

User Guide

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1. PRESENTATION OF MiCOM P120, P121, P122 AND P123 RELAYS

MiCOM P120, P121 P122 and P123 are fully numerical relays designed to perform electrical protection and control functions.

The following section describes the MiCOM P120 range and the main differences between the different models.

MiCOM relays are powered either from a DC (3 voltage ranges) or an AC auxiliary power supply.

Using the front panel, the user can easily navigate through the menu and access data, change settings, read measurements, etc.

Eight LEDs situated in the front panel help the user to quickly know the status of the relay and the presence of alarms. Alarms that have been detected are stored and can be displayed on the back-lit LCD.

Any short time voltage interruption (<50ms) is filtered and regulated through the auxiliary power supply.

Regarding current inputs, **MiCOM P120** has 2 current inputs available, one for 1A and one for 5A rated CTs.

MiCOM P121, P122 & P123 have 3 phase and 1 earth current inputs available for 1 and 5 Amps rated CTs. On each one of these relays, it is possible to combine 1 and 5 Amp current inputs together (i-e a mix between 1A for earth fault and 5A for phase connections).

MiCOM 120, P121, P122 and P123 relays continuously measure phase and earth currents (P120 makes a single measurement) and take into account the true RMS current value up to 10th harmonic (at 50 Hz).

Output relays are freely configurable and can be activated by any of the control or protection functions available in the relay. Logic inputs can also be assigned to various control functions.

On their rear terminals **MiCOM P120, P121 P122 and P123** have a standard RS485 port available. When ordering, the user can choose between the following communication protocol: ModBus RTU, IEC 60870-5-103, Courier or DNP3.0.

Using RS485 communication channel, all stored information (measurements, alarms, and parameters) can be read and settings can be modified when the chosen protocol allows it.

Reading and modification of this data can be carried out on site with a standard PC loaded with AREVA setting software.

Thanks to its RS485 based communication, **MiCOM P120, P121, P122 and P123** relays can be connected directly to a digital control system. All the available data can then be gathered by a substation control system and be processed either locally or remotely.

2. USER INTERFACE

MiCOM P120, P121, P122 and P123 relay front panel allows the user to easily enter relay settings, display measured values and alarms and to clearly display the status of the relay.

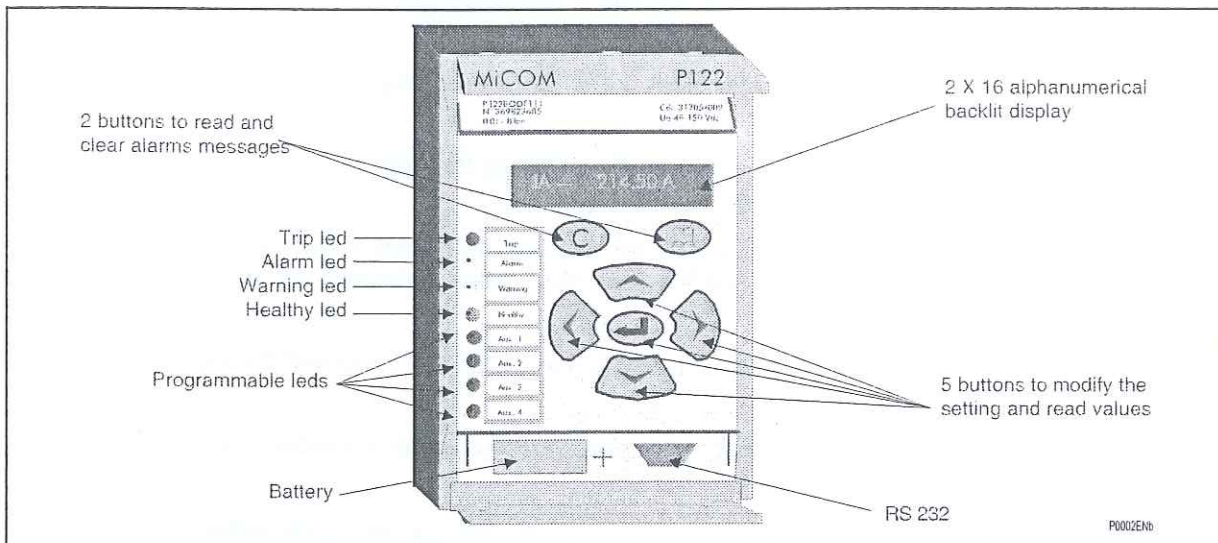


FIGURE 1 : MiCOM P120, P121, P122 AND P123 FRONT PANEL

The front panel of the relay has three separate sections:

1. The LCD display and the keypad,
2. The LEDs
3. The two zones under the upper and lower flaps.

2.1 LCD display and keypad description

2.1.1 LCD display

In the front panel, a liquid crystal display (LCD) displays settings, measured values and alarms. Data is accessed through a menu structure.

The LCD has two lines, with sixteen characters each. A back-light is activated when a key is pressed and will remain lit for five minutes after the last key press. This allows the user to be able to read the display in most lighting conditions.

2.1.2 Keypad

The keypad has seven keys divided into two groups :

- Two keys located just under the screen (keys and).

Keys and are used to read and acknowledge alarms. To display successive alarms, press key . Alarms are displayed in reverse order of their detection (the most recent alarm first, the oldest alarm last). To acknowledge the alarms, the user can either acknowledge each alarm using or go to the end of the ALARM menu and acknowledge all the alarms at the same time.

When navigating through submenus, key is also used to come back to the head line of the corresponding menu.

NOTE : To acknowledge a relay latched refer to the corresponding submenu section.

- Four main keys , , , located in the middle of the front panel.

They are used to navigate through the different menus and submenus and to do the setting of the relay.

The key is used to validate a choice or a value (modification of settings).

2.2 LEDs

The LED labels on the front panel are by default written in English, however the user has self-adhesive labels available with **MiCOM** relays on which it is possible to write using a ball point pen.

The top four LEDs indicate the status of the relay (Trip condition, alarm LED, equipment failure, auxiliary supply).

The four lower LEDs are freely programmable by the user and can be assigned to display a threshold crossing for example (available for all models) or to show the status of the logic inputs (P122 & P123 ONLY). The description of each one of these eight LEDs located in the left side of the front view is given hereafter (numbered from the top to bottom from 1 to 8):

LED 1

Colour : RED

Label : Trip

LED 1 indicates that the relay has issued a trip order to the cut-off element (circuit breaker, contactor). This LED recopies the trip order issued to the Trip logic output. Its normal state is unlit. As soon as a triggering order is issued, the LED lights up. It is cleared when the associated alarm is acknowledged either through the front panel, or by a remote command, a digital input, or by a new fault (CONFIGURATION/Alarms menu).

LED 2

Colour : ORANGE

Label : ALARM

LED 2 indicates that the relay has detected an alarm. This alarm can either be a threshold crossing (instantaneous), or a trip order (time delayed). As soon as an alarm is detected, the LED starts blinking. After all the alarms have been read, the LED lights up continuously.

After acknowledgement of all the alarms, the LED is extinguished.

NOTE : It is possible to configure the instantaneous alarms to be self reset or not by choosing Yes or No in the CONFIGURATION/Alarms Menu.

The alarm LED can be reset either through the front panel, or by remote command, by a digital input, or by a new fault (CONFIGURATION/Alarms menu).

LED 3

Colour : ORANGE

Label : Warning

LED 3 indicates internal alarms of the relay. When the relay detects a « non critical » internal alarm (typically a communication failure), the LED starts blinking continuously. When the relay detects a fault that is considered as « critical », the LED lights up continuously. Only the disappearance of the cause of the fault can clear this LED (repair of the module, clearance of the Fault).

LED 4

Colour : GREEN

Label : Healthy

LED 4 indicates that the relay is powered by an auxiliary source at the nominal range.

LED 5 to 8

Colour : RED

Label : Aux. 1 to 4.

These LEDs are user programmable and can be set to display information about instantaneous and time-delayed thresholds as well as the status of the logic inputs (for P122 & P123 only). Under the CONFIGURATION/LED menu of the relay, the user can select the information he wishes to associate with each LED. He can affect more than one function to one LED. The LED will then light up when at least one of the associated information is valid (OR gate). The LED is cleared when all the associated alarms are acknowledged.

2.3 Description of the two areas under the top and bottom flaps

Under the upper flap, a label identifies the relay according to its model number (order number) and its serial number. This information defines the product in a way that is unique. In all your requests, please make reference to these two numbers.

Under the model and serial number, you will find information about the level of voltage of the auxiliary supply and the nominal earth current value.

Under the lower flap, a RS232 port is available in all **MiCOM** relays. Nonetheless, this RS232 port is used differently depending on the model of the relay:

1. For **MiCOM P120** and **P121**, this RS232 port can be used to download a new version of the application software into the relay flash memory.
2. For **MiCOM P122** and **P123**, this RS232 port can be used either to download a new version of the application software version into the relay flash memory or to plug a laptop loaded with AREVA T&D' setting software MiCOM S1.

To withdraw more easily the active part of the MiCOM relay (i-e the chassis) from its case, open the two flaps, then with a 3mm screwdriver, turn the extractor located under the upper flap, and pull it out of its case pulling the flaps towards you.

2.4 The battery box

The battery box MiCOM E1 allows the user to be able to read and change the settings of the relay when it is not powered by its auxiliary source.

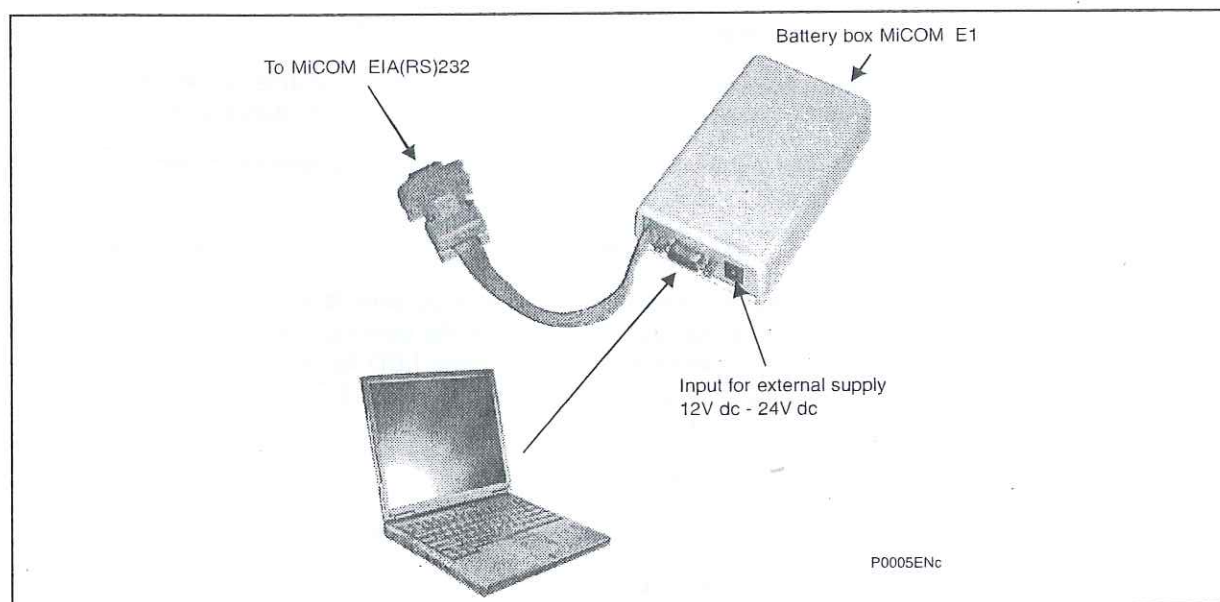


FIGURE 2 : BATTERY BOX MiCOM E1

The battery box performs the following functions:

1. It temporarily powers the relay. This allows the user to view or modify data when the auxiliary power supply has failed. The battery used is a 6LR61 type (9V) which can power the relay for up to 3 hours. When the battery is flat it is possible to power the battery box with an external dc supply. The dc voltage range must be between 12 and 24Vdc.
2. It provides an EIA RS232 interface between the MiCOM relay and the PC. This allows the user to be able to change the setting of the relay using a PC loaded with the setting software MiCOM S1.

This battery box facilitates the use of the relay allowing the retrieval of records and disturbance files for example when the auxiliary supply has failed or is not available.

3. PASSWORD

3.1 Password protection


A password is required for relay settings, especially when changing the various thresholds, time delays, communication parameters, allocation of inputs and outputs relays.

The password consists of four capital characters. When leaving factory, the password is set to AAAA. The user can define his own combination of four characters.

Should the password be lost or forgotten, the modification of the stored parameters is blocked. It is then necessary to contact the manufacturer or his representative and a stand-by password specific to the relay may be obtained.

The programming mode is indicated with the letter "P" on the right hand side of the display on each menu heading. The letter "P" remains present as long as the password is active (5 minutes if there is no action on the keypad).



3.1.1 Password entry

The input of the password is requested as soon as a modification of a parameter is made for any one of the six/eight menus and the submenus. The user enters each one of the 4 characters and then validates the entire password with .

After 5 seconds, the display returns to the point of the preceding menu.

If no key is pressed inside of 5 minutes, the password is deactivated. A new password request is associated with any subsequent parameter modification.


3.1.2 Changing the password

To change an active password, go to the OP. PARAMETERS menu and then to the Password submenu. Enter the current password and validate it. Then press  and enter the new password character by character and validate the new password using .

The message NEW PASSWORD OK is displayed to indicate that the new password has been accepted.

3.1.3 Change of setting invalidation

The procedure to modify a setting is described in the following sections of this manual.

If there is a need to get back to the old setting push key  before validating the setting change. The following message will then appear on the LCD for a few seconds and the old setting will remain unchanged.

UPGRADE CANCEL

4. DISPLAYS OF ALARM & WARNING MESSAGES

Alarm messages are displayed directly on the front panel LCD. They have priority over the default display presenting measured current values. As soon as the relay detects an alarm condition (crossing of a threshold for example), the associated message is displayed on the front panel LCD and the LED Alarm (LED 2) lights up.

We distinguish two types of alarm and warning messages :

- Alarm messages generated by the electrical power network.
- Warning messages caused by hardware or software faults from the relay.

4.1 Electrical Network Alarms

Any crossing of a threshold (instantaneous or time delay) generates an "electrical network alarm". The involved threshold is indicated. Regarding the phase thresholds, the phase designation (A, B or C) is also displayed.

If several alarms are triggered, they are all stored in their order of appearance and presented on the LCD in reverse order of their detection (the most recent alarm first, the oldest alarm last). Each alarm message is numbered and the total number of alarm messages is displayed.

The user can read all the alarm messages pressing \odot .

The user acknowledges and clears the alarm messages from the LCD pressing \odot .

The user can acknowledge each alarm message one by one or all by going to the end of the list to acknowledge, and clear, all the alarm messages pressing \odot .

The control of the ALARM LED (LED 2) is directly assigned to the status of the alarm messages stored in the memory.

If one or several messages are NOT READ and NOT ACKNOWLEDGED, the ALARM LED (LED 2) flashes.

If all the messages have been READ but NOT ACKNOWLEDGED, the ALARM LED (LED 2) lights up continuously.

If all the messages have been ACKNOWLEDGED, and cleared, if the cause that generated the alarm disappears, the ALARM LED (LED 2) is extinguished.

The different electrical system alarms are listed below:

le>	1 st stage earth fault threshold
le>>	2 nd stage earth fault threshold
le>>>	3 rd stage earth fault threshold
l> PHASE	1 st stage overcurrent threshold
l>> PHASE	2 nd stage overcurrent threshold
l>>> PHASE	3 rd stage overcurrent threshold
tle>	1 st stage earth fault time-out
tle>>	2 nd stage earth fault time-out
tle>>>	3 rd stage earth fault time-out
tl> PHASE	1 st stage overcurrent time-out
tl>> PHASE	2 nd stage overcurrent time-out
tl>>> PHASE	3 rd stage overcurrent time-out
THERMAL ALARM	thermal alarm threshold
THERMAL TRIP	thermal trip threshold

I<	undercurrent element threshold
tl< PHASE	undercurrent fault time-out
BRKN COND.	broken conductor indication. I2/I1 ratio exceeded for a period of time that is higher than tBC can be set under the AUTOMAT. CTRL/Broken cond. menu.
t AUX 1	t AUX1 time-out
t AUX 2	t AUX2 time-out
CB FAIL	circuit breaker failure indication (the CB does not trip on tBF time. tBF can be set under the AUTOMAT. CTRL/CB Fail menu.
I2>	negative sequence current threshold (1 st stage)
tl2>	negative sequence current threshold time-out (1 st stage)
I2>>	negative sequence current threshold (2 nd stage)
tl2>>	negative sequence current threshold time-out (2 nd stage)
SPRING CHARGE FAIL	Faulty circuit breaker indication given by a logic input that has been assigned (under the AUTOMAT. CTRL/Inputs menu).
T operating CB	Operating (or tripping) time of the circuit breaker longer than the value set in the AUTOMAT. CTRL/CB Supervision menu.
CB OPEN NB	Number of circuit breaker operation higher than the value set in the AUTOMAT. CTRL/CB Supervision menu.
ΣAmps(n)	Total measured current broken by CB is higher than the value set in AUTOMAT. CTRL/CB Supervision menu.
TRIP CIRCUIT	Circuit breaker trip circuit failure longer than the supervision timer t SUP (that can be set under the AUTOMAT. CTRL/CB Supervision menu.
LATCH RELAY	At least one output relay is latched.
LATCH RELAY TRIP	The relay trip is latched.
CB CLOSE FAILURE	Circuit breaker closing time longer than the value set in the AUTOMAT. CTRL/CB Supervision menu.
RECLOSER SUCCESSFUL	Successful reclose signal. Indicates that when the fault has been cleared upon circuit breaker reclosure, and has not re-appeared before expiry of the reclaim time.
RECLOSER BLOCKED	<p>Recloser blocking signal. Generated by:</p> <ul style="list-style-type: none"> - auxiliary power supply failure during dead time (definitive trip). - external blocking signal. External blocking can be set by the user in the PROTECTION G1 / [79] AUTORECLOSE/Ext Block menu. This blocking signal is provided via a logic input assigned to the Block_79 function in the AUTOMAT. CTRL/Inputs menu. - definitive trip. - remote trip command during the reclaim time. - pick-up of I2> or thermal trip during dead time. - breaker failure (circuit breaker failure to trip on expiry of tBF). - breaker operating time (or tripping time) longer than the set time.

RECLOSER CONFLICT	<p>Configuration conflict of the re-close function. This signal is generated by:</p> <ul style="list-style-type: none"> - O/O Interlock not assigned to a logic input or assigned but not wired to the input. - no output relay assigned to the CB CLOSE function (AUTOMAT. CTRL/Output Relays menu). - trip contact latched. - no re-close cycle assigned to the protection functions (PROTECTION/ [79] Autoreclose menu).
MAINTENANCE MODE	The relay is in maintenance mode.

4.2 Relay Hardware or Software Warning Messages

Any software or hardware fault internal to MiCOM relay generates a "hardware/software alarm" that is stored in memory as a "Hardware Alarm". If several hardware alarms are detected they are all stored in their order of appearance. The warning messages are presented on the LCD in reverse order of their detection (the most recent first and the oldest last). Each warning message is numbered and the total stored is shown.

The user can read all warning messages pressing \oplus , without entering the password.

It is not possible to acknowledge and clear warning messages caused by internal relay hardware or software failure. This message can only be cleared once the cause of the hardware or software failure has been removed.

The control of the WARNING LED (LED 3) is directly assigned to the status of the warning messages stored in the memory.

If the internal hardware or software failure is major (i.e. the relay cannot perform protection functions), the WARNING LED (LED 3) lights up continuously.

If the internal hardware or software failure is minor (like a communication failure that has no influence on the protection and automation functions), the WARNING LED (LED 3) will flash.

Possible Hardware or Software alarm messages are:

Major fault:

The protection and automation functions are stopped.

The RL0 watchdog relay is de-energised (35-36 contact closed).

<<EEPROM ERROR CALIBR.>> : Calibration zone failure

<<CT ERROR>> : Analog channel failure

Minor fault:

The MiCOM relay is fully operational.

The RL0 watchdog relay is energised (35-36 contact open, 36-37 contact closed).

<<RAM ERROR>> : RAM supplied by battery failed.

<<Battery fail>> : battery failure (flat or not correctly in place)

NOTE : The <<Battery backed RAM memory>> and <<Battery failure>> alarm messages can be configured to be displayed or not by selecting yes or no, in the CONFIGURATION/Alarms menu.

<< DEFAULT SETTINGS (*) >>

<< SETTING ERROR (**) >>

<<COMM.ERROR>> : Communication failure

<<CLOCK ERROR>> : Time tag failure

(*) **DEFAULT SETTINGS:** Each time the relay is powered ON it will check its memory contents to determine whether the settings are set to the factory defaults. If the relay detects that the default settings are loaded an alarm is raised. The **ALARM LED (YELLOW)** will light up and the Watch Dog contact will be activated.

Only one parameter in the relay's menu needs to be changed to suppress these messages and to reset the watch dog. This alarm is only an indication to the user that the relay has its default settings applied.

(**) **SETTING ERROR:** Should the CPU fails to get correctly store data to the **EEPROM** during a setting change, a "**HARDWARE**" **ALARM** will appear on the LCD display followed by "**SETTING ERROR**" message (when pushing on the button). In addition, the **ALARM LED (YELLOW)** will light up and the Watch Dog contact will be activated To reset this alarm it is necessary to power **ON** and **OFF** the relay. Following this, the last unsuccessful setting change will then need to be re-applied. If the alarm persists, i.e. the "**SETTING ERROR**" alarm is still displayed, please contact AREVA After Sales Services for advice and assistance.

5. MENUS





The menu of **MiCOM P120, P121, P122 and P123** relays is divided into main menus and submenus. The available content depends on the model of the relay.

5.1 Default display

By default, the LCD displays the current value measured (selected phase or earth). As soon as an alarm is detected by the relay, that information is considered as more important and the alarm message is then displayed instead of the default value.

The user can configure the information he wants to display by default going under the CONFIGURATION/Display menu.

5.2 Access to the menu

Navigation through the different menus is done pressing the keys    . The organisation of the menus is shown in figure 2 for **P120** and **P121** and figure 3 for **P122** and **P123**.

There is no need of a password when reading parameters and measured values.

Modification of a parameter requires entering a password.

Should an error be made in entering a parameter, press  to cancel.

NOTE : The letter P is displayed when the password needs to be entered. If no key is pushed during 5 minutes, the password needs to be entered again.

5.3 Menu contents description

The menu of **MiCOM P122 & P123** relays is divided into 8 main sections (6 for **P120** and **P121**):

- ⇒ OP PARAMETERS
- ⇒ CONFIGURATION
- ⇒ MEASUREMENTS
- ⇒ COMMUNICATION
- ⇒ PROTECTION G(1)
- ⇒ PROTECTION G2 (**P122 & P123** only)
- ⇒ AUTOMAT. CTRL
- ⇒ RECORDS (**P122 & P123** only)

To access these menus from the default display press .

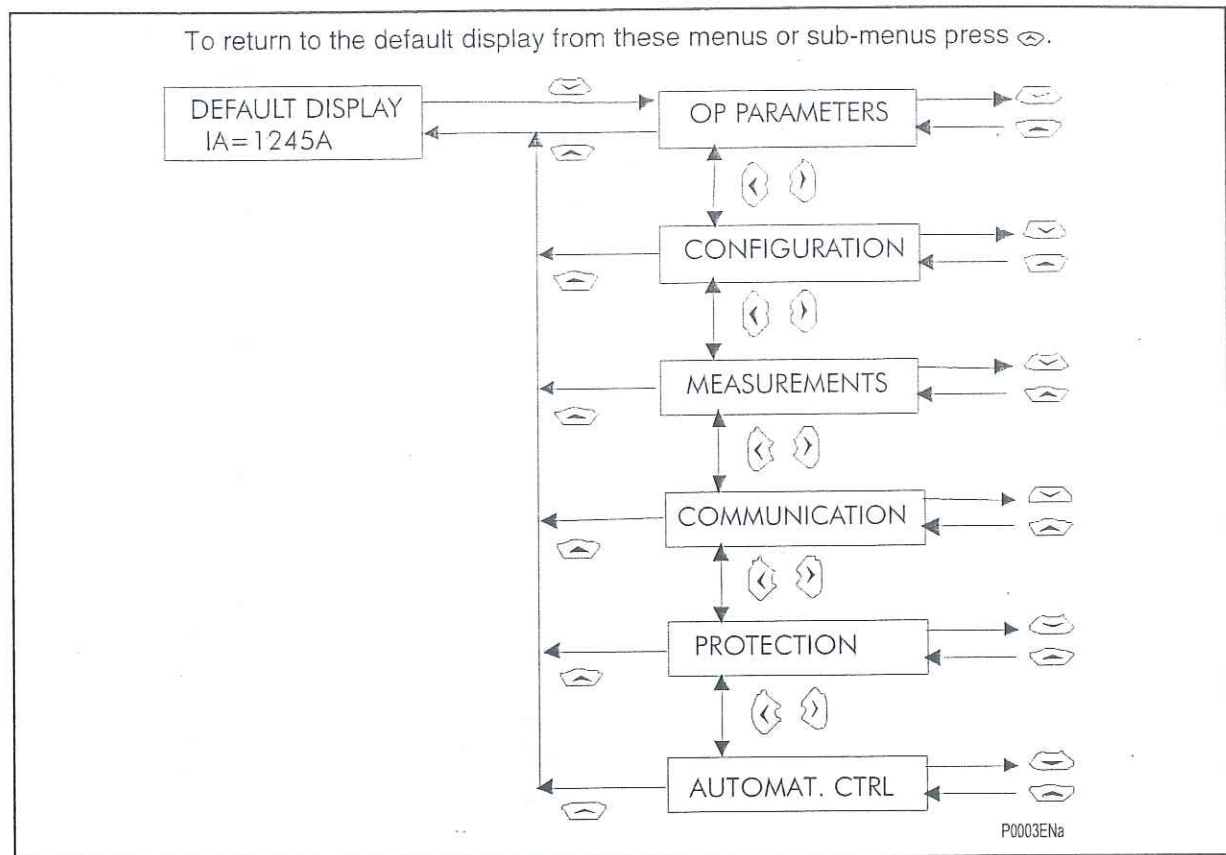


FIGURE 3 : ORGANISATION OF MiCOM P120 AND P121 MAIN MENU

NOTE : The content of the menu is presented in the P12x/EN HI document. This table helps the user to navigate through the different menus and submenus.

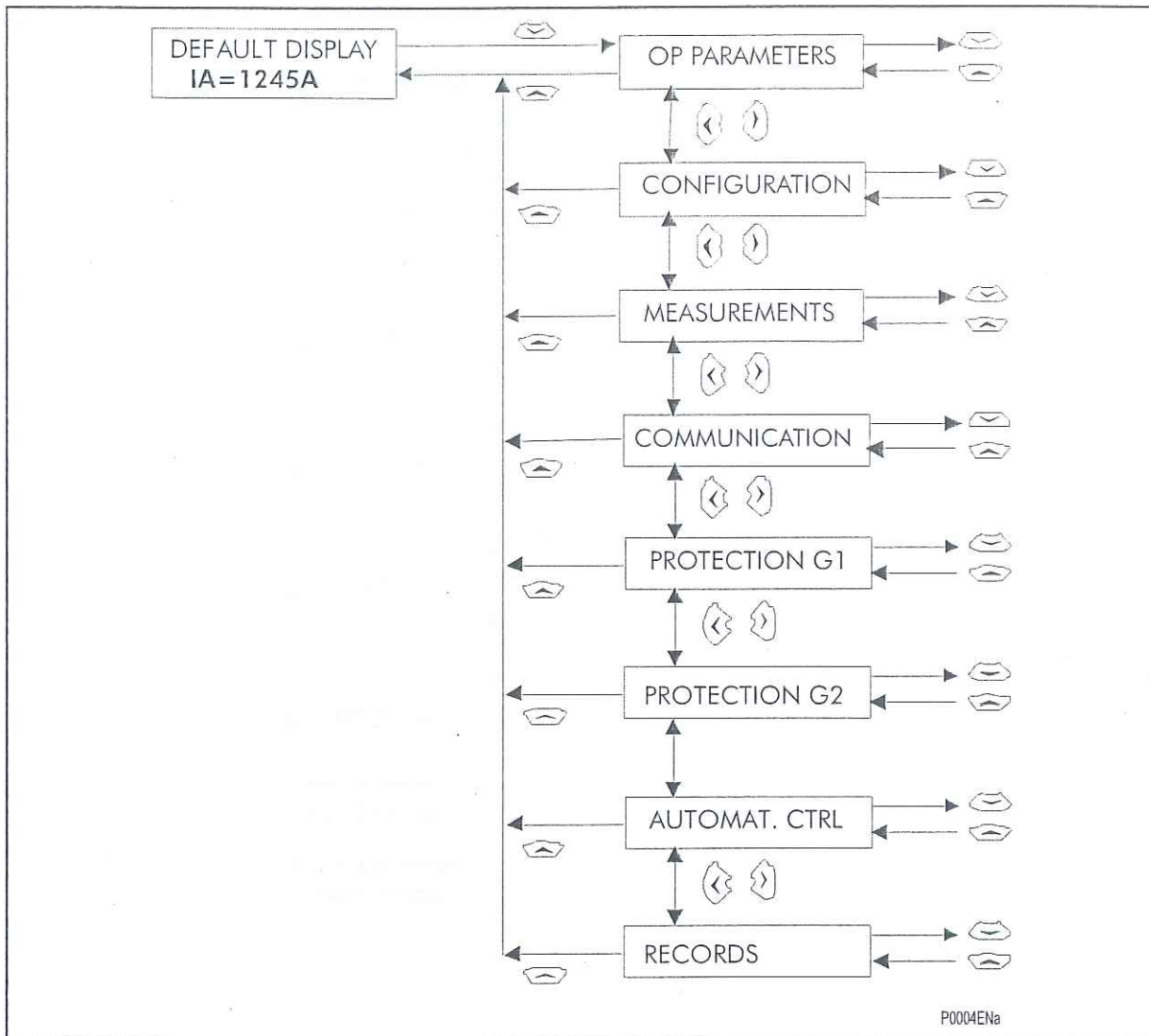


FIGURE 4 : ORGANISATION OF MiCOM P122 AND P123 MAIN MENU


NOTE : The content of the menu is presented in the document P12x/EN HI. This table helps the user to navigate through the different menus and submenus.

For MiCOM P121, P122 and P123, while navigating between submenu points, the user can press the key c to go back to the corresponding head menu.


5.4 OP PARAMETERS Menu

Press  to access the menu OP PARAMETERS from the default display.





OP PARAMETERS

Heading of the OP PARAMETERS menu
Press  to access the menu content.

Password	*****
----------	-------

Password entry. This password is required when modifying relay settings and parameters. Press  to enter a new password,

Password	AAAA
----------	------

To enter a password, the user needs to enter it letter by letter using   to go up or down in the alphabet. After each letter, press  to enter the following letter. At the end, press  to validate the password. If the password is correct, the message « PASSWORD OK » is displayed on the screen.





NOTE : The password is initially set in factory to AAAA.

WARNING : NO SETTING CHANGES DONE EITHER LOCALLY (THROUGH RS232) OR REMOTELY (THROUGH RS485) WILL BE ALLOWED DURING THE 5 FIRST MINUTES FOLLOWING A CHANGE OF PASSWORD.





Description	P121
-------------	------

Indicates the type of relay

Reference	ALST
-----------	------

Displays the reference number that lists the equipment associated with the relay.
The entry of the reference is made character by character using  . After each character (letter, number or sign), press  to enter the following character. Press  to validate the reference entry.
Note: The reference is initially set in the factory to ALST.

Frequency	50 Hz
-----------	-------

Nominal value of the network frequency. Select either 50 or 60 Hz. Press  to modify this value, and press   to select the desired value. Press  to validate your choice.

Input	54321
Status	10110

Displays the status of the logic Inputs. The Logic Inputs are numbered from 1 to 5 for P123, 1 to 3 for P122 and 1 to 2 for P120 and P121. When the status of one input is :

- state 0 : it means that the input is de-energised
- state 1 : it means that the input is energised

Relay	87654321
Status	01011101

Displays the status of the logic outputs. The Logic Outputs are numbered from 1 to 8 for P123, 1 to 6 for P122 and 1 to 4 for P120 and P121. When The state of each output is :

- state 0 : it means that the output relay is activated
- state 1 : it means that the output relay is not activated

NOTE : The Watch-dog output (RL0) is not display in the output status menu .

5.4.1 P121, P122 and P123 additional OP.PARAMETERS Menu

Software version	6.A
------------------	-----

Displays the version of the software

5.4.2 P122 and P123 additional OP.PARAMETERS Menu

Active Group 1	Displays the active protection and automation group. This value can be either 1 or 2.
Date 12/08/02	Displays the date. Press \odot to modify this date then use \uparrow to enter another date. Press \odot to validate your choice. In this example the date is : 12 August 2002.
Time 13:57:44	Displays the time. Press \odot to modify the time then press \uparrow to enter another value. Press \odot to validate your choice. In this example the time is : 13 hours, 57 minutes, 44 seconds.

5.5 Menu CONFIGURATION

Under this menu, the different submenus are :

- ⇒ Display
- ⇒ CT Ratio
- ⇒ Led 5
- ⇒ Led 6
- ⇒ Led 7
- ⇒ Led 8
- ⇒ Group Select (P122 & P123 only)
- ⇒ Alarms (P122 & P123 only)
- ⇒ Configuration inputs (P122 & P123 only)
- ⇒ Relays Maintenance (P122 & P123 only)
- ⇒ Phase rotation (P122 & P123 only)

Press \odot to access the CONFIGURATION menu from the default display, then \uparrow until the desired submenu header is displayed.

5.5.1 Submenu DISPLAY

CONFIGURATION	Heading of the CONFIGURATION menu. Press \odot to access the submenu DISPLAY,.
Display	Heading of the DISPLAY submenu. Press \odot to access the submenu content.
Default Display RMS I A	Displays the default current value (Phase A, Phase B, Phase C, Earth N, or the four values simultaneously can be chosen). Press \odot to modify this default value, then use \uparrow to enter the required value. Press \odot to validate your choice.
Phase A Text A	Choose a label for phase A. The possible choices are A, L1, or R. This value can be modified after entering the password and is displayed with the associated measurement value.
Phase B Text B	Choose a label for phase B. The possible choices are B, L2, or S. This value can be modified after entering the password and is displayed with the associated measurement value.

Phase C Text	C
--------------	---

Choose a label for phase C. The possible choices are C, L3, or T. This value can be modified after entering the password and is displayed with the associated measurement value.



E/Gnd Text	E
------------	---

Choose a label for the earth phase. The possible choices are N, E, or G. This value can be modified after entering the password and is displayed with the associated measurement value.



WARNING : This DISPLAY submenu does not exist in MiCOM P121.
The default display is IA and A,B, C, N for the label of the different phases.

5.5.2 Submenu CT RATIO

CONFIGURATION

Heading of the CONFIGURATION menu. Press  to access the CT RATIO menu, and  until the desired submenu is reached.

CT Ratio

Heading of the CT RATIO submenu.
To access the submenu, press , .

Line CT primary	1000
-----------------	------

Choose the rated primary current of the line CT.
The setting range is from 1 to 9999.

Line CT sec	5
-------------	---

Choose the rated secondary current of the line CT.
The setting value is either 1 or 5.

E/Gnd CT primary	1000
------------------	------

Choose the rated primary current of the earth CT.
The setting range is from 1 to 9999.

E/Gnd CT sec	5
--------------	---

Choose the rated secondary current of the earth CT.
The setting value is either 1 or 5.

5.5.3 LED 5 to 8 configuration submenus

Press  to access the LED 5 CONFIGURATION submenu, then  twice.

To access the others LEDs CONFIGURATION submenus, press  3 times for LED 6, 4 times for LED 7 and 5 times for LED 8.

26 different parameters can be assigned to each LED in MiCOM P123 (20 for MiCOM P122 and 12 for MiCOM P120 and P121).

The following table lists the protection functions that can be assigned to the LEDs (5 to 8) for each model of relay.




TEXT	Information
I>	Instantaneous first phase threshold
I>>	Instantaneous second phase threshold
I>>>	Instantaneous third phase threshold
tI>	Time delayed first phase threshold
tI>>	Time delayed second phase threshold
tI>>>	Time delayed third phase threshold
Ie>	Instantaneous first earth threshold
Ie>>	Instantaneous second earth threshold
Ie>>>	Instantaneous third earth threshold
tIe>	Time delayed first earth threshold
tIe>>	Time delayed second earth threshold
tIe>>>	Time delayed third earth threshold
Therm Trip	Trip on Thermal overload
Brkn Cond.	Broken conductor detection
CB Fail	Detection of a Circuit Breaker failure (CB not open at the end of tBF timer)
tI2>	Time delayed negative phase sequence (1 st threshold)
Input 1	Copy of the status of the Logic Input n°1
Input 2	Copy of the status of the Logic Input n°2
Input 3	Copy of the status of the Logic Input n°3
Input 4	Copy of the status of the Logic Input n°4
Input 5	Copy of the status of the Logic Input n°5
Recloser Run	Signal that Autoreclose cycle is working
Recloser Blocked	Auto-recloser function blocked
t SOTF	Switch on to fault timer expired
t Aux 1	Copy of the status of the Logic Input delayed by t Aux 1
t Aux 2	Copy of the status of the Logic Input delayed by t Aux 2
tI2>>	Time delayed negative phase sequence (2 nd threshold)

Only available in MiCOM P122 & P123 model

Only available in MiCOM P123 model

NOTES : ⇒ Each parameter can be assigned to one or more LED's.
 ⇒ One or more parameters (OR logic) can provoke each LED to light up.

Example of LED 5 setting :

CONFIGURATION	Heading of the CONFIGURATION menu. To access the LED submenu, press  and  until the desired submenu is reached.
Led 5	Heading LED 5 submenu. To access the submenu content, press  .
Led I> Yes	Setting choice Yes: LED 5 lights up when I> threshold is crossed. Setting choice No: No operation when I> threshold is crossed
Led tl> No	Setting choice Yes: LED 5 lights up when tl> delay time has elapsed. Setting choice No: No operation when tl> delay time has elapsed.
Led I>> No	Setting choice Yes: LED 5 lights up when I>> threshold is crossed. Setting choice No: No operation when I>> threshold is crossed
Led tl>> No	Setting choice Yes: LED 5 lights up when tl>> delay time has elapsed. Setting choice No: No operation when tl>> delay time has elapsed.
Led I>>> No	Setting choice Yes: LED 5 lights up when I>>> threshold is crossed. Setting choice No: No operation when I>>> threshold is crossed
Led tl>>> No	Setting choice Yes: LED 5 lights up when tl>>> delay time has elapsed. Setting choice No: No operation when tl>>> delay time has elapsed
Led le> No	Setting choice Yes: LED 5 lights up when le> threshold is crossed. Setting choice No: No operation when le> threshold is crossed.
Led tle> Yes	Setting choice Yes: LED 5 lights up when tle> delay time has elapsed. Setting choice No: No operation when tle> delay time has elapsed.
Led le>> No	Setting choice Yes: LED 5 lights up when le>> threshold is crossed. Setting choice No: No operation when le>> threshold is crossed.
Led tle>> Yes	Setting choice Yes: LED 5 lights up when tle>> delay time has elapsed. Setting choice No: No operation when tle>> delay time has elapsed.
Led le>>> No	Setting choice Yes: LED 5 lights up when le>>> threshold is crossed. Setting choice No: No operation when le>>> threshold is crossed.
Led tle>>> Yes	Setting choice Yes: LED 5 lights up when tle>>> delay time has elapsed. Setting choice No: No operation when tle>>> delay time has elapsed.












Example of LED 5 setting (information available only for P122 & P123) :

Led Therm. Trip	No	Setting choice Yes: LED 5 lights up when Thermal Trip occurs. Setting choice No: No operation when Thermal Trip occurs.
Led Brkn. Cond	Yes	Setting choice Yes: LED 5 lights up when Brkn. Cond is detected. Setting choice No: No operation when Brkn. Cond is detected.
Led CB Fail	Yes	Setting choice Yes: LED 5 lights up when CB failure occurs. Setting choice No: No operation when CB failure occurs.
Led Input 1	No	Setting choice Yes: LED 5 lights up with signal present at logic input 1. Setting choice No: No operation with signal present at logic input 1.
Led Input 2	Yes	Setting choice Yes: LED 5 lights up with signal present at logic input 2. Setting choice No: No operation with signal present at logic input 2.
Led Input 3	No	Setting choice Yes: LED 5 lights up with signal present at logic input 3. Setting choice No: No operation with signal present at logic input 3.
Led t Aux 1	Yes	Setting choice Yes: LED 5 lights up when time Aux1 has elapsed. Setting choice No: No operation when time Aux1 has elapsed.
Led t Aux 2	No	Setting choice Yes: LED 5 lights up when time Aux2 has elapsed. Setting choice No: No operation when time Aux2 has elapsed.
Led tI2>	No	Setting choice Yes: LED 5 lights up when tI2> delay time has elapsed. Setting choice No: No operation when tI2> delay time has elapsed.
Led tI2>>	No	Setting choice Yes: LED 5 lights up when tI2>> delay time has elapsed. Setting choice No: No operation when tI2>> delay time has elapsed.







Example of LED 5 setting (information only for P123):

Led Input 4 No	Setting choice Yes: LED 5 lights up with signal present at logic input 4. Setting choice No: No operation with signal present at logic input 4.
Led Input 5 No	Setting choice Yes: LED 5 lights up with signal present at logic input 5. Setting choice No: No operation with signal present at logic input 5.
Led Recloser Run No	Setting choice Yes: LED 5 lights up when Recloser Run cycle is active. Setting choice No: No operation when Recloser Run cycle is active.
Led Recloser Blocked No	Setting choice Yes: LED 5 lights up when Recl. Blocked function is active. Setting choice No: No operation when Recl. Blocked function is active.
Led Conf SOTF No	Setting choice Yes: LED 5 lights up when time tSOTF has expired. Setting choice No: No operation when time tSOTF has expired.

5.5.4 Submenu Selecting Active Protection Group (P122 & P123 only)

CONFIGURATION	Heading of the CONFIGURATION menu. Press  to access the Group Select menu, and  until the desired submenu is reached.
Group Select	Heading of the GROUP SELECT sub-menu. Press  to access the submenu content.
Change Group Input = INPUT	Press  and use 1 or 2 and   to select if the change of the group is done through an INPUT or through the MENU. Press  to confirm your choice.
Setting Group 1	If MENU is selected, the following menu is displayed: To select active setting protection group 1 or 2 press  and  or  . Press  to confirm choice.

5.5.5 Alarms sub-menu (P122 & P123 only)

CONFIGURATION	Heading of the configuration menu. To access the Alarm submenu, press  ,  until the submenu is reached.
Alarms	Heading of the Alarms submenu. Press  to access the submenu content.
Inst. Self-reset ? No	Setting choice Yes: the alarms that are instantaneous will be self reset when they come back to a normal value (below the threshold). Setting choice No: the alarms that are instantaneous will be need to be acknowledged by the user to be reset. Press  to modify and use  to select your choice. Press  to validate the setting.

Reset led on
fault ? No

Setting choice Yes: the LED associated with an old alarm will be automatically reset when a new fault occurs. This is done to avoid a display of numerous alarms that are not active any more.

Setting choice No: the appearance of a new fault will not automatically reset LEDs associated with an old fault. To reset or not the LED when a new fault occurs. Press to modify the value and use keys to select your choice. Press to validate the setting.

Alarm Battery No

To display or not the alarm "RAM ERROR" or "BATTERY FAIL" in case of RAM error or battery failure. Press to modify and use keys to select your choice. Press to validate the setting.

5.5.6 Submenu Inputs Configuration (P122 & P123 only)

A digital input can be configured to be activated either on falling edge/low level, or on rising edge/high level.

Falling edge or low level (idem for rising edge or high level) depends of the application of the digital inputs.

For example, a digital input configured as "blocking logic" will operate on level, but a digital input configured as "Cold load pick up" will operate on edge.

Function allocated to the Digital Input	Operation of the Digital Input
Unlatch of the output relays	On level
Position of the CB, 52a or 52b	On level
Blocking logic 1 & 2	On level
Logic Selectivity 1 & 2	On level
Aux 1, Aux 2, Aux 3 & Aux 4	On level
CB Fault	On level
Reset of the thermal state	On edge
Blocking of the Autorecloser	On level
Cold load Pick Up	On edge
Start of disturbance record	On edge
Trip circuit supervision	On level
Change of setting group	On level (since version V6G)
CB Fail start	On edge

The user has to set under the Menu CONFIGURATION the auxiliary voltage (AC or DC) for the digital inputs. This setting is necessary because of the time filtering which is different in DC and AC.

NOTE : If the V4 or V5 software is used with a V3 hardware the setting **has to be DC**.

CONFIGURATION

Heading of the CONFIGURATION menu. Press to access the Configuration Inputs menu, then until the desired submenu is reached.

**Configuration
Inputs**

Heading of the Configuration Inputs submenu. Press to access the submenu content.

Inputs	5 4 3 2 1
	1 0 1 1 0

Press to modify and use to assign active high or low functionality to each logic input. Press to validate your choice.

0 = active low 1 = active high

Voltage input	DC
---------------	----

Press to modify and use to select AC or DC power supply for the digital input. Press to confirm the setting. The power supply for any input is the same as the power supply of the relay.

5.5.7 Configuration Relays Maintenance sub-menu (P122 & P123 only)

CONFIGURATION

Heading of the CONFIGURATION menu. Press to access the Relays Maintenance menu then until the desired submenu is reached.

REL. Maintenance

Heading of the CONFIGURATION RELAYS MAINTENANCE submenu. Press to access the submenu content.

Maintenance Mode
Yes

Choose if you want to activate the MAINTENANCE MODE of the relay. If the user selects Yes, output relays are disconnected from the protection and automation functions.

Relays	8765W4321
	000000001

If the MAINTENANCE MODE is activated (set to Yes), this menu allows the user to activate each one of the output relay

1 = relay activated

0 = relay not activated

5.5.8 Configuration Phase Rotation sub-menu (P122 & P123 only)

CONFIGURATION

Heading of the CONFIGURATION menu. Press to access the menu Phase Rotation, and until the desired submenu is reached..

PHASE ROTATION

Heading of the PHASE ROTATION sub-menu. Press to access the submenu content..

PHASE ROTATION
A-B-C

Choose the phase rotation between either A-B-C or A-C-B.

Press to change the phase rotation then to scroll through the available selections.

Press to validate your choice.

5.6 MEASUREMENTS Menu

Under the MEASUREMENTS menu, the user can read the various measurement values.

To access the MEASUREMENTS menu from the default display, press \odot then \odot 2 times.

MEASUREMENTS	Heading of the MEASUREMENTS menu. To access the MEASUREMENTS menu, press \odot , \odot , 2 times. Press \odot to access the submenu content.
Frequency 50.10 Hz	Displays the network frequency calculated from phase currents
I A 640.10 A	Displays the current value of phase A (True RMS value) taking into account the phase CT ratio (CONFIGURATION/CT RATIO submenu).
I B 629.00 A	Displays the current value of phase B (True RMS value) taking into account the phase CT ratio (CONFIGURATION/CT RATIO submenu).
I C 634.50 A	Displays the current value of phase C (True RMS value) taking into account the phase CT ratio (CONFIGURATION/CT RATIO submenu).
I N 3.15 A	Displays the earth current value (True RMS value) taking into account the earth CT ratio (CONFIGURATION/CT RATIO submenu).

5.6.1 P122 & P123 additional MEASUREMENTS Menu

I1 103A	Displays the positive sequence component.
I2 50A	Displays the negative sequence component.
RATIO I2/I1 50%	Displays the ratio of I2/I1. This derived measurement is used by the Broken Conductor detection function. (Automat. Ctrl menu)
In - fn RST = [C] 0.0A	Displays the earth current In (True RMS value) minus the current value at the fundamental frequency (value of the harmonics). Press \odot to clear the value (password required)
Thermal θ RST = [C] 67%	Displays the % thermal state based on true RMS values. Press \odot to clear the % values. (password required).
Max & Average I RST = [C]	Allows the user to clear the maximum (peak) and average (rolling) memorised values of the current. Press \odot to clear these values (password required).
Max IA Rms 127.36 A	Displays the peak value for phase A. The value is the true RMS maximum value.
Max IB Rms 156.28 A	Displays the peak value for phase B. The value is the true RMS maximum value.
Max IC Rms 139.01 A	Displays the peak value for phase C. The value is the true RMS maximum value.
Average IA Rms 98.25 A	Displays the rolling value for phase A. The value is the true RMS average value.
Average IB Rms 97.88 A	Displays the rolling value for phase B. The value is the true RMS average value.

Average IC Rms 99.02 A	Displays the rolling value for phase C. The value is the true RMS average value.
MAX. SUBPERIOD RST = [C]	Allows the user to clear the maximum subperiod values of the 3 currents.
MAX. SUBPERIOD IA Rms = 245A	Displays the IA peak value demand. The value is the true RMS maximum value on a subperiod.
MAX. SUBPERIOD IB Rms = 240A	Displays the IB peak value demand. The value is the true RMS maximum value on a subperiod.
MAX. SUBPERIOD IC Rms = 250A	Displays the IC peak value demand. The value is the true RMS maximum value on a subperiod.
ROLLING AVERAGE RST = [C]	Allows the user to clear the rolling average values of the 3 currents.
ROLLING AVERAGE IA Rms = 0A	Displays the IA average value demand. The value is the true RMS average value on a number of subperiod set in Record menu.
ROLLING AVERAGE IB Rms = 0A	Displays the IB average value demand. The value is the true RMS average value on a number of subperiod set in Record menu.
ROLLING AVERAGE IC Rms = 0A	Displays the IC average value demand. The value is the true RMS average value on a number of subperiod set in Record menu.

5.6.2 P123 additional MEASUREMENTS Menu

Reclose Stats RST = [C]	Allows the user to clear the statistics stored for the autoreclose function. Press \odot to clear these values.
Total Recloses 16	Displays the total number of reclosings.
Cycle 1 Recloses 1	Displays the total number of re-closings for cycle 1.
Cycle 2 Recloses 7	Displays the total number of re-closings for cycle 2.
Cycle 3 Recloses 5	Displays the total number of re-closings for cycle 3.
Cycle 4 Recloses 3	Displays the total number of re-closings for cycle 4.
Total Trip & Lockout 2	Displays the total number of definitive trips issued by the autoreclose function.

5.7 COMMUNICATION Menu

The COMMUNICATION menu content depends on the communication protocol of the relay. Four protocols are available: MODBUS, Courier, IEC 60870-5-103 and DNP3.0.

To access the COMMUNICATION menu from the default display, press then 3 times.

5.7.1 MODBUS COMMUNICATION Menu

COMMUNICATION	Heading of the COMMUNICATION menu. Press to access the menu, then 3 times. Press to access the submenus.
Communication ? Yes	Activates MODBUS RTU communication via the RS485 port on the rear terminals of the relay. Press to activate the communication, and use to select Yes. Press to validate your choice.
Baud Rate 9600 bd	Choose the baud rate of ModBus transmission. Select from: 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400 bd.
Parity None	Choose the parity in the ModBus data frame. Select parity: Even, Odd or Non
Stop Bits 1	Choose the number of stop bits in the ModBus data frame. Select stop bit: 0 or 1.
Relay Address 29	Choose the network address of the relay in the ModBus network. Select an address from 1 to 255.
Date format Private	Choose the format of the date, either PRIVATE or IEC protocol.

WARNING : A MODBUS NETWORK IS LIMITED TO 32 RELAY ADDRESSES ON THE SAME MODBUS SUB-LAN.

5.7.2 Courier COMMUNICATION Menu

COMMUNICATION	Heading of the COMMUNICATION menu. Press to access the menu, then 3 times. Press to access the submenus.
Communication ? Yes	Activates Courier communication via the RS485 port on the rear terminals of the relay. Press to activate the communication, then use to select Yes. Press to validate your choice.
Relay Address 12	Choose the network address of the relay in the Courier network. Select an address from 1 to 255 using and press to validate your choice.

5.7.3 IEC 60870-5-103 COMMUNICATION Menu

COMMUNICATION	Heading of the COMMUNICATION menu. Press \odot to access the menu, then \odot 3 times. Press \odot to access the submenus.
Communication ? Yes	Activates IEC 60870-5-103 communication via the RS485 port on the rear terminals of the relay. Press \odot to activate communication, then use \odot to select Yes. Press \odot to validate your choice.
Data Bits 9600 bd	Choose the baud rate of IEC 60870-5-103 transmission. Select from : 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bauds using \odot . Press \odot to validate your choice.
Relay Address 29	Choose the network address of the relay in the IEC 60870-5-103 network. Select from 1 to 255 using \odot . Press \odot to validate your choice.

5.7.4 DNP3 COMMUNICATION Menu

COMMUNICATION	Heading of the COMMUNICATION menu. Press \odot to access the menu, then \odot 3 times. Press \odot to access the submenus.
Communication ? Yes	Activates MODBUS RTU communication via the RS485 port on the rear terminals of the relay. Press \odot to activate communication, and use \odot to select Yes. Press \odot to validate your choice.
Baud Rate 9600 bd	Choose the baud rate of MODBUS transmission. Select from : 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 bauds using \odot . Press \odot to validate your choice.
Parity None	Choose the parity in the MODBUS frame. Select Even, Odd or None using \odot . Press \odot to validate your choice.
Stop Bits 1	Choose the number of stop bits in the MODBUS frame. Select 0 or 1 using \odot . Press \odot to validate your choice.
Relay Address 29	Choose the network address of the relay in the MODBUS network. Select from 1 to 255 using \odot . Press \odot to validate your choice.

5.8 PROTECTION Menu

The protection menu is divided into two groups for **MiCOM P122 and P123**: PROTECTION G1 for the first setting group and PROTECTION G2 for the second setting group.

Under this PROTECTION menu, the user can program the parameters of the different phase or earth protection functions and define their associated setting (thresholds, time delay).

The different submenus are listed below:

[50/51] Phase OC

[50N/51N] E/Gnd

[46] (P122 & P123 only) Neg seq OC






[49] (P122 & P123 only) Therm OL

[37] (P122 & P123 only) Under Current





[79] (P123 only) Autoreclose

Press \odot to access the PROTECTION menu (PROTECTION G1 menu for **MiCOM P122 and P123**), then \odot until the desired submenu is reached. For **MiCOM P122 and P123**, press \odot to access the PROTECTION G2 menu, then \odot five times.





5.8.1 [50/51] Phase OC sub-menu

PROTECTION G1	Heading of the PROTECTION menu. Press  to access to the menu, then  until the desired submenu is reached.
[50/51] Phase OC	Heading of the [50/51] Phase Overcurrent submenu. Press  to navigate through the different submenus.
I> ? Yes	Setting choice Yes: the first phase threshold (I>) is enabled. Then the following menu is displayed. Setting choice No: the first phase threshold (I>) is not enabled, and the next menu is the "I>>" menu.
I> 4 In	Set the value for the current threshold I>. Press  to modify this value. The threshold setting range is from 0.1 to 25In. Press  to validate your choice.
Delay Type DMT	Select the time delay type associated with I>. Setting choices are: DMT for definite time, IDMT for inverse time curves, and RI for the electromechanical inverse time curve. If the user selects DMT the following menu is displayed:



5.8.1.1 I> DMT threshold menu

Delay Type DMT	Shows that the delay time type chosen is DMT.
tl > 100 ms	Set the value for the time delay associated with I>. The setting range is from 0 to 150 s. Use  to change setting and press  to validate your choice.
t Reset 0 ms	Set the reset time value. The setting range is from 0 to 600 s. Use  to change setting and press  to validate your choice (only for P122, P123).





5.8.1.2 I> IDMT threshold, IEC or IEEE/ANSI curve menu

Delay Type IDMT	Displays the inverse time delay (IEC or IEEE/ANSI curves associated with I>.
Idmt IEC SI	Select the type of curve. Select your choice from IEC SI, IEC STI, IEC VI, IEC EI, IEC LTI, CO2, IEEE MI, CO8, IEEE VI, IEEE EI using  and press  to validate your choice.
Tms 0,025	Set the TMS value for the curve. The setting range is from 0.025 to 1.5. Use  to change setting and press  to validate your choice.

5.8.1.2.1 P122 & P123 additional I> DMT reset time, IEC curves menu

t Reset 60 ms	Set the reset time setting value. The setting range is from 40 ms to 100 s. Use  to change setting and press  to validate your choice.
-------------------------	--

5.8.1.2.2 P122 & P123 additional I> DMT reset time, ANSI curves menu

Type Tempo Reset DMT	Select the reset delay time type.. Select between DMT (Definitive Time) and IDMT (Inverse Time) using  and press  to validate your choice.
t Reset 40 ms	Set the Reset time setting value. Select from 40 ms to 100 s using  and press  to validate your choice.

5.8.1.2.3 P122 & P123 additional I> IDMT reset time, ANSI curves menu

Type Tempo Reset	IDMT
---------------------	------

Select the type of reset time delay. Select between DMT (Definitive Time) and IDMT (Inverse Time) using \leftarrow and press \rightarrow to validate your choice.

Rtms	0.025
------	-------

Set the Rtms value associated with the IDMT reset time choice. Select from 0.025 to 1.5 using \leftarrow and press \rightarrow to validate your choice.

5.8.1.3 I> IDMT threshold, Electromechanical RI curve menu

Delay Type	RI
------------	----

Display of the I> inverse time delay (electromechanical RI curve).

K	2.500
---	-------

Select the RI curve K value. Select from 0.100 to 10 using \leftarrow and press \rightarrow to validate your choice.

5.8.1.3.1 P122 & P123 additional I> DMT reset time, Electromechanical RI curves menu

t Reset	60 ms
---------	-------

Set the value for the time reset. The setting range is from 40 ms to 100 s. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.1.4 I>> threshold menu

I>> ?	Yes
-------	-----

Setting choice Yes: the second phase threshold (I>>) is enabled. Then the following menu is displayed.

Setting choice No: the second phase threshold (I>>) is not enabled, and the next menu is the "I>>>" menu.

I>>	10 In
-----	-------

Set the value for the second current threshold I>>. Press \leftarrow to modify this value. The threshold setting range is from 0.5 to 40 In. Press \rightarrow to validate your choice.

Delay Type	DMT
------------	-----

Select the threshold delay time type associated with I>>. Setting choices are: DMT for definite time, IDMT for inverse time curves, and RI for the electromechanical inverse time curve.

tl >>	100 ms
-------	--------

Set the value for the time delay associated with the second threshold I>>. Select the time delay from 0 to 150 s using \leftarrow and press \rightarrow to validate your choice.

t Reset	0 ms
---------	------

Set the value for the time reset. Press \leftarrow to modify this value. The setting range is from 0 to 600 s. Press \rightarrow to validate your choice (only P122, P123).

5.8.1.5 I>>> threshold menu

I>>> ?	Yes
--------	-----

Setting choice Yes: the third phase threshold (I>>>) is enabled. Then the following menu is displayed.

Setting choice No: the third phase threshold (I>>>) is not enabled, and the next menu is the heading of the [50/51] phase OC.

I>>> Sample	No
-------------	----

Select the mode of operation of the third threshold. I>>> operates on current sample base if you select (YES), or on Fast Fourier Transformation base if you select (NO) (Only P122, P123).

I>>>	10 In
------	-------

Set the value for the third current threshold I>>>. Press \leftarrow to modify this value. The threshold setting range is from 0.5 to 40 In. Press \rightarrow to validate your choice.

tl >>>	100 ms
--------	--------

Set the time delay associated with I>>>. The setting range is from 0 to 150 s. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.2 [50N/51N] EARTH OC sub-menu (P121 - P122 - P123 only)

PROTECTION G1	Heading of the PROTECTION menu. To gain access to the menu, press \odot , \odot 4 times.
[50N/51N] E/Gnd	Heading of the [50N/51N] E/Gnd submenu. Press \odot access the different submenus.
le> ? Yes	Setting choice Yes: the first earth fault threshold (le>) is enabled. Then the following menu is displayed. Setting choice No: the first earth fault threshold (le>) is not enabled, and the next menu is the heading of the [50/51] phase OC.
le > 0.05 Ien	Set the value for the earth fault current threshold le>. Press \odot to modify this value. Three earth fault current ranges are available (at order): from 0.002 to 1 Ien. Cortec code A from 0.01 to 8 Ien. Cortec code B from 0.1 to 40 Ien. Cortec code C Press \odot to validate your choice.
Delay Type DMT	Select the threshold delay time type associated with le>. Setting choices are: DMT for definite time, IDMT for inverse time curves, and RI for the electromechanical inverse time curve.

5.8.2.1 le> DMT threshold menu

Delay Type DMT	Display of the le> DMT time delay.
t le > 100 ms	Set the time delay associated with le>. The setting range is from 0 to 150 s. Use \odot to change setting and press \odot to validate your choice.
t Reset 0 ms	Set the value for the time reset. Press \odot to modify this value. The setting range is from 0 to 600 s. Press \odot to validate your choice (only P122, P123).

5.8.2.2 le> IDMT threshold, IEC or IEEE/ANSI curves menu

Delay Type DMT	Display of the le> inverse time delay (IEC or IEEE/ANSI curves).
Idmt IEC SI	Select the le> type of curve. Select from IEC SI, IEC STI, IEC VI, IEC EI, IEC LTI, CO2, IEEE MI, CO8, IEEE VI, IEEE EI using \odot and press \odot to validate your choice.
Tms 0,025	Set the value for the time multiplier setting Tms of the selected curve. Select from 0.025 to 1.5 using \odot and press \odot to validate your choice.

5.8.2.2.1 P122 & P123 additional le> DMT reset time, IEC curves menu

t Reset 60 ms	Set the value for the time reset. Press \odot to modify this value. The setting range is from 40 ms to 100 s. Press \odot to validate your choice.
--------------------------------	--

5.8.2.2.2 P122 & P123 additional le> DMT reset time, ANSI curves menu

Type Tempo Reset	DMT
---------------------	-----

Select the type of reset time delay. Setting choices are: DMT for definite time and IDMT for inverse time curves.

t Reset	40 ms
---------	-------

Set the value for the time reset associated with the DMT reset time choice. Press \odot to modify this value. The setting range is from 40 ms to 100 s. Press \ominus to validate your choice (only P122, P123).

5.8.2.2.3 P122 & P123 additional le> IDMT reset time, ANSI curves menu

Type Tempo Reset	IDMT
---------------------	------

Select the reset time type. Setting choices are: DMT for definite time and IDMT for inverse time curves.

Rtms	0.025
------	-------

Set the value for the Rtms factor associated to IDMT delay type reset.

5.8.2.3 le> IDMT threshold, Electromechanical RI curve menu

Delay type	RI
------------	----

Displays the le> inverse time delay (electromechanical RI curve).

K	2.500
---	-------

Set the K value associated to the RI curve. The setting range is from 0.100 to 10.

5.8.2.3.1 P122 & P123 additional le> DMT reset time, RI curves menu

t Reset	60 ms
---------	-------

Set the value for the time reset. Press \odot to modify this value. The setting range is from 40 ms to 100 s. Press \ominus to validate your choice.

5.8.2.4 le>> threshold menu

le>> ?	Yes
--------	-----

Setting choice Yes: the second earth threshold (le>>) is enabled. Then the following menu is displayed.

Setting choice No: the second earth threshold (le>>) is not enabled, and the next menu is the "le>>>" menu.

le>>	5 len
------	-------

Set the value for the second earth fault current threshold le>>. Press \odot to modify this value. Three earth fault current ranges are available (at order):

from 0.002 to 1 len. Cortec code A

from 0.01 to 8 len. Cortec code B

from 0.5 to 40 len. Cortec code C

Press \ominus to validate your choice.

Delay Type	DMT
------------	-----

Select the threshold delay time type. Setting choices are: DMT for definite time, IDMT for inverse time curves and RI for electromechanical inverse time curve.

t le>>	100 ms
--------	--------

Set the time delay associated with le>>. The setting range is from 0 to 150 s. Use \odot to change setting and press \ominus to validate your choice.

t Reset	0 ms
---------	------

Set the value for the time reset. The setting range is from 0 to 600 s. Use \odot to change setting and press \ominus to validate your choice (only P122, P123).

5.8.2.5 le>>> threshold menu

le>>> ?	Yes
---------	-----

Setting choice Yes: the third earth threshold (le>>>) is enabled. Then the following menu is displayed.

Setting choice No: the third earth threshold (le>>>) is not enabled, and the next menu is the heading of the menu [50N/51N] E/Gnd.

le>>> Sample	No
--------------	----

Select the mode of operation of the third threshold. le>>> operates on current sample base if you select (YES), or on Fast Fourier Transformation base if you select (NO) (Only P122, P123).

le>>>	10 len
-------	--------

Set the value for the third earth fault current threshold le>. Press \ominus to modify this value. The threshold setting range is from 0.5 to 40 len. Press \ominus to validate your choice.

tle>>>	100 ms
--------	--------

Set the time delay associated with le>>>. The setting range is from 0 to 150 s. Use \ominus to change setting and press \ominus to validate your choice.

5.8.3 [46] NEGATIVE Phase SEQUENCE I2> submenu (P122 & P123 only)

PROTECTION G1

Heading of the PROTECTION menu. To gain access to the menu, press \ominus , 4 times.

[46] Neg Seq OC

Heading of the [46] NEGATIVE Phase SEQUENCE I2> submenu.

I2 > ?	Yes
--------	-----

Setting choice Yes: the first negative phase sequence overcurrent threshold (I2>) is enabled. Then the following menu is displayed.

Setting choice No: the first negative phase sequence overcurrent threshold (I2>) is not enabled, and the next menu is not activated.

I2 >	0.1 In
------	--------

Set the value for the negative phase sequence threshold I2>. Press \ominus to modify this value. The threshold setting range is from 0.1 to 40 In, in steps of 0.01 In. Press \ominus to validate your choice..

Delay Type	DMT
------------	-----

Select the threshold delay time type associated with I2>. Setting choices are: DMT for definite time, IDMT for inverse time curves and RI for electromechanical inverse time curve.

5.8.3.1 I2> DMT threshold menu

Delay Type	DMT
------------	-----

Display of the I2> DMT time delay.

t I2 >	100 ms
--------	--------

Set the time delay associated with I2>. The setting range is from 0 to 150 s. Use \ominus to change setting and press \ominus to validate your choice.

5.8.3.2 I2> IDMT threshold, IEC or IEEE/ANSI curves menu

Delay Type	IDMT
------------	------

Display of the I2> inverse time delay (IEC or IEEE/ANSI curves).

Curve	IEC SI
-------	--------

Selection of the I2> curve. Select from IEC SI, IEC STI, IEC VI, IEC EI, IEC LTI, CO2, IEEE MI, CO8, IEEE VI, IEEE EI using \leftarrow and validate your choice using the key \rightarrow .

Tms	0,025
-----	-------

Set the time multiplier setting value associated to the selected curve. Setting range is from 0.025 to 1.5.

5.8.3.2.1 I2> DMT reset time, IEC curves menu

t Reset	60 ms
---------	-------

Set the value for the time reset. The setting range is from 40 ms to 100 s. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.3.2.2 I2> DMT reset time, ANSI curves menu

Type Tempo Reset	DMT
------------------	-----

Select the type of reset time delay. Select between DMT (Definitive Time) and IDMT (Inverse Time) using \leftarrow and press \rightarrow to validate your choice.

t Reset	40 ms
---------	-------

Set the value for the time reset. The setting range is from 40 ms to 100 s. Use \leftarrow to change setting and press \rightarrow to validate your choice (only P122, P123).

5.8.3.2.3 I2> IDMT reset time, ANSI curves menu

Type Tempo Reset	IDMT
------------------	------

Select the type of reset time delay. Select between DMT (Definitive Time) and IDMT (Inverse Time) using \leftarrow and press \rightarrow to validate your choice.

Rtms	0.025
------	-------

Select the Rtms value associated to the IDMT curve. Setting range is from 0.025 to 1.5. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.3.3 I2> IDMT threshold, Electromechanical RI curve menu

Delay Type	RI
------------	----

Display of the I2> inverse time delay (electromechanical RI curve).

K	2.500
---	-------

Set the value for the K factor associated to the RI curve. Setting range is from 0.100 to 10. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.3.3.1 I2> DMT reset time, RI curves

t Reset	60 ms
---------	-------

Set the value for the reset time. The setting range is from 40 ms to 100 s. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.3.4 I2>> threshold menu

I2>> ?	Yes
--------	-----

Setting choice Yes: the second negative phase sequence overcurrent threshold (I2>) is enabled. Then the following menu is displayed.

Setting choice No: the second negative phase sequence overcurrent threshold (I2>) is not enabled, and the next menu is not activated.

I2>>	1 In
------	------

Set the value for the second threshold of the negative phase sequence OC I2>>. Press \odot to modify this value. The threshold setting range is from 0.1 to 40 In, in steps of 0.01 In. Press \odot to validate your choice.

tl2>>	150 ms
-------	--------

Set the time delay associated with I2>>. The setting range is from 0 to 150 s. Use \odot to change setting and press \odot to validate your choice.

5.8.3.5 [49] Therm OL sub-menu (P122 & P123 only)

PROTECTION G1

Heading of the PROTECTION menu. Press \odot to access the menu, then \odot 4 times.

[49] Therm OL

Heading of the [49] Therm OL (Thermal Overload) submenu.

Press \odot to access the different submenus.

Therm OL ?	Yes
------------	-----

Setting choice Yes: the thermal overload function is enabled. Then the following menu is displayed.

Setting choice No: the thermal overload function is not enabled, and no menu content is displayed.

I0 >	0.5 In
------	--------

Set the value for the thermal current threshold I0>. Press \odot to modify this value. The setting range is from 0.1 to 3.2 In in steps of 0.01. Press \odot to validate your choice.

Te	10 mn
----	-------

Set value for the Te thermal time constant associated with the thermal overload formula. Press \odot to modify this value. The setting range is from 1 min to 200 min in steps of 1 min. Press \odot to validate your choice.

k	1.01
---	------

Set the value for the k factor associated with the thermal overload function. Press \odot to modify this value. The setting range is from 1 to 1.5 in steps of 0.01. Press \odot to validate your choice.

θ Trip	110 %
---------------	-------

Set the percentage applicable to the thermal overload trip threshold. Press \odot to modify this value. The setting range is from 50 % to 200 % in steps of 1%. Press \odot to validate your choice.

θ Alarm ?	Yes
------------------	-----

Setting choice Yes: the thermal overload alarm function is enabled. Then the following menu is displayed.

Setting choice No: the thermal overload function is not enabled, and refer to the THERMAL OVERLOAD submenu.

θ Alarm	90 %
----------------	------

Set the percentage applicable to the thermal overload alarm threshold. Press \odot to modify this value. The setting range is from 50 % to 200 % in steps of 1%. Press \odot to validate your choice.

5.8.4 [37] UNDERCURRENT I< sub-menu (P122 & P123 only)

PROTECTION G1

Heading of the PROTECTION menu. Press \odot to access the menu, then \odot 4 times.

[37] Under
Current

Heading of the [37] Under-Current submenu. Press \odot to access the submenu content.

I < ?
Yes

Setting choice Yes: the first undercurrent threshold (I<) is enabled. Then the following menu is displayed.

Setting choice No: the first undercurrent threshold (I<) is not enabled, and the next menu is not activated.

I <
0.2 In

Set the value for the undercurrent threshold I<. Press \odot to modify this value. The threshold setting range is from 0.02 to 1 In, in steps of 0.01 In. Press \odot to validate your choice.

tl <
200 ms

Set the time delay associated with I<. The setting range is from 0 to 150 s. Use \odot to change setting and press \odot to validate your choice.

5.8.5 [79] AUTORECLOSE sub-menu (P123 only)

PROTECTION G1

Heading of the PROTECTION menu. Press \odot to access the menu, then \odot 4 times.

[79] Autoreclose

Heading of the [79] AUTORECLOSER submenu. Press \odot to access the submenu.

Autoreclose ?
Yes

Setting choice Yes: the autoreclose function is enabled. Then the following menu is displayed.

Setting choice No: the autoreclose function is not enabled, and no menu is activated.

Ext CB Fail ?
Yes

Setting choice Yes: the external circuit breaker failure function associated with the autoreclose function is enabled. Then the following menu is displayed.

Setting choice No: the Ext Block submenu is activated.

5.8.5.1 [79] EXTERNAL CB FAILURE

Ext CB Fail
Yes

Allows the use of a dedicated input (CB FLT) to inform the autoreclose function of the state of the CB (failed or operational).

Ext CB Fail Time
10000 ms

Set the value for the external CB failure time delay tCFE. Once this set time has elapsed, the information Ext CB Fail is validated. Setting range is from 10 ms to 600 s. Use \odot to change setting and press \odot to validate your choice.

5.8.5.2 [79] EXTERNAL BLOCKING

Ext Block ?
Yes

Allows the use of a dedicated input (Block_79) to block the autoreclose function.

5.8.5.3 [79] DEAD and RECLAIM TIMES

Dead Time	
tD1	60 ms

Set the value for the First Cycle Dead Time (tD1) associated with the autoreclose function. Setting range is from 10 ms to 300 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

Dead Time	
tD2	100 ms

Set the value for the second Cycle Dead Time (tD2) associated with the autoreclose function. Setting range is from 10 ms to 300 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

Dead Time	
tD3	200 ms

Set the value for the third Cycle Dead Time (tD3) associated with the autoreclose function. Setting range is from 10 ms to 600 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

Dead Time	
tD4	60 ms

Set the value for the fourth Cycle Dead Time (tD4) associated with the autoreclose function. Setting range is from 10 ms to 600 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

Reclaim Time	
tR	120 ms

Set the Reclaimer time value (tR) associated with the autoreclose function. Setting range is from 20 ms to 600 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

Inhib Time	
tI	120 ms

Set the value for the Inhibit Time (tI) associated with the autoreclose function. Setting range is from 20 ms to 600 s in steps of 10 ms. Use \leftarrow to change setting and press \rightarrow to validate your choice.

5.8.5.4 [79] Cycles number

Phase Cycles	
	4

Select the number of cycles associated with the phase autoreclose function. Select from 0 to 4 using \leftarrow and press \rightarrow to validate your choice.

E/Gnd Cycles	
	4

Select the number of cycles associated with the earth autoreclose function. Select from 0 to 4 using \leftarrow and press \rightarrow to validate your choice.

5.8.5.5 [79] Cycle allocation

CYCLES	4321
tI>	1101

0 = no action on autorecloser : definitive trip

1 = trip on tI> pick-up, followed by reclosing cycle

2 = no trip on tI> pick-up

CYCLES	4321
tI>>	1211

0 = no action on autorecloser : definitive trip

1 = trip on tI>> pick-up, followed by reclosing cycle

2 = no trip on tI>> pick-up

CYCLES	4321
tI>>>	1110

0 = no action on autorecloser : definitive trip

1 = trip on tI>>> pick-up, followed by reclosing cycle

2 = no trip on tI>>> pick-up

CYCLES	4321
tIe>	0111

0 = no action on autorecloser : definitive trip

1 = trip on tIe> pick-up, followed by reclosing cycle

2 = no trip on tIe> pick-up

CYCLES	4321
tIe>>	1121

0 = no action on autorecloser : definitive trip

1 = trip on tIe>> pick-up, followed by reclosing cycle

2 = no trip on tIe>> pick-up

CYCLES	4321
tIe>>>	1111

- 0 = no action on autorecloser : definitive trip
- 1 = trip on tIe>>> pick-up, followed by reclosing cycle
- 2 = no trip on tIe>>> pick-up

CYCLES	4321
tAux1>	1112

- 0 = no action on autorecloser : definitive trip
- 1 = trip on tAux1> pick-up, followed by reclosing cycle
- 2 = no trip on tAux1> pick-up

CYCLES	4321
tAux2>	0111



- 0 = no action on autorecloser : definitive trip
- 1 = trip on tAux2> pick-up, followed by reclosing cycle
- 2 = no trip on tAux2> pick-up

5.9 AUTOMAT. CTRL Menu

Under the AUTOMAT. CTRL Menu, the user can program the different automation functions available in the **MiCOM P120, P121, P122 and P123**.




The different submenus are listed below:

- ⇒ Trip Commands
- ⇒ Latch of the trip output relay RL1 by function (**P121, P122, P123** only)
- ⇒ Latch of functions (**P120** only)
- ⇒ Blocking logic (1)
- ⇒ Blocking Logic 2 (**P122 & P123** only)
- ⇒ Logic Select. 1 (**P122 & P123** only)
- ⇒ Logic Select. 2 (**P122 & P123** only)
- ⇒ Outputs Relays
- ⇒ Latch of the auxiliary output relays (**P121, P122, P123** only)
- ⇒ Inputs
- ⇒ Broken Conductor (**P122 & P123** only)
- ⇒ Cold load PU (**P122 & P123** only)
- ⇒ CB Fail (**P122 & P123** only)
- ⇒ CB Supervision (**P122 & P123** only)
- ⇒ Comm. Ord. Latch times (**P122 & P123** only)

To access the AUTOMAT. CTRL Menu, press  then  until the menu is reached.

5.9.1 Trip Commands sub-menu

This submenu makes it possible to assign some or all the selected thresholds to the trip output relay (RL1).

AUTOMAT. CTRL	Heading of the AUTOMAT.CTRL Menu. Press  to access the menu, then  6 times.
Trip Commands	Heading of the Trip ORDER sub-menu. Press  to access the different submenus..
Trip tl> Yes	Setting choice Yes: Assign the first phase overcurrent time delay threshold to the trip output relay RL1. Then the trip output relay (RL1) will be activated at the end of the time delay tl>. Setting choice No: the trip output relay (RL1) will never be activated, even at the end of the time delay tl>.
Trip tl>> Yes	Assign the second phase time delay overcurrent threshold (tl>>) to the trip output relay RL1. Setting choice: Yes or No.
Trip tl>>> No	Assign the third phase time delay overcurrent threshold (tl>>>) to the trip output relay RL1. Setting choice: Yes or No.
Trip tle> Yes	Assign the first earth fault overcurrent (tle>) to the trip output relay RL1. Setting choice: Yes or No.
Trip tle>> No	Assign the second earth fault overcurrent (tle>>) to the trip output relay RL1. Setting choice: Yes or No.
Trip tle>>> No	Assign the third earth fault overcurrent (tle>>>) to the trip output relay RL1. Setting choice: Yes or No.

5.9.1.1 P122 & P123 additional Trip Commands menu

Trip tl < No	Assign the minimum current threshold (tl<) to the trip output relay RL1. This information is generated in less than a cycle of the network frequency (50 or 60 Hz). Setting choice: Yes or No.
Trip tl2 > No	Assign the first negative phase sequence overcurrent time delayed threshold (tl2>) to the trip output relay RL1. Setting choice: Yes or No.
Trip tl2 >> No	Assign the second negative phase sequence overcurrent time delayed threshold (tl2>>) to the trip output relay RL1. Setting choice: Yes or No.
Trip Thermal θ No	Assign the thermal overload trip threshold (θ Trip) to the trip output relay RL1. Setting choice: Yes or No.
Trip Brkn.Cond Yes	Assign the broken conductor detection signal to the trip output relay RL1. Setting choice: Yes or No.

Trip t Aux 1 No	Assign the delayed auxiliary input Aux 1 to the trip output relay RL1. Setting choice: Yes or No.
Trip t Aux 2 No	Assign the delayed auxiliary input Aux 2 to the trip output relay RL1. Setting choice: Yes or No.
Trip t Aux 3 No	Assign the delayed auxiliary input Aux 3 to the trip output relay RL1. Setting choice: Yes or No.
Trip CB Fail No	Assign the Breaker failure signal to the trip output relay RL1. Setting choice: Yes or No.

5.9.1.2 P123 additional Trip COMMAND menu

Trip t Aux 4 No	Assign the delayed auxiliary input Aux 4 to the trip output relay RL1. Setting choice: Yes or No.
Trip SOTF No	Assign the SOTF function to the trip output. When the t SOTF has elapsed, the trip command is ordered. Setting choice: Yes, No
Ctrl Trip No	Assign the control Trip function to the trip output relay RL1. Setting choice: Yes, No
Trip CB Fail No	Assign the CB Fail function to the trip output relay RL1. Setting choice: Yes, No

5.9.2 Latch of trip output relay by Function Submenu (**P121, P122 & P123** relays)

With this submenu the user can program the trip output relay RL1 associated with one or many thresholds so that it stays latched after the cause for activating these functions has disappeared.

AUTOMAT. CTRL	Heading of the AUTOMAT. CTRL menu. Press \odot to access the menu, and \otimes until the desired menu is reached.
Latch Functions	Heading of the submenu. Press \odot to access the different submenus.
Latch tl> Yes	Setting choice Yes: Latch the trip output relay RL1 associated with first phase overcurrent time delay threshold. The relay will remain latched after tl> has disappeared. Setting choice No: The trip output relay RL1 will be active when the relevant command is active; the relay will not be active if the relevant command is reset.
Latch tl>> Yes	Latch the trip output relay RL1 associated with the second phase time delay overcurrent threshold (tl>>). Setting choice: Yes or No.
Latch tl>>> No	Latch the trip output relay RL1 associated with the third phase time delay overcurrent threshold (tl>>>). Setting choice: Yes or No.

Latch tle> No	Latch the trip output relay RL1 associated with the first earth time delay overcurrent threshold (tle>). Setting choice: Yes or No.
Latch tle>> No	Latch the trip output relay RL1 associated with the second earth time delay overcurrent threshold (tle>>). Setting choice: Yes or No.
Latch tle>>> No	Latch the trip output relay RL1 associated with the third earth fault time delay overcurrent threshold (tle>>>). Setting choice: Yes or No.



5.9.2.1 P122 & P123 additional Latch functions sub-menu

Latch tl < Yes	Latch the trip output relay RL1 associated with the time delay minimum current threshold (tl<). Setting choice: Yes or No.
Latch tl2 > No	Latch the trip output relay RL1 associated with the time delay negative phase sequence overcurrent threshold (tl2>) to the trip output. Setting choice: Yes or No.
Latch tl2 >> No	Latch the trip output relay RL1 associated with the time delay negative phase sequence overcurrent threshold (tl2>>) to the trip output. Setting choice: Yes or No.
Latch Thermal θ No	Latch the trip output relay RL1 associated with the thermal overload Trip information (θ Trip). Setting choice: Yes or No.
Latch Brkn.Cond No	Latch the trip output relay RL1 associated with the broken conductor function. Setting choice: Yes or No.
Latch t Aux 1 No	Latch the trip output relay RL1 associated with the delayed auxiliary input Aux 1. Setting choice: Yes or No.
Latch t Aux 2 No	Latch the trip output relay RL1 associated with the delayed auxiliary input Aux 2. Setting choice: Yes or No.
Latch t Aux 3 No	Latch the trip output relay RL1 associated with the delayed auxiliary input Aux 3. Setting choice: Yes or No.

5.9.2.2 P123 additional latch functions submenu

Latch t Aux 4 No	Latch the trip output relay RL1 associated with the delayed auxiliary input Aux 4. Setting choice: Yes or No.
Latch SOTF No	Latch the trip output relay RL1 associated with the SOTF function. Setting choice: Yes or No.
Latch CB Fail No	Latch the trip output relay RL1 associated with the CB Fail function. Setting choice: Yes or No.

NOTE : To reset the latched output relay :



	P121	P122 & P123
The active relay latched can be reset by:	<ul style="list-style-type: none"> - Either by resetting of the alarm "tl> PHASE"* from the front panel by pushing . - or by a logic input assigned to this function - or by remote command. <p>Note: No alarm dedicated to the latch of RL1</p>	<ul style="list-style-type: none"> - Either by resetting of the alarm "LATCH RELAY TRIP" from the front panel by pushing . - or by a logic input assigned to this function - or by remote command. <p>Note: The alarm "LATCH RELAY TRIP" is dedicated to the latch of RL1</p>

* : tl> or other function presented in the "AUTOMAT. CTRL/Latch functions" menu


5.9.3 Latch functions submenu (P120 relay)

Through this submenu, the user can program trip functions so that output relays (including the trip output relay RL1) remain latched after the cause for exceeding the threshold has disappeared.

AUTOMAT. CTRL

Heading of the AUTOMAT. CTRL menu. Press  to access the menu, then  until the submenu is reached.

Latch function

Heading of the submenu.
Press  to access the submenus.

Latch tl>

Yes

Setting choice Yes: Latch the output relays associated with first phase overcurrent time delay threshold. The relay will be remain latched after tl> has disappeared.

Setting choice No: The output relay will be active when the relevant command is active; the relays will not be active if the relevant command is reset.

Latch tl>>

Yes

Setting choice Yes: Latch the output relays associated with second phase overcurrent time delay threshold. The relay will be remain latched after tl>> has disappeared.

Setting choice No: The output relay will be active when the relevant command is active; the relays will not be active if the relevant command is reset.

Latch tl>>>

Yes


Setting choice Yes: Latch the output relays associated with third phase overcurrent time delay threshold. The relay will be remain latched after tl>>> has disappeared.

Setting choice No: The output relay will be active when the relevant command is active; the relays will not be active if the relevant command is reset.

NOTE :

To reset the latched relays with MiCOM P120:

When a relay associated to a time delay overcurrent threshold is latched, no dedicated alarm signalling that the relay has been latched is displayed.




The latched output can be reset by acknowledging the alarm message pressing keys  and .

The latched relay can also be reset either by an opto input or by a remote command.

5.9.4 Blocking Logic submenu

Through the Blocking Logic submenu, the user can block each delayed threshold using a "Blk Log" input (refer to Inputs menu). **MiCOM P122 & P123** relays have the submenu Blocking Logic 1 and Blocking Logic 2 available for setting.

It is possible to enable or disable the "blocking" of most protection functions even if a logic input has been assigned to that function. Blocking of a protection function can be prevented if "No" is selected in the relevant window (see below). Blocking of a protection function can be enabled if "Yes" is selected in the relevant window.

AUTOMAT. CTRL	Heading of the AUTOMAT. CTRL menu. Press  to access the menu then  6 times.
Blocking Logic	Heading of the Blocking Logic submenu. Press  to access the different submenus.
Block tl> Yes	Enables/disables Blocking Logic of the first time delay overcurrent threshold (tl>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block tl>> Yes	Enables/disables Blocking Logic of the second time delay overcurrent threshold (tl>>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block tl>>> Yes	Enables/disables Blocking Logic of the third time delay overcurrent threshold (tl>>>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block tle> No	Enables/disables Blocking Logic of the first earth time delay overcurrent threshold (tle>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block tle>> No	Enables/disables Blocking Logic of the second earth fault time delay overcurrent threshold (tle>>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block tle>>> No	Enables/disables Blocking Logic of the third earth fault time delay overcurrent threshold (tle>>>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.

5.9.4.1 P122 & P123 additional Blocking Logic menu



Block 1 tl2 > No	Enables/disables Blocking Logic of the first time delay negative phase sequence overcurrent threshold (tl2>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block 1 tl2 >> No	Enables/disables Blocking Logic of the second time delay negative phase sequence overcurrent threshold (tl2>>) from locking on the level (logic state = 1) of logic input "Blk Log". Setting choice: Yes, No.
Block 1 Thermal 0 Yes	Enables/disables Blocking Logic of the trip threshold for thermal overload from locking on the level (logic state 1) of logic input "Blk Log". Setting choice: Yes, No.




Block 1 Brkn.Cond No	Enables/disables Blocking Logic of the Broken Conductor trip signal from locking on the level (logic state 1) of logic input "Blk log". Setting choice: Yes, No.
Block 1 t Aux 1 No	Enables/disables Blocking Logic of time delay of auxiliary input Aux1. Setting choice: Yes, No.
Block 1 t Aux 2 No	Enables/disables Blocking Logic of time delay of auxiliary input Aux2. Setting choice: Yes, No.
Block 1 t Aux 3 No	Enables/disables Blocking Logic of time delay of auxiliary input Aux 3. Setting choice: Yes, No

5.9.4.2 P123 additional Blocking Logic menu

Block 1 t Aux 4 No	Enables/disables Blocking Logic of time delay of auxiliary input Aux 4. Setting choice: Yes, No.
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5.9.5 Logic Select submenus (P122 & P123 only)

With the submenu Logic Select. 1 or Logic Select. 2, the user can assign each time delay threshold to the "Log Sel" input (refer to Inputs menu). To access the submenu Logic Select. 1 or Logic Select. 2, press  and  until the submenu is reached.

AUTOMAT. CTRL	Heading of the AUTOMAT. CTRL menu. Press  to access the menu, then  6 times.
Logic Select. 1	Heading of the Logic Select. 1 submenu. Press  to access the different submenus.
Sel1 tl>> Yes	Enables/disables Logic Selectivity 1 of the second phase time delay overcurrent threshold (tl>>). Setting choice: Yes, No.
Sel1 tl>>> Yes	Enables/disables Logic Selectivity 1 of the third phase time delay overcurrent threshold (tl>>>). Setting choice: Yes, No.
Sel1 tle>> No	Enables/disables Logic Select 1 of the second earth fault time delay overcurrent threshold (tle>>). Setting choice: Yes, No.
Sel1 tle>>> No	Enables/disables Logic Select 1 of the third earth fault time delay overcurrent threshold (tle>>>). Setting choice: Yes, No.
t Sel1 20 ms	Set the selective scheme logic time delay t Sel1. The setting range for t Sel1 is from 0 s to 150 s, in steps of 10 ms.

5.9.6 Outputs Relays submenu

This submenu makes it possible to assign various alarm and trip thresholds (instantaneous and/or time delay) to a logic output. Excepted from this option are the Watchdog (RL0) and the Tripping (RL1) outputs (refer to Trip Commands submenu).

The total number of programmable logic outputs for the four relay models is listed in the table:

Model	P120	P121	P122	P123
Output relays	3	3	5	7

RL2 relay is a change over relay. The others RL3 to RL8 are normally open relays.

AUTOMAT. CTRL

Heading of the AUTOMAT.CTRL menu. Press \odot to access the menu and \odot until the submenu is reached.

Output Relays

Heading of the Output Relays submenu. To navigate within submenu points, press \odot \odot . To modify setting, press \odot . Use \odot \odot \odot \odot to scroll and set available selections. Press \odot to confirm choice.

Trip 8765432
 1100010

Assign output signal Trip (RL1) to other output relays; i.e. to output 3 (RL3), 7 (RL7) and 8 (RL8). Setting choice: 1 assigns the output relay; 0 no assignment.

I> 8765432
 0000010

Assign first phase instantaneous overcurrent threshold (I>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

tl> 8765432
 1100010

Assign first phase time delay overcurrent threshold (tl>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

I>> 8765432
 1100010

Assign second phase instantaneous overcurrent threshold (I>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

tl>> 8765432
 1100010

Assign second phase time delay overcurrent threshold (tl>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

I>>> 8765432
 1100010

Assign third phase instantaneous overcurrent threshold (I>>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

tl>>> 8765432
 1100010

Assign third phase instantaneous overcurrent threshold (tl>>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

Ie> 8765432
 1100010

Assign first earth instantaneous overcurrent threshold (Ie>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

tle> 8765432
 1100010

Assign first earth time delay overcurrent threshold (tle>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

Ie>> 8765432
 1100010

Assign second earth fault instantaneous overcurrent threshold (Ie>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

tle>> 8765432
 1100010

Assign second earth fault time delay overcurrent threshold (tle>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.

le>>>	8765432 1100010	Assign third earth fault instantaneous overcurrent threshold (le>>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
tle>>>	8765432 1100010	Assign third earth fault time delay overcurrent threshold (tle>>>) to output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
CB Close	8765432 10100000	Assign the circuit breaker closing order to output relays. ; i.e. to output 6 & 8 (RL6 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.

5.9.6.1 P122 & P123 additional Outputs menu

tl<	8765432 1100010	Assign threshold for undercurrent (l<) to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
tl2>	8765432 1100010	Assign negative phase sequence overcurrent time delay threshold (tl2>) to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
tl2>>	8765432 1100010	Assign negative phase sequence overcurrent time delay second threshold (tl2>>) to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
Therm. Alarm	8765432 1100010	Assign thermal alarm threshold to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
Therm. Trip	8765432 1100010	Assign thermal trip threshold to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
CB Alarm	8765432 1100010	Assign Circuit Breaker Alarm function signal (CB Open NB, Sum Amps(n), CB Open Time and CB Close Time) to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
52 Fail	8765432 1100010	Assign the trip circuit supervision (TCS) failure function signal to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
Brkn. Cond	8765432 1100010	Assign the broken conductor function signal to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
CB Fail	8765432 1100010	Assign the circuit breaker failure function signal to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment. CB Fail = CB not open at the end of tBF timer.
t Aux 1	8765432 1100010	Assign delayed auxiliary input Aux 1 to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
t Aux 2	8765432 1100010	Assign delayed auxiliary input Aux 2 to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.




t Aux 3	8765432 1010101	Assign delayed auxiliary input Aux 3 to the output relays; i.e. to output 3, 7 & 8 (RL3, RL7 & RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
Order 1 Comm.	8765432 0000100	Assign remote command 1 to the output relays; i.e. to output 4 (RL4). Setting choice: 1 assigns the output relay; 0 no assignment.
Order 2 Comm.	8765432 0000010	Assign remote command 2 to the output relays; i.e. to output 3 (RL3). Setting choice: 1 assigns the output relay; 0 no assignment.
Order 3 Comm.	8765432 0000001	Assign remote command 3 to the output relays; i.e. to output 2 (RL2). Setting choice: 1 assigns the output relay; 0 no assignment.
Order 4 Comm.	8765432 1000000	Assign remote command 4 to the output relays; i.e. to output 8 (RL8). Setting choice: 1 assigns the output relay; 0 no assignment.
Active Group	8765432 0010000	Assign the Active Group indication to the output relays; i.e. to output 6 (RL6). Setting choice: 1 assigns the output relay; 0 no assignment.

5.9.6.1.1 P123 additional Outputs menu

t Aux 4	8765432 0010000	Assign the delayed auxiliary input Aux 4 to the output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
79 Run	8765432 1100010	Assign the "autorecloser in progress" signal to the output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
79 Trip	8765432 1100010	Assign the autoreclose final trip function to the output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
79 Locked	8765432 1100010	Assign the autoreclose final close function to the output relays. Setting choice: 1 assigns the output relay; 0 no assignment.
SOTF Group	8765432 0000010	Assign the SOTF functionality to the output relays; i.e. to output 3 (RL3). When the tSOTF has elapsed the assigned relay is activated. Setting choice 1 assigns the output relay, 0 no assignment.
CONTROL Trip	8765432 0000100	Assign the Control trip command to the output relays; i.e. to output 4 (RL4). Setting choice 1 assigns the output relay, 0 none assignment.
CONTROL Close	8765432 0000100	Assign the Control close command to the output relays; i.e. to output 4 (RL4). Setting choice: 1 assigns the output relay; 0 no assignment

5.9.7 Latch of the auxiliary output relays (RL2 to RL8)

This submenu (not available in P120 menu) makes it possible to latch the auxiliary output relays, relay by relay.

AUTOMAT. CTRL	Heading of the AUTOMAT.CTRL menu. Press  to access the menu, then  6 times.
Latch Output Relays	Heading of the Latch Output Relays submenu. Press  to access the different submenus.
Output 2 No	Latch the auxiliary output relay RL2. Setting choice: Yes, No.
Output 3 Yes	Latch the auxiliary output relay RL3. Setting choice: Yes, No.
Output 4 Yes	Latch the auxiliary output relay RL4. Setting choice: Yes, No.



5.9.7.1 P122 & P123 additional latch output relays menu

Output 5 Yes	Latch the auxiliary output relay RL5. Setting choice: Yes, No.
Output 6 No	Latch the auxiliary output relay RL6. Setting choice: Yes, No.

5.9.7.2 P123 additional latch output relays menu

Output 7 Yes	Latch the auxiliary output relay RL7. Setting choice: Yes, No.
Output 8 No	Latch the auxiliary output relay RL8. Setting choice: Yes, No.

NOTE : To reset the latched auxiliary relays :

	P121	P122 & P123
The auxiliary output latched can be reset by:	<ul style="list-style-type: none"> - Either by resetting of the "OP PARAMETERS/Relay Status" from the front panel by pushing . - or by a logic input assigned to this function - or by remote command. <p>Note: No alarm dedicated to the latch of the auxiliary output relay</p>	<ul style="list-style-type: none"> - Either by resetting of the alarm "LATCH RELAY TRIP" from the front panel by pushing . - or by a logic input assigned to this function - or by remote command. <p>Note: The alarm "LATCH RELAY TRIP" is dedicated to the latch of RL1</p>

5.9.8 Inputs submenu

With the submenu Inputs it is possible to assign either a label or an automation function to each logic input (according to the following table) :

Label abstract	Label signification
None	No link/assignment
Unlatch	Unlocks latched output relays
52 a	Position of the circuit breaker (open)
52 b	Position of the circuit breaker (close)
CB FLT	External failure information from the CB
Aux 1	Assign external information to input Aux1
Aux 2	Assign external information to input Aux2
Blk Log (1)	Blocking logic 1
Blk Log 2	Blocking logic 2
Strt Dist	Starting of the disturbance recording function
Cold L PU	Assign cold load pick up
Log Sel 1	Logic selectivity 1
Log Sel 2	Logic selectivity 2
Change set	Change of setting group (default setting group 1)
θ Reset	Reset of the thermal state
Trip Circ	Trip circuit supervision input
Strt tBF	Starting of the Breaker Fail Timer
Rst led	Reset of the "Trip" & "Alarm" leds
Maint. M	Maintenance Mode ON/OFF change
Aux 3	Assign the input the external information Aux 3
Block [79]	Blocking of the autorecloser function [79]
Aux 4	Assign the input the external information Aux 4
Man. Close	Manual control close CB
Local	Local mode condition (if activated, any remote command to the output relays is forbidden)

NOTE: For P120 and P121 :
 The external information Aux1 and Aux2 is used only for signalisation on the communication network.
 T Aux1 and t Aux2 are fixed and equal to 0 ms.
 Only one blocking logic function.



Only available in model MiCOM P122 and P123



Only available in model MiCOM P123

AUTOMAT. CTRL

Heading of the AUTOMAT.CTRL menu. Press to access the menu, then 6 times.

Inputs

Heading of the Inputs sub-menu.
To navigate within submenu points, press . To modify setting, press . Use to scroll and set available selections. Press to confirm choice.

Input 1
52a

Assign label 52a to logic input 1.
To modify see above windows.

Input 2
52b

Assign label 52a to logic input 2.
To modify see above windows.

5.9.8.1 P122 & P123 additional Inputs menu

Input 3
Aux1

Assign label 52a to logic input 3.
To modify see above windows.

Aux1 Time
t Aux1 300 ms

Displays setting value of timer assigned to logic input Aux1.
The setting range for tAux1 is from 0 ms to 200 s, in steps of 10 ms.

Aux2 Time
t Aux2 1.2 ms

Displays setting value of timer assigned to logic input Aux2.
The setting range for tAux2 is from 0 ms to 200 s, in steps of 10 ms.

Aux3 Time
t Aux3 10s

Displays setting value of timer assigned to logic input Aux3.
The setting range for tAux3 is from 0 ms to 200 s, in steps of 10 ms.

5.9.8.2 P123 additional Inputs menu

Input 4
Log Sel 1

Assign label Log Sel1 to logic input 4.
To modify see above windows.

Input 5
Aux 2

Assign label Aux2 to logic input 5.
To modify see above windows.

Aux4 Time
t Aux4 100s

Displays setting value of timer assigned to input Aux4.
The setting range for tAux4 is from 0 ms to 200 s, in steps of 10 ms.










Input 7
Man. Close

Assign the Manual control close signal to the assigned logic input 7. To modify see above windows.

Input 7
Local











Assign the Local signal to the assigned logic input 7. To modify see above windows.

5.9.9 BROKEN CONDUCTOR submenu (P122 & P123 only)

AUTOMAT. CTRL	Heading of the AUTOMAT. CTRL menu. Press  to access the menu, then  until the submenu is reached.
Broken Cond.	Heading of Broken Conductor detector submenu. To navigate within submenu points, press   . To modify setting, press  . Use     to scroll and set available selections.
Brkn. Cond. ? Yes	Selection of the Broken Conductor function. Setting choice: Yes, No. If Yes is selected, the following menu is displayed: If No is selected, the Broken Conductor function is inactive.
Brkn. Cond Time tBC 20 ms	Displays delay timer setting (tBC) for the Broken Conductor function. The setting range for tBC is from 0 to 14400s, in steps of 1s.
Ratio I2/I1 20 %	Displays value, in percent, for the Broken Conductor threshold. This threshold is the ratio between negative and positive phase sequence current. Setting range is from 20 to 100% by, in steps of 1%.

5.9.10 COLD LOAD PICK-UP submenu (P122 & P123 only)











The Cold Load PU submenu allows the user to enable the cold load pick-up function. Selected threshold values can temporary be raised.

AUTOMAT. CTRL	Heading of the AUTOMAT. CTRL menu. Press  to access the menu, then  until the submenu is reached.
Cold Load PU	Heading of the Cold Load PU submenu. To navigate within submenu points, press   . To modify setting, press  . Use     to scroll and set available selections. Press  to confirm choice.
Cold Load PU ? Yes	Selection of the cold load pick-up function. Setting choice: Yes, No. If Yes is selected, the following menu is displayed: If No is selected, the cold load pick-up function is inactive.
Cold Load PU tl> ? No	Assign the l> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU tl>> ? Yes	Assign the l>> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU tl>>> ? Yes	Assign the tl>>> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU tle> ? Yes	Assign the tle> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU tle>> ? Yes	Assign the tle>> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU tle>>> ? Yes	Assign the tle>>> time delay threshold with the cold load pick up function. Setting choice: Yes, No.

COLD LOAD P/UP tl2> Yes	Assign the tl2> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
COLD LOAD P/UP tl2>> No	Assign the tl2>> time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU t Therm. ? Yes	Assign the Thermal overload time delay threshold with the cold load pick up function. Setting choice: Yes, No.
Cold Load PU level 200 %	Displays scaling value, in percent, for the cold load pick up assigned to the selected thresholds. Setting range is from 100% to 500%, in steps of 1%.
Cold Load PU tCL = 400 ms	Displays delay timer setting (tCL) for the Cold Load Pick-up function. Setting range is from 0.1 to 3600 s, in steps of 10 ms.

5.9.11 CIRCUIT BREAKER FAILURE submenu (P122 & P123 only)

With the CB Fail submenu, circuit breaker failure can be detected and associated parameters can be set.

AUTOMAT. CTRL	Heading of the AUTOMAT.CTRL menu. Press  to access the menu then  until the menu is reached.
CB Fail	Heading of the CB Fail submenu. To navigate within submenu points, press   . To modify setting, press  . Use     to scroll and set available selections. Press  to confirm choice.
CB Fail ? Yes	Selection of the circuit breaker failure function. Setting choice: Yes, No. If Yes is selected, the following menu is displayed: If No is selected, the CB Fail function is inactive.
I<= 0.1 In	Selection of the under current threshold associated to the CB failure detection function. Setting range is from 0.02 In to 1 In in steps of 0.01 In.
CB Fail Time tBF 40 ms	Selection of the circuit breaker failure time delay. Setting range is from 10 ms to 10 s in steps of 10 ms.
Block I> ? No	Select the possibility to block the instantaneous signal I> in case of circuit breaker failure detection. Select Yes or No.
Block Ie> ? Yes	Select the possibility to block the instantaneous signal Ie> in case of circuit breaker failure detection. Select Yes or No.

5.9.12 CIRCUIT BREAKER SUPERVISION sub-menu (P122 & P123 only)

With the CB Supervision submenu circuit breakers can be supervised and monitored, and associated parameters can be set.

AUTOMAT. CTRL	Heading of the AUTOMAT.CTRL menu. Press \odot to access the menu, then \odot until the submenu is reached.
CB Supervision	Heading of the CB Supervision submenu. To navigate within submenu points, press \odot \odot . To modify setting, press \odot . Use \odot \odot \odot \odot to scroll and set available selections. Press \odot to confirm choice.
TC Supervision Yes	Selection of the trip circuit supervision function. Setting choice: Yes, No. If Yes is selected, the following menu is displayed: If No is selected, the TC supervision function is inactive.
t Trip Circuit t SUP 200 ms	Displays the delay timer setting (tSUP) for TC supervision. The setting range for tSUP is from 0.1 to 10 s, in steps of 10 ms.
CB Open S'vision Yes	Selection of the time monitoring function of CB open operations. Setting choice: Yes, No. If Yes is selected, the following window is displayed: If No is selected the next window is CB Close S'vision.
CB Open Time 100 ms	Displays monitoring time for CB open operations. Setting range from 0.05 to 1.0 s, in steps of 10 ms.
CB Close S'vision Yes	Selection of the time monitoring function of CB close operations. Setting choice: Yes, No. If Yes is selected, the following window is displayed: If No is selected the next window is CB Open Alarm.
CB Close Time 100 ms	Displays monitoring time for CB close operations. Setting range from 0.050 to 1.0 s, in steps of 10 ms.
CB Open Alarm ? Yes	Selection of the monitor function for maximum count of CB operations. Setting choice: Yes, No. If Yes is selected, the following window is displayed: If No is selected, the next window is Σ Amps(n).
CB Open NB = 0	Displays alarm threshold for CB open count. Setting range is from 0 to 50000, in steps of 1.
ΣAmps(n) ? Yes	Selection of the monitoring function that continuously sums the current (in Amps or square Amps) interrupted by the CB. Setting choice: Yes, No. If Yes is selected, the following window is displayed: If No is selected, the next window is tOpen Pulse.
ΣAmps(n) ? 1000 E6	Displays alarm threshold for the summation of the current (in Amps or square Amps) interrupted by the CB. Setting range is from 0 to 4000 E6 A (or A ²), in steps of 1 E6. (E6 = 10 ⁶)
n 1	Displays the exponent for the summation (I A or I ² A ²). Setting choice for n: 1 or 2
t Open Pulse 100 ms	Displays and sets the tripping pulse time. Setting range is from 0.1 to 5 s, in steps of 10 ms.

t Close Pulse
100 ms

Displays and sets the closing pulse time. Setting range is from 0.1 to 5 s, in steps of 10 ms.

5.9.13 Comm. Order Submenu (P122 & P123 only)

AUTOMAT. CTRL

Heading of the AUTOMAT. CTRL menu. Press to access the menu, then Until the desired submenu is reached.

Comm. Ord. Latch Times

Heading of the Comm. Ord. Latch Times submenu.

Press to access the different submenus.
NOTE : This submenu is active if at least one communication order is assigned to an output relay.

t Comm 1
100 ms

Selection of the t Comm 1 pulse time.
The setting range for t Comm 1 is from 0.1 s to 5 s, in steps of 0.05 s. Use to modify and press to validate your choice.

t Comm 2
150 ms

Selection of the t Comm 2 pulse time.
The setting range for t Comm 2 is from 0.1 s to 5 s, in steps of 0.05 s. Use to modify and press to validate your choice.

t Comm 3
5 s

Selection of the t Comm 3 pulse time.
The setting range for t Comm 3 is from 0.1 s to 5 s, in steps of 0.05 s. Use to modify and press to validate your choice.

t Comm 4
1 s

Selection of the t Comm 4 pulse time.
The setting range for t Comm 4 is from 0.1 s to 5 s, in steps of 0.05 s. Use to modify and press to validate your choice.

5.9.14 Submenu SOTF (Switch on to Fault) (P123 only)

With the SOTF submenu, it is possible to shorten the time to trip when for example the relay has detected a fault that is still present on a feeder after energising.

AUTOMAT. CTRL

Heading of AUTOMAT. CTRL menu.
Press to access the SOTF-menu, and until the desired submenu is reached.

SOTF

Heading of SOTF submenu.
To navigate within submenu points, press . To modify setting, press . Use to scroll and set available selections. Press to confirm choice.

Sotf?
No

Enables/Disables the SOTF function.

Setting choice: Yes, No.

If Yes is selected, the following menu is displayed:
If No is selected, the SOTF submenu is not activated.

t Sotf
0.10 s

Set the time delay value (tSotf) associated to the SOTF function.

The setting range for t Sotf is from 0 to 500 ms, in steps of 10 ms.

The SOTF/TOR tripping time delay is useful for some cases of serious transient or when three poles don't close at the same time, or when the CB doesn't close instantaneously.

I>>?**No**

Setting choice Yes: The crossing of the I>> threshold activates the SOTF function. The timer t Soft starts its countdown on crossing of the I>> threshold, and once elapsed, the relay issues a trip order.

Setting choice No: The crossing of the I>> threshold doesn't activate the SOTF function.

I>>>?**No**

Setting choice Yes: The crossing of the I>>> threshold activates the SOTF function. The timer t Soft starts its countdown on crossing of the I>>> threshold, and once elapsed, the relay issues a trip order.

Setting choice No: The crossing of the I>>> threshold doesn't activate the SOTF function.

5.10 RECORDS Menu (P122 & P123 only)

Through the RECORDS menu, stored data, events, disturbances and monitoring information can be displayed and read:

- ⇒ CB Monitoring
- ⇒ fault record
- ⇒ Instantaneous
- ⇒ Disturb record
- ⇒ Time peak value
- ⇒ Rolling demand

To access the RECORDS menu, press \odot then \odot 7 times.







5.10.1 CB MONITORING submenu

Through the CB Monitoring submenu, it is possible to read and clear counter values associated with the circuit breaker.

RECORD	Heading the RECORD menu. Press \odot to access the menu, then \odot 7 times.
CB Monitoring	Heading the CB Monitoring submenu. Press \odot to access the different submenus.
CB Opening Time 95 ms	Displays the circuit breaker opening time in ms.
CB Closing Time 115 ms	Displays the circuit breaker closing time in ms.
CB Operations RST = [C] 5489	Displays the number of opening commands executed by the circuit breaker. To clear these values, press \odot .
Σ Amps (n) RST = [C]	Displays the summation of the current (in Amps or square Amps) interrupted by the CB. Stored current values for all 3 phases are cleared together. To clear these values, press \odot .
Σ Amps (n) IA 4 E4	Displays the summation value of the current (in Amps or square Amps) for phase A interrupted by the circuit breaker.
Σ Amps (n) IB 2 E4	Displays the summation value of the current (in Amps or square Amps) for phase B interrupted by the circuit breaker.
Σ Amps (n) IC 8 E3	Displays the summation value of the current (in Amps or square Amps) for phase C interrupted by the circuit breaker.

5.10.2 Fault Record submenu for MiCOM P122 and P123

The Fault Record submenu makes it possible to read up to five stored fault records. Information about a fault is recorded when a threshold is crossed.

RECORD	Heading of the RECORD menu. Press  , to access the menu, the  7 times.
fault Record	Heading of the fault Record submenu. Press  to access the different submenus.
Record Number 2	Selection of the fault record number) to be displayed (select either 1, 2, 3, 4 or 5). To modify this fault record number, press  then using  enter the required number. Press  to validate your choice.
fault Time 12:05:23:42	Displays the time when the fault was recorded. The format of the time is hh:mm:ss. In this example the fault was recorded at 12:05:23 pm (and 420ms).
fault Date 12/11/99	Displays the date when the fault was recorded. The format of the Date is DD/MM/YY. In this example, the fault was recorded on November 12th 1999.
Active Set Group 1	Displays the active setting group (1 or 2).
Faulted Phase Phase A	Displays the phase, where a fault occurred, for the chosen fault record. (NONE, phase A, B, C, EARTH, AB, AC, BC, or ABC).
Threshold I>>	Displays the origin of the fault that generated the trip order.
Magnitude 1200 A	Displays the magnitude value of the fault: Voltage, current, earth power. The value is based on the amplitude at 50 or 60 Hz.
IA Magnitude 1200 A	Displays the magnitude value of the phase A current at the time of the fault.
IB Magnitude 500 A	Displays the magnitude value of the phase B current at the time of the fault.
IC Magnitude 480 A	Displays the magnitude value of the phase C current at the time of the fault.
In Magnitude 103 A	Displays the magnitude value of the earth current at the time of the fault.

5.10.3 INSTANTANEOUS submenu

Through the INSTANANEOUS submenu, it is possible to read recorded values associated with the crossing of a threshold (start information).

RECORDS	Heading of the RECORDS menu. Press to access the menu, then 7 times.
Instantaneous	Heading of the Instantaneous submenu. Press to access the different submenus.
Number 5	Select the number of Instantaneous records to be displayed (maximum 5). Press to modify this value, then use to enter a new number. Press to validate your choice.
Hour 13:07:15:53	Displays the time when the instantaneous record was recorded. The format of the time is hh:mm:ss: ms. In this example the fault was recorded at 1:07:15 pm and 530 ms.
Date 12/11/01	Displays the date when the instantaneous record was recorded. The format of the Date is DD/MM/YY. In this example, the fault was recorded on November 12th 2001.
Origin le>	Displays which threshold has been crossed.
Length 57 ms	Displays the period of time during which the threshold has been exceeded.
Trip No	Displays if a trip followed the crossing of the threshold or not.

5.10.4 DISTURBANCE RECORD submenu

The Disturb Record submenu makes it possible to set and read up to 5 disturbance records of 3 seconds each.






RECORD	Heading of the RECORD menu. Press to access the menu, then 7 times.
Disturb Record	Heading of the Disturb Record submenu. Press to access the different submenus.
Pre-Time 0.2 s	Set the disturbance record pre-time. Select from 100 ms to 3s by step of 100 ms using and validate your choice using .
Post-Time 0.2 s	Set the disturbance record post-time. Select from 100 ms to 3s by step of 100 ms using and validate your choice using .

WARNING : THE TOTAL DISTURBANCE RECORDING TIME IS 3 SECONDS (PRE TIME + POST TIME).

Disturb Rec Trig ON INST.	Select which criteria will start the disturbance record function. Setting choices are ON INST. (starts recording on instantaneous thresholds) or ON TRIP (starts recording after a trip happened). Use to modify the criteria then press to validate your choice.
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5.10.5 Time PEAK VALUE submenu

The Time PEAK VALUE submenu makes it possible to set parameters associated to this function. (Peak and Average values displayed in the Measurements menu)

RECORD	Heading of the RECORD menu. Press  to access the menu, then  7 times.
Time Peak Value	Heading of the Time Peak Value submenu. Press  to access the different submenus.
Time Window 5 mn	Set the value for the time window during which peak and average values are stored. Select from 5mn, 10mn, 15mn, 30mn, or 60mn using  and press  to validate your choice.

5.10.6 ROLLING DEMAND submenu

The Rolling Demand submenu makes it possible to set the values for rolling sub-period and number of the sub-period used for the calculation of the 3 phase Rolling Average and peak demand values, available in the Measurement menu.

RECORDS	Heading of the RECORDS menu. Press  to access the menu, then  7 times.
Rolling Demand	Heading of the Rolling Demand submenu. Press  to access the different submenus.
Sub period 1 mn	Set the window of time of the subperiod used to calculate rolling average values d. Select from 1 mn to 60 mn in step of 1 mn using  and press  to validate your choice .
Num of Sub Per 1	Select the number of sub-period used for the calculation of the average of these average values.

6. WIRING

MiCOM P120 range of relays have the same terminal layout for common elements. The wiring diagram for each model is provided in Appendix 1 of the Technical Guide.

6.1 Auxiliary supply

The auxiliary power supply for the **MiCOM P120, P121, P122 & P123** relays can be either direct current with a voltage range of 24-60 VDC, 48-150 VDC, 130-250 VDC, or alternative current with a voltage range of 110-250 VAC/ 50-60 Hz. The voltage range (Ua) is specified on the adhesive paper label under the top hinged cover on the front of the relay.

The auxiliary power supply must be connected only to terminals 33 and 34.

6.2 Current measurement inputs

MiCOM P120, P121, P122 and P123 have 3 phase and 1 earth current inputs available for 1 and 5 Amps rated CTs. On each one of these relays, it is possible to combine 1 and 5 Amp current inputs together (i-e a mix between 1A for earth fault and 5A for phase connections) (refer to the wiring diagram).

NOTE : All phase inputs must have the same rating (1 or 5 Amps).

6.3 Logic inputs

The number of logic inputs depends on the relay model. The relays have programmable opto-isolated logic inputs, which can be assigned to any available label or function.

Logic inputs for each relay model:

Model	P120	P121	P122	P123
Logic outputs	2	2	3	5

The voltage range of the inputs is identical to the **DC (or AC)** auxiliary supply range of the MiCOM relay (e.g. Uaux = 48-150 Vdc, logic input voltage range = 48-150 Vdc).

On the same **MiCOM P12x** relay, the user can mix different voltage levels for the logic inputs (e.g. Uaux = 48-150 Vdc, Input 1= 48 Vdc, Input 2-5= 110 Vdc).

If the user sets the supply of the logic input as AC they are active from 24 to 220Vac.

The automation functions that can be assigned to these logic inputs can be selected from the AUTOMAT. CTRL Menu.

NOTE : Do not forget to select in the CONFIGURATION/Configuration Inputs Menu whether the voltage input is "AC" or "DC".

6.4 Output relays

The number of logic outputs depends on the relay model. The relays have configurable logic outputs, which can be assigned to any available function.

The number of logic outputs available for each relay model is presented in the following table:

Model	P120	P121	P122	P123
Logic outputs	5	5	7	9

The first logic output (RL0) is dedicated to indicate a relay fault (Watchdog, WD) and is not part of this table.

The normally closed (NC) contact of the Watchdog (RL0) can not be configured. The other contacts can be configured to be activated on activation of the different functions available in the relay. A basic output matrix is included in the relay.

Some logic outputs have changeover contacts (RL1 and RL2). The other relays (RL3, to RL 9) are normally open contacts.

The protection and control functions that can be assigned to these output relays can be selected from the AUTOMAT. CTRL Menu.

6.5 Communication

6.5.1 RS485 rear communication port

All MiCOM relays have an RS485 rear communication port.

The terminals 29-30-31-32 are dedicated to the RS485 communication port. See wiring diagrams in chapter P12y/EN CO of the Technical Guide.

6.5.2 RS232 front communication port (P122 & P123 only)

MiCOM P122 and P123 relays provide a RS 232 communication port. This port is dedicated to MiCOM Setting software MiCOM S1.

The cable between the P122 or P123 and the PC is a standard RS 232 shielded-cable.

The relay requires a RS232 cable with a 9-pin male connector.

The RS232 cable has to be wired as indicated below:

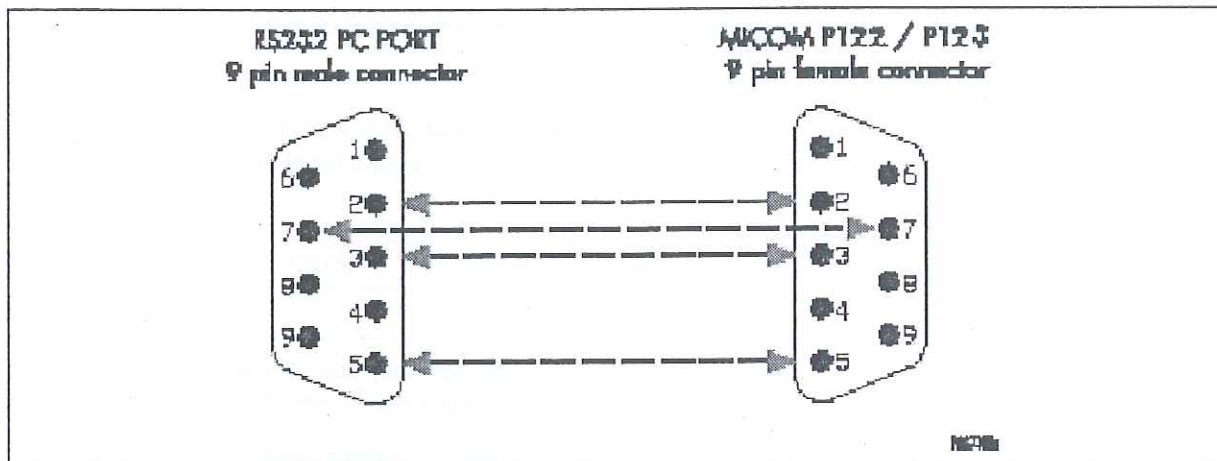


FIGURE 5: FRONT PANEL PORT COMMUNICATION RS232 CABLE WIRING