



MiCOM P12x/y

Three phase and earth fault
overcurrent relays

The MiCOM P12x/y relays are suitable for all the applications where overcurrent and earth-fault protection are required.

The P12x non-directional relays ranges from the single phase/earth fault P120 up to the multifunction three phase and earth fault P123.

The P12y directional relays ranges from the single phase/earth fault P125 up to the multifunction three phase and earth fault P127, complete of voltage functions.

MiCOM P12x and P12y relays provide features for easy adaptation to different applications and operation conditions.

The simple and powerful interface on the relay front and the setting software MiCOM S1 allow the user easy configuration and access to all measurements and stored information for maintenance and post-fault analysis purposes.

Selection of integrated communication protocols allows interfacing substation control or SCADA system.

This family of MiCOM relays is housed in the same draw out 4U metal case for panel or rack mounting with 20TE width (P120, P121, P122, P123 and P125) or 30TE width (P126 and P127).

Customer Benefits

- Highly flexible current relay
- Fully configurable direction determination
- Additional wattmetric or $I \cdot \cos \phi$ earth fault protection
- Multi-shot Autoreclose
- Full set of measurement, metering, and recording

APPLICATION

The MiCOM P12x and P12y provides a wide range of protection functions;
typical applications are:

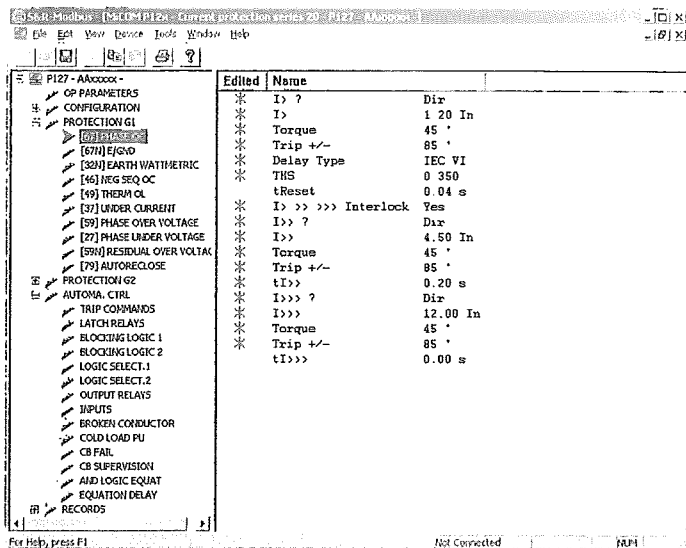
- Overhead lines and underground cables, backup on HV systems
- Insulated, solid earthed, resistance earthed, and Petersen coil earthed neutral systems
- MV subscribers, Industry, Transport
- Generator and transformer scheme

GLOBAL FUNCTIONS

The following functions are generally available in all devices (see table below):

- Input quantities' measurement and metering
- Dynamic average values, max peak value and rolling demand for the current measurements
- Disturbance recording including all the CT/VT inputs and logic status
- Fault recording
- Event recording

FUNCTIONS OVERVIEW		P120	P121	P122	P123	P125	P126	P127
67/50/51	Three phase directional non directional overcurrent							•
50/51	Three-phase overcurrent		•	•	•		•	
49	Thermal overload			•	•		•	•
37	Three-phase undercurrent			•	•		•	•
46	Negative phase sequence overcurrent			•	•		•	•
67N/50N/51N	Earth fault directional non directional overcurrent					•	•	•
50N/51N	Earth fault (Single-phase) overcurrent	•	•	•	•			
32N	Earth fault Wattmetric / $I_e \cdot \cos\phi$					•	•	•
59N	Residual overvoltage					•	•	•
27/59	Phase/Line under/ overvoltage							•
79	Autoreclose				•		•	•
	Switch on to fault (SOTF)				•		•	•
	CB control Local/ remote				•	•	•	•
	Phase current rotation			•	•			
50BF	Circuit breaker failure detection			•	•		•	•
	Circuit Breaker Maintenance and Trip Circuit Supervision			•	•		•	•
46BC	Broken conductor detection I2/I1			•	•		•	•
	Cold load pick up			•	•		•	•
86	Output relay latching	•	•	•	•	•	•	•
	Blocking Logic	•	•	•	•	•	•	•
	Selective relay scheme logic			•	•		•	•
	Relay maintenance mode			•	•	•	•	•
	Remote control of output relays			•	•			
	Setting groups	1	1	2	2	2	2	2
	Programmable AND logic						•	•
	VT supervision (VTS) and logic application							•
	Auxiliary timers			•	•	•	•	•
	Measurements	•	•	•	•	•	•	•
	Peak and rolling values			•	•		•	•
	Power and Energy measurement							•
	Fault records			•	•		•	•
	Elapsed time of protection starting			•	•		•	•
	Event records			•	•		•	•
	Disturbance recording			•	•		•	•
	Binary inputs / output relays	2/4	2/4	3/6	5/8	4/6	7/8	7/8
	AC current / voltage inputs	1/0	4/0	4/0	4/0	1/1	4/1	4/3
	Modbus RTU	•	•	•	•	•	•	•
	IEC 60870-5-103	•	•	•	•	•	•	•
	Courier	•	•	•	•			
	DNP3	•	•	•	•			
	Setting software MiCOM S1	•	•	•	•	•		



Simple Function Selection by Mouseclick with S1

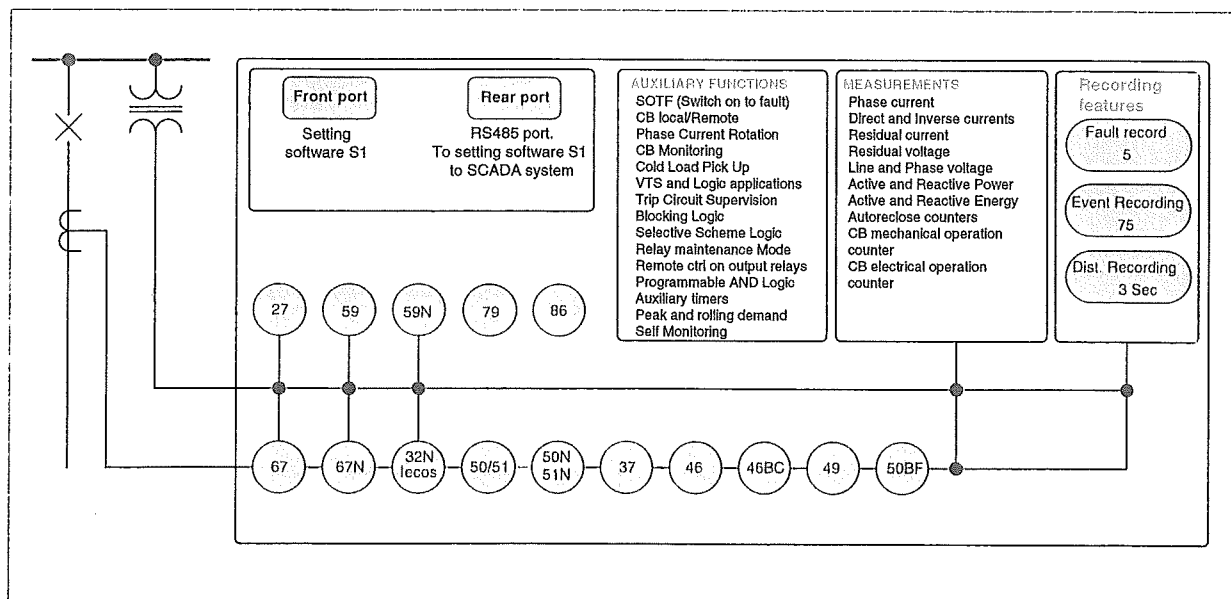
MAIN FUNCTIONS

The relays of these ranges are comprised of full suite of protection functions as well as automatic recloser and auxiliaries; each function can be individually configured or disabled to suit any particular application.

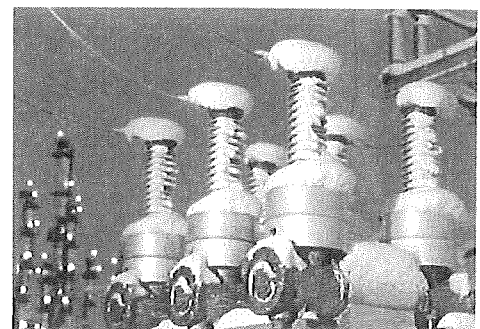
All the available functions, including protection, automation, communication, leds, inputs and outputs, are easy programmable by means of the user-friendly front panel interface and the S1 software interface.

The 32 alphanumeric back-lit LCD (available in a range of languages) provides the user with key information (faults, measurements, settings, etc). The menus have a pull-down structure for easy use and quick access to any data.

FUNCTIONAL OVERVIEW



MiCOM P12x & P12y
provide simple
and complete solution
for your specific application.



THREE-PHASE OVERCURRENT PROTECTION (50/51)

EARTH FAULT OVERCURRENT PROTECTION (50N/51N)

Three independent stages are available either for phase and earth fault protection. For the first and second stage the user may independently select definite time delay or inverse time delay with different type of curves (IEC, IEEE/ANSI, RI, RECT). The third stage can be configured for peak detection and with definite time only. Each stage and related time delay can be programmed to provide maximum selectivity. The IDMT stages have reset definite or IDMT timer to reduce clearance times when intermittent faults occur.

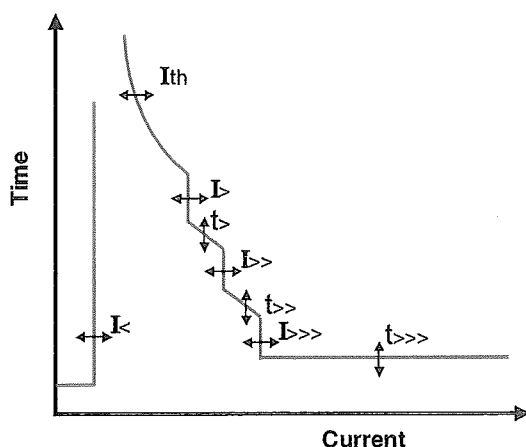
The MICOM P12x/y relays have separate instantaneous and delayed information for each stage. P126 & P127 can indicate the phase(s) in fault by configuring output relays (first stage only). The range of earth fault current sensitivity can be selected by ordering code

THREE-PHASE DIRECTIONAL OVERCURRENT (67)

Each of the three-phase overcurrent stages of P127 can be independently configured as directional protection and with specific characteristic angle (RCA) and boundaries. Each directional stage makes available instantaneous reverse (mirror) information.

The phase fault directional elements are internally polarised by quadrature phase-phase voltages. A synchronous polarising function is provided to ensure a correct operation of the overcurrent elements for close-up three phase faults where the collapse of the polarising line voltages occurs.

Tripping Characteristics

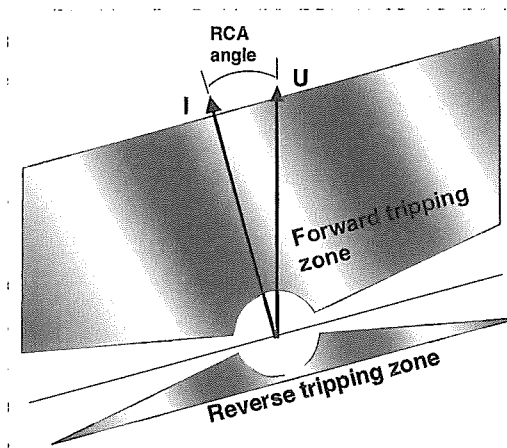


EARTH-FAULT DIRECTIONAL OVERCURRENT (67N)

Each of the three earth-fault stages of P125, P126 and P127 can be configured as directional protection and with specific characteristic angle (RCA). Each directional stage makes available instantaneous reverse information.

In addition to the residual current, the residual voltage must be connected to a dedicated input or internally calculated as vector sum (P127 only) in order to make possible the directional operation.

Each earth-fault directional stage measures the residual current, the residual voltage, and the angle between residual voltage and current.

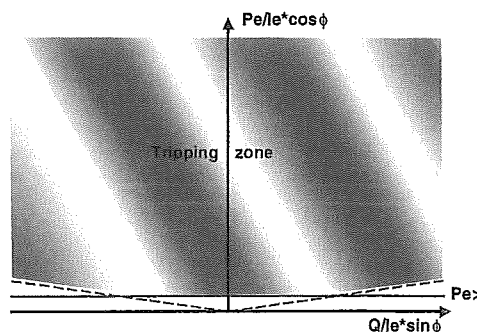


Directional Overcurrent Tripping Zone

WATTMETRIC / $I_e \cdot \cos \phi$ PROTECTION (32N)

Two additional stages are configurable with Wattmetric or $I_e \cdot \cos \phi$ characteristic. The first stage can be set with definite time or with various IDMT curves as the 51N and 67N. The second stage is definite time only.

Wattmetric characteristic



MICOM P12x/y,
the easy, safe and fast way
to detect the fault in your power system.

HIGH IMPEDANCE RESTRICTED EARTH-FAULT (64N)

MiCOM P12x range offer the REF feature applied to enhanced ground fault detection on each transformer winding.

The relays ensure a high degree of stability against external fault conditions and a reliable performance against internal faults.

All the 50N/51N stages can be used for this application.

NEGATIVE SEQUENCE OVER-CURRENT (46)

The MiCOM P122, P123, P126 & P127 relays include a programmable function specially designed to detect unbalanced load or fault conditions.

The three stages of negative sequence overcurrent have the same setting ranges and time delay as the phase overcurrent.

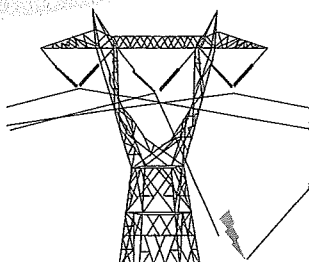
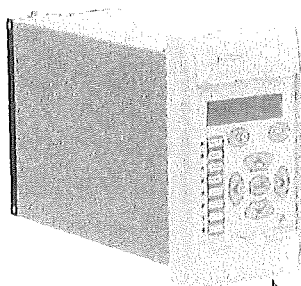
THERMAL OVERLOAD (49)

Transformers and cables must be protected taking account of their particular thermal characteristics. MiCOM P122, P123, P126 & P127 relays include a thermal replica element based on the true RMS value of the current, up to 10th harmonic. Alarm and overload thresholds and time constant are fully programmable to match each application requirement.

BROKEN CONDUCTOR

A typical unbalanced fault that can occur on the system is an open circuit fault. This fault can arise from broken conductor, mal-operation of one of the switchgear poles, or blowing of a fuse.

MiCOM P122/3 and P126/7 relays incorporate an element, which measures the ratio of negative to positive sequence current (I_2/I_1). This fully programmable function allows more sensitivity and stability than pure negative sequence measurement.



UNDERCURRENT PROTECTION (37)

MiCOM P122, P123, P126 & P127 relays provide a definite time undercurrent protection. This function allows typical applications such as loss of load or simple broken conductor detection.

HIGH IMPEDANCE THREE-PHASE DIFFERENTIAL PROTECTION (87)

The phase inputs of MiCOM P12x relays can be applied in the typical high-impedance scheme for busbar or machine protection.

The relays ensure a high degree of stability against external fault conditions and a reliable performance against internal faults.

All the 50/51 stages can be used for this application, the third stage configured in peak mode is recommended for the best performance.

UNDER/OVER VOLTAGE (27/59)

The P127 relay provides two independent under-voltage stages and two over-voltage stages. They are definite time elements. Each stage can be configured to operate in single-phase mode (OR mode) or three-phase mode (AND mode).

RESIDUAL OVERVOLTAGE (59N)

P125, P126, and P127 provide an additional residual over-voltage stage that can be used for generic earth faults detection, particularly in insulated neutral system or as backup at busbar level.

SWITCH ON TO FAULT PROTECTION

Closing of a circuit breaker might inadvertently lead to a short-circuit fault due to a maintenance ground clamp not yet removed. The P12x and P12y relays incorporate configurable switch on to fault protection. It provides an instantaneous trip during a settable time after local or remote manual close or after automatic reclose.

BLOCKING LOGIC

When the MiCOM P12x and P12y relays are used in critical networks, management of protection relays must take surrounding devices into consideration. Two blocking logic inputs can be configured independently each other to lock any combination of the selected elements (i.e. current or voltage stages, thermal replica, etc).

SELECTIVE RELAY SCHEME LOGIC

The P122/3 and P126/7 relays include selective relay scheme logic. A dedicated digital input can temporarily alter the time delay settings in response to the phase/earth fault start condition of a downstream relay. This function allows the MiCOM relays to clear the fault fast and correctly when used in a cascade scheme.

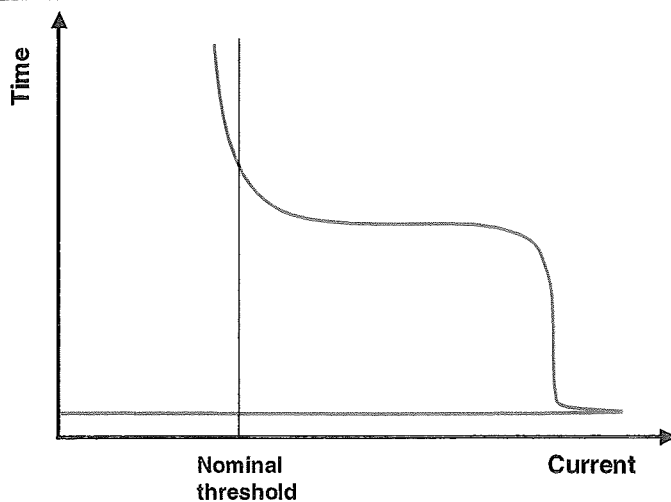
CIRCUIT BREAKER FAILURE PROTECTION (50BF)

The circuit breaker failure verifies the effective opening of the CB by a dedicated undercurrent threshold. The circuit breaker failure function can be activated by trip of a generic protection or/and external command by the relevant digital input. The Circuit breaker failure protection can be used for tripping upstream circuit breakers too.

COLD LOAD PICK UP

Cold load pick-up temporarily raises the setting of selectable stages closer to the load profile, avoiding unwanted trips.

Cold-load characteristics



VOLTAGE CONTROLLED OVERCURRENT (51V) AND VOLTAGE TRANSFORMER SUPERVISION (VTS)

The logical functionality includes the possibility to provide the 51V function controlled by under-voltage $V < (27)$ and negative sequence over voltage $V2 > (47)$. The 50/51 functions are supervised by voltage transformer supervision (VTS).

VTS logic:

$$\begin{aligned} \text{VTS} = & [(V2 > 0.3V_n) \text{ AND } (I2 < 0.5I_n)] \\ \text{OR} \\ & [(V1 < 0.1V_n) \text{ AND } (I > 0.1I_n)] \end{aligned}$$

AUTORECLOSER (79)

MiCOM P123, P126 and P127 relays include a 4-shot autorecloser. All the programmed protection functions may independently start any of the shots and the user can program which functions are allowed to trip after any of the shots. This makes possible special reclosing cycles e.g. as requested for coordination with fuses in distribution with tapped transformers.

Dead and reclaim times are freely adjustable. A counter stores the number of reclose commands. This information is free locally or remotely.

SETTING GROUPS

External conditions may request the need for different settings. MiCOM P122, P123, P125, P126 and P127 provide two setting groups.

CIRCUIT BREAKER MONITORING AND SUPERVISION

Circuit-breaker preventive maintenance is the advanced function provided by the MiCOM P122, P123, P126 and P127 relays with adjustable closing and opening time measurements. All fault phase currents I or I2 are cumulated to inform about total interrupted current. MiCOM P122 P123 P126 and P127 relays allow trip circuit supervision via a specific input. The result of this monitoring can be viewed locally or remotely.

**Proven protection
as safe, simple
and versatile
as your application needs.**

INPUTS AND OUTPUTS

The P12x and P12y include freely configurable digital inputs and output relays for CB control and signalling. Each input can be configured for blocking, selective logic, control, etc.

Each instantaneous and delayed trip is assignable to any output relay of the MiCOM relays and to the led on front panel.

OUTPUT RELAY LATCHING (86)

Any outputs, including trip, can be latched. Reset of the latched outputs is possible by logic input, front panel operator interface or by remote communication.

EVENT RECORDING

75 logic events are stored in MiCOM P122/3 and P126/7 relays.

Events include inputs/outputs, change of status, alarms and contact operations. All events are time stamped to 1ms.

FAULT RECORDING

The last 5 faults are stored inside the MiCOM relays. Each fault includes:

- > Record number
- > Fault time
- > Active setting group
- > Faulted phase
- > Protection operation
- > Magnitude of input quantities

Fault indicator helps the user to identify clearly the fault and to monitor relay setting and operation.

DISTURBANCE RECORDING

Up to 5 records of max 3 seconds each are stored in the relays.

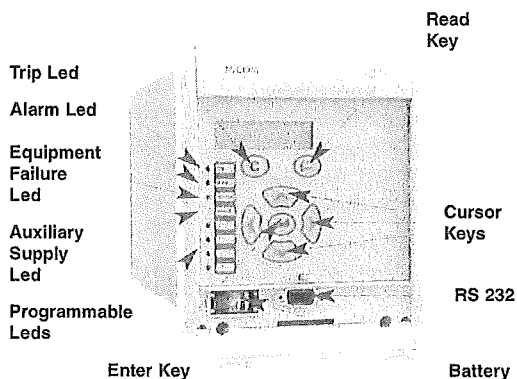
The disturbance recording function is triggered either by any of the programmed thresholds or by an external input, or through the communications.

All logic and analogue information is stored in memory and can be transferred using the front communication port or the rear LAN to an external data analyser.

USER INTERFACE

All functions, including protection, automation, communication, LEDs, inputs and outputs, can be programmed and modified using the front panel user interface. The backlit LCD informs the user about settings, measurements, faults, etc.

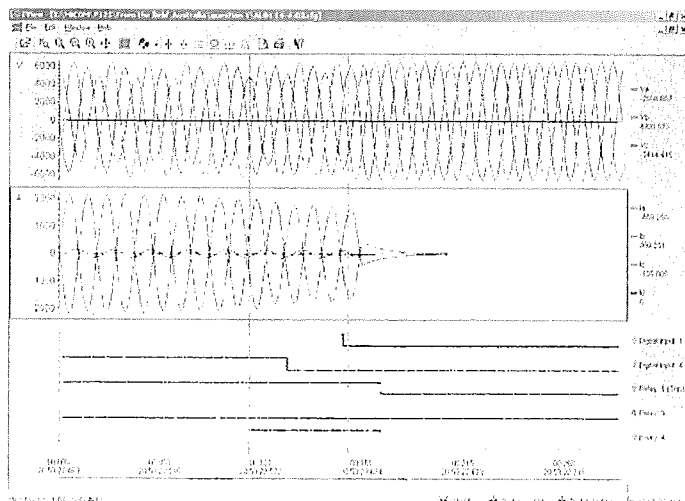
The menus have a pull-down structure allowing easy and quick access to any data.



MiCOM S1 SUPPORT SOFTWARE

A Support Software MiCOM S1 is available for the entire MiCOM family, including P12x/y relays. S1 is fully Windows TM compatible. This support Software allows easy setting of any MiCOM P12x/y model, preparing, storing, and retrieving setting files for further download on relay. In addition S1 makes possible reading measurements and downloading event, fault and disturbance records for post-fault analysis purpose.

Example of disturbance record



HARDWARE & CASE

MiCOM P12x/y and control relays are based on advanced numerical technology.
All the models of the MiCOM P12x/y series have a 4U draw out metal case, and can be flush-mounted in switchboard or panel or rack-mounted.

All the CT inputs are automatically short-circuited if the active unit is withdrawn from its case.

WIRING

External connections are made via MIDOS type terminal blocks. Each connection includes two 4.8 mm Faston and one M4 screw fixing. The wiring for all the MiCOM P120 P121 P122 P123 P125, P126 and P127 are standard to provide maximum compatibility.

AREVA TRACK RECORD - OVERCURRENT PROTECTION

- >> **MCGG:** First Microprocessor based overcurrent relay launched in 1984. More than 80000 devices installed.
- >> **OPN/MODN:** First Numerical overcurrent relay launched in 1988. More than 9800 devices installed.
- >> **PS4xx:** First Numerical overcurrent relay launched in 1990. More than 25000 devices installed.
- >> **KCGG/KCEG/KCEU:** First Numerical overcurrent relay launched in 1993. More than 75000 devices installed.
- >> **MX3AMxxx:** First Numerical overcurrent relay launched in 1995. More than 14000 devices installed.
- >> **MiCOM P12x and P12y range:** First MiCOM P20 Numerical overcurrent relay launched in 1998. More than 61000 devices installed.

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MiCOM P120/P121/P122 & P123 OVERCURRENT RELAYS TECHNICAL GUIDE

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SAFETY SECTION

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1. INTRODUCTION

This guide and the relevant operating or service manual documentation for the equipment provide full information on safe handling, commissioning and testing of this equipment and also includes descriptions of equipment label markings.

Documentation for equipment ordered from AREVA Energy Automation & Information is despatched separately from manufactured goods and may not be received at the same time. Therefore this guide is provided to ensure that printed information normally present on equipment is fully understood by the recipient.



Before carrying out any work on the equipment the user should be familiar with the contents of this Safety Guide.

Reference should be made to the external connection diagram before the equipment is installed, commissioned or serviced.

Language specific, self-adhesive User Interface labels are provided in a bag for some equipment.

2. HEALTH AND SAFETY

The information in the Safety Section of the equipment documentation is intended to ensure that equipment is properly installed and handled in order to maintain it in a safe condition.

It is assumed that everyone who will be associated with the equipment will be familiar with the contents of that Safety Section, or this Safety Guide.

When electrical equipment is in operation, dangerous voltages will be present in certain parts of the equipment. Failure to observe warning notices, incorrect use, or improper use may endanger personnel and equipment and cause personal injury or physical damage.

Before working in the terminal strip area, the equipment must be isolated.

Proper and safe operation of the equipment depends on appropriate shipping and handling, proper storage, installation and commissioning, and on careful operation, maintenance and servicing. For this reason only qualified personnel may work on or operate the equipment.

Qualified personnel are individuals who





- are familiar with the installation, commissioning, and operation of the equipment and of the system to which it is being connected;
- are able to safely perform switching operations in accordance with accepted safety engineering practices and are authorised to energize and de-energize equipment and to isolate, ground, and label it;
- are trained in the care and use of safety apparatus in accordance with safety engineering practices;
- are trained in emergency procedures (first aid).

The operating manual for the equipment gives instructions for its installation, commissioning, and operation. However, the manual cannot cover all conceivable circumstances or include detailed information on all topics. In the event of questions or specific problems, do not take any action without proper authorization. Contact the appropriate AREVA technical sales office and request the necessary information.

3. SYMBOLS AND EXTERNAL LABELS ON THE EQUIPMENT

For safety reasons the following symbols and external labels, which may be used on the equipment or referred to in the equipment documentation, should be understood before the equipment is installed or commissioned.

3.1 Symbols

	
Caution: refer to equipment documentation	Caution: risk of electric shock
	
Protective Conductor (*Earth) terminal.	
	
Functional/Protective Conductor Earth terminal	
Note – This symbol may also be used for a Protective Conductor (Earth) terminal if that terminal is part of a terminal block or sub-assembly e.g. power supply.	

***NOTE:** THE TERM EARTH USED THROUGHOUT THIS GUIDE IS THE DIRECT EQUIVALENT OF THE NORTH AMERICAN TERM GROUND.

3.2 Labels

See "Safety Guide" (SFTY/4L M) for equipment labelling information.

4. INSTALLING, COMMISSIONING AND SERVICING



Equipment connections

Personnel undertaking installation, commissioning or servicing work for this equipment should be aware of the correct working procedures to ensure safety.

The equipment documentation should be consulted before installing, commissioning or servicing the equipment.

Terminals exposed during installation, commissioning and maintenance may present a hazardous voltage unless the equipment is electrically isolated.

Any disassembly of the equipment may expose parts at hazardous voltage, also electronic parts may be damaged if suitable electrostatic voltage discharge (ESD) precautions are not taken.

If there is unlocked access to the rear of the equipment, care should be taken by all personnel to avoid electric shock or energy hazards.

Voltage and current connections should be made using insulated crimp terminations to ensure that terminal block insulation requirements are maintained for safety.

To ensure that wires are correctly terminated the correct crimp terminal and tool for the wire size should be used.

The equipment must be connected in accordance with the appropriate connection diagram.

Protection Class I Equipment

- Before energising the equipment it must be earthed using the protective conductor terminal, if provided, or the appropriate termination of the supply plug in the case of plug connected equipment.
- The protective conductor (earth) connection must not be removed since the protection against electric shock provided by the equipment would be lost.

The recommended minimum protective conductor (earth) wire size is 2.5 mm² (3.3 mm² for North America) unless otherwise stated in the technical data section of the equipment documentation, or otherwise required by local or country wiring regulations.

The protective conductor (earth) connection must be low-inductance and as short as possible.

All connections to the equipment must have a defined potential. Connections that are pre-wired, but not used, should preferably be grounded when binary inputs and output relays are isolated. When binary inputs and output relays are connected to common potential, the pre-wired but unused connections should be connected to the common potential of the grouped connections.

Before energising the equipment, the following should be checked:

- Voltage rating/polarity (rating label/equipment documentation);
- CT circuit rating (rating label) and integrity of connections;
- Protective fuse rating;
- Integrity of the protective conductor (earth) connection (where applicable);
- Voltage and current rating of external wiring, applicable to the application.

**Equipment Use**

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

**Removal of the equipment front panel/cover**

Removal of the equipment front panel/cover may expose hazardous live parts which must not be touched until the electrical power is removed.

**UL and CSA Listed or Recognized Equipment**

To maintain UL and CSA approvals the equipment should be installed using UL and/or CSA Listed or Recognized parts of the following type: connection cables, protective fuses/fuseholders or circuit breakers, insulation crimp terminals, and replacement internal battery, as specified in the equipment documentation.

**Equipment operating conditions**

The equipment should be operated within the specified electrical and environmental limits.

**Current transformer circuits**

Do not open the secondary circuit of a live CT since the high voltage produced may be lethal to personnel and could damage insulation.

Generally, for safety, the secondary of the line CT must be shorted before opening any connections to it.

For most equipment with ring-terminal connections, the threaded terminal block for current transformer termination has automatic CT shorting on removal of the module. Therefore external shorting of the CTs may not be required, the equipment documentation should be checked to see if this applies.

For equipment with pin-terminal connections, the threaded terminal block for current transformer termination does NOT have automatic CT shorting on removal of the module.

**External resistors, including voltage dependent resistors (VDRs)**

Where external resistors, including voltage dependent resistors (VDRs), are fitted to the equipment, these may present a risk of electric shock or burns, if touched.

**Battery replacement**

Where internal batteries are fitted they should be replaced with the recommended type and be installed with the correct polarity to avoid possible damage to the equipment, buildings and persons.

**Insulation and dielectric strength testing**

Insulation testing may leave capacitors charged up to a hazardous voltage. At the end of each part of the test, the voltage should be gradually reduced to zero, to discharge capacitors, before the test leads are disconnected.

**Insertion of modules and pcb cards**

Modules and pcb cards must not be inserted into or withdrawn from the equipment whilst it is energised, since this may result in damage.

**Insertion and withdrawal of extender cards**

Extender cards are available for some equipment. If an extender card is used, this should not be inserted or withdrawn from the equipment whilst it is energised. This is to avoid possible shock or damage hazards. Hazardous live voltages may be accessible on the extender card.

**Insertion and withdrawal of integral heavy current test plugs**

It is possible to use an integral heavy current test plug with some equipment. CT shorting links must be in place before insertion or removal of heavy current test plugs, to avoid potentially lethal voltages.

**External test blocks and test plugs**

Great care should be taken when using external test blocks and test plugs such as the MMLG, MMLB and MiCOM P990 types, hazardous voltages may be accessible when using these. *CT shorting links must be in place before the insertion or removal of MMLB test plugs, to avoid potentially lethal voltages.

*Note – when a MiCOM P992 Test Plug is inserted into the MiCOM P991 Test Block, the secondaries of the line CTs are automatically shorted, making them safe.

**Fibre optic communication**

Where fibre optic communication devices are fitted, these should not be viewed directly. Optical power meters should be used to determine the operation or signal level of the device.

**Cleaning**

The equipment may be cleaned using a lint free cloth dampened with clean water, when no connections are energised. Contact fingers of test plugs are normally protected by petroleum jelly which should not be removed.

5. DECOMMISSIONING AND DISPOSAL



Decommissioning:

The supply input (auxiliary) for the equipment may include capacitors across the supply or to earth. To avoid electric shock or energy hazards, after completely isolating the supplies to the equipment (both poles of any dc supply), the capacitors should be safely discharged via the external terminals prior to decommissioning.



Disposal:

It is recommended that incineration and disposal to water courses is avoided. The equipment should be disposed of in a safe manner. Any equipment containing batteries should have them removed before disposal, taking precautions to avoid short circuits. Particular regulations within the country of operation, may apply to the disposal of batteries.

6. EQUIPMENT WHICH INCLUDES ELECTROMECHANICAL ELEMENTS



Electrical adjustments

It is possible to change current or voltage settings on some equipment by direct physical adjustment e.g. adjustment of a plug-bridge setting. The electrical power should be removed before making any change, to avoid the risk of electric shock.



Exposure of live parts

Removal of the cover may expose hazardous live parts such as relay contacts, these should not be touched before removing the electrical power.

7. TECHNICAL SPECIFICATIONS FOR SAFETY

7.1 Protective fuse rating

The recommended maximum rating of the external protective fuse for equipments is 16A, high rupture capacity (HRC) Red Spot type NIT, or TIA, or equivalent, unless otherwise stated in the technical data section of the equipment documentation. The protective fuse should be located as close to the unit as possible.



DANGER - CTs must NOT be fused since open circuiting them may produce lethal hazardous voltages.

7.2 Protective Class

IEC 61010-1: 2001
EN 61010-1: 2001

Class I (unless otherwise specified in the equipment documentation). This equipment requires a protective conductor (earth) connection to ensure user safety.

7.3 Installation Category

IEC 61010-1: 2001
EN 61010-1: 2001

Installation Category III (Overvoltage Category III):

Distribution level, fixed installation.

Equipment in this category is qualification tested at 5kV peak, 1.2/50µs, 500Ω, 0.5J, between all supply circuits and earth and also between independent circuits

7.4 Environment

The equipment is intended for indoor installation and use only. If it is required for use in an outdoor environment then it must be mounted in a specific cabinet or housing which will enable it to meet the requirements of IEC 60529 with the classification of degree of protection IP54 (dust and splashing water protected).

Pollution Degree – Pollution
Degree 2
Altitude – operation up to
2000 m
IEC 61010-1: 2001
EN 61010-1: 2001

Compliance is demonstrated by reference to safety standards.

8. CE MARKING



Marking

Compliance with all relevant European Community directives:

Product safety:
Low Voltage Directive - 73/23/EEC
amended by 93/68/EEC
EN 61010-1: 2001
EN 60950-1: 2001
EN 60255-5: 2001
IEC 60664-1: 2001

Compliance demonstrated by reference to safety standards.

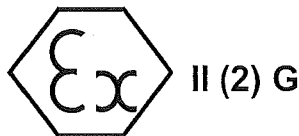
Electromagnetic Compatibility Directive
(EMC) 89/336/EEC amended by
93/68/EEC.

Compliance demonstrated via the Technical Construction File route.

The following Product Specific Standard
was used to establish conformity:

EN 50263 : 2000

Where applicable :



ATEX Potentially Explosive
Atmospheres directive
94/9/EC, for equipment.

The equipment is compliant with Article 1(2) of European directive 94/9/EC. It is approved for operation outside an ATEX hazardous area. It is however approved for connection to Increased Safety, "Ex e", motors with rated ATEX protection, Equipment Category 2, to ensure their safe operation in gas Zones 1 and 2 hazardous areas.

CAUTION – Equipment with this marking is not itself suitable for operation within a potentially explosive atmosphere.

Compliance demonstrated by Notified Body certificates of compliance.

Radio and
Telecommunications Terminal
Equipment (R & TTE)
directive 95/5/EC.

Compliance demonstrated by compliance to the Low Voltage Directive, 73/23/EEC amended by 93/68/EEC, down to zero volts, by reference to safety standards.

9. RECOGNIZED AND LISTED MARKS FOR NORTH AMERICA**CSA** - Canadian Standards Association**UL** - Underwriters Laboratory of America

- UL Recognized to UL (USA) requirements



- UL Recognized to UL (USA) and CSA (Canada) requirements



- UL Listed to UL (USA) requirements



- UL Listed to UL (USA) and CSA (Canada) requirements



- Certified to CSA (Canada) requirements

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