONAL (67PC)
Voltage pickup levels:	Vh 2 – 45 V in steps of 0.1 V
Current pickup levels:	I low 5 – 100 mA in steps of 1 mA
Real power pickup levels:	10 – 4500 mW in steps of 0.1 mW
Definite time: Instantaneous trin deviatio	0.03 – 3 Sec in steps of 10 msec
instantaneous arp acviate	1 – 10 sec in steps of 100 msec
Torque angle:	-90, +90 (0.01 steps)
DIRECTIONAL REVERSE PO)WER (32RP)
Power pickup level:	0.01 – 0.99 x Rated MW
Time delay:	0.2 – 120 seconds in steps of 0.1
Block from online:	U – 5,000 sec.
DIRECTIONAL LOW FORW	ARD POWER (32LF)
Power pickup level:	0.01 – 0.99 x Rated MW
lime delay: Block from online:	0.2 – 120 seconds in steps of 0.1
BIOCK ITOIN OININC.	0 13,000 300.
LOSS OF EXCITATION (40)	0 F 000 share
Circle 1 diameter:	2.5 – 300 0nm 2.5 – 150 ohm
Circle 1 trip delay:	0.1 – 10 sec
Circle 2 diameter:	2.5 – 300 ohm
Circle 2 offset:	2.5 – 150 ohm
urcle 2 trip delay:	u. I – IU sec
THERMAL IMAGE UNIT (49)
Tap current:	10 – 240% of CT rating
T1	3 – 600 min
T2	1 – 6 x T1
ĸ	1-1.2
Alarm level:	70 - 100%
PHASE UNDERVOLTAGE (2	7P)
Pickup level:	2.0 to 60 V or 10 to 250 V in steps of 0.1
	(depending on model)
Curve shapes: Time delay:	Definite time
Accuracy:	0.0 to 000 Sec III Steps OF 0.01
Level:	±3% over the complete range
Time:	Greater of ±3% or ±25 ms
PHASE OVERVOLTAGE (59) Pickup level:	2.0 to 60 V or 10 to 250 V in steps of 0.1
PHASE OVERVOLTAGE (59) Pickup level:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model)
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or +25 ms
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: Curpound over the state of the state	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5)	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms SN) 2.0 _60 V or 10_250 V in steps of 0.1
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5 Pickup level:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms SN) 2.0 – 60 V or 10 – 250 V in steps of 0.1 (depending on model)
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5 Pickup level: Curve shapes:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms 9N) 2.0 – 60 V or 10 – 250 V in steps of 0.1 (depending on model) Definite time
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5 Pickup level: Curve shapes: Time delay:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms SN) 2.0 - 60 V or 10 - 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5 Pickup level: Curve shapes: Time delay: Accuracy:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms SN) 2.0 = 60 V or 10 - 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 #2% over the product
PHASE OVERVOLTAGE (59) Pickup level: Curve shapes: Time delay: Accuracy: Level: Time: GROUND OVERVOLTAGE (5 Pickup level: Curve shapes: Time delay: Accuracy: Level: Time:	2.0 to 60 V or 10 to 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±25 ms SN) 2.0 - 60 V or 10 - 250 V in steps of 0.1 (depending on model) Definite time 0.0 to 600 sec in steps of 0.01 ±3% over the complete range Greater of ±3% or ±5° ms

PROTECTION	
VOLTAGE LINBALANCE (47)	
Pickup level	2.0 to 60 V or 10 to 250 V in stone of 0.1
i lokup lovol.	(depending on model)
Curvo chonoo:	Definite time
Time deleur	0.0 to 600 coo in stone of 0.01
Time delay:	0.0 to 600 sec in steps of 0.01
Accuracy:	00/ 11 1.
Level:	±3% over the complete range
Time:	Greater of ±3% or ±25 ms
OVERFREQUEINCT (010)	Veltage (Dhees D)
Source:	Voltage (Flase D)
Pickup level:	42.0 to 67.5 Hz in steps of 0.01 Hz
Time delay:	0.0 to 600 sec in steps of 0.01
Voltage inhibit setting:	30 to 250 V/10 to 60 V in steps of 0.01
UNDERFREQUENCT (010)	Vales as (ales as D)
Source:	Voltage (phase B)
Pickup level:	42.0 to 67.5 Hz in steps of 0.01 Hz
Time delay:	0.0 to 600 sec in steps of 0.01
Voltage inhibit setting:	30 to 250 V/10 to 60 V in steps of 0.01
CURRENT UNBALANCE (46)
Distant Israel	F 00% of CT actions
PICKUP level:	5 - 99% of CT rating
Definite time:	Up to 99.99 sec (10 msec steps)
Curve shapes:	$I^2t = K$
Time multiplier:	K: 1 – 100
Accuracy:	
Level:	±3% in the complete range
Time:	Greater of ±3% or ±25 ms
STARTS/HOUR AND LOCKE	D ROTOR
Pickup level:	101 – 1000% of CT rating
Definite time:	0.1 – 99.9 sec
Time window:	10 – 100 min
Number of starts:	1 - 10
Restart block time	10 – 100 min
UNDERCURRENT (37)	
Pickup level:	10 – 99% of CT rating
Definite time:	0 – 99.99 sec
METERING	
Frequency:	±5m Hz
Voltage/current	+3% over the complete range
THERMAL CAPACITY	10/0 of of the complete range
Current circuits:	
Continuously:	4 × 1
During 2 cool	FO VI
During 1 sec.	
During i sec.	IOU X In
MONITORING (OP	TIONAL
USCILLUGRAPHY	
Records:	1 x 24 cycles
Sampling rate:	8 samples per power frequency cycle
Triggers:	Any element pickup or operate
	Digital input change of state
	Digital output change of state
	Communication command
Data: AC input shannal-	Communication Commanu
vala.AC input channels	Divite Line of a stand of a second
	Digital input/output channels
	Self-test events
EVENT RECORDER	
Consoitu	24 overte (22 in MIE)
Capacity.	Zer Gvenia (JZ III IVIIF)
rune-iao:	TO T HIMISECOND

 Time-tag:
 To 1 millisecond

 Triggers:
 Any element pickup, operate or reset

 Digital input/output change of state
 Self-test events

 RANGES:
 Current:
 0.2 – 30 x I_n

 Voltage:
 Pickup level
 Self-test events

 TRIPPING CONTACTS
 Contact capacity:
 Self-test events

Max. op Continu Make a Breakin	erating ous curi nd carry ig:	voltage: 400 V rent: 16 A r: 30 A 4000	VAC VA		
OUTPUT REL/ Configuration: Contact mater Operate time: Max ratings f	AYS : ial: for 10000	6 ele silve 8 ms 10 operations:	ctromechanica r alloy suited fo	al Form C or inductiv	e loads
VOLTAGE		MAKE/CARRY	MAKE/CARRY	BREAK	
DC Resistive	24 VDC	16 A	48 A	16 A	384 W
	48 VDC	16 A	48 A	2.6 A	125 W
	125 VDC	16 A	48 A	0.6 A	75 W
	250 VDC	16 A	48 A	0.5 A	125 W
DC Inductive	24 VDC	16 A	48 A	8 A	192 W
	48 VDC	16 A	48 A	1.3 A	62 W
	125 VDC	16 A	48 A	0.3 A	37.5 W
(L/R = 40 ms)	250 VDC	16 A	48 A	0.25 A	62.5 W
AC Resistive	120 VAC	16 A	48 A	16 A	1920 VA
	250 VAC	16 A	48 A	16 A	4000 VA
AC Inductive	120 VAC	16 A	48 A	6 A	720 VA
PF=0.4	250 VAC	16 A	48 A	5 A	1250 VA

INDUTS						
INPOIS						
BURDENS	0.0.1/4					
Voltage circuits:	0.2 VA					
Current circuits:	0.1 VA TOF In= 5					
DC hundens	0.02 VA for I _n =	IA				
Durden:	10.14/					
During operation:	10 VV	105				
Fel each activateu in	put. o mAy i vv, v _{au}	₍ . 125				
COMMUNICATION	IS					
Local communication:	Alphanumeric disp	lav:				
	3 button frontal key	/pad				
Remote communication						
(local or remote PC and communications net):						
Mode:	ModBus® RTU					
Speed:	300 to 19,200 bps					
· · ·	· ·					
POWER SUPPLY						
Frequency:	50/60 Hz					
Nominal phase current:	1 or 5 A (depending	on model)				
Nominal ground current:	1 or 5 A (depending	on model)				
Auxiliary voltage:	24 – 48 VDC, ±20%					
	110 – 250 VDC, 110 -	- 220 VAC ±20%				
	ADACTEDICT	00				
MECHANICAL CH	ARACTERISTI	cs				
	or 19" rack and four uni	its high				
 Metallic package in quarte 		Frontal MMI with display and keypad				
 Metallic package in quarte Frontal MMI with display a 	ind keypad	•				
 Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po 	ind keypad ints on the front (1) and I	RS485 on the rear				
 Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (according) 	ind keypad ints on the front (1) and I ording to IEC 529)	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (acco	ind keypad irts on the front (1) and I ording to IEC 529)	RS485 on the rear				
Metallic package in quarter Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (acco ENVIRONMENTAL	ind keypad irts on the front (1) and I ording to IEC 529)	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (acc) ENVIRONMENTAL Temperature	ind keypad ints on the front (1) and I ording to IEC 529)	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (accr ENVIRONIVIENTAL Temperature Storage:	-40° C to +80° C	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB3 connector for R5222 po Protection class IP52 (acco INVIRONIVIENTAL Temperature Storage: Operation:	-40° C to +80° C -20° C to +80° C	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB9 connector for R522 p Protection class IP52 (acc: ENVIRONIMENTAL Temperature Storage: Operation: Humidity:	-40° C to +80° C -20° C to +80° C Up to 95% without co	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB9 connector for RS232 po Protection class IP52 (accr ENVIRONIMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS	-40° C to +80° C -20° C to +80° C Up to 95% without c	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB8 connector for R522 po Protection class IP52 (acco ENVIRONIVIENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Type Tests	-40° C to +80° C -20° C to +80° C -20° C to +80° C -20° C to +80° C -20° C to +80° C	RS485 on the rear				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (acc: ENVIRONIMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Surge test voltage:	-40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c	condensing				
Metallic package in quarte Frontal MMI with display a DB3 connector for R5222 po Protection class IP52 (acco ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Surge test voltage: Interference:	A 0' took the foot of the foot of the foot of the front (1) and 1 ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class III according to the foot of the foot	condensing				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (according to the second secon	- 40° constant of our display	condensing				
Metallic package in quarte Frontal MMI with display a DBS connector for RS22 p Protection class IP52 (acc: ENVIRONIVIENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Interference: Electrostatic discharge: Badio interference:	-40° C to +80° C -20° C to +80° C -20° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according Class IV according Class IV according	condensing				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (according to the second secon	nd keypad rts on the front (1) and I ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class III according Class III according Class III according	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-3				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (accident of the second	-40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according Class IV according Class IV according Class IV according	condensing				
Metallic package in quarte Frontal MMI with display a DB3 connector for R5222 po Protection class IP52 (according to the second seco	-40° C to +80° C -20° C to +80° C -20° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according I Class II according I Class II according I Class II according I Class II according I	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-21-1 0. IEC60255-21-1 0. IEC60255-21-1				
Metallic package in quarte Frontal MMI with display a DB3 connector for R5232 p Protection class IP52 (according to the second secon	-40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV pe60, 0, 5 J Class II according 1 Class IV according Class IV according 1 Class IV according 1 Class IV according 1 Class II according t Class II according t	to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-21-1 IEC60255-21-1 IEC60255-21-1				
Metallic package in quarte Frontal MMI with display a DB3 connector for R322 p Protection class IP52 (accel ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Isolation test voltage: Interference: Electrostatic discharge: Radio interference: Fast transient: Sinusoidal vibration: Shock: Radiofrequency emission:	-40° C to +80° C -40° C to +80° C -20° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according I Class II according I Class II according I Class II according I Class II according t Class II according t According to IEC 41	to IEC60255-22-1 to IEC60255-22-1 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-21-2 B (Sec 81) and				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (acceleration) Environment of the second	- dt keypad rts on the front (1) and I ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according t Class II according t Class II according t Class II according t Class I according t Class I according t Class I according t Class I according t Scording to IEC 41 EN55022 Class B nsient:	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-21-1 IEC60255-21-1 IEC60255-21-2 B (Sec 81) and				
Metallic package in quarte Frontal MMI with display a DB3 connector for R5232 p Protection class IP52 (according to the second secon	-40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according 1 Class IV according 1 Class IV according 1 Class IV according to Class IV according to Class I according to Class I according to Class I according to According to IEC 41 ENS5022 Class B sisient: ANSI/IEEE C 37.90.1	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-1 to IEC60255-21-1 IEC60255-21-2 B (Sec 81) and				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 pp Protection class IP52 (acceleration) Total MMI with display a torage: Operation: Humidity: TYPE TESTS Isolation test voltage: Interference: Radio interference: Fast transient: Sinusoidal vibration: Shock: Radiofrequency emission: Oscillatory/fast risetime tran Electrostaric discharge: Isolation test results	-40° C to +80° C -40° C to +80° C -20° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according 1 Class II according 1 Class II according 1 Class II according to Class II according to Class II according to Class II according to Elass I according to Elas	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-21-1 0 IEC60255-21-2 B (Sec 81) and				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (acceleration) Type Tests Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Interference: Fast transient: Sinusoidal vibration: Shock: Radiofrequency emission: Oscillatory/fast risetime tran Electromagnetic interference	- dv kevpad rts on the from(1) and 1 ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according t Class II according t Class IV according to Class IV according to Class II according to Class	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-22-4 IEC60255-21-1 IEC60255-21-1 JEC60255-21-2 B (Sec 81) and y:				
Metallic package in quarte Frontal MMI with display a DB3 connector for R322 p Protection class IP52 (accr ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Isolation test voltage: Interference: Radio interference: Radio interference: Sinusoidal vibration: Shock: Radiofrequency emission: Oscillatory/fast risetime tran Electromagnetic interference:	-40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according to Class IV according to Class IV according to Class IV according to Class IV according to According to IEC 41 EN55022 Class B sient: ANSI/IEEE C 37.90.1 e withstand capabilit	to IEC60255-22-1 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-22-4 to IEC60255-21-2 B (Sec 81) and y:				
Metallic package in quarte Frontal MMI with display a DB3 connector for RS22 p Protection class IP52 (accr ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Interference: Radio interference: Fast transient: Sinusoidal vibration: Shock: Radiofrequency emission: Oscillatory/fast risetime tran Electromagnetic interference: PacKAGING	-40° C to +80° C -40° C to +80° C -20° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according t Class IV according t Class II according t Class II according to Class II according to EC st HNS5022 Class B sient: ANSI/IEEE C 37.90.2	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-21-1 o IEC60255-21-2 B (Sec 81) and Y:				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (acceleration) Type TESTS Isolation test voltage: Interference: Radio interference: Fast transient: Shock: Radiofrequency emission: Oscillatory/fast risetime trai Electrostatic interference: Isolation yifast risetime trai Electrostatic interference: Shock: Radiofrequency emission: Oscillatory/fast risetime trai Electrostatic interference: Electrostatic interference: Shock: Radiofrequency emission: Oscillatory/fast risetime trai Electrostatic interference: Electrostatic interference: PACKAGING Approximate weight:	- 40° C to +80° C -40° C to +80° C -20° C to +80° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class III according 1 Class III according 1 Class III according 1 Class III according 1 Class II according to Class II according to Class II according to Class I according	Condensing to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-21-1 IEC60255-21-1 IEC60255-21-1 y: Condensing				
Metallic package in quarte Frontal MMI with display a DB3 connector for RS22 p Protection class IP52 (accr ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Interference: Radio interference: Fast transient: Sinusoidal vibration: Shock: Radiofrequency emission: Oscillatory/fast risetime tran Electrostaric discharge: Isolation test reference: Sandiofrequency emission: Oscillatory/fast risetime tran Electrostaric discharge: Radiofrequency emission: Oscillatory/fast risetime tran Electrostaric discharge: Not: Net:	-40° C to +80° C -40° C to +80° C -20° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according t Class II according t According to IEC 41 EN5502 Class B nsient: ANSI/IEEE C 37.90.1 Two 4-rack 8.8 lbs (4 kgs)	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-3 to IEC60255-21-1 IEC60255-21-1 IEC60255-21-1 IEC60255-21-2 B (Sec 81) and y: 				
Metallic package in quarte Frontal MMI with display a DB3 connector for R522 po Protection class IP52 (acceleration) Environment of the second	- dv kevpad rts on the from(1) and 1 ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according t Class II according t Class II according t Class I according to Class I according t	Condensing to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-22-4 to IEC60255-21-1 IEC60255-21-1 IEC60255-21-2 B (Sec 81) and y: One 8-rack 3.9 lbs (2.7 kg) 7 lbs (3.2 kg)				
Metallic package in quarte Frontal MMI with display a DB3 connector for R322 p Protection class IP52 (accr ENVIRONMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Isolation test voltage: Interference: Radio interference: Radio interference: Sincek: Radiofrequency emission: Oscillatory/fast risetime tran Electromagnetic interference PACKAGING Approximate weight: Net: Ship:	-40° C to +80° C -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according to Class IV according to Class I according to According to IEC 41 ENS502C Lass B sient: ANSI/IEEE C 37.90.2 Two 4-rack 8.8 lbs (4 kgs) 9.3 lbs (4 kgs)	Condensing to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-4 to IEC60255-21-1 IEC60255-21-2 B (Sec 81) and y: Cone 8-rack 3.9 lbs (2.7 kg) 7 lbs (3.2 kg)				
Metallic package in quarte Frontal MMI with display a DB3 connector for RS22 p Protection class IP52 (accr ENVIRONIMENTAL Temperature Storage: Operation: Humidity: TYPE TESTS Isolation test voltage: Surge test voltage: Interference: Electrostatic discharge: Radiofrequency emission: Oscillatory/fast risetime trait Electromagnetic interference PACKAGING Approximate weight: Nei: Ship: APPROVALS	- da keypad rts on the front (1) and 1 ording to IEC 529) -40° C to +80° C -20° C to +60° C Up to 95% without c 2 kV, 50/60 Hz, 1 min 5 kV peak, 0.5 J Class II according ti Class I according to Class I according to According to IEC 41 EN55022 Class B siont: ANSI/IEEE C 37.90.2 Two 4-rack 88 lbs (4 kgs) 9.1 bs (4.5 kgs)	to IEC60255-22-1 to IEC60255-22-2 to IEC60255-22-2 to IEC60255-22-3 to IEC60255-21-2 B (Sec 81) and y: 				

 ISO:
 Manufactured under an ISO9001 registered system.

 C€:
 Conforms to EN 55011/CISPR 11, EN 50082-2, IEC 947-1, 1010-1

 UL - UL listed for USA and Canada

*Specifications subject to change without notice.

M Family Guideform Specifications

For an electronic version of the M Family guideform specifications, please visit: www.GEindustrial.com/ Multilin/specs, fax your request to 905-201-2098 or email to literature.multilin@indsys.ge.com.



enerVista enabled See page 275. www.enerVista.com