

# DIRIS A80

Operating instructions

EN



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# DANGER AND WARNING

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This equipment must be mounted only by professionals.

The manufacturer shall not be held responsible for failure to comply with the instructions in this manual.

## Risk of electrocution, burns or explosion

- the device must be installed and serviced only by qualified personnel
- prior to any work on or in the device, isolate the voltage inputs and auxiliary power supplies and short-circuit the secondary winding of all current transformers (PTI SOCOMEC)
- always use an appropriate voltage detection device to confirm the absence of voltage
- put all mechanisms, door and covers back in place before energising the device
- always supply the device with the correct rated voltage

Failure to take these precautions could cause serious injuries.

## Risk of damaging device

### Check the following:

- the voltage of the auxiliary power
- the frequency of the distribution system (50 or 60 Hz)
- the maximum voltage across the voltage-input terminals, (V1, V2, V3 and VN) 700 V AC phase-to-phase or 400 V AC phase-to-neutral
- a maximum current of 10 A on the current-input terminals (I1, I2 and I3)
- use only differential current transformers recommended by SOCOMEC

## Environment

This product contains a lithium button battery.

# DANGER AND WARNING

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For personnel and product safety please read the contents of these operating instructions carefully before connecting.

Check the following points as soon as you receive the package:

- the packing is in good condition,
- the product has not been damaged during transit,
- the product reference number conforms to your order,
- the packaging included a product fitted with disconnectable terminal strips,
- a CD-ROM containing the operating instructions.

# PRESENTATION

1. Key-pad with 6 dual-function keys (display or programming)
2. Backlit LCD display
3. Phase
4. Values
5. Unit
6. Activity indicator on the communication bus
7. Energy metering indication
8. Hour meter and energy display
9. Alarm  $I_{\Delta n}$
10. Alarm  $I_{PE}$

The **DIRIS A80** combines all the functions of powerful multifunction meter with relevant RCM capabilities. In addition to the functions of power management, detection of harmful events for electrical installation, the **DIRIS A80** allows the monitoring of fault currents or RCM (Residual Current Monitoring) for TNS and TT systems.

2 references:

- 4825 0213: Version with 2 outputs
- 4825 0214: Version with 1 input and 1 output

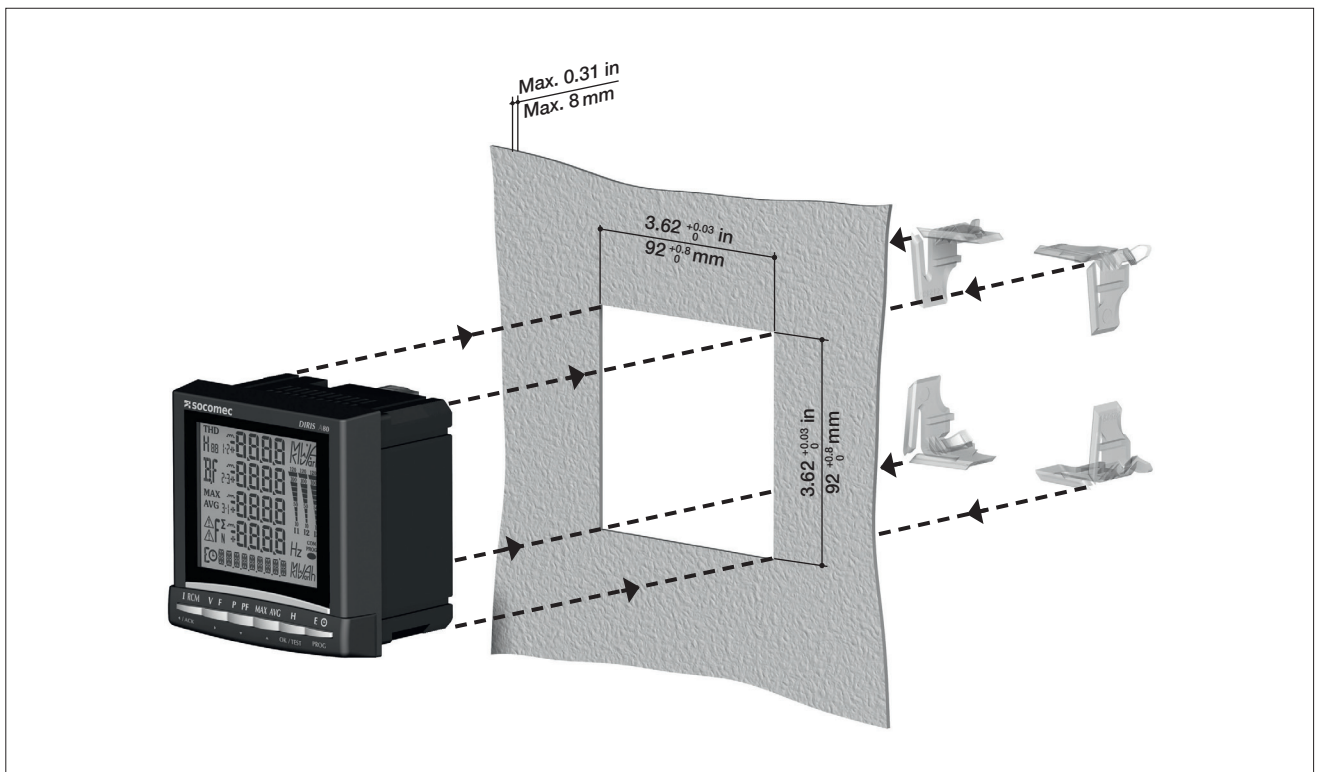
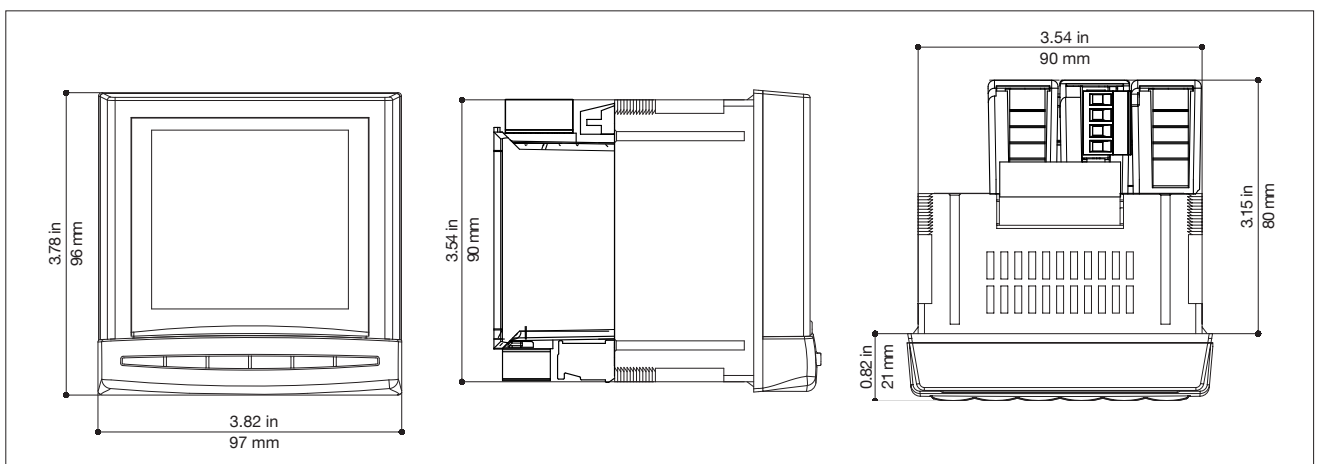


# INSTALLATION

## RECOMMENDATIONS

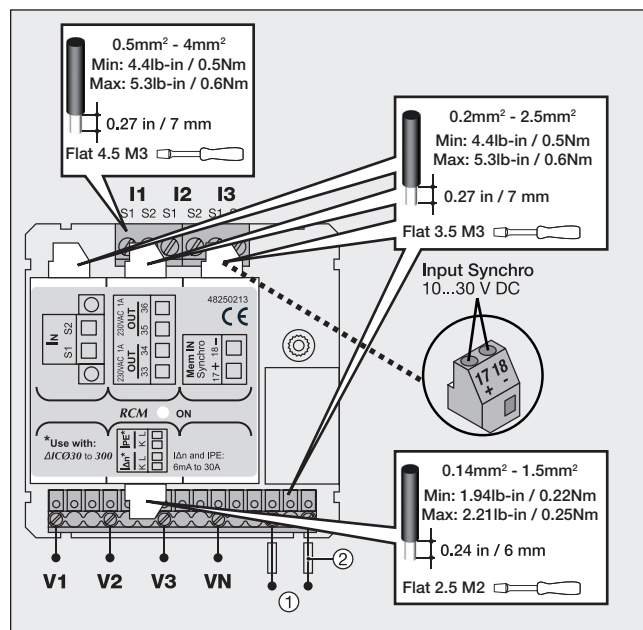
- Avoid being close to systems generating electromagnetic disturbances.
- Avoid vibrations involving accelerations greater than 1 G for frequencies lesser than 100 Hz.
- In combination with communication modules Class B is obtained with ferrite ref. 4899 0011.
- It is recommended to place the **DIRIS A80** in a shielded enclosure in an environment with high electromagnetic interference.

## CUT-OUT DIAGRAM, MOUNTING



CONNECTION

Each CT's secondary winding must be short-circuited when disconnecting the DIRIS. This can be done automatically using one of Socomec's catalogue products: the PTI. Please contact us for further information.



DIRIS A80

- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC

# INSTALLATION

## OPTIONAL MODULES

**DIRIS A80** is supplied with the following modules:

- Slot 1: In
- Slot 2: RCM
- Slot 3: MEM

These modules can't be switched or removed.

The free slot 4 can only be fitted with the following optional modules:

- **JBUS/MODBUS communication;**  
ref. : 4825 0092:

RS485 JBUS/MODBUS serial port in RTU mode with a speed from 2400 to 38400 baud. (Operating instructions ref. : 536 103).

- **Ethernet; ref. : 4825 0203 :**

Link with RJ45 connector. Protocol MODBUS/TCP or JBUS/MODBUS RTU with TCP. Webserver for the display of the main quantities and diagnosis. (Operating instructions ref. : 536 181).

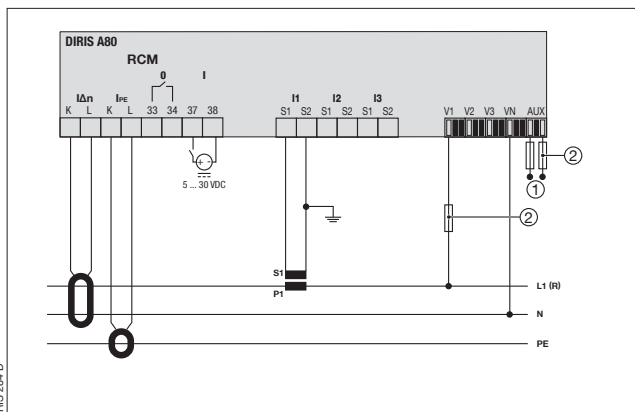
- **Ethernet/gateway RS485; ref. : 4825 0204:**

Link with RJ45 connector. Master gateway function MODBUS with 3 points link RS485. Protocol MODBUS/TCP or JBUS/MODBUS RTU with TCP. Webserver for the display of the main quantities and diagnosis. (Operating instructions ref. : 536 181).

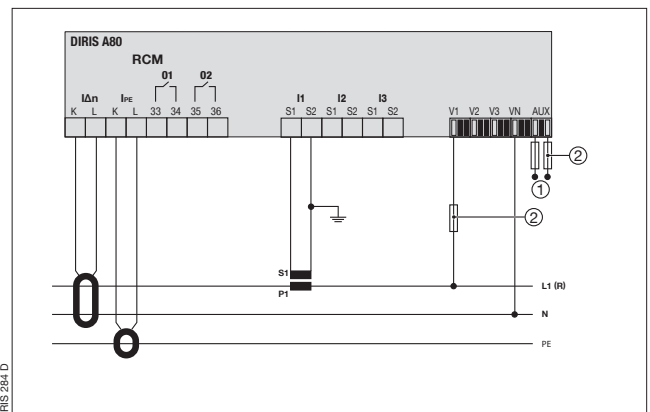
## SINGLE-PHASE NETWORK (1BL)

Version with 1 input and 1 output - ref. 48250214

Version with 2 outputs - ref. 48250213



- ① **Aux.:** 110 ... 400 V AC / 120 ... 350 V DC  
② **Fus.:** IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC



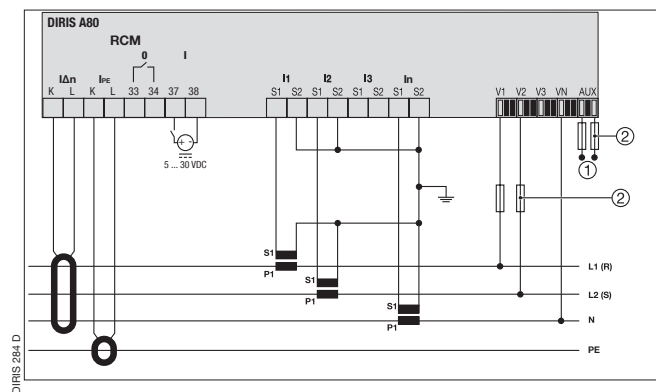
- ① **Aux.:** 110 ... 400 V AC / 120 ... 350 V DC  
② **Fus.:** IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC



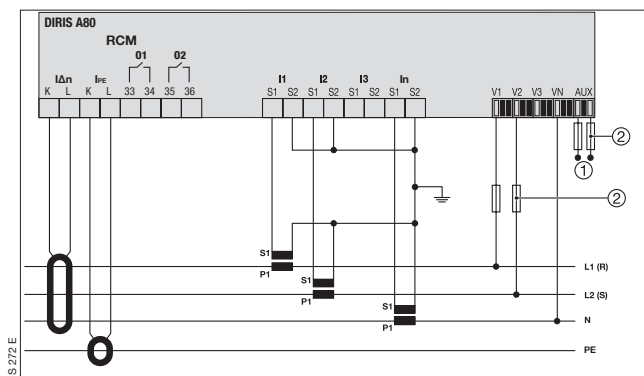
UNBALANCED THREE-PHASE + NEUTRAL NETWORK (2NBL)

Version with 1 input and 1 output - ref. 48250214

Version with 2 outputs - ref. 48250213



- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC

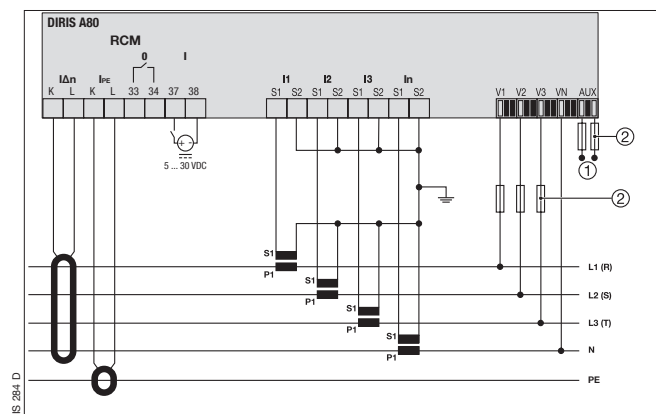


- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC

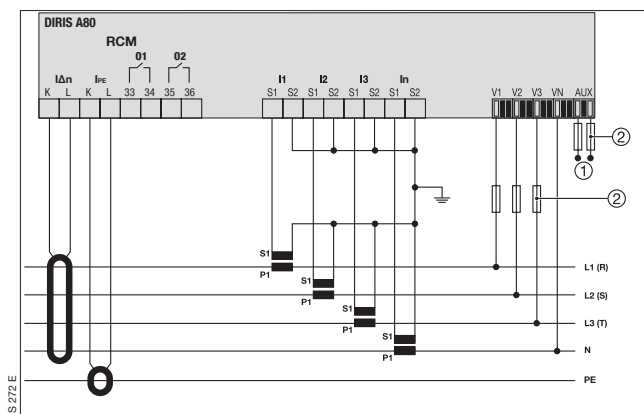
UNBALANCED THREE-PHASE + NEUTRAL NETWORK (4NBL)

Version with 1 input and 1 output - ref. 48250214

Version with 2 outputs - ref. 48250213

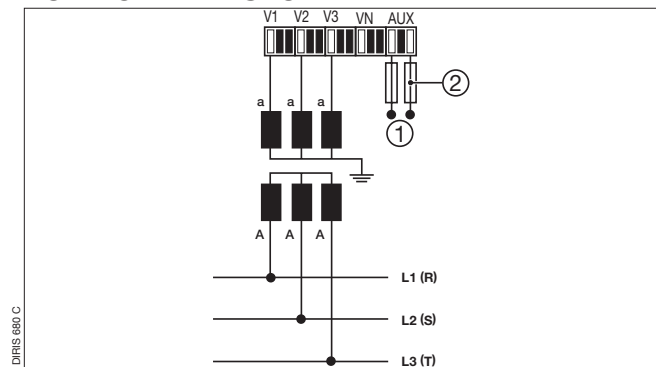


- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC



- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC

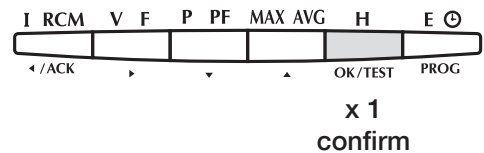
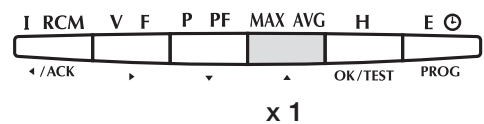
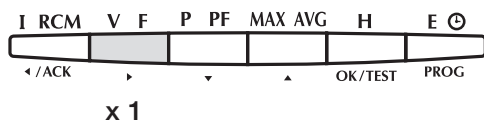
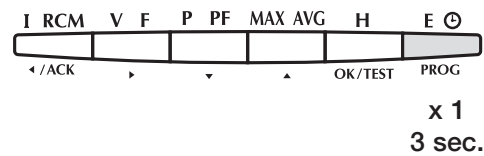
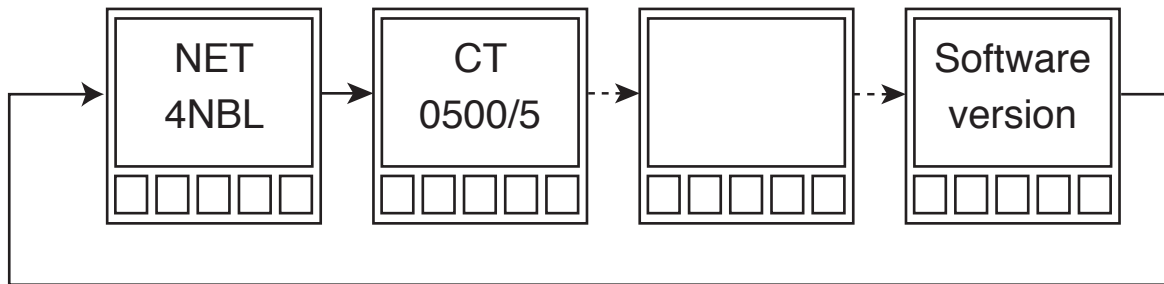
VOLTAGE TRANSFORMER



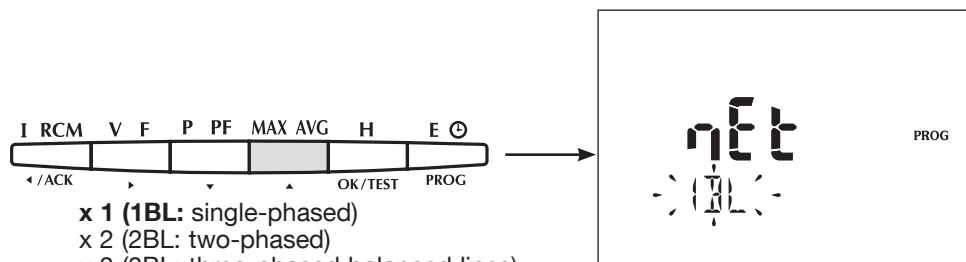
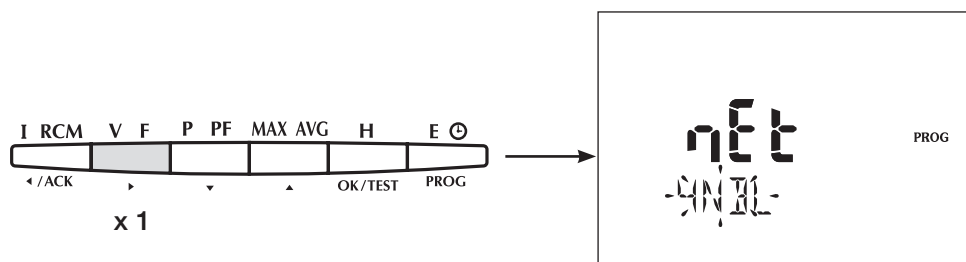
- ① Aux.: 110 ... 400 V AC / 120 ... 350 V DC
- ② Fus.: IEC 0.5 A gG / BS88 2 A gG / 0.5 A class CC

### ACCES TO PROGRAMMING MODE (COdE 100)

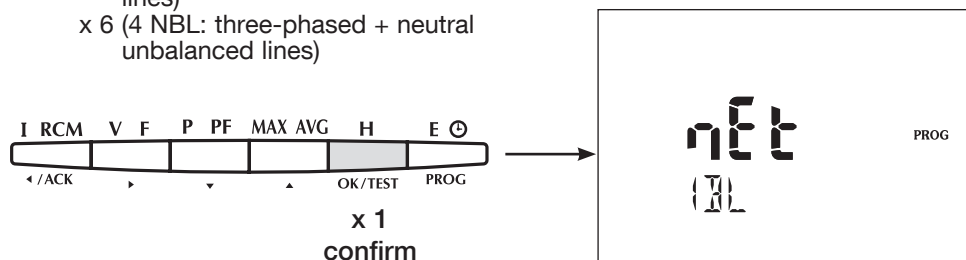
The structure of the configuration menu is the following:



NETWORK (Example : NET = 1BL)



- x 2 (2BL: two-phased)
- x 3 (3BL: three-phased balanced lines)
- x 4 (3NBL: three-phased unbalanced lines)
- x 5 (4BL: three-phased + neutral balanced lines)
- x 6 (4 NBL: three-phased + neutral unbalanced lines)

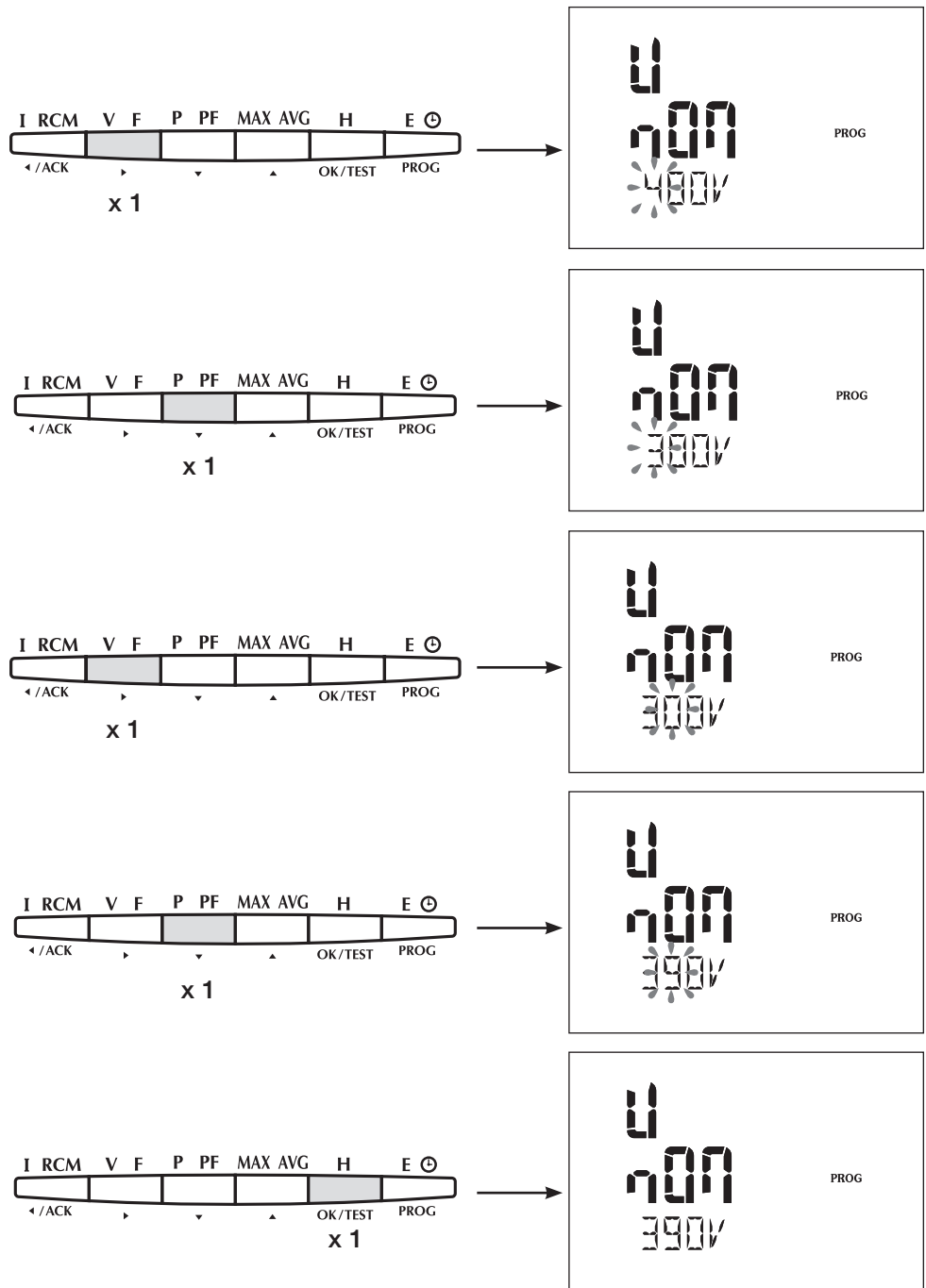


NOMINAL VOLTAGE OF THE NETWORK (phase/phase) (Example: 4NBL: U=390 V)

This voltage corresponds to:

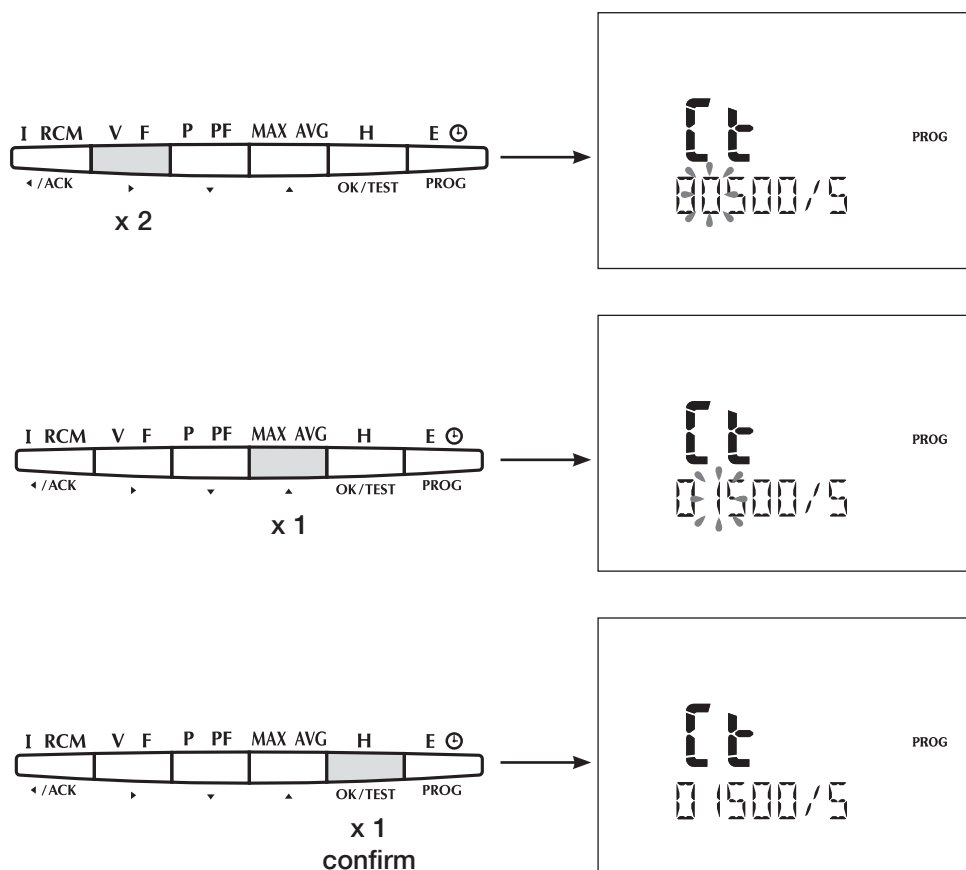
- 1BL: phase-neutral voltage
- 2BL / 3BL / 3NBL / 4BL / 4NBL: phase-phase voltage

This value is used for defining the reference voltage (Ureg) for the detection of the voltage dips and interruption, as well as voltage swells.



CURRENT TRANSFORMERS (Example: CT = 1500 / 5 A).

Max. 10000/5 or 10000/1

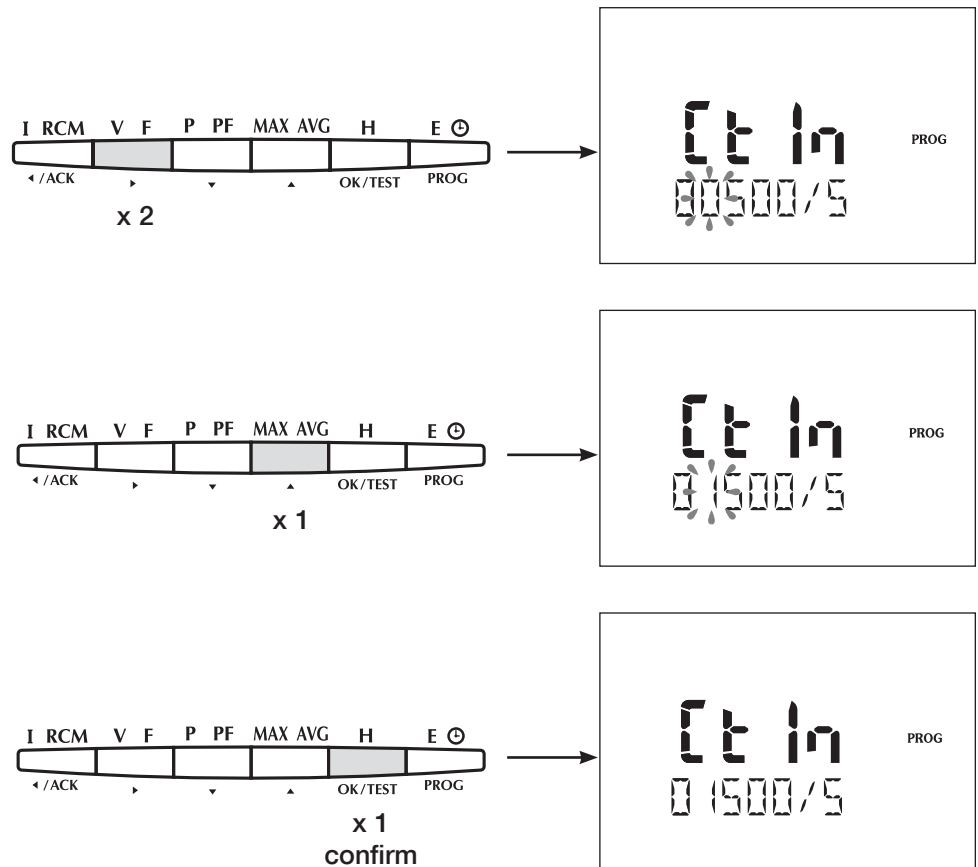


# DIRIS A80

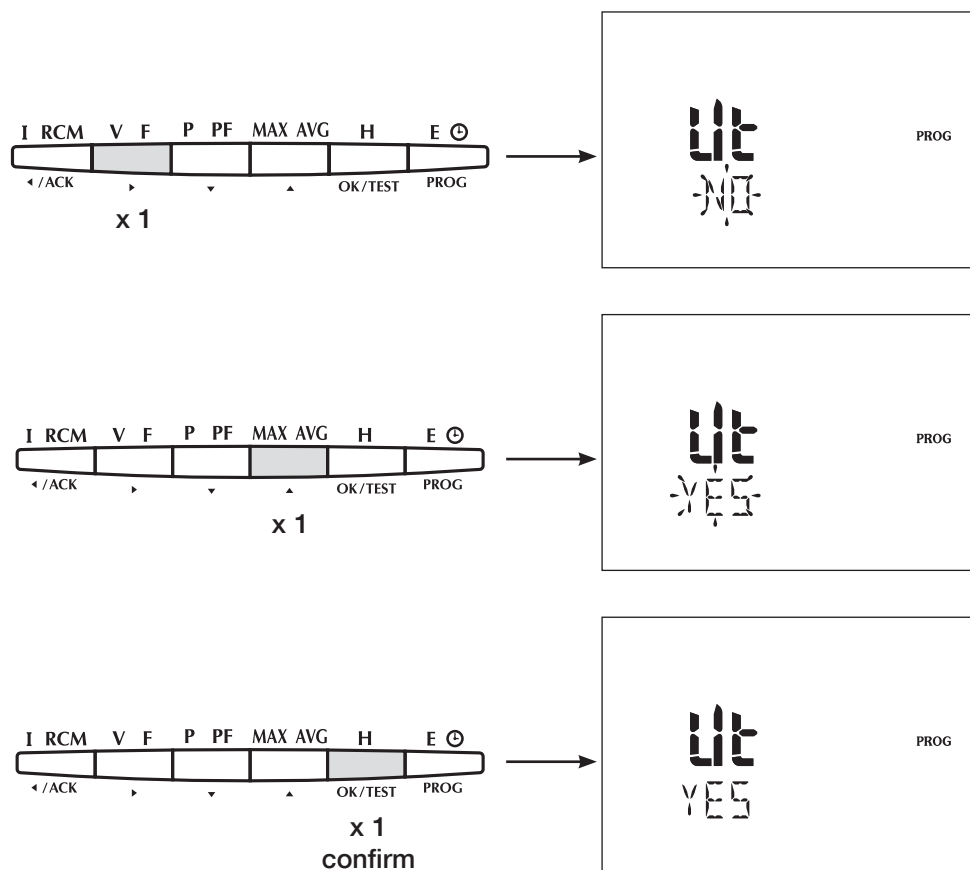
## PROGRAMMING

NEUTRAL CURRENT TRANSFORMER (Example: CT = 1500 / 5 A).

Max. 10000/5 or 10000/1

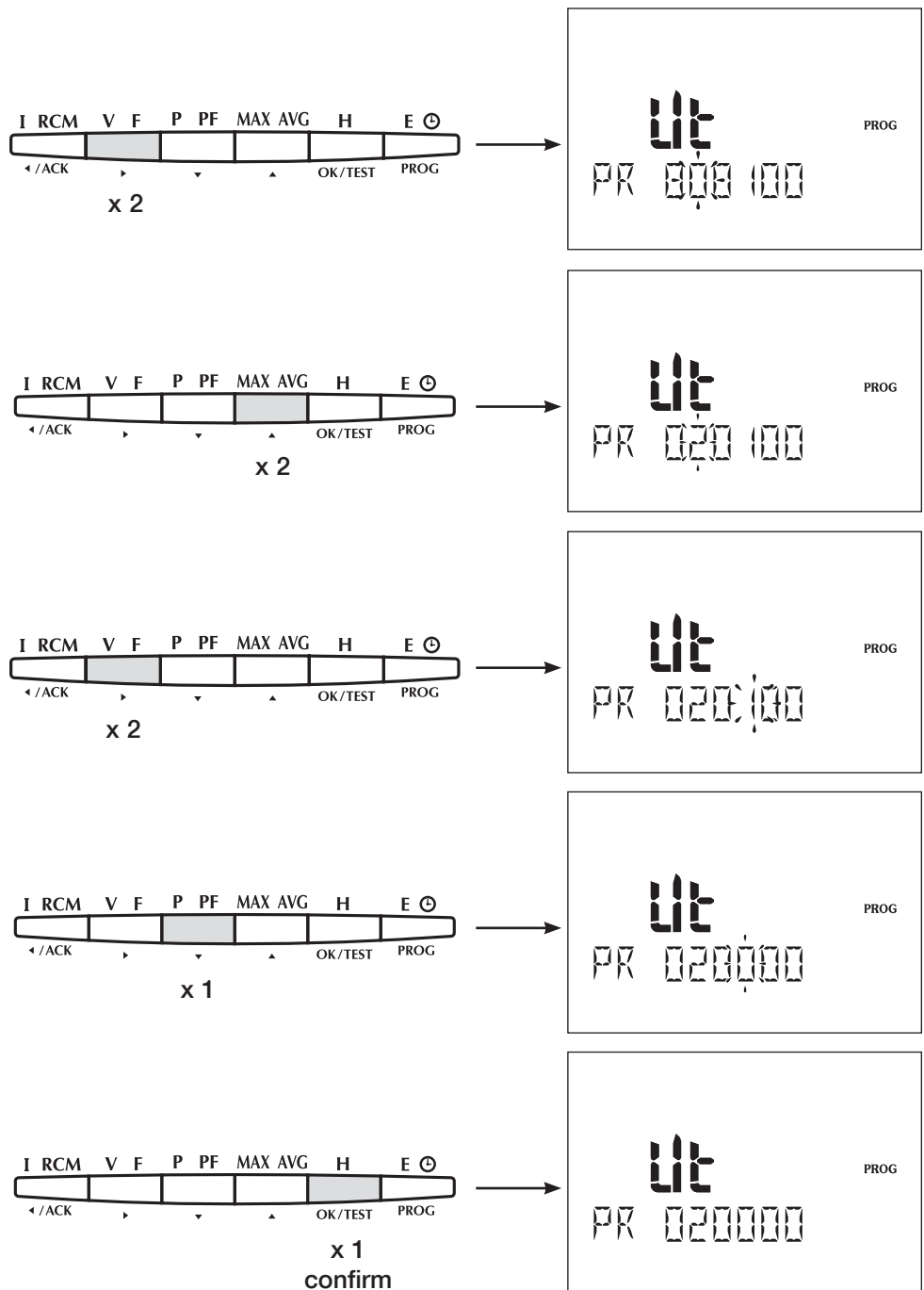


VOLTAGE TRANSFORMER (Example: Ut = YES)



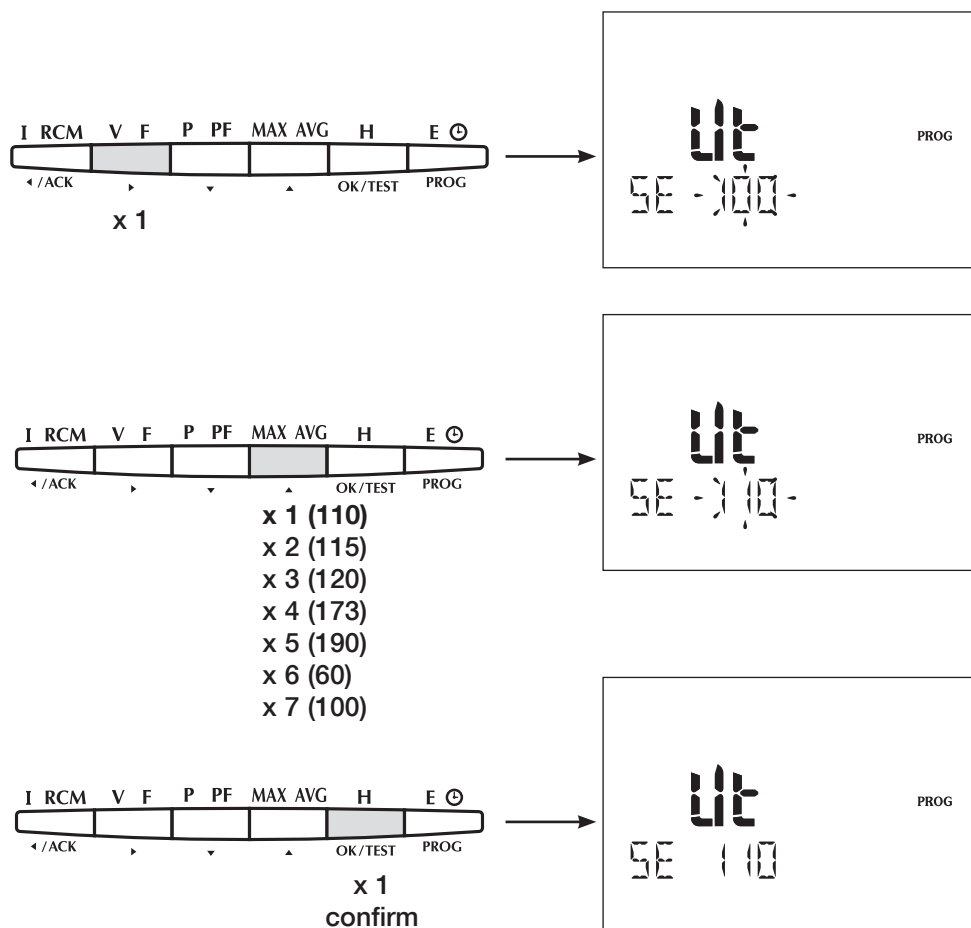
### VOLTAGE TRANSFORMER PRIMARY (Example: PR = 20 000 V)

Max. 500 000 V



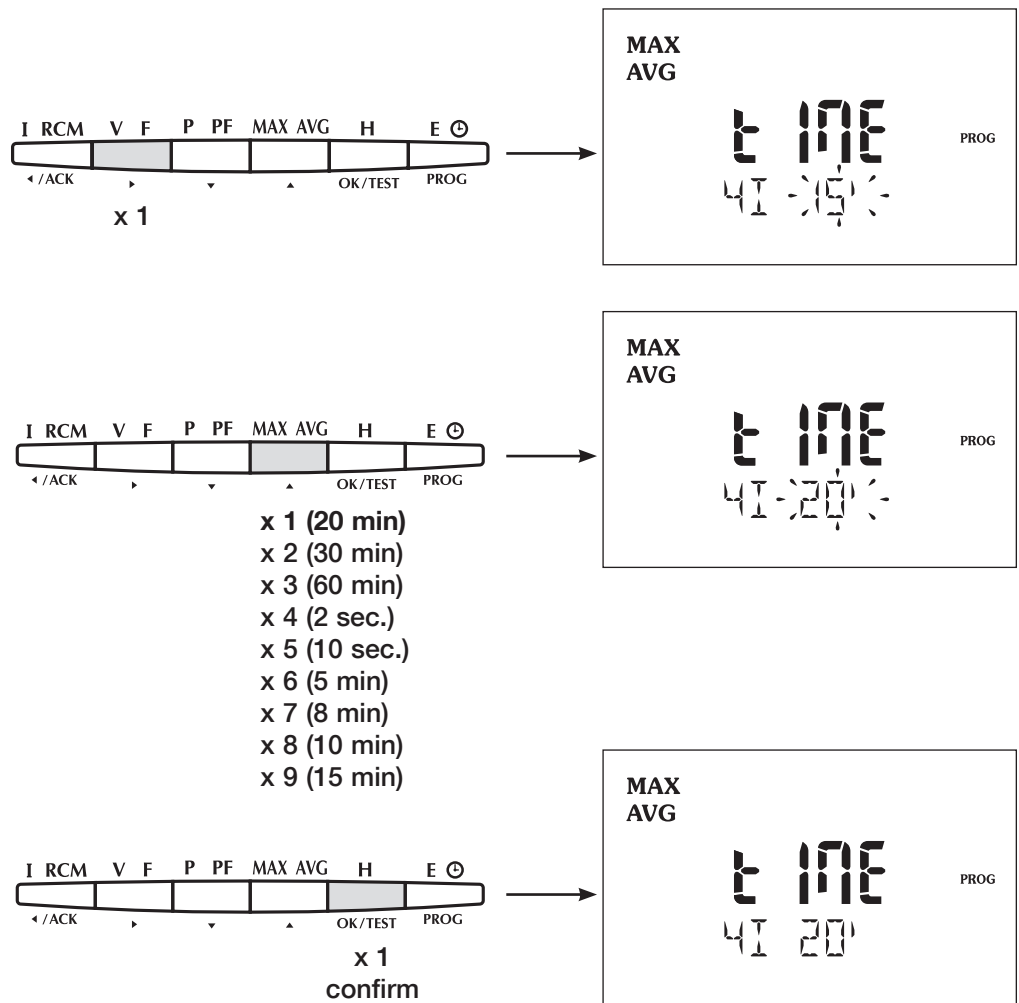


VOLTAGE TRANSFORMER SECONDARY (Example: SE = 110 V)



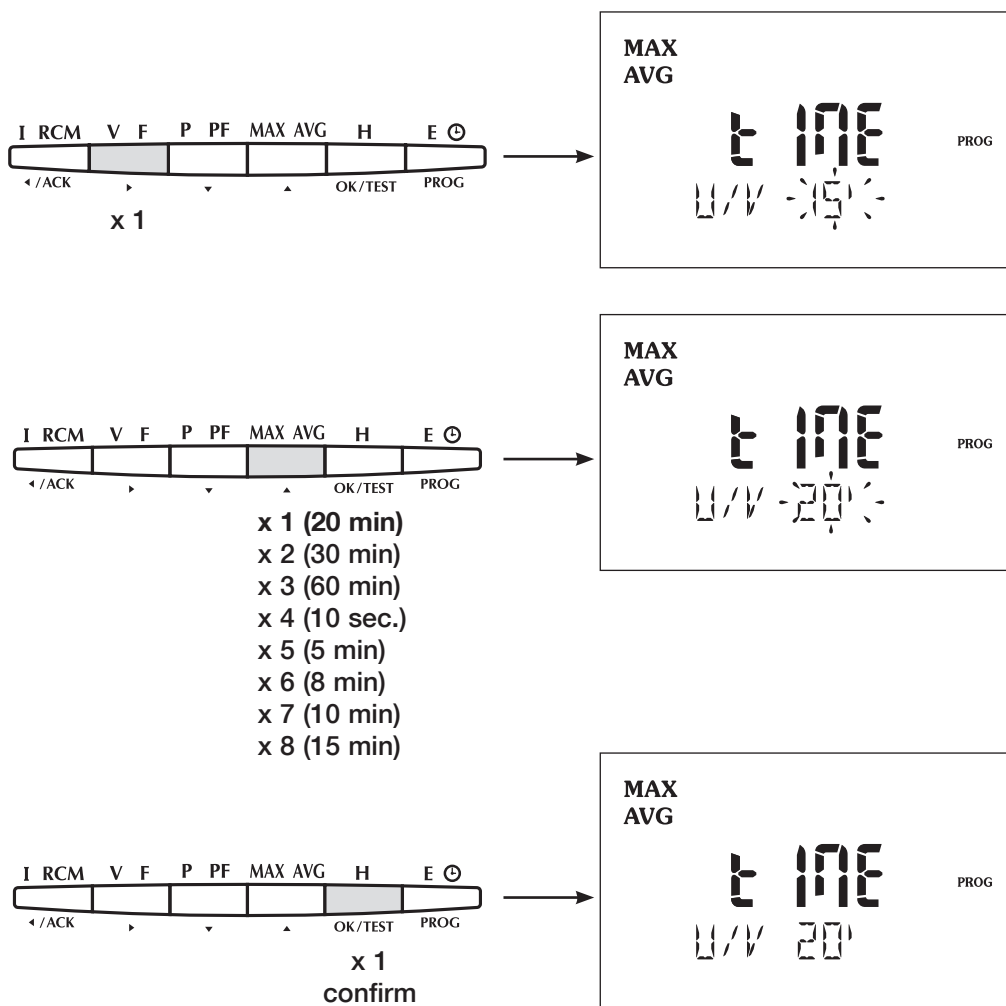
### INTEGRATION PERIOD OF AVERAGE AND MAXIMUM CURRENTS

(Example: tIME 4I = 20 min)



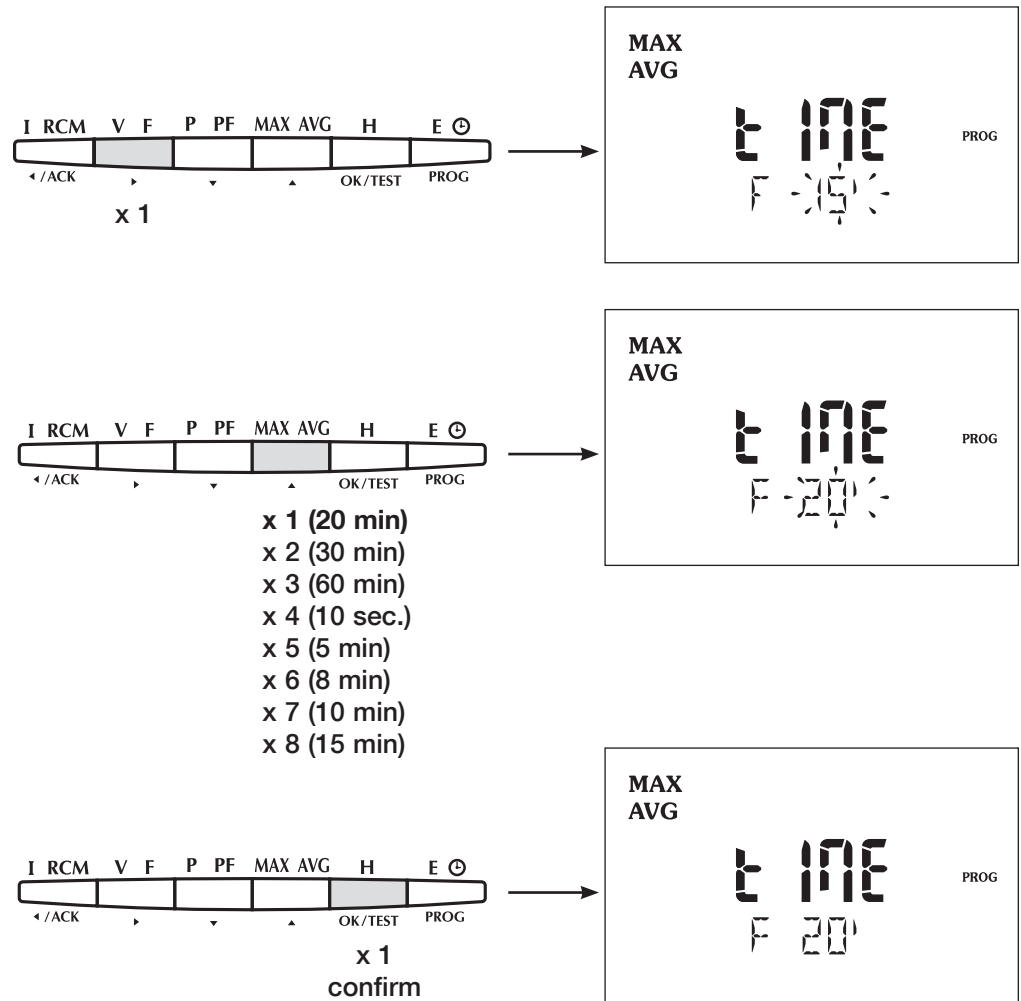
INTEGRATION PERIOD OF AVERAGE AND MAXIMUM VOLTAGES

(Example: tIME U/V = 20 min)

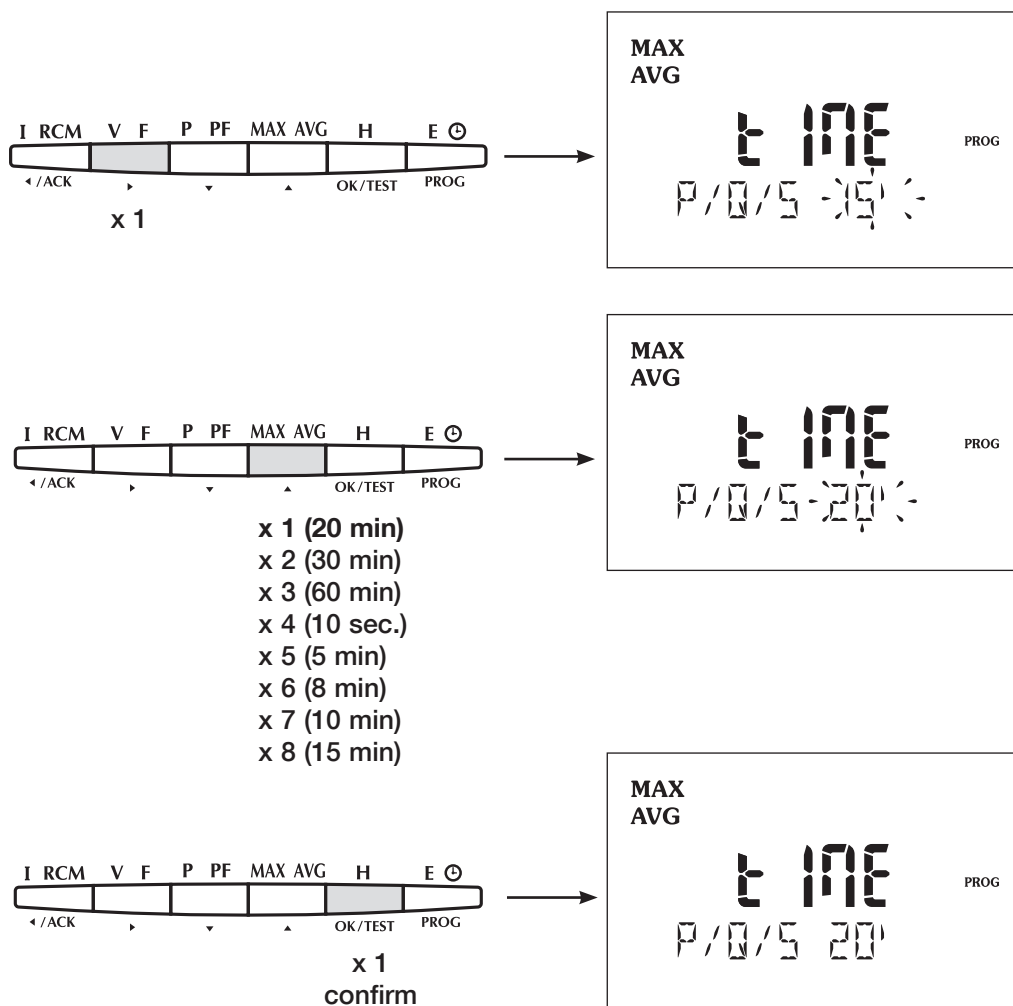


### INTEGRATION PERIOD OF AVERAGE AND MAXIMUM FREQUENCIES

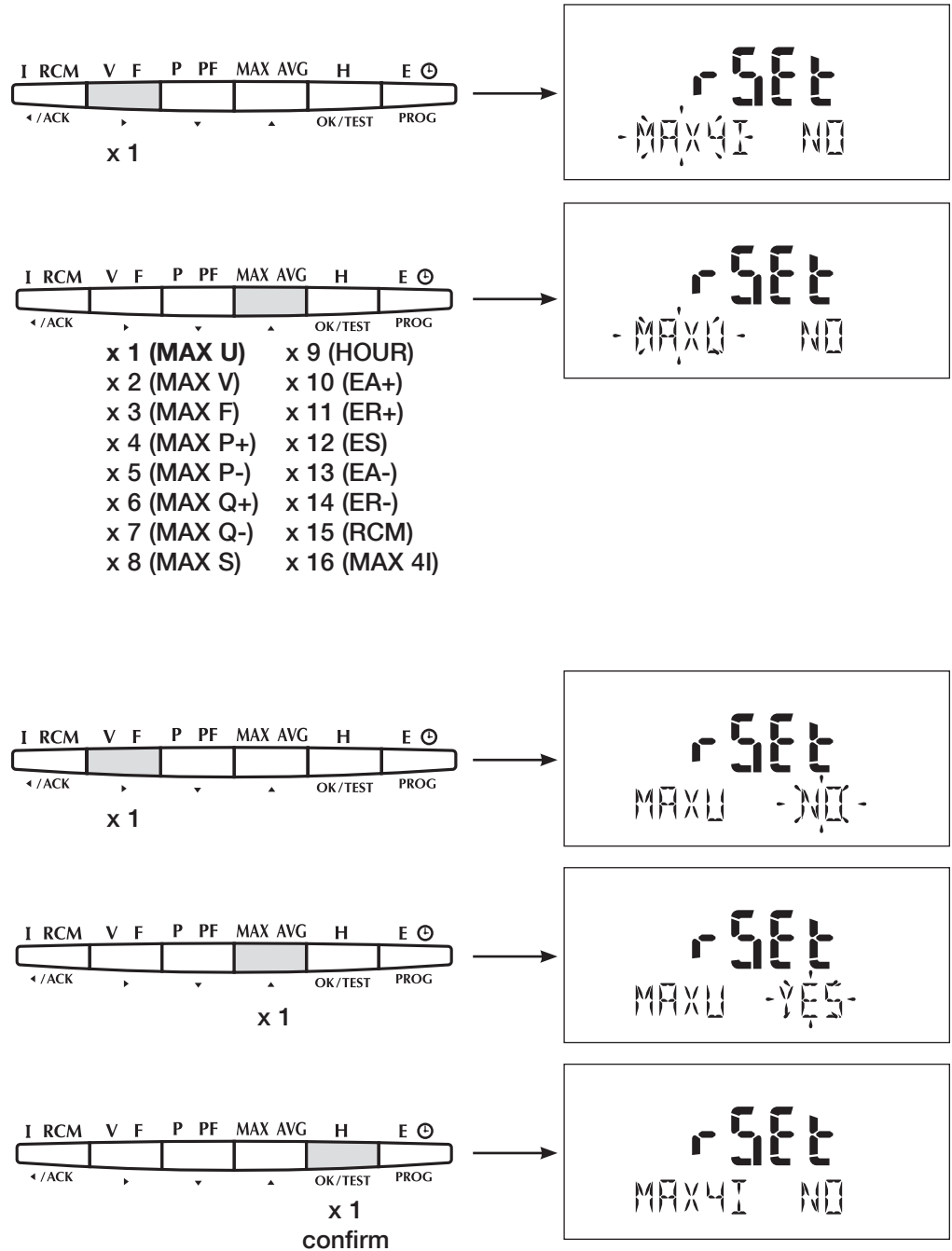
(Example: tIME F = 20 min)



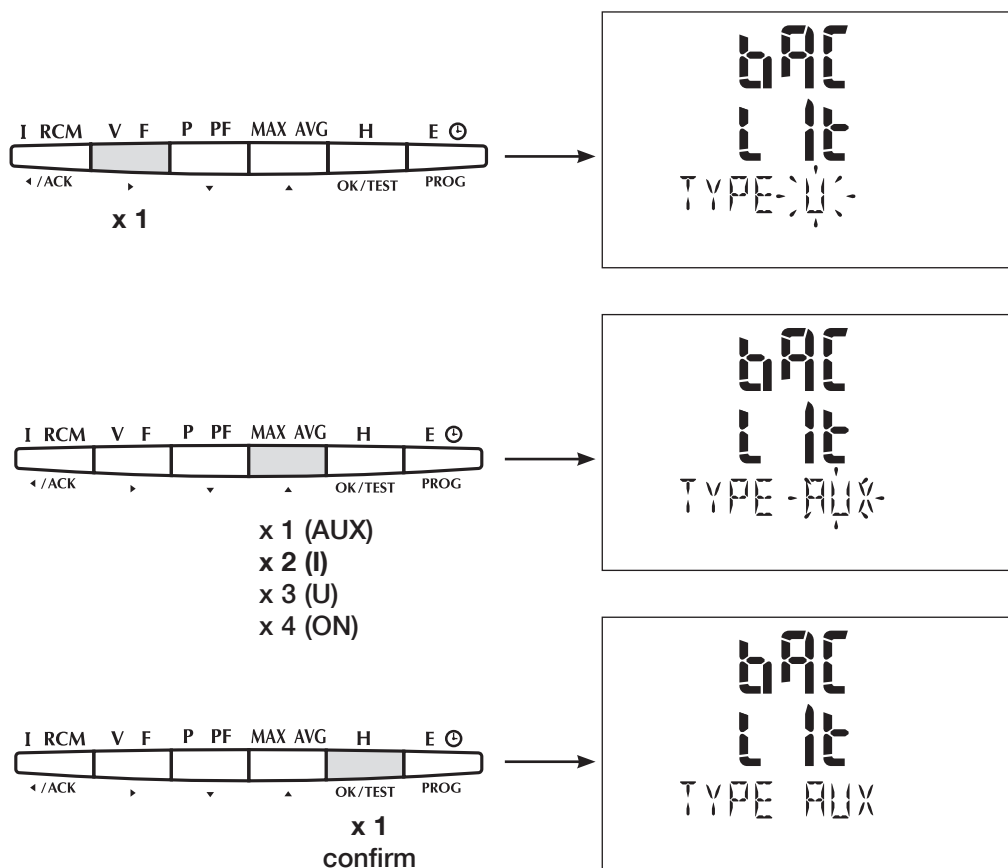
INTEGRATION PERIOD OF AVERAGE AND MAXIMUM POWER (Example: tIME P/Q/S = 20 min)



### RESET OF THE MEMORIZED VALUES (Example: Reset Max and AVG powers)

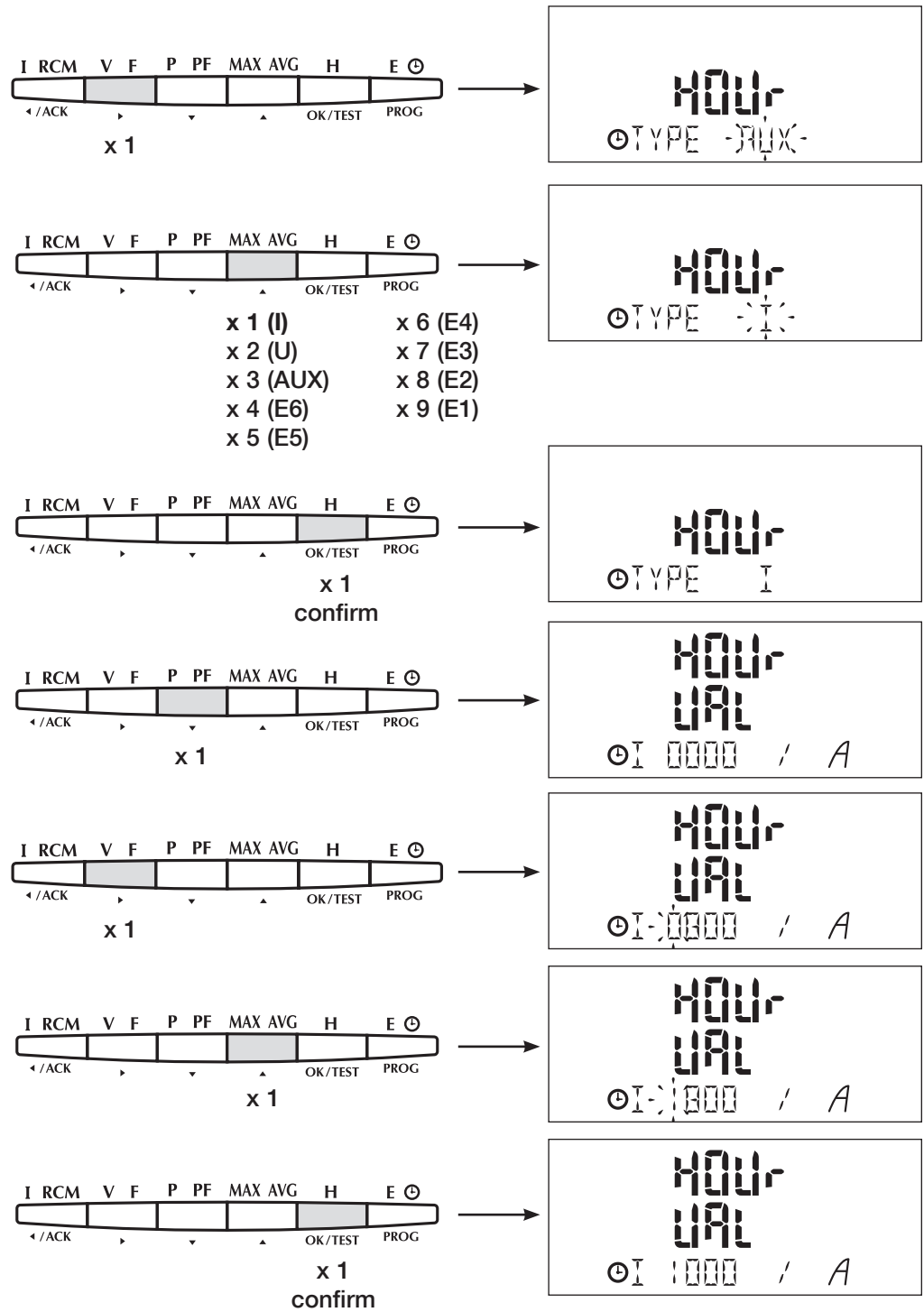


OPERATING MODE OF BACKLIGHTING (Example: bACLIT = AUX)



### OPERATING MODE OF HOUR METER

(Example: hour meter for current with start-up at 1000 A)



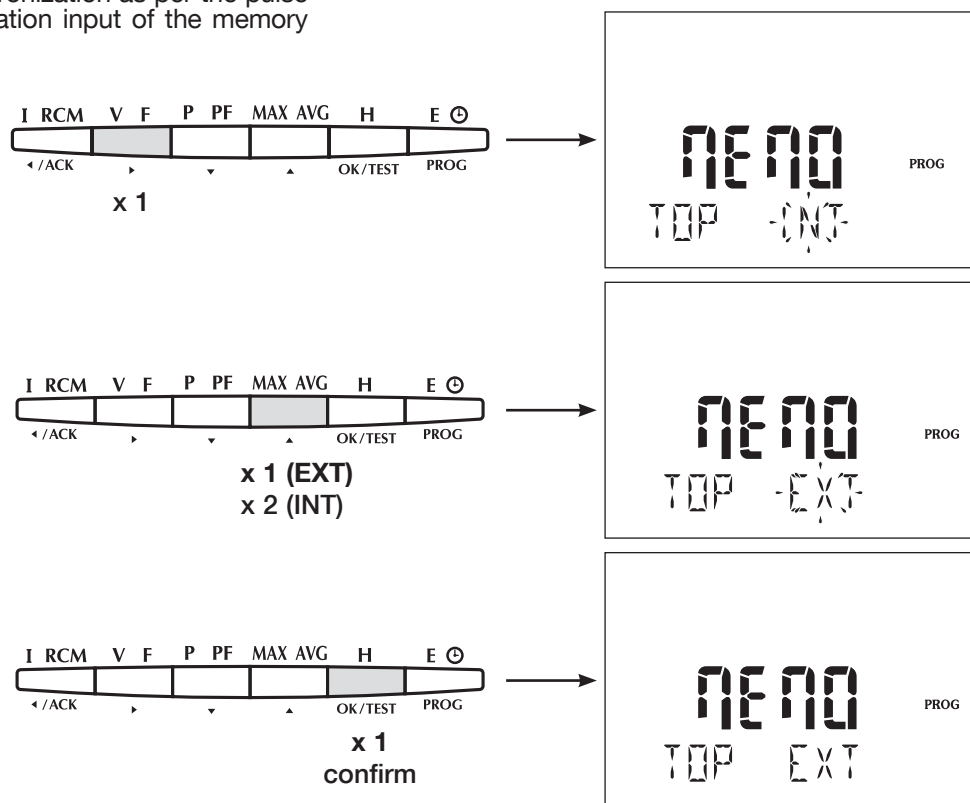


INTERNAL OR EXTERNAL SYNCHRONIZING PULSE (Example: MEMO TOP = EXT)

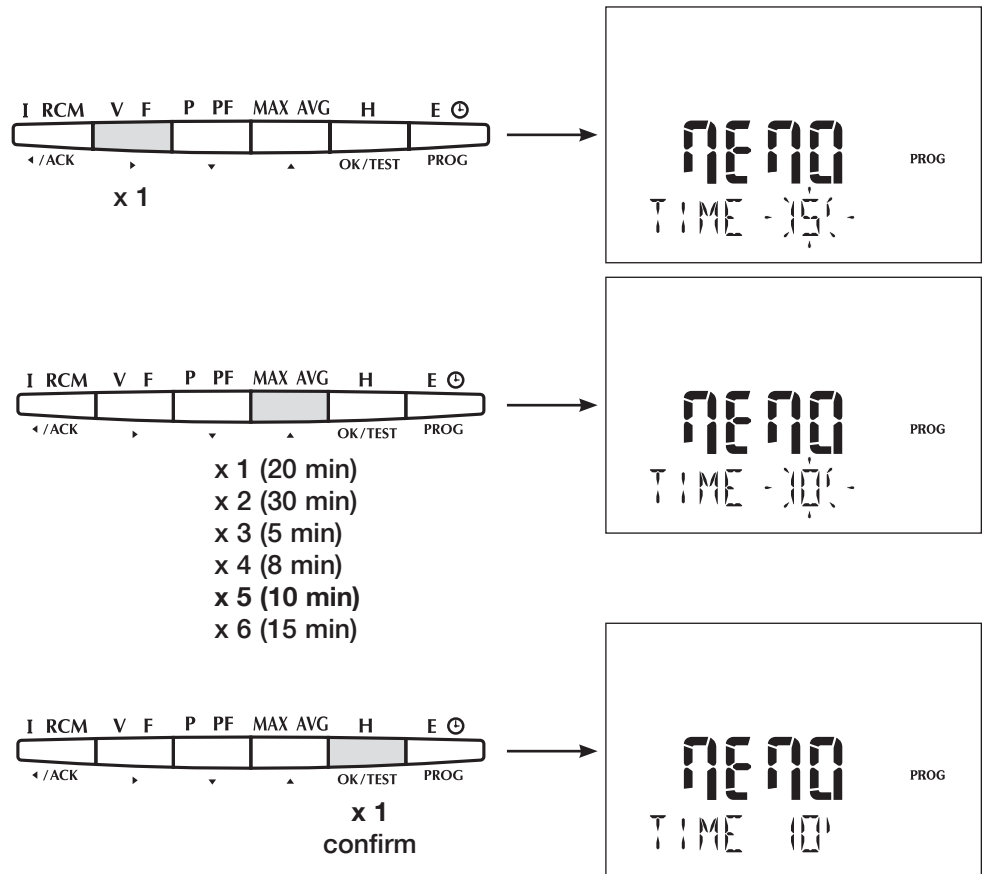
This function is used for synchronizing the period of the Power load curves on:

INTERNAL PULSE = synchronization with DIRIS internal clock.

EXTERNAL PULSE = synchronization as per the pulse received by the synchronization input of the memory module.



### INTEGRATION PERIOD OF THE MEMORY MODULE (Example: MEMO TIME = 10')



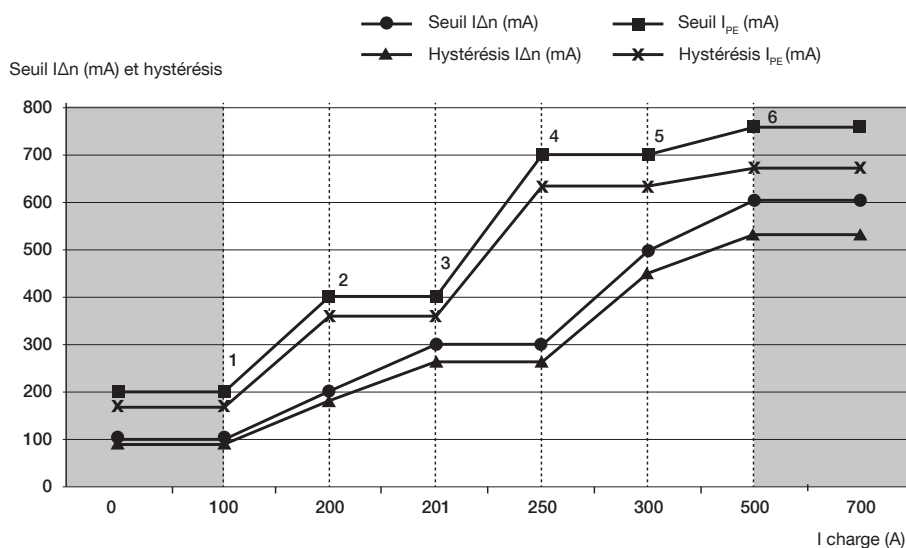
$I_{\Delta n}$  AND  $I_{PE}$  ALARM PRINCIPLE

Residual current  $I_{\Delta n}$  ( $I_1+I_2+I_3+I_n$ ) and earth current  $I_{PE}$  thresholds can be set in function of the load of the installation. In order to do it, the **DIRIS A80** uses 2 curves (1 for  $I_{\Delta n}$ , 1 for  $I_{PE}$ ) representing the installation when loads are activated or not. The curves are built with up to 6 points.

The load current is defined by: Load current =  $(I_1+I_2+I_3)/3$  for three-phase network or =  $I_1$  for single-phase network.

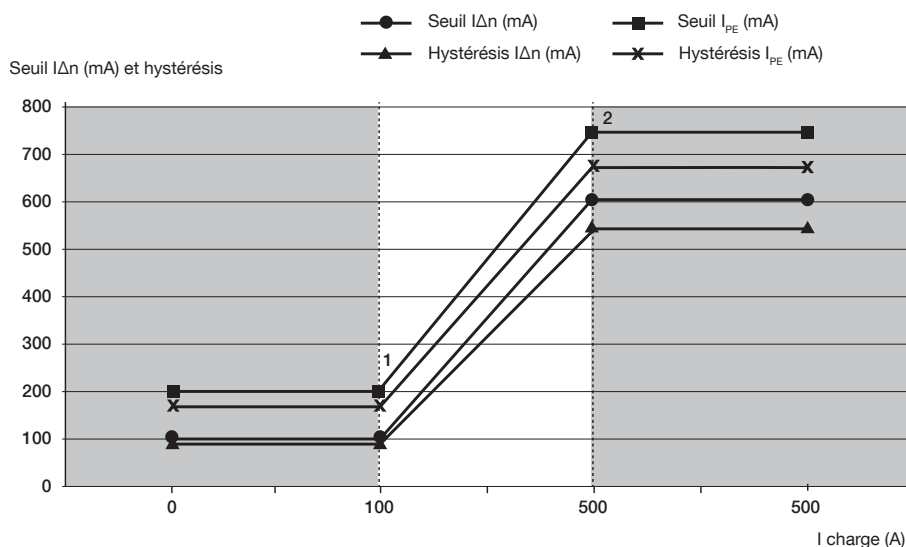
The user can also set a hysteresis and a delay to avoid unintentional alarms.

The curves are piecewise linear and the RCM module computes the threshold of each curve segment in function of the load current.



Example: Alarm threshold curve with 6 points and 10 % hysteresis

For a simplified approach the user can only set a 2 points curve, for instance the point 1 corresponds to a minimum load and the point 2 to a maximum load in the installation.



Example: Alarm threshold curve with 2 points and 10 % hysteresis

# PROGRAMMING

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## Principle of defining the threshold curves

There are 2 ways of defining these curves :

### MANUAL MODE:

Up to 6 points can be configured to define a curve.  
The user has to give for each point 2 values:

- Pt LD => Value of the current load
- Pt TH => Value of the threshold of the differential current

### AUTOMATIC LEARNING MODE:

The automatic learning mode measures the nominal differential current according to the load current of the installation.

During the automatic learning process, the user has to be able to change the load level of its installation on a wide range in order to create the curve of the nominal differential current according to the load current representative of the installation.

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## CONFIGURATION MODE:



Select "NO" to configure in MANUAL mode: see chapter "MANUAL MODE", page 33.

Select "YES" to configure in AUTOMATIC mode: see chapter "AUTOMATIC LEARNING MODE", page 29.

AUTOMATIC LEARNING MODE:  $I_{\Delta n}$  AND  $I_{PE}$  AUTO CONFIGURATION MODE**Principle**

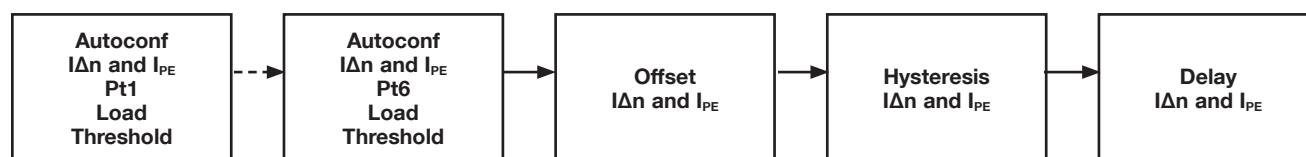
Auto configuration feature on the **DIRIS A80** allows the user to build the  $I_{\Delta n}$  and  $I_{PE}$  threshold curve directly based on his electrical installation. The **DIRIS A80** integrates a method of threshold auto learning allowing the user to configure easily the threshold curve.

In auto configuration mode, the points for  $I_{\Delta n}$  and  $I_{PE}$  are filled with the values directly measured by the differential current transformers.

During the automatic learning process, the user has to be able to change the load level of its installation on a wide range in order to create the curve of the nominal differential current according to the load current representative of the installation.

The user adds an offset value on the  $I_{\Delta n}$  and  $I_{PE}$  measured points to define the threshold level.

This offset value represents the delta between the normal  $I_{\Delta n}$  (or  $I_{PE}$ ) current level of the installation and the level generating an alarm. By default the offset value is set to 0.



# PROGRAMMING

## Steps

The number of points to acquire is showed on this screen:

- “Pt-1” to “Pt-6”: from 1 to 6 points acquire.
- 2 steps: “ACQU” (point acquisition) and “RSET” (reset acquisition).



To perform the points acquisition, choose “ACQU” by pressing “▶” then “▼” or “▲” keys then press “OK” when the point is acquired.

The next point is automatically displayed and is acquired by following the same procedure.

Up to 6 points can be acquired.

To finish the procedure before the point 6, press “▼” key once to reach  $I\Delta n$  threshold screen.

## $I\Delta n$ threshold

When all the points have been acquired in the previous “STEP” screen, press “▼” key up to reach the following screen:



Choose the offset value by pressing “▶” then “▼” or “▲” keys.

The value is an offset on  $I\Delta n$  measured value.

The offset is automatically applied on the alarm curve when the user validates the auto configuration.

**$I_{PE}$  threshold**

Press “▼” key up to reach the following screen:



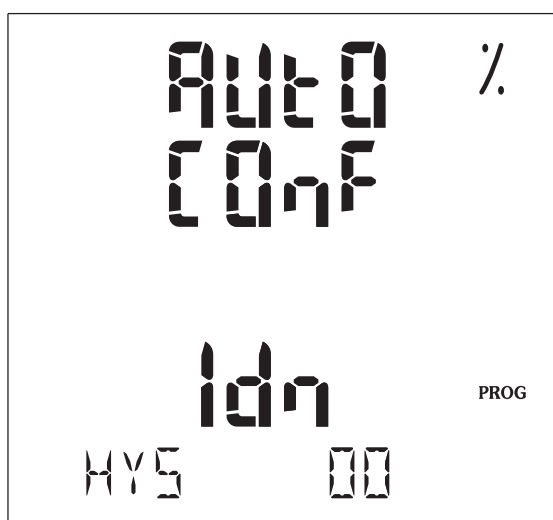
Choose the offset value by pressing “▶” then “▼” or “▲” keys.

The value is an offset on  $I_{PE}$  measured value.

The offset is automatically applied on the tripping curve when the user validates the auto configuration.

 **$I_{\Delta n}$  hysteresis**

Press “▼” key up to reach the following screen:



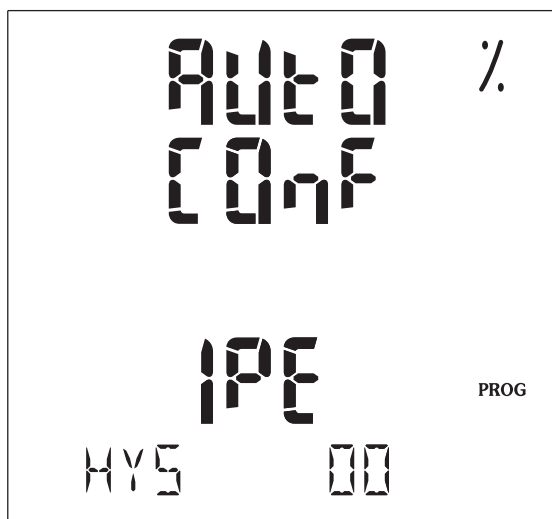
Choose the hysteresis value by pressing “▶” then “▼” or “▲” keys.

The value is given in percentage of  $I_{\Delta n}$  threshold.

The hysteresis is automatically applied on the tripping curve when the user validates the auto configuration.

### $I_{PE}$ hysteresis

Press “▼” key up to reach the following screen:



Choose the hysteresis value by pressing “▶” then “▼” or “▲” keys.

The value is given in percentage of  $I_{PE}$  threshold.

The hysteresis is automatically applied on the tripping curve when the user validates the auto configuration.

### Auto configuration end

Press “▼” key up to reach the following screen:

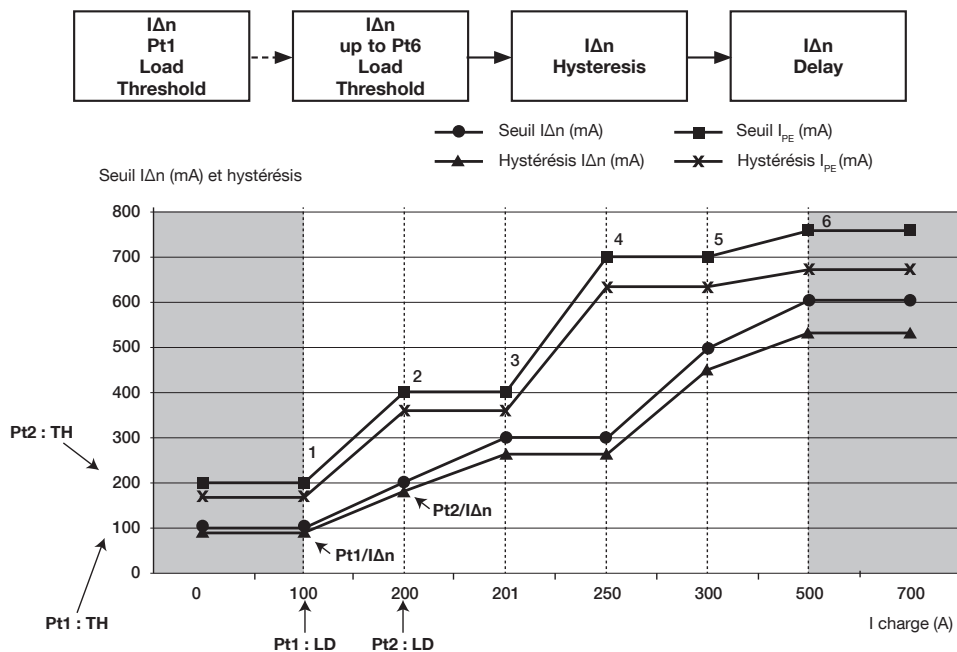


The user selects “YES” to validate the auto learning, or “NO” to quit this function.

The acquired points are displayed on the following screens.



MANUAL MODE: IΔn ALARM SETTINGS



12 screens allow the user to change the current load (LD) and threshold (TH) values to set the IΔn alarm curve.

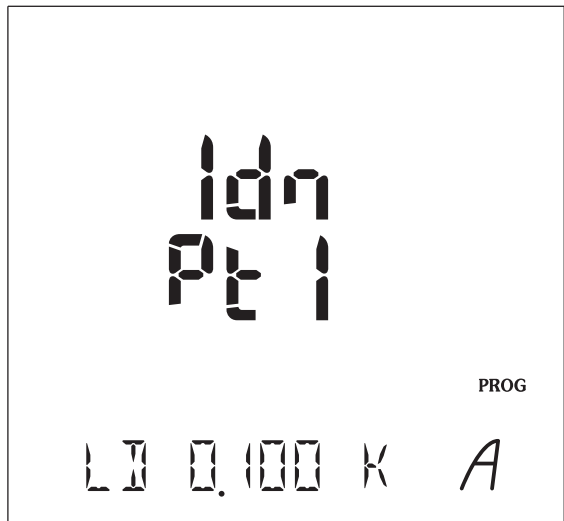
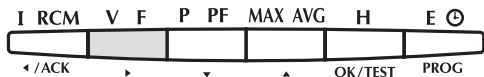
Press “▼” key up to reach the following screen:

Up to 6 points.

# PROGRAMMING

## IΔn load current

The load current defines the load levels of the installation.



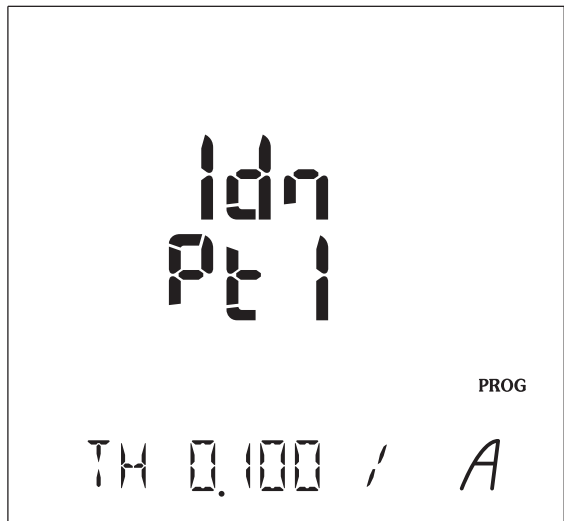
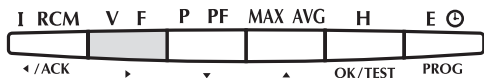
Select load current by pressing “▶” key and select “LI” with “▼” or “▲” keys.

Choose the load value by pressing “▶” then “▼” or “▲” keys for each digit and range.

Once the correct value is obtained validate by pressing “OK” key.

## IΔn threshold

The IΔn threshold defines the leakage current level generating an alarm.



Select IΔn threshold by pressing “▶” key and select “TH” with “▼” or “▲” keys.

Choose the value by pressing “▶” then “▼” or “▲” keys for each digit and range.

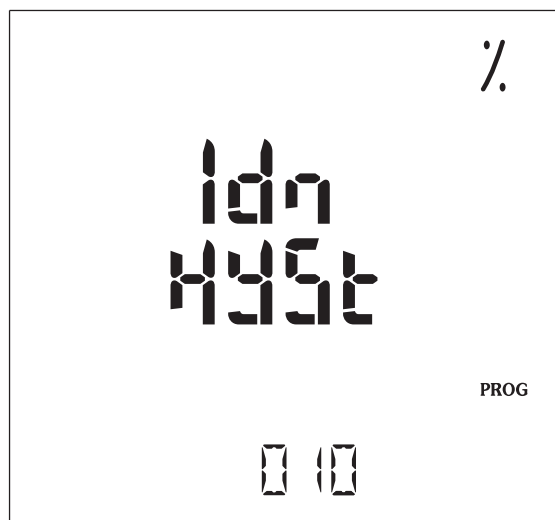
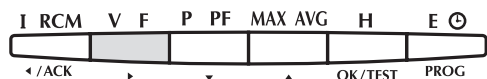
Once the correct value is obtained validate by pressing “OK” key.

Set for point 2 to 6, IΔn by pressing “▼” key and redo the previous procedure for load current and threshold settings of each point.

Note: If less than 6 points are used. The remaining points have to be set to 0.

### IΔn hysteresis

The hysteresis is set once for all the points of the curve. Set the hysteresis screen by pressing “▼” key:

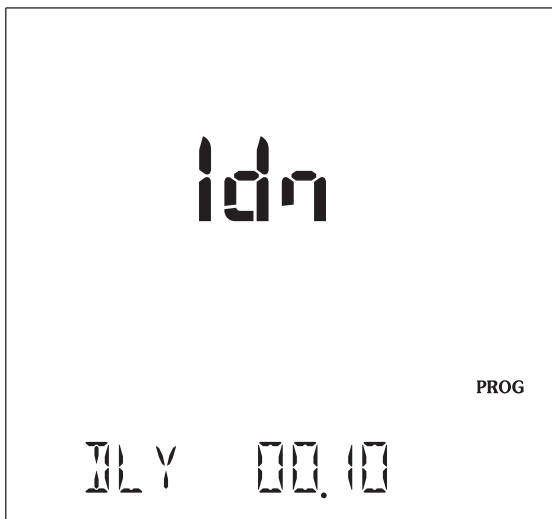


Choose the value by pressing “▶” then “▼” or “▲” keys. The value is given in percentage of IΔn.

# PROGRAMMING

## I $\Delta$ n delay

Press “▼” key up to reach the following screen:



Choose the delay value by pressing “▶” then “▼” or “▲” keys for each digit and range.

The I $\Delta$ n delay can be set from 0 to 10 seconds.

## Default values for load current and I $\Delta$ n threshold

PARAMETER	DEFAULT VALUE
I $\Delta$ n – point 1 – LD	10 A
I $\Delta$ n – point 1 – TH	1 A
I $\Delta$ n – point 2 – LD	300 A
I $\Delta$ n – point 2 – TH	30 A
I $\Delta$ n – point 3 – LD	0
I $\Delta$ n – point 3 – TH	0
I $\Delta$ n – point 4 – LD	0
I $\Delta$ n – point 4 – TH	0
I $\Delta$ n – point 5 – LD	0
I $\Delta$ n – point 5 – TH	0
I $\Delta$ n – point 6 – LD	0
I $\Delta$ n – point 6 – TH	0
I $\Delta$ n - hysteresis	5 %
I $\Delta$ n - delay	0,10 s

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## I<sub>PE</sub> ALARM SETTINGS

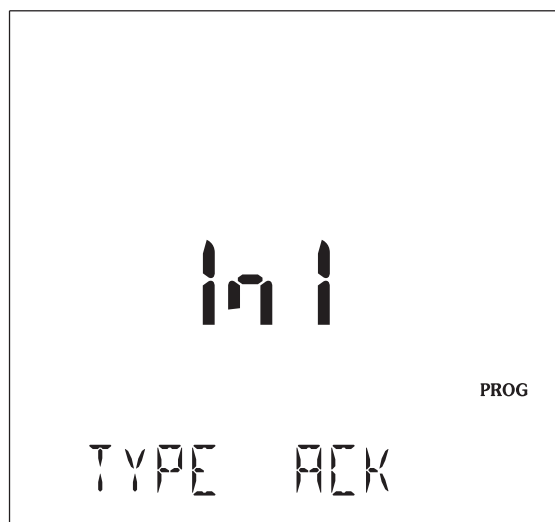
The procedure to set I<sub>PE</sub> alarm is similar to the previous one for I $\Delta$ n settings.

## INPUT SETTINGS

These settings are available only on DIRIS A80 with 1 input / 1 output (réf. 4825 0214).

### Input types

Press “▼” key up to reach the following screen:



Choose the delay value by pressing “▶” then “▼” or “▲” keys for each digit and range.

Different types of inputs can be selected.

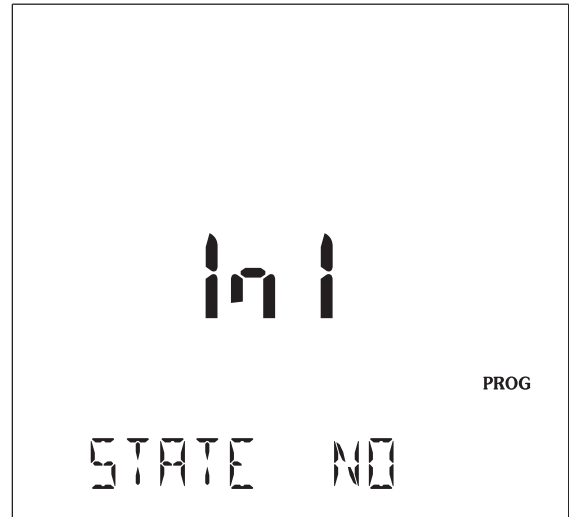
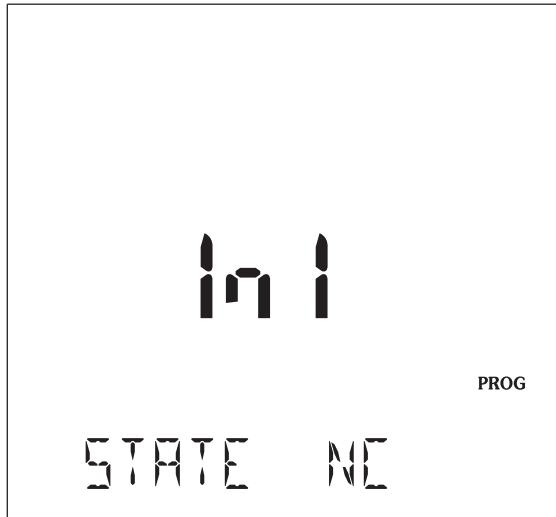
TYPE
“---” : No assignment
“ACK”: Acknowledgement of alarm
“SEN”: Tests of sensors
“RMS”: Start RMS curve
“AVG”: Start AVG curve

# DIRIS A80

## PROGRAMMING

### Input state

Press “▼” key up to reach the following screen:



Choose the value by pressing “▶” then “▼” or “▲” keys.

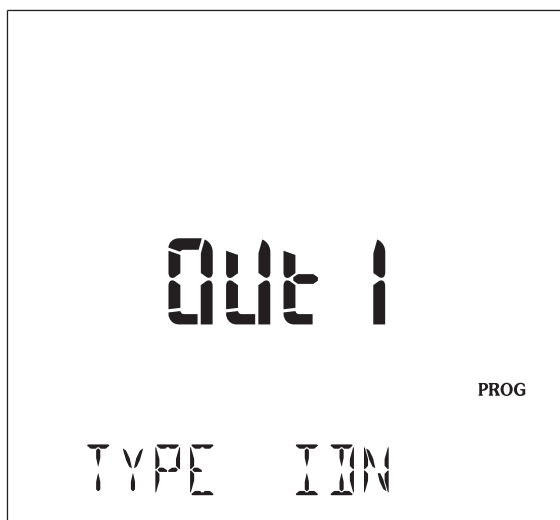
The state of the input relay can be Normally Close (NC) or Normally Open (NO).

## OUTPUT SETTINGS

The OUT2 settings are available only on *DIRIS A80* with 2 output (ref. 4825 0213)

### Output types

Press “▼” key up to reach the following screen:



Choose the type by pressing “▶” then “▼” or “▲” keys.

Different types of output can be selected.

TYPE
“---” : No assignment
“IDN” : Alarm on I $\Delta$ n
“IPE” : Alarm on I <sub>PE</sub>
“I” : Alarm on I $\Delta$ n or I <sub>PE</sub>
“SE1” : Sensor 1 defect
“SE2” : Sensor 2 defect
“SE” : Sensor 1 or 2 defect

### Output relay states

The state of the relay can be Normally Close (NC) or Normally Open (NO). When the DIRIS A80 is powered off the relays are open.

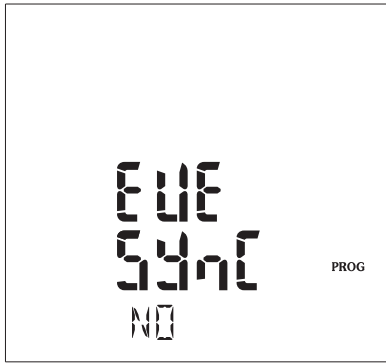
Press “▼” key up to reach the following screen:



### OTHER SETTINGS

#### 1. Synchronization of events

Press “▼” key up to reach the following screen:



Choose YES by pressing “▶” then “▼” or “▲” keys. All the record of RMS curves from DIRIS A80 are together synchronized.

#### 2. Alarm acknowledgment

Press “▼” key up to reach the following screen:

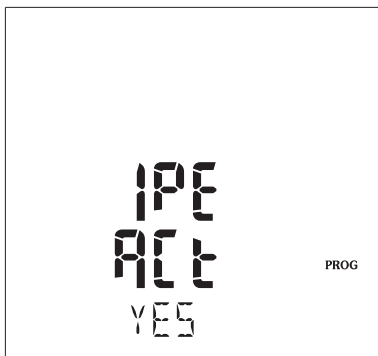


Change by pressing “▶” then “▼” or “▲” keys.

TYPE
“AUTO”: acknowledgment from supervision
“FULL”: acknowledgment from ACK button or supervision or input (if input available)
“EXT”: acknowledgment from supervision or input (if input available)

#### 3. Activation of I<sub>PE</sub> current transformer

Press “▼” key up to reach the following screen:



Change by pressing “▶” then “▼” or “▲” keys.

TYPE
“YES” : To activate I <sub>PE</sub> current transformer
“NO” : To not activate I <sub>PE</sub> current transformer



## DEFINITION OF THE FUNCTIONS OF VOLTAGE DIPS AND INTERRUPTION, AS WELL AS VOLTAGE SWELL AND OVER-CURRENTS

**DIRIS A80** allows detecting events such as:

- Voltage dips
- Voltage swells
- Interruption
- Over-currents

A packet of 10 RMS  $\frac{1}{2}$  period curves (I1, I2, I3, In, V1, V2, V3, U12, U23, U31) is associated with each event detected.

At 50 Hz, a fundamental period is 20 ms, that is 1/2 a RMS period at a mean value of 10 ms.

An RMS  $\frac{1}{2}$  period curve is made up of 120 points. For a signal at 50 Hz it represents a history on 1.2 sec. (60 Hz for 1 sec.). A configurable trigger (Pre-post mode from 0 to 100 %) allows distributing the number of points around the event (50 % / 50 % = 60 points before the event and 60 points after).

For voltage dips, swells and over-currents, an event starts if one of the quantities exceeds the determined threshold. It ends if all the quantities have come back to normal condition (hysteresis).

For voltage interruption, an event starts if all the quantities exceed the determined threshold. It ends if one of the quantities has come back to normal condition.

Depending upon the length, the events are recorded in the following manner:

- Event < 1.2 sec. (50 Hz), 1 packet of 10 curves over 1.2 sec.
- 1.2 sec. > Event < 2.4 sec. (50 Hz), 2 packets following 10 curves, i.e. 2.4 sec.
- Event > 2.4 sec. (50 Hz), 1 packet of 10 curves consisting of the beginning of the event, 1 packet of 10 curves consisting of the end of the event.

Between these two, the values are not available.

### > Logging capacity (FIFO):

- Date and time of 60 events
- Recording of 43 curves

### > Voltage dips and swells

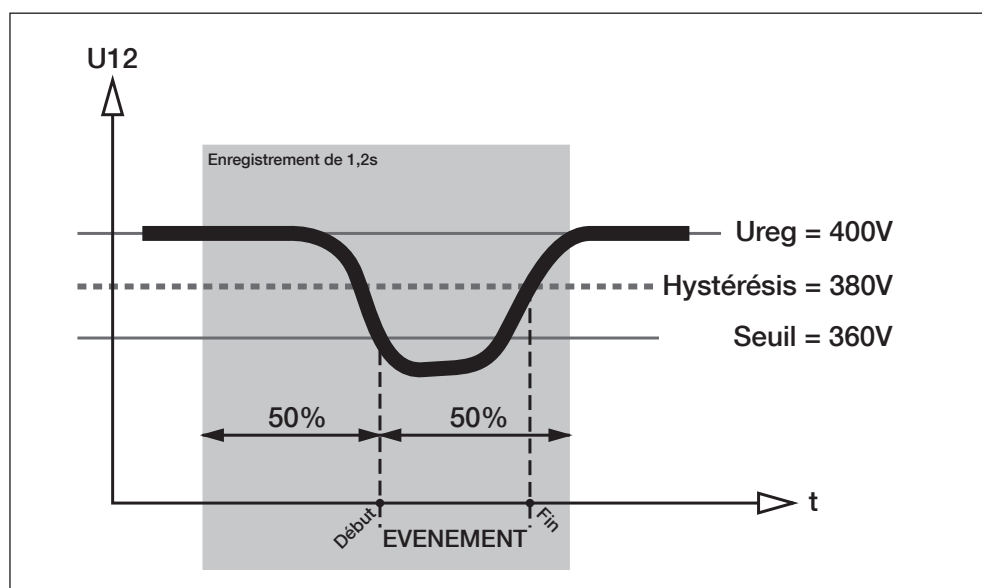
They are memorized as per IEC 61000-4-30 and EN50160 with a category B measurement method.

### > Voltage interruption

It is possible to configure the outage threshold (in % of  $U_n$ ), on the other hand the measurement limit of **DIRIS A80** which is 29 V AC neutral phase and 50 V AC phase/phase must be taken into account.

### > Over-currents

The detection threshold is configured in % of the CT rating. Detection is made as in the case of voltage swell.

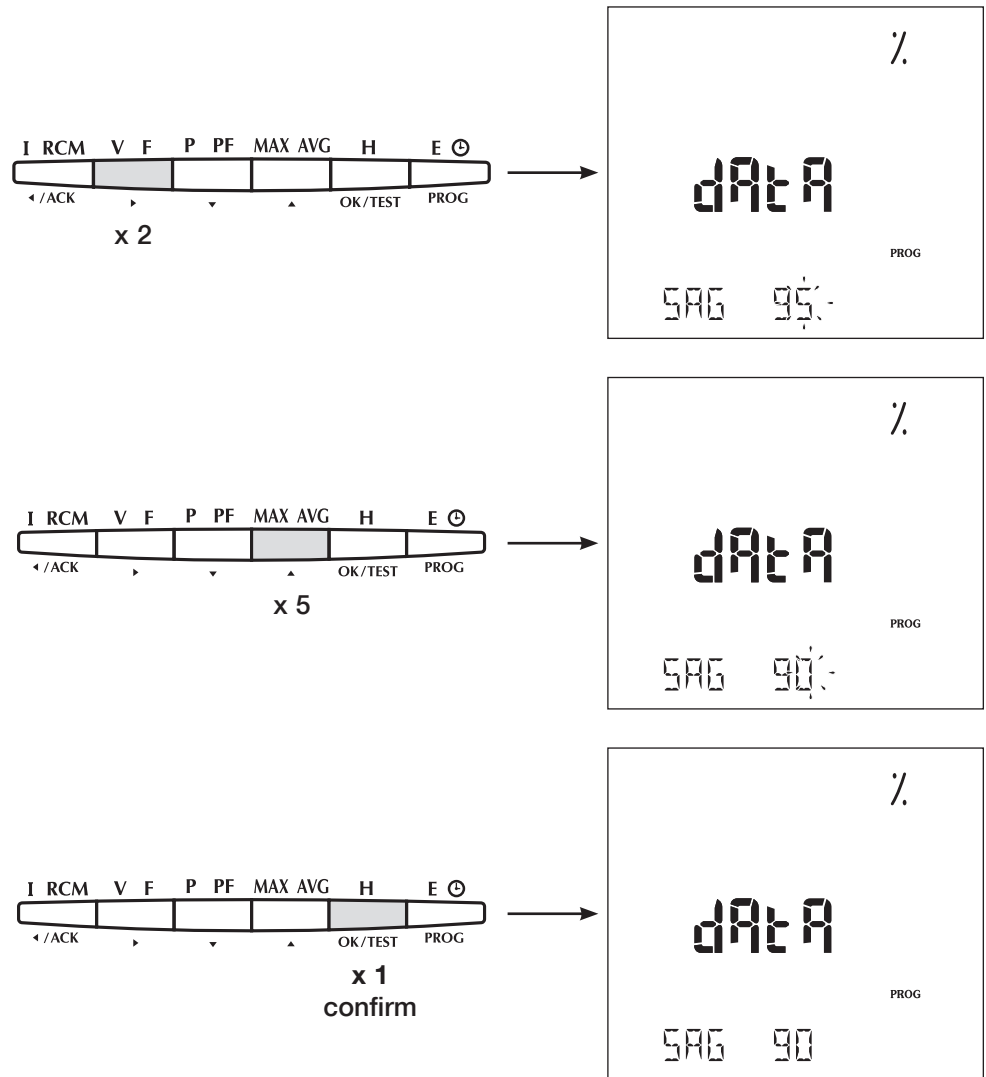


**Example:** Voltage dips with a 90 % voltage threshold and 5 % hysteresis.

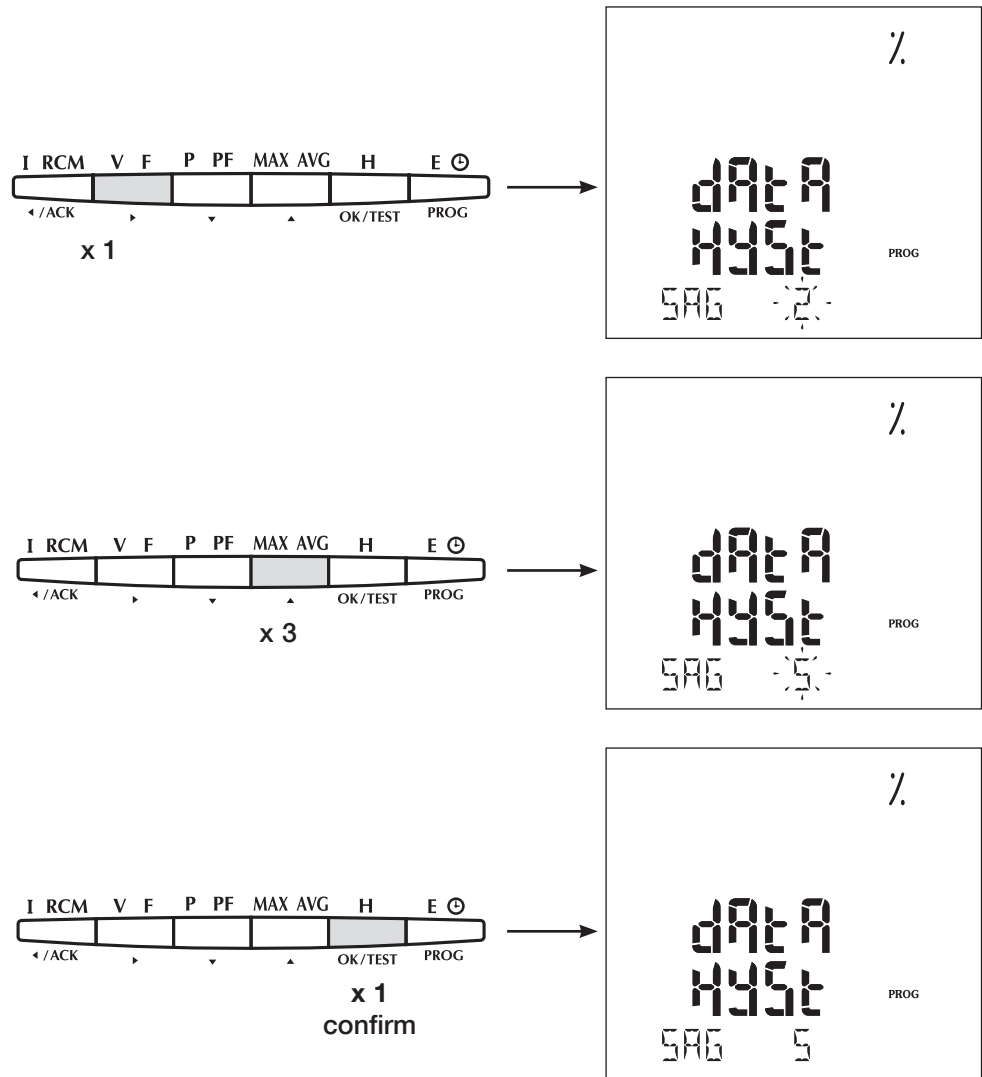
### THRESHOLD OF VOLTAGE DIPS (SAG) (Example: dAtA SAG = 90 %)

% of the nominal voltage.

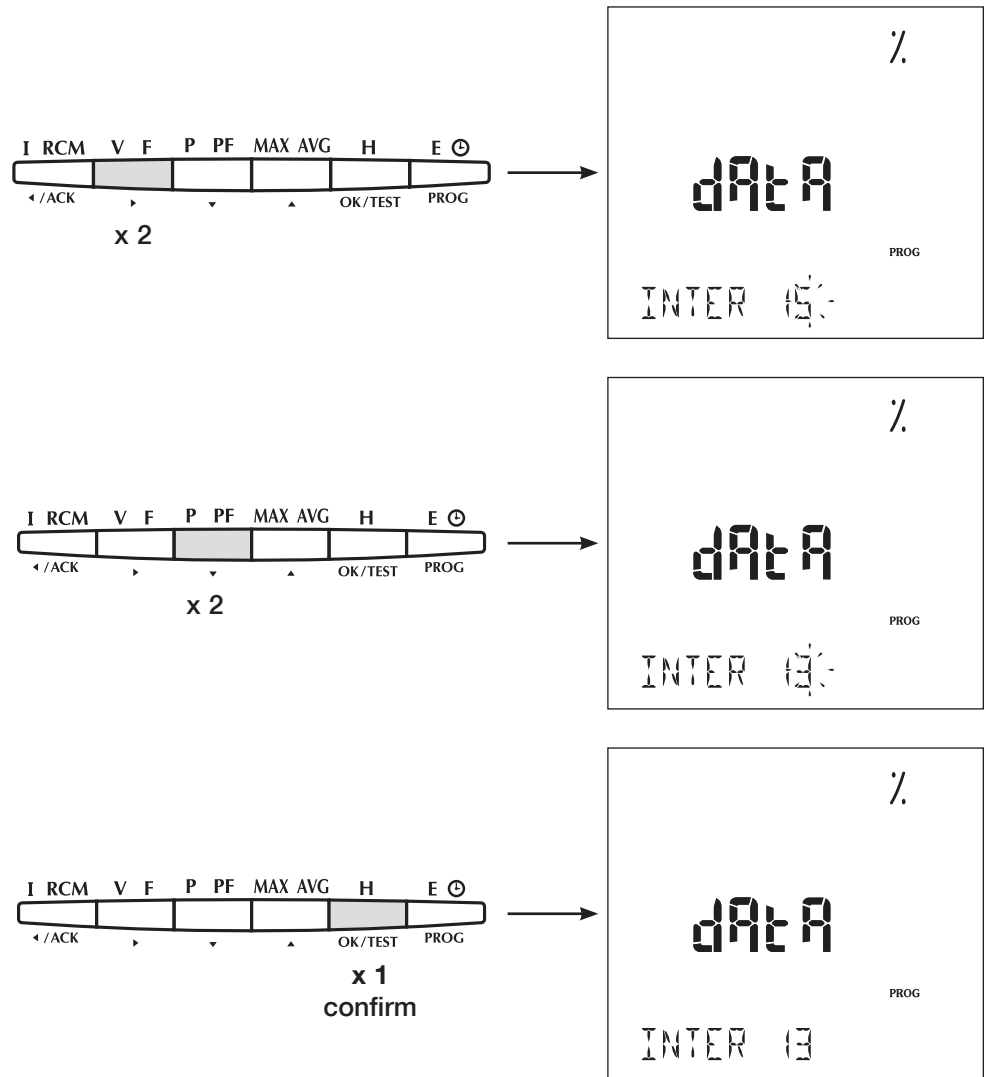
Example: 90 % for 400 V, when SAG is < 360 V.



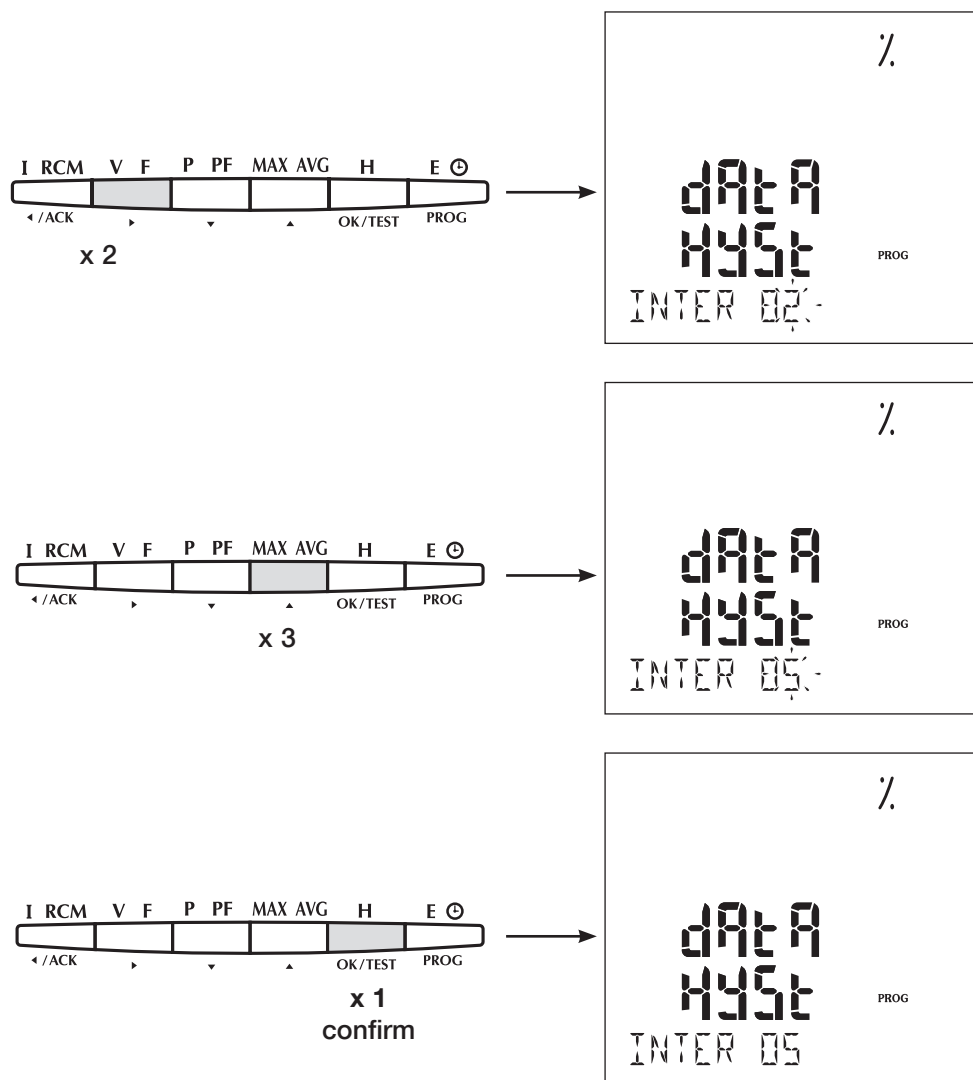
HYSTERESIS OF VOLTAGE DIPS (Example: dAtA HySt SAG = 5 %)



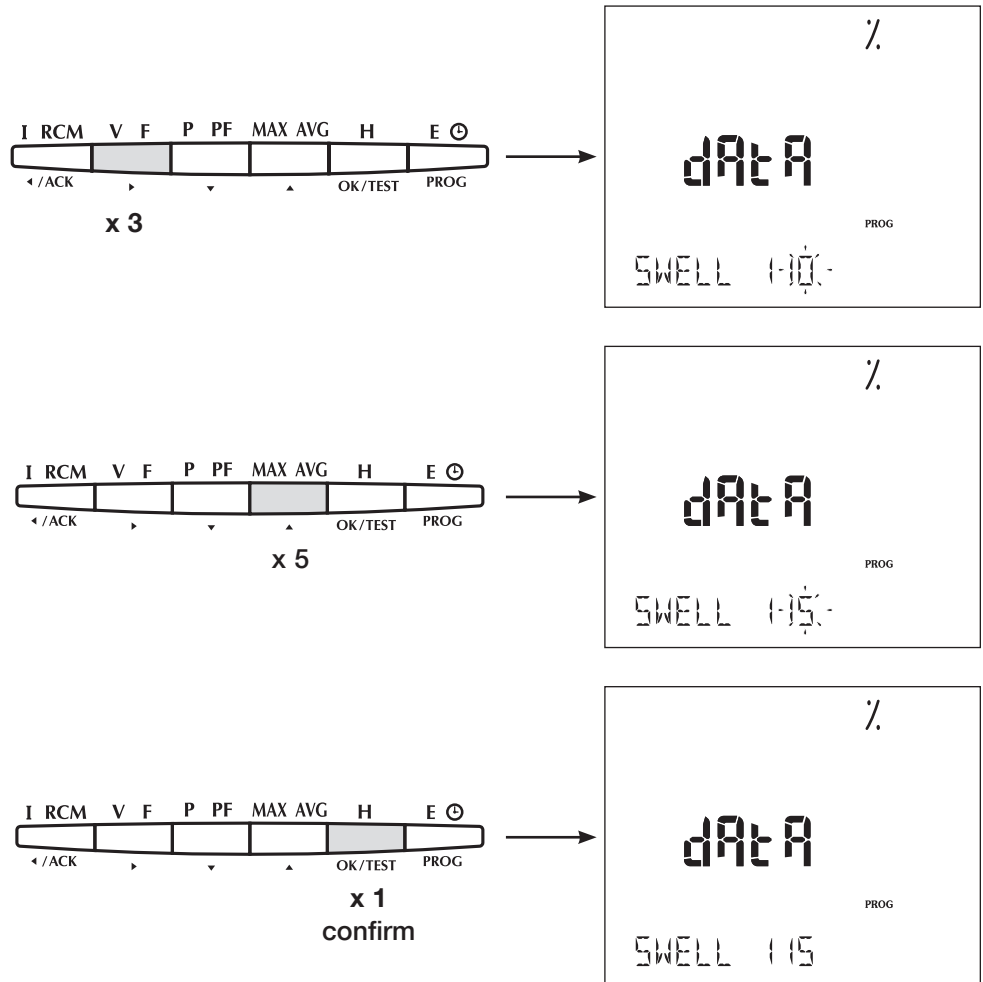
THRESHOLD OF VOLTAGE INTERRUPTION (INTER) (Example: dAtA INTER = 13 %)



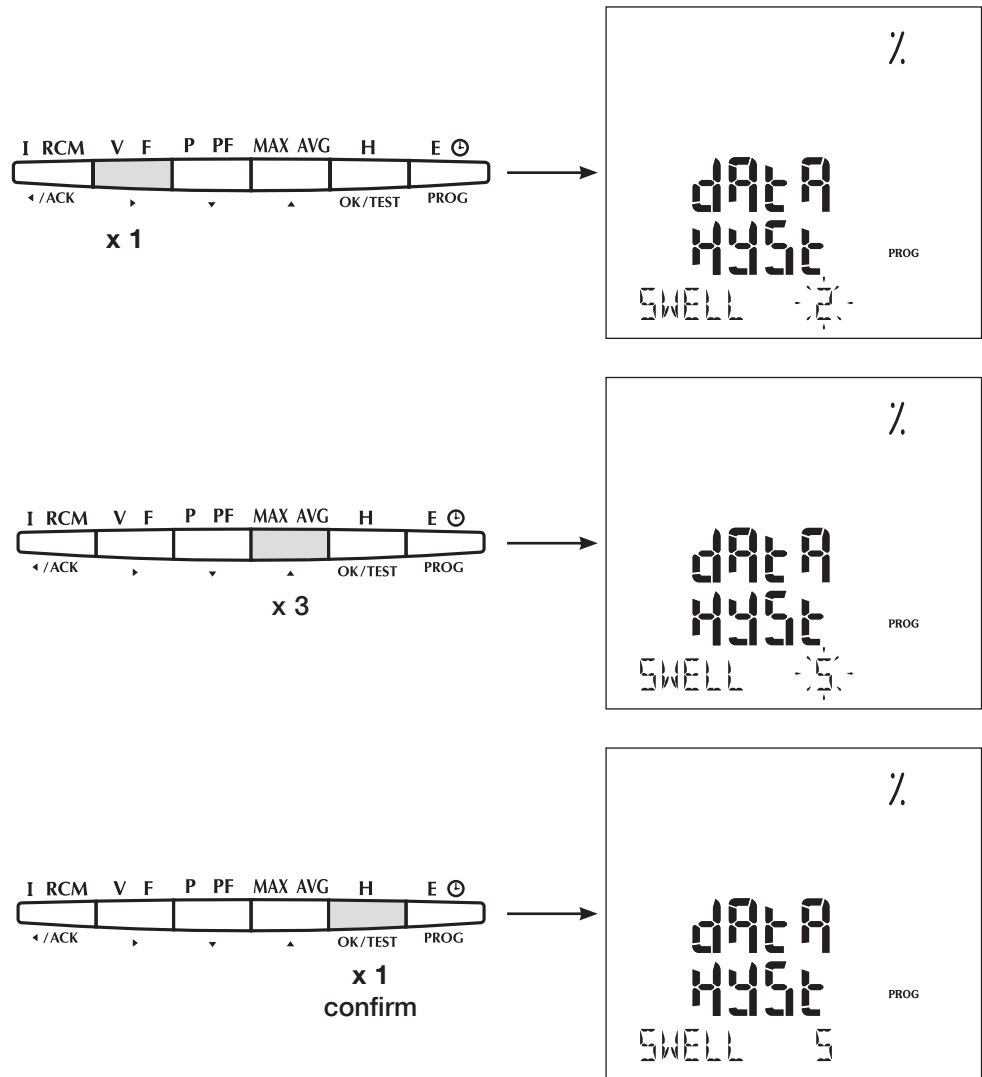
HYSTERESIS OF VOLTAGE INTERRUPTION (INTER) (EXAMPLE: DATA HYST INTER = 5 %)



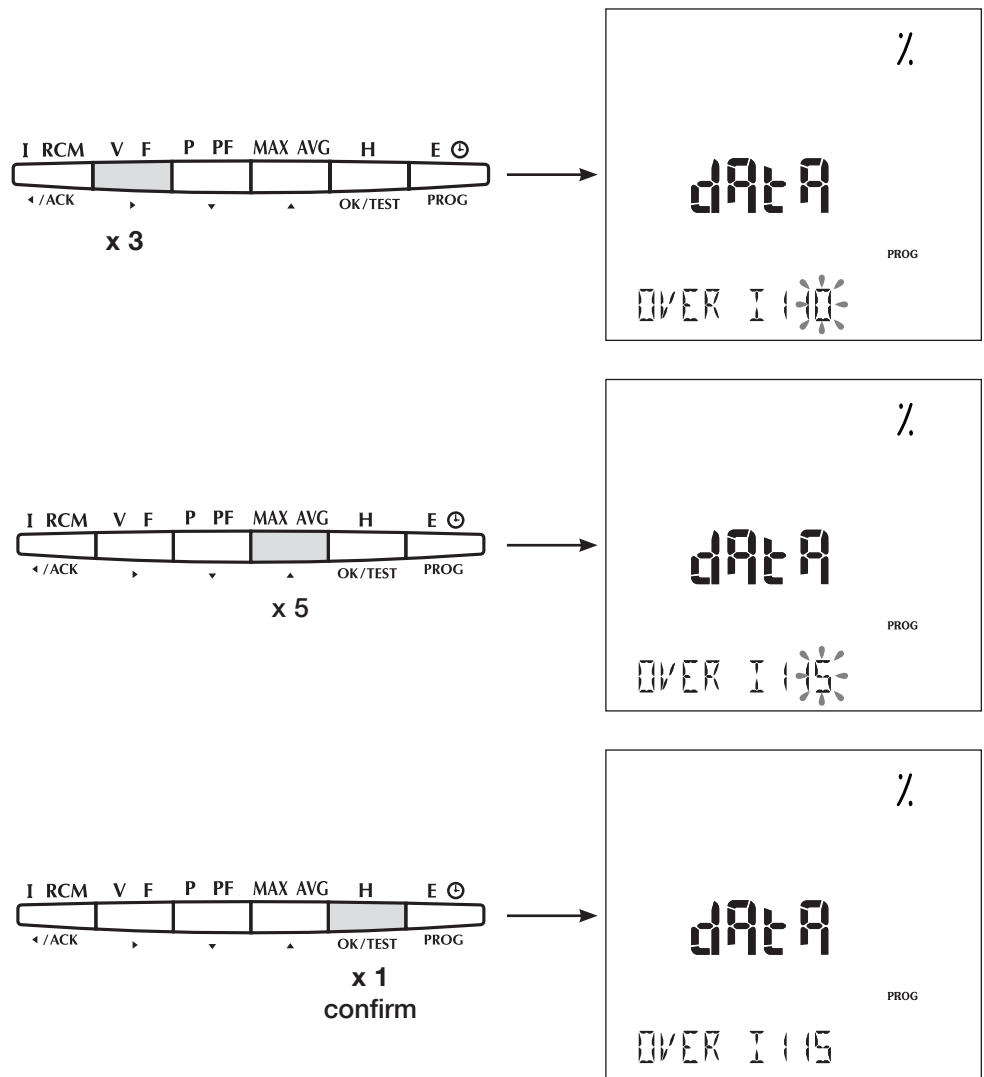
THRESHOLD OF VOLTAGE SWELL (SWELL) (Example: dAtA SWELL = 115 %)



HYSTERESIS OF VOLTAGE SWELL (SWELL) (Example: dAtA HySt SWELL = 5 %)

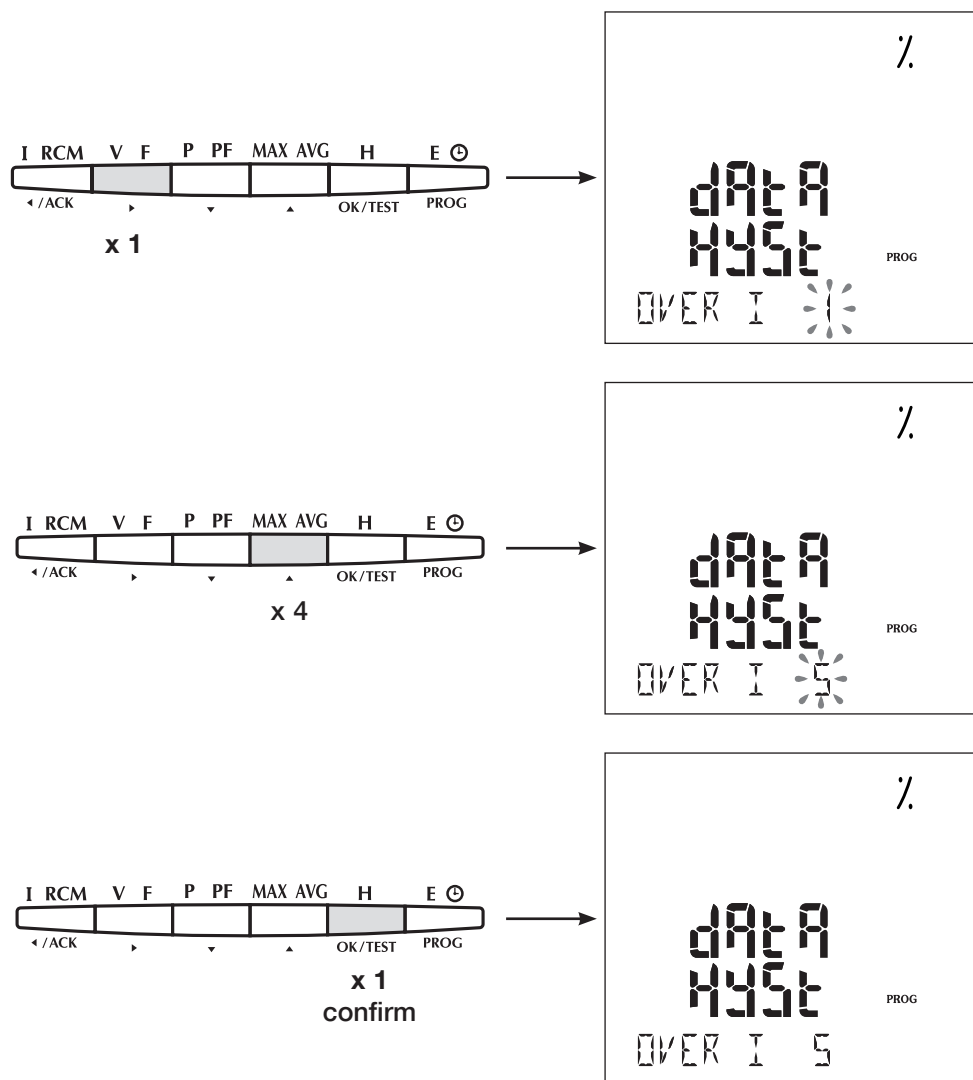


THRESHOLD OF OVER-CURRENTS (OVER) (Example: dAtA OVER I = 115 %)



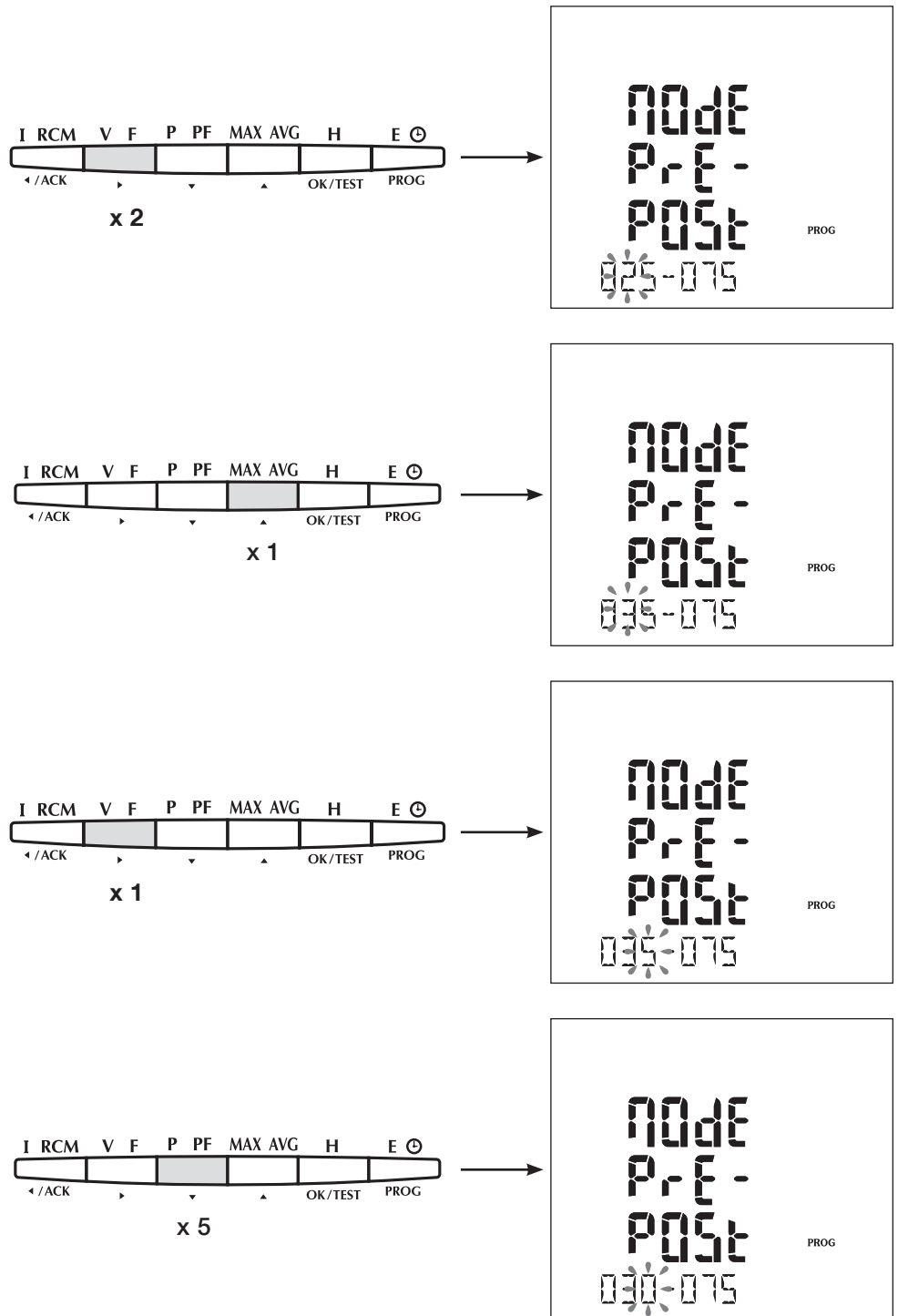


HYSTERESIS OF OVER-CURRENTS (Example: dAtA HySt I = 5 %)



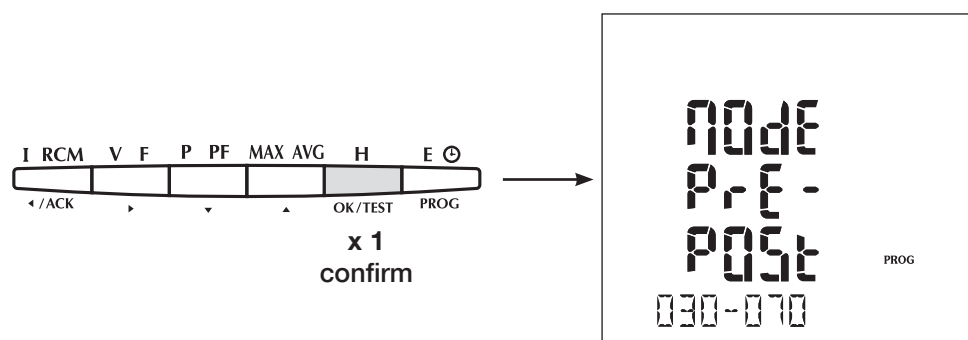
### CONFIGURABLE TRIGGER FOR RMS 1/2 PERIOD CURVES

(Example: MOdE PRE-POST = 30 % - 70 %)

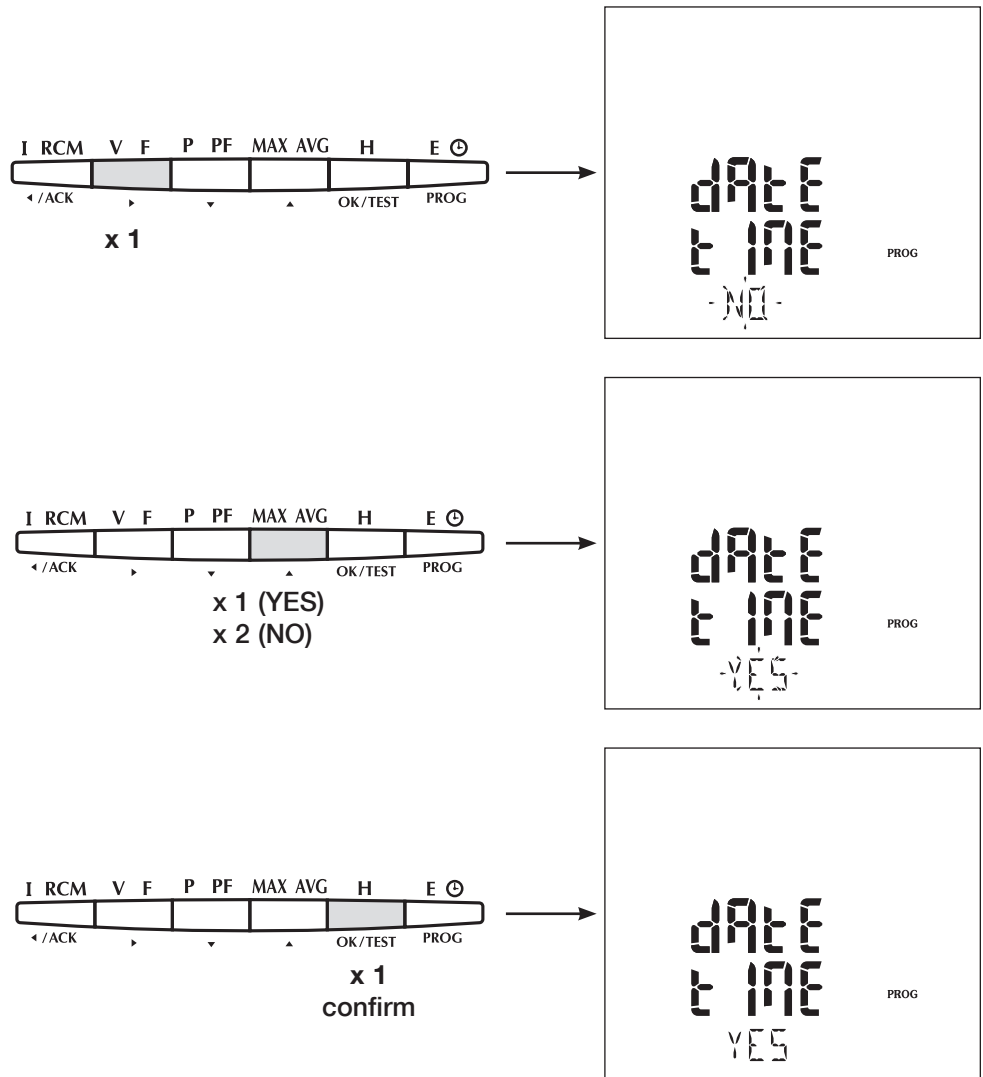


## CONFIGURABLE TRIGGER FOR RMS 1/2 PERIOD CURVES

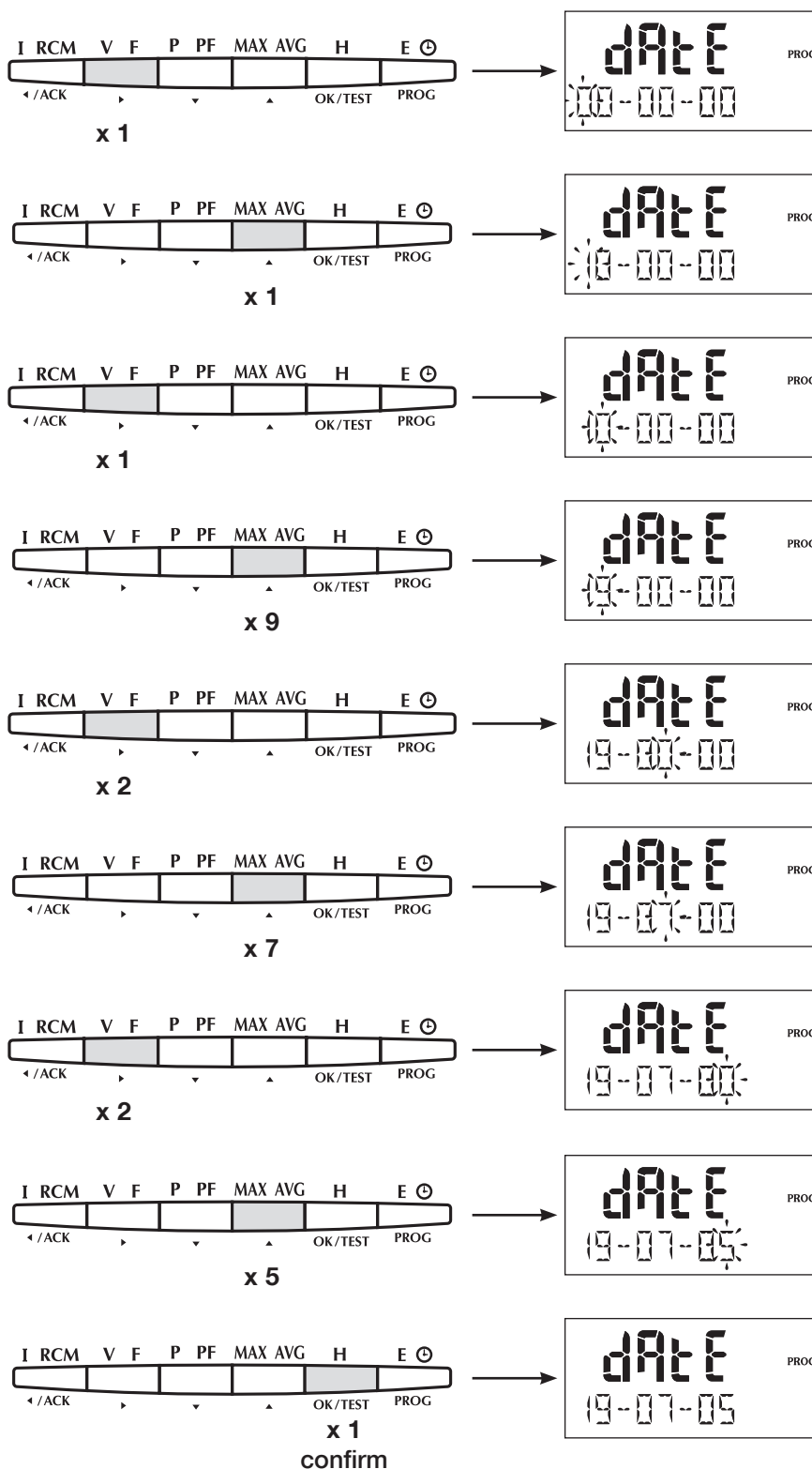
(Example: MOdE PRE-POST = 30 % - 70 %)



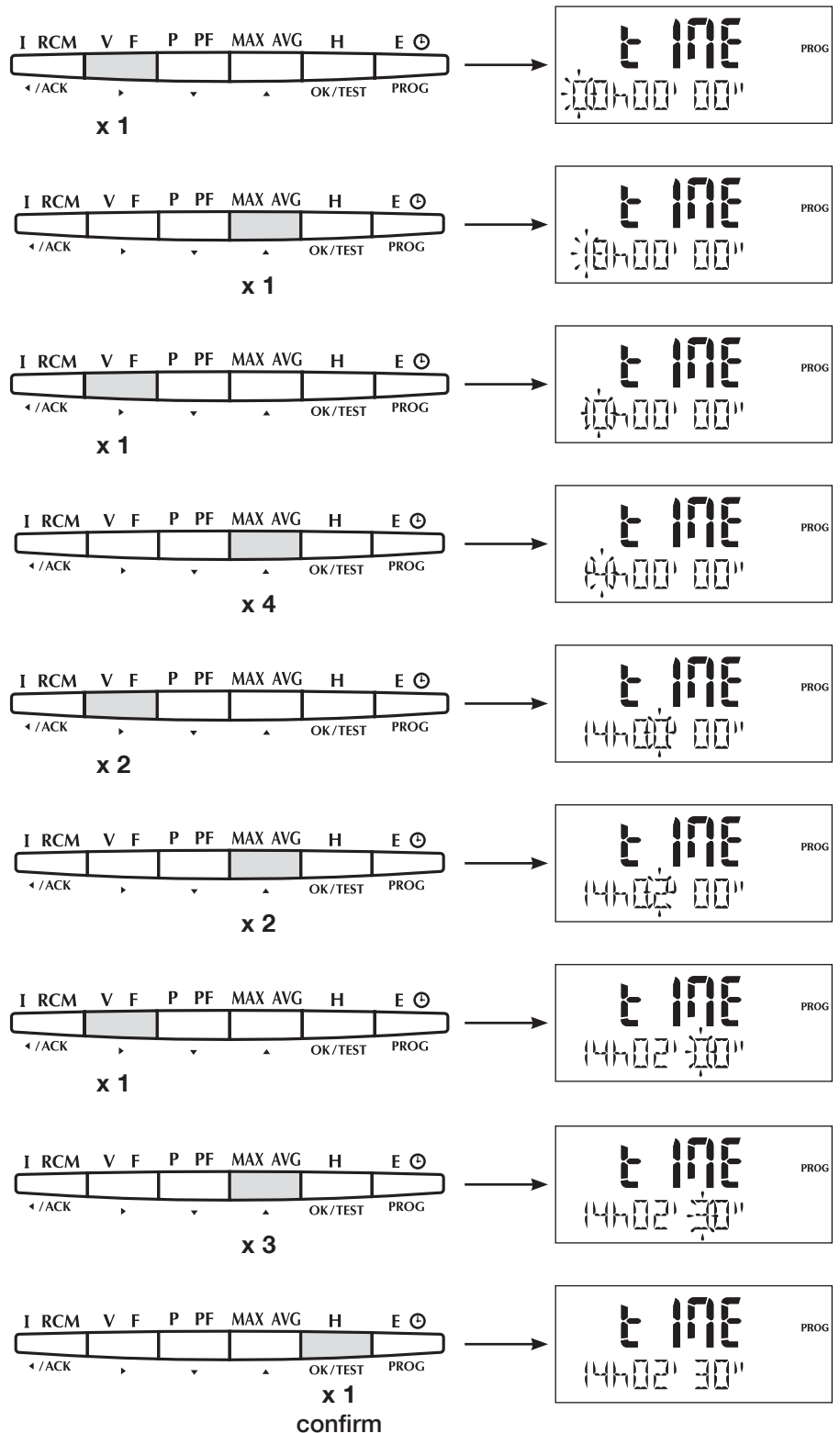
MODIFICATION OF THE DATE / TIME FUNCTION: YES / NO (By default no timestamping)



DATE SETTINGS (Example: dAtE = DD-MM-YY)

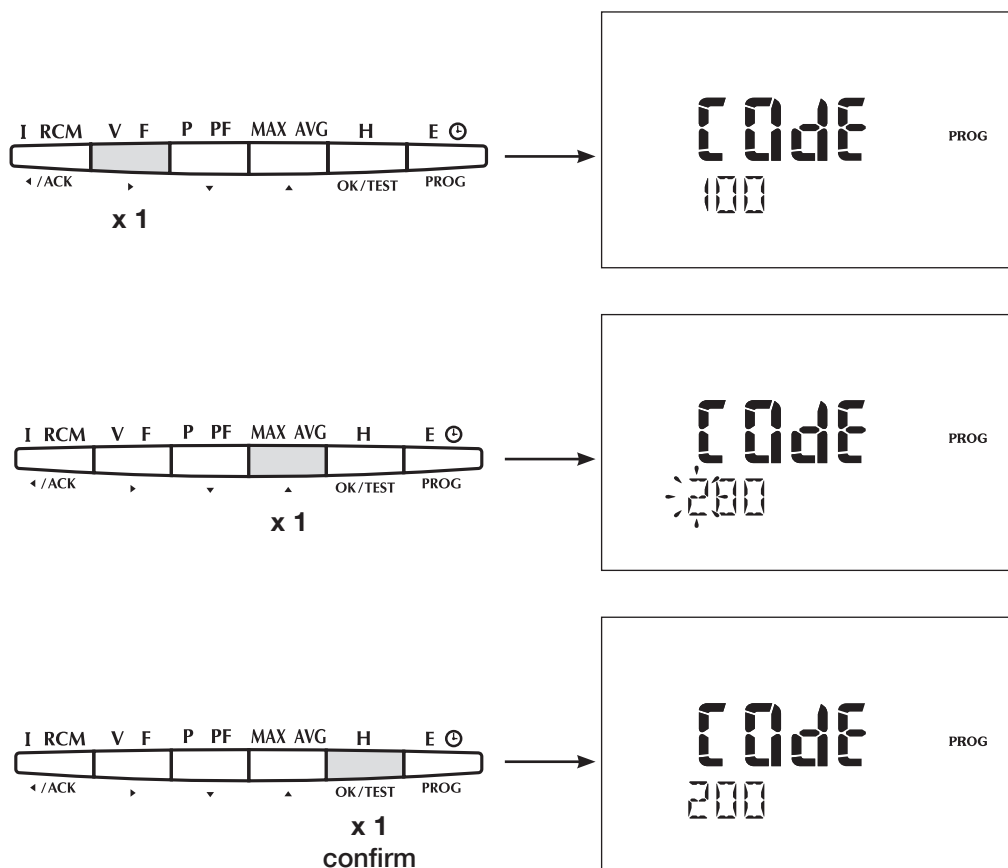


### HOUR SETTINGS (Example: tIME 14h02'30")



MODIFICATION OF THE ACCESS CODE IN THE CONFIGURATION MENU

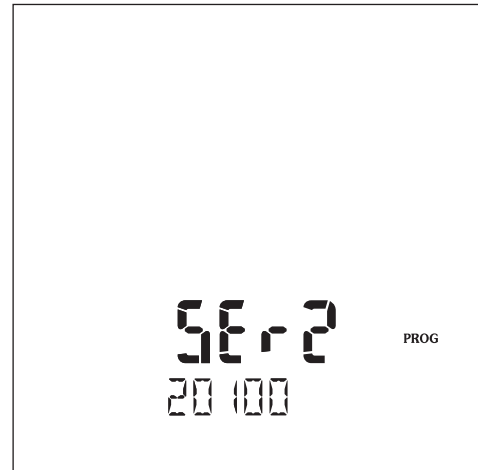
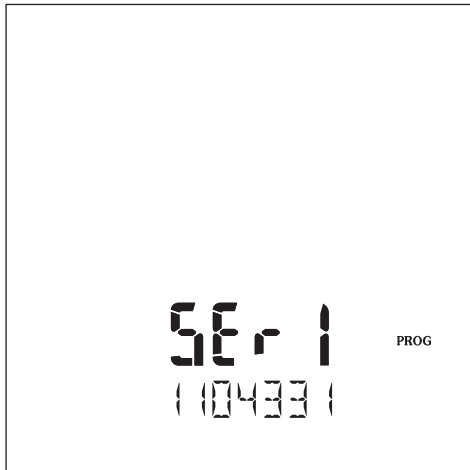
(Example: COdE = 200)



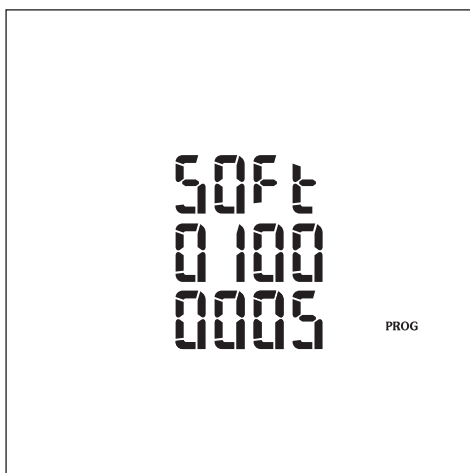
# DIRIS A80

## PROGRAMMING

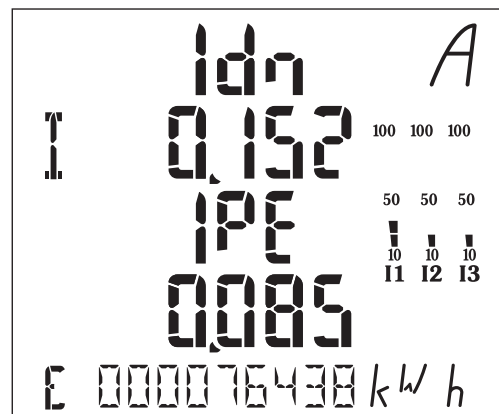
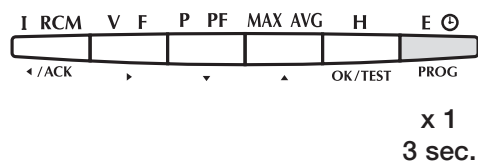
SERIAL NUMBER (Example: SEr1 = 110433120100)



SOFTWARE VERSION (Example: version 100)



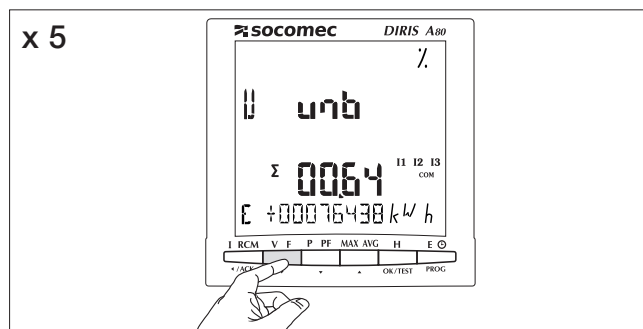
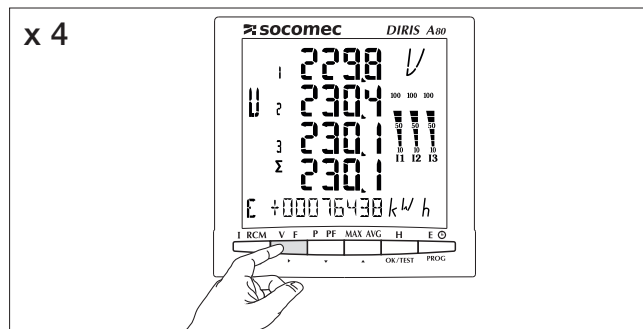
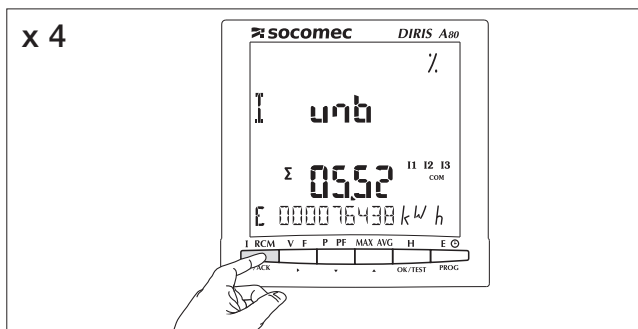
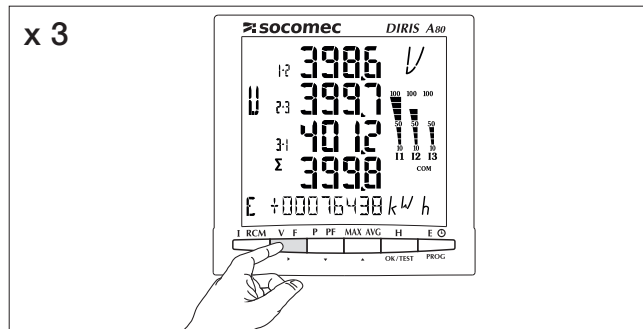
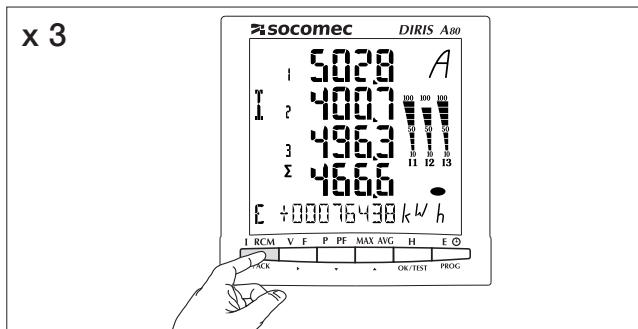
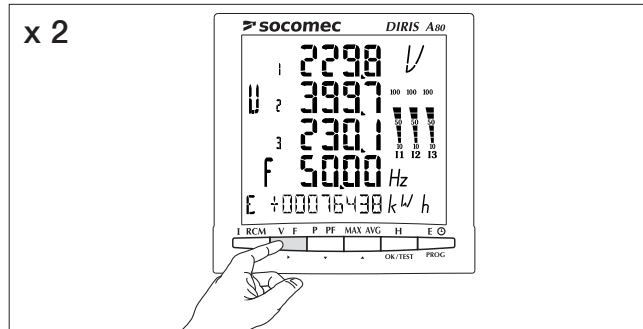
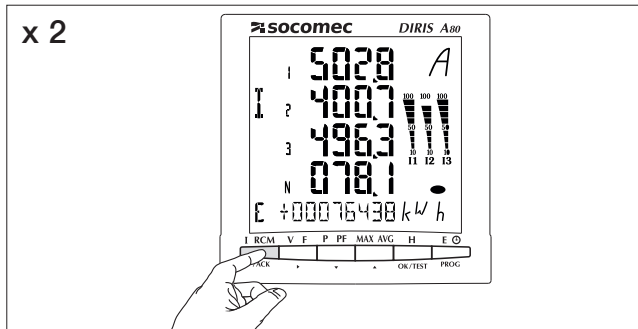
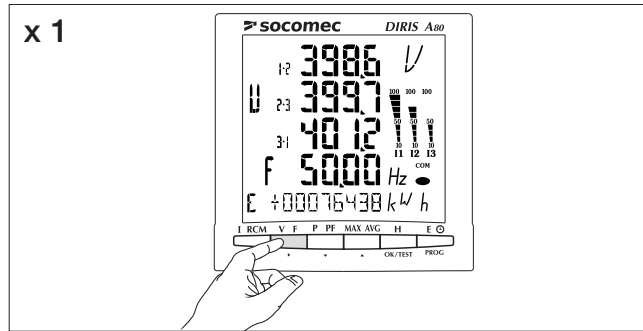
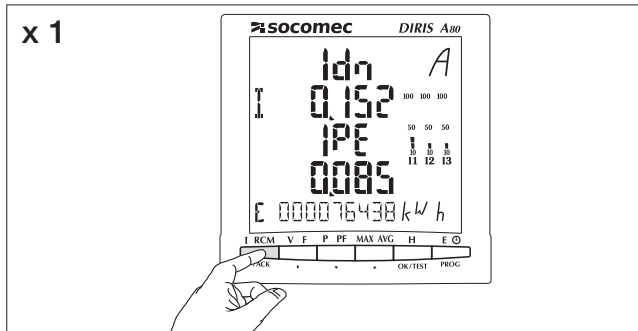
EXIT PROGRAMMING





# DIRIS A80

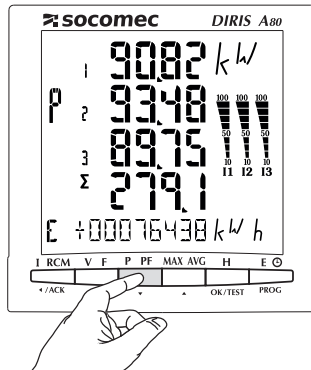
## OPERATION



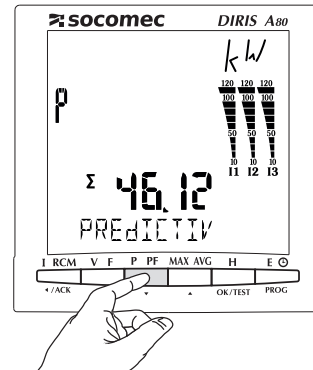
# DIRIS A80

## OPERATION

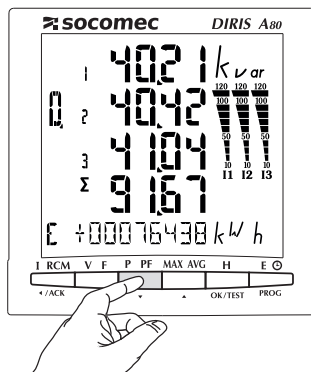
x 1



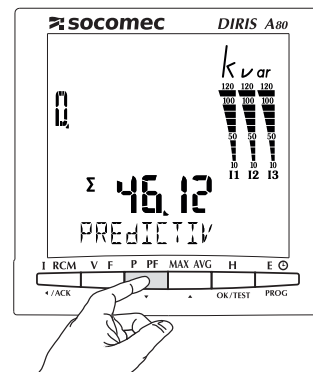
x 5



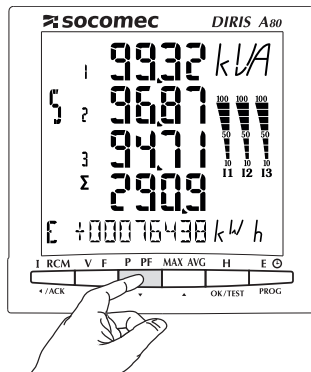
x 2



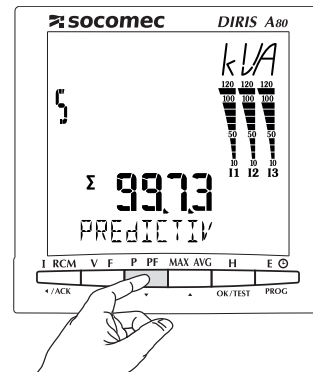
x 6



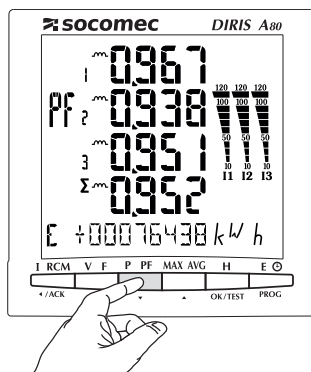
x 3



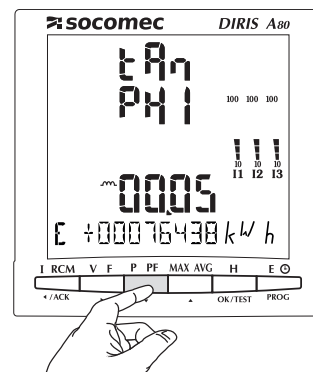
x 7

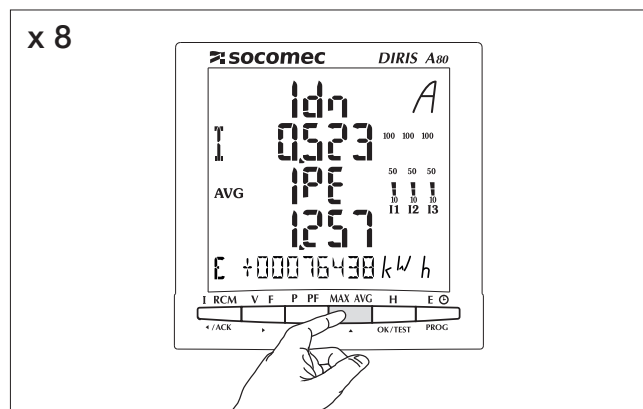
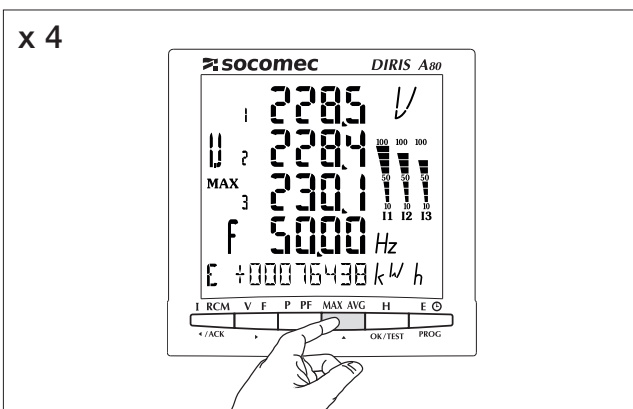
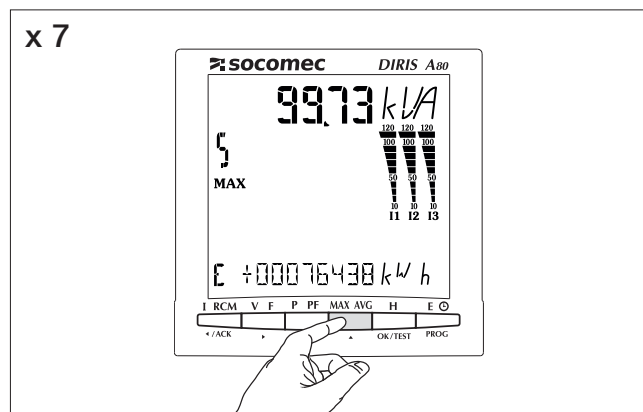
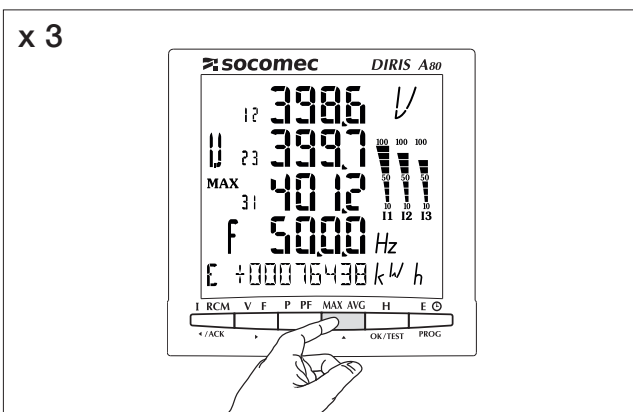
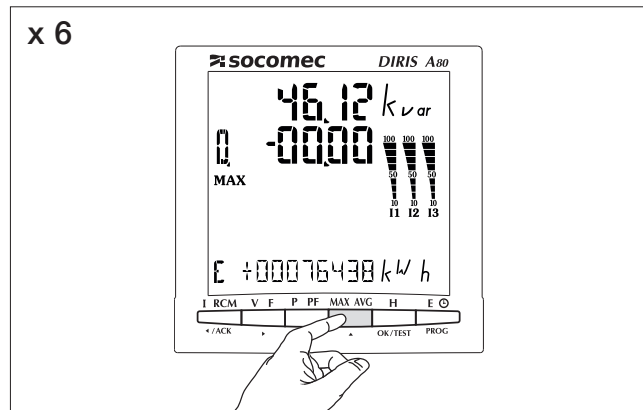
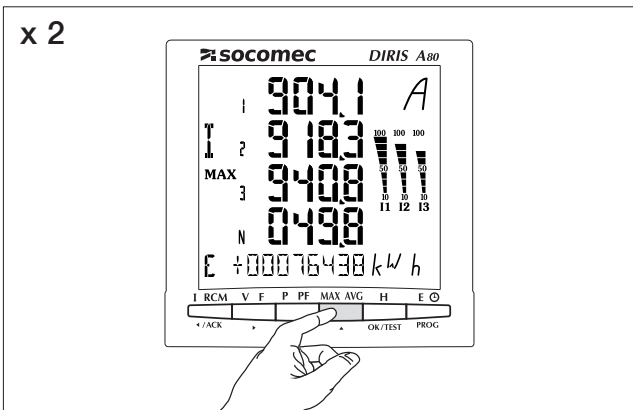
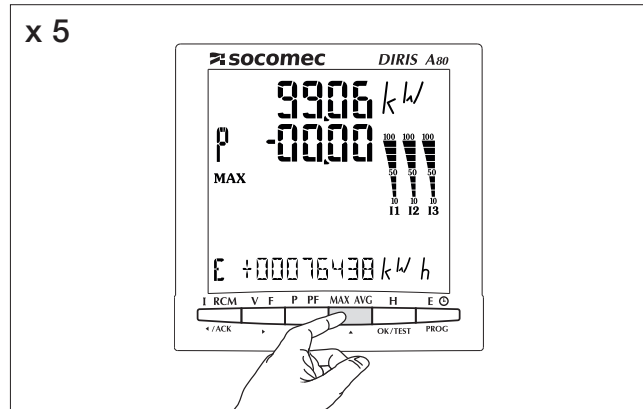
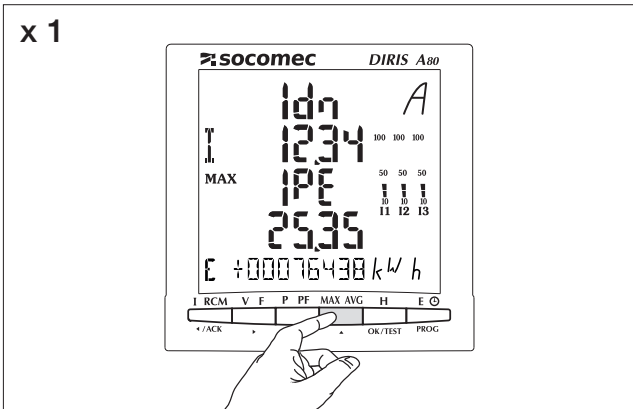


x 4



x 8

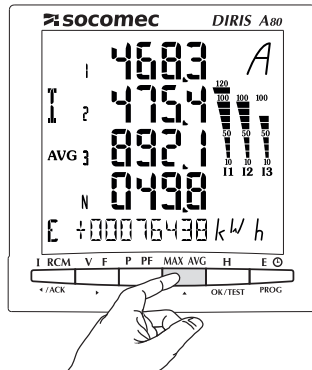




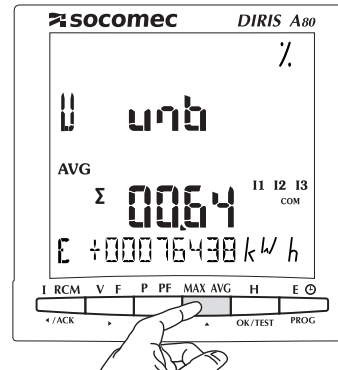
# DIRIS A80

## OPERATION

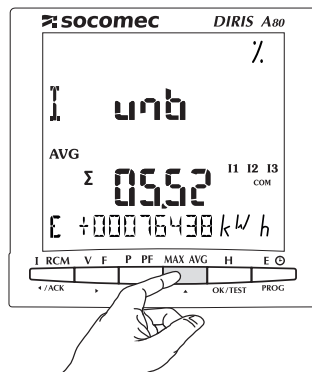
x 9



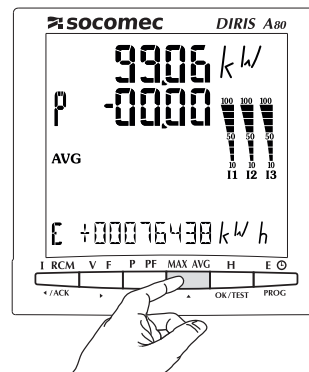
x 13



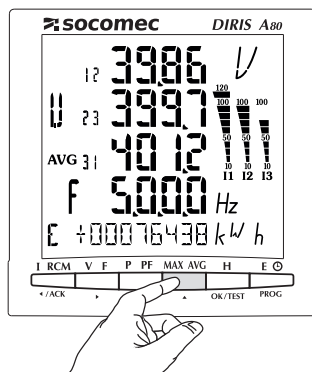
x 10



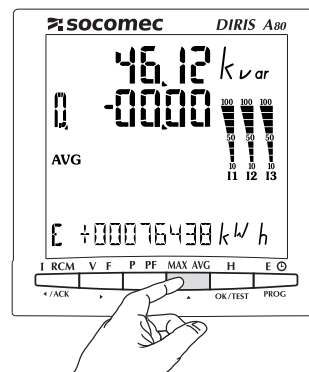
x 14



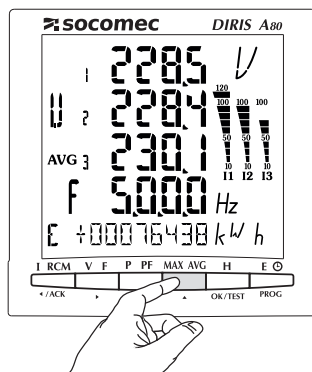
x 11



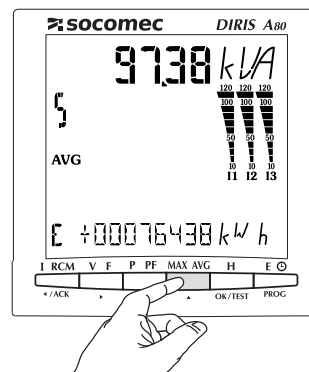
x 15

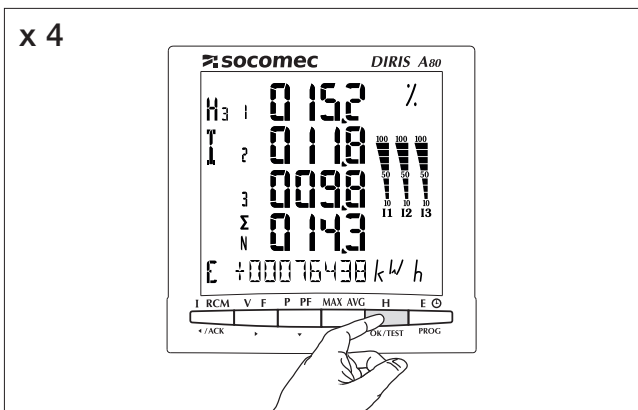
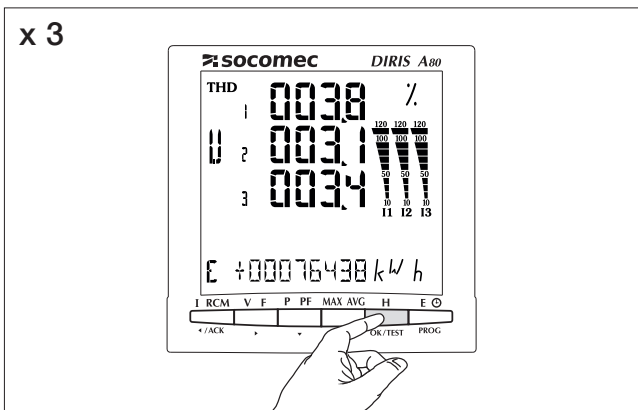
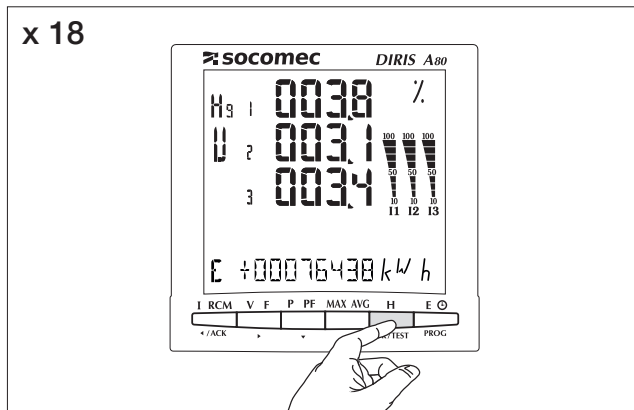
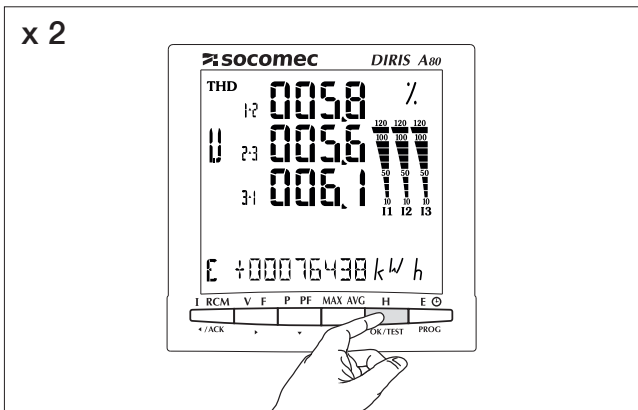
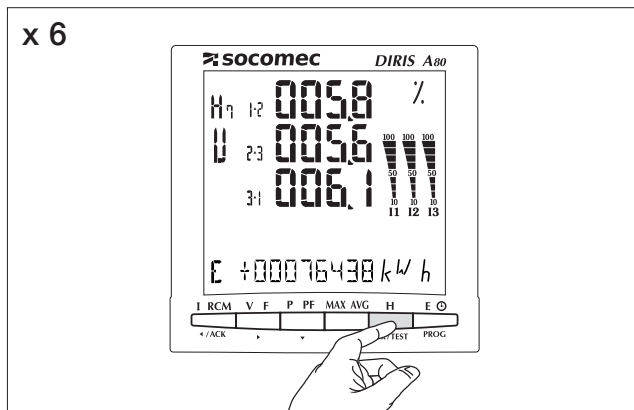
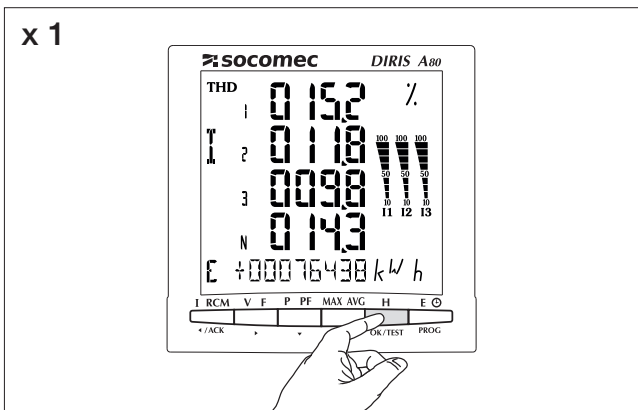


x 12



x 16

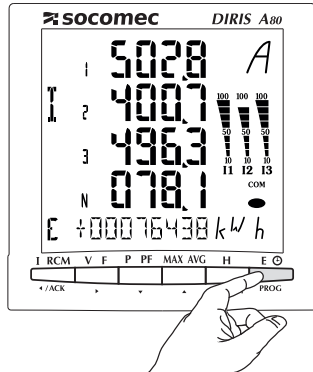




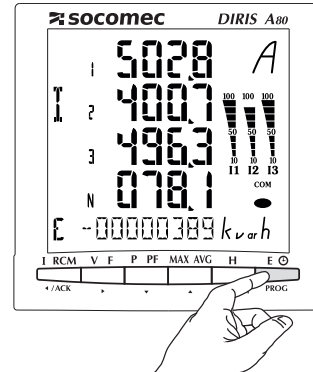
# DIRIS A80

## OPERATION

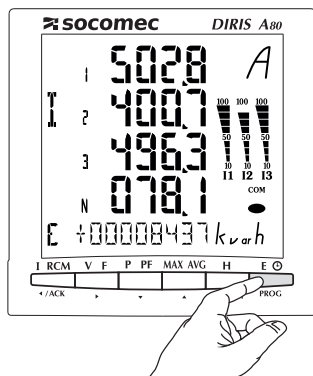
x 1



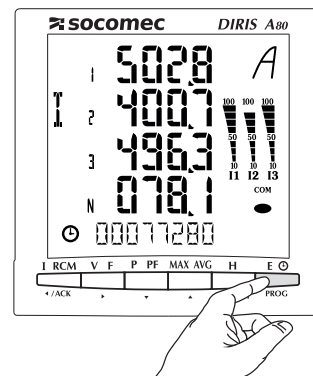
x 5



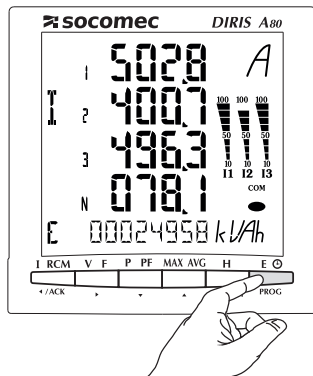
x 2



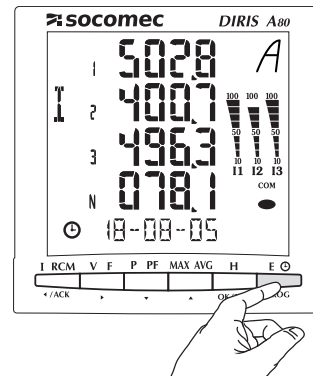
x 6



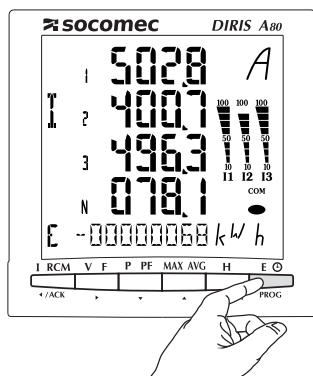
x 3



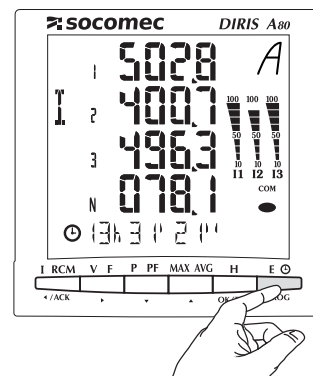
x 7



x 4



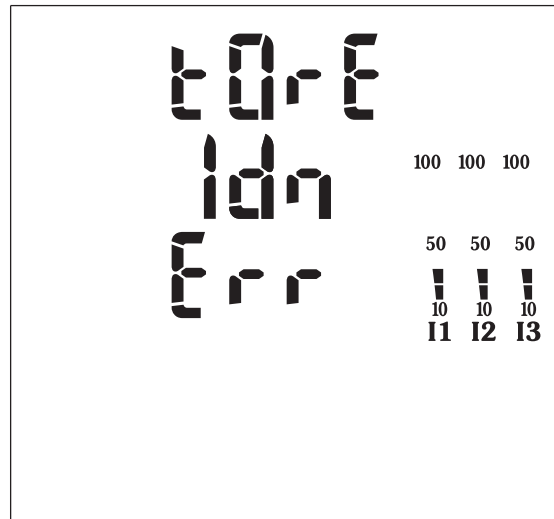
x 8



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### I<sub>Δn</sub> AND I<sub>PE</sub> CURRENT TRANSFORMER DETECTION

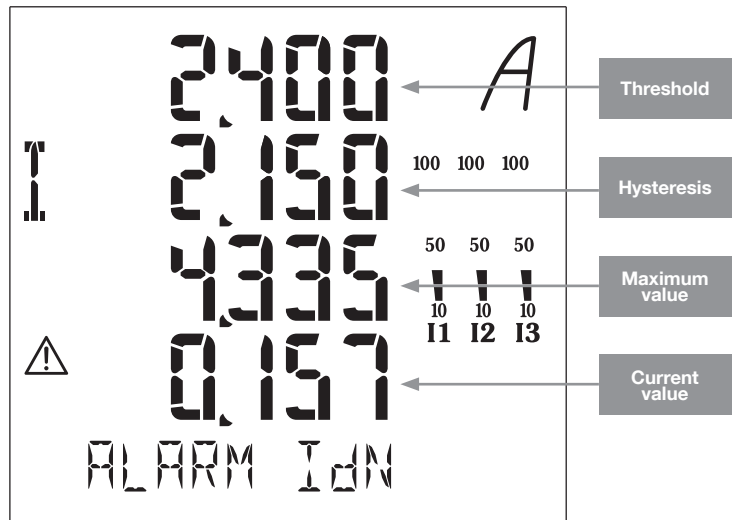
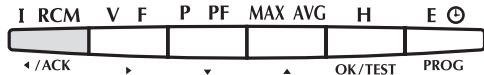
A special screen will be displayed to inform the user if a current transformer is not connected or in default. This screen can be removed by pressing any key.



**Example:** Current transformer issue on I<sub>Δn</sub> input

### ALARM ON IΔN

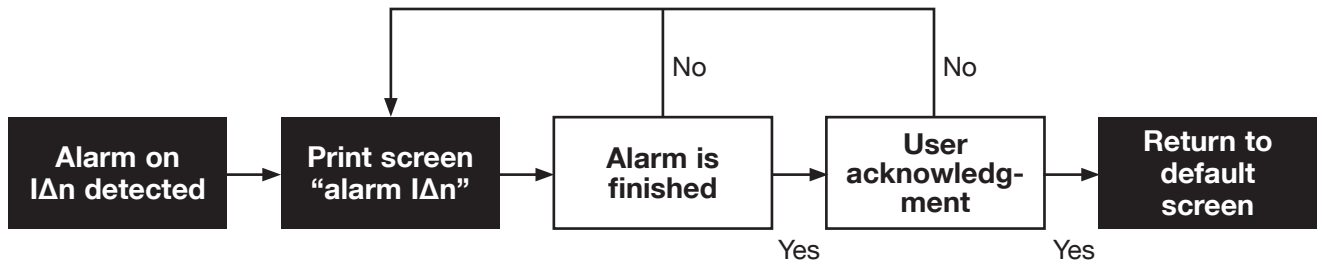
This screen appears when an alarm on IΔn is activated. It has the highest priority.



If the alarm auto acknowledgment is off (type "AUTO" see Alarm acknowledgment settings for more details), this screen stays on while the alarm is active or the user has not validated it.

For alarm acknowledgment, the user presses the "ACK" key (3 sec.).

When the alarm is acknowledged, the product returns to its default screen.





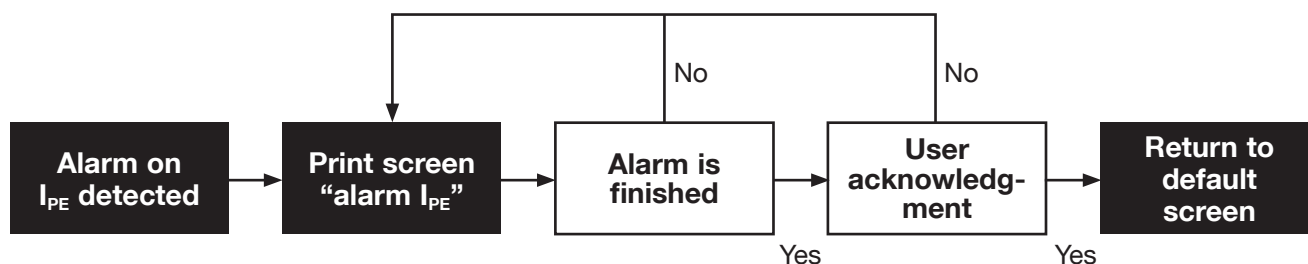
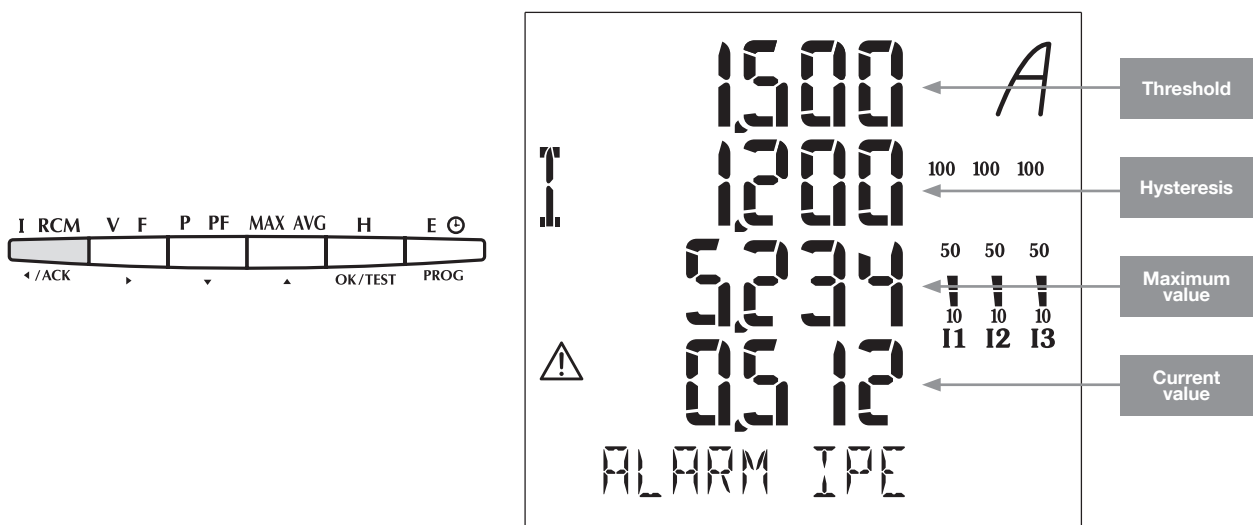
Alarm on I<sub>PE</sub>

This screen appears when an alarm on I<sub>PE</sub> is activated. It has a higher priority than normal menu, but lower priority than IΔn alarm screen.

If the alarm auto acknowledgment is off (type "AUTO" see Alarm acknowledgment settings for more details), this screen stays on while the alarm is active or the user has not validated it.

For alarm acknowledgment, the user presses the "ACK" key (3 sec.).

When the alarm is acknowledged, the product returns to its default screen.



## TEST FUNCTIONS

During the test, the DIRIS must have current (minimum 20% of nominal load) and voltage for each of the phases.

In addition to this, the function recognises the PF of the installation as being between  $0.6 < PF < 1$ . If the PF of the installation is not within this range, this function cannot be used.

In 4NBL, the connection as a whole is controlled.

Do check that these are the right conditions:

Err 0 = no error

Err 1 = CT phase 1 inverted

Err 2 = CT phase 2 inverted

Err 3 = CT phase 3 inverted

Err 4 = V1 and V2 voltages inverted

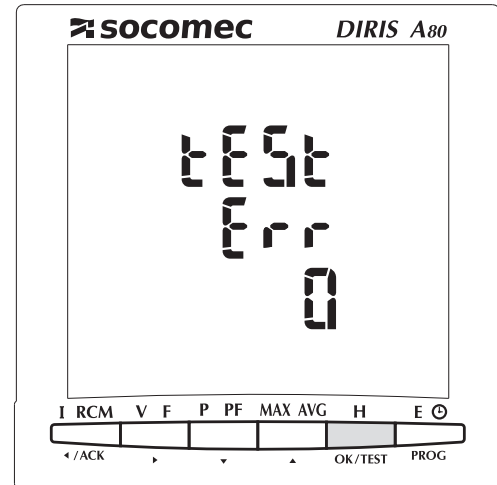
Err 5 = V2 and V3 voltages inverted

Err 6 = V3 and V1 voltages inverted

Err 7 = RCM fault

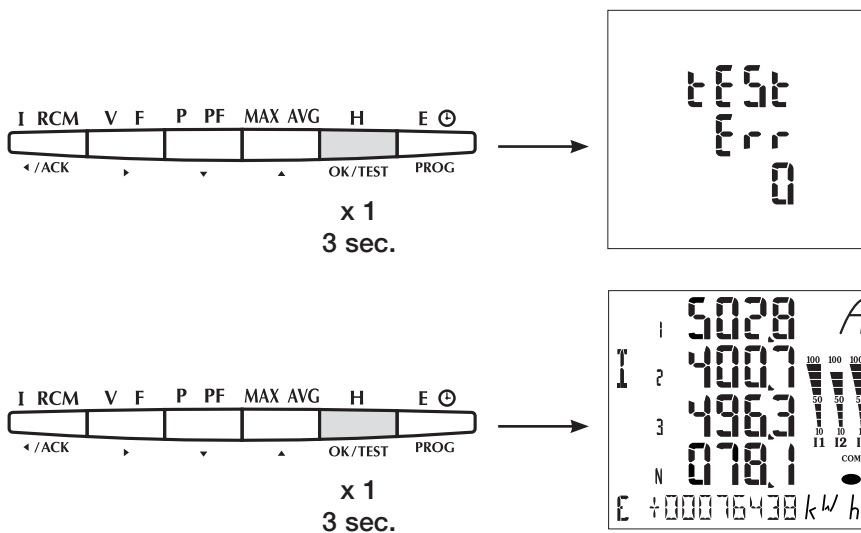
For the Err 1, Err 2 and Err 3, the modification can be performed automatically by the DIRIS or manually by correcting the current connections.

For the Err 4, Err 5 and Err 6 the modification must be performed manually by correcting the voltage connections.

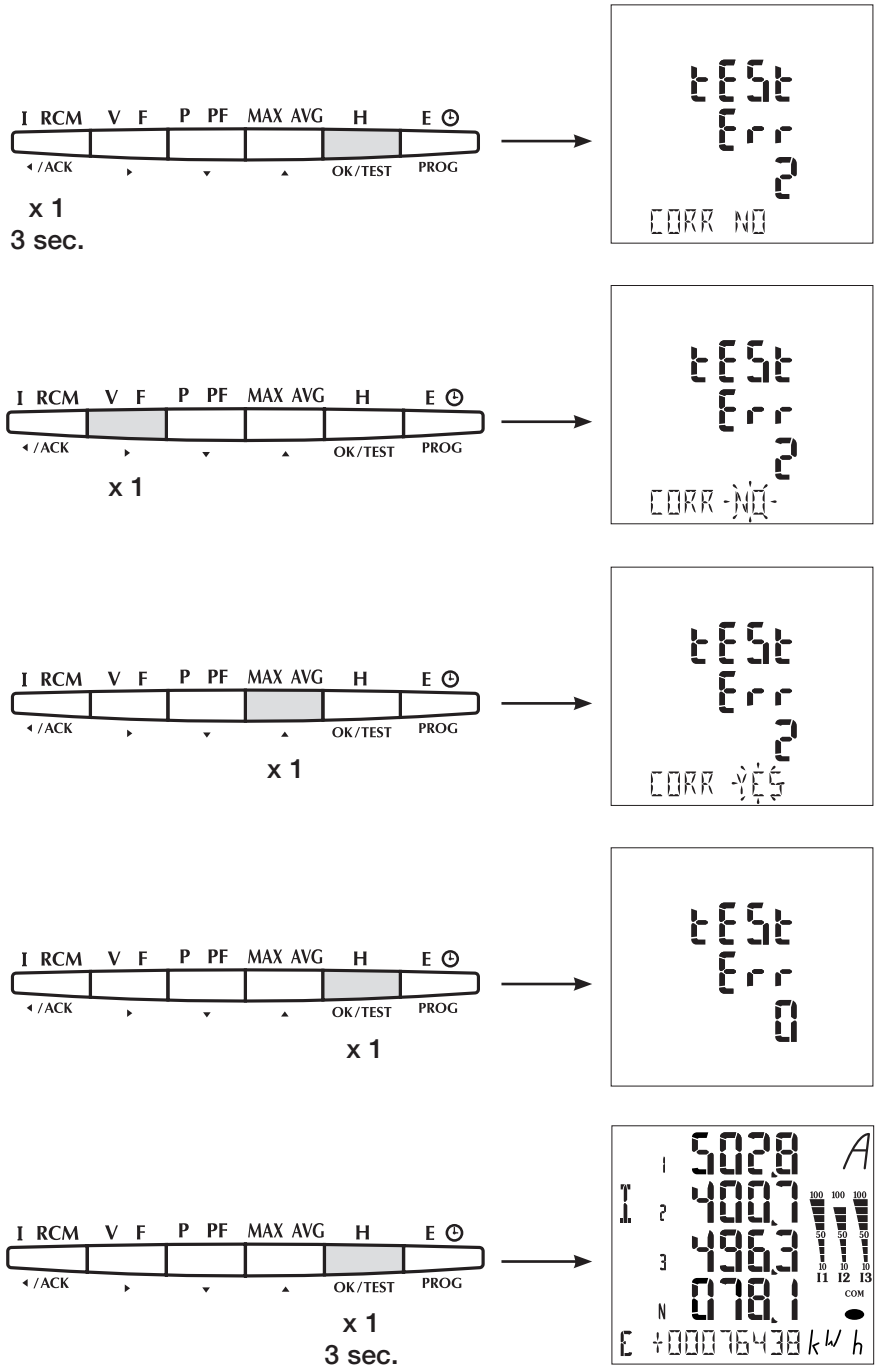


x 1  
3 sec.

Example: tESt Err 0



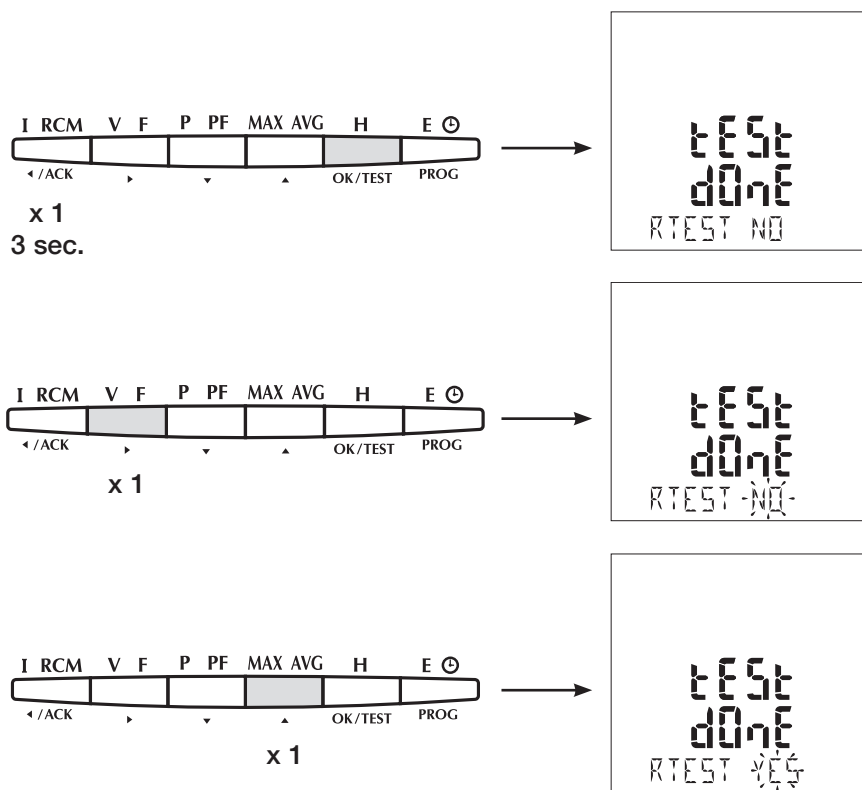
Example: tEst Err 2



> **Second test operation**

This menu is displayed if the product has already been tested. You can run a full test again as explained below.

This action will delete the previous software corrections.



- **Device Switched off**  
Check auxiliary supply
- **Backlight switched off**  
Check backlight configuration in set up menu  
(p. 24)
- **Voltage = 0**  
Verify the connections
- **Current = 0 or incorrect**  
Verify the connections  
Verify the configuration of CT's in set up
- **Powers, power-factor and energies false**  
Use the test connection function (p. 48)
- **Phases missing on display**  
Check the Network configuration (p. 9)

## TECHNICAL CHARACTERISTICS

<b>Case</b>	
Dimensions:	97 x 97 x 80 mm with all optional modules (DIN 43700)
Connection :	Current: fixed terminals from 0.2 to 4 mm <sup>2</sup> (stranded) from 0.2 to 6 mm <sup>2</sup> (solid) Voltage: disconnectable terminals from 0.2 to 2.5 mm <sup>2</sup>
IP index:	IP52 (front panel) and IP30 (case)
Weight:	560 g.
<b>DISPLAY</b>	
Type:	Backlit LCD display
<b>MEASUREMENTS</b>	
Three-phase and single-phase networks	
<b>Voltage (TRMS)</b>	
Direct measurement:	from 50 to 700 V AC (phase/phase) from 29 to 404 V AC (phase/neutral)
Measurement via PT:	• Primary: up to 500 kV • Secondary: 60, 100, 110, 115, 120, 173 and 190 V AC
Display and resolution	from 0 to 500.0 kV
Permanent overload between phases:	760 V AC
Update period:	1 s
<b>Current (TRMS)</b>	
Via CT with:	• Primary: up to 10000 A • Secondary: 1 or 5 A
Minimum measuring current	3 mA with U ( Ph/N ) > 29 V AC
Input consumption:	< 0.3 VA
Display:	from 0 to 11 kA (1.1 times the primary value)
Permanent overload:	10 A
Intermittent overload:	10 In / 1 s
Update period:	1 s
Maximum ratio kU x kI :	10 000 000
<b>Power</b>	
Total:	0 to 8000 MW/Mvar/MVA
Update period:	1 s
<b>Frequency</b>	
	from 45.0 to 65.0 Hz
Update period:	1 s
<b>Power supply IEC</b>	
110 to 400 V AC 50/60 Hz	± 10 %
120 to 350 V DC	± 20 %
Consumption:	< 10 VA
<b>Synchro input</b>	
Forward voltage max.	30 V DC
Forward voltage min.	10 V DC
Reverse voltage max.	30 V DC
Galvanic insulation	3 kV
Minimum pulse width	1s
Max number of operating cycles	10 <sup>8</sup>

According to IEC 61557-12 Edition 2 (07/2008)			
<b>PMD characteristics</b>			
Type of specification	Examples of possible specification values	Other additional characteristics	
Supply quality evaluation function (optional)	-	-	
PMD classification	SD	-	
Temperature	K55	operating: -10 °C to +55 °C storage: -25 °C to +85 °C	
Humidity + Altitude	-	-	
Operating performance class for active power or active energy	0,5	-	
<b>Characteristics of the functions</b>			
Symbol of the functions	Measurement range	Operational performance category according to IEC 61557-12	Other additional characteristics
P	1 % to 120 % In	0,5	-
Qa	1 % to 120 % In	0,5	-
Sv	1 % to 120 % In	1	-
Ea	0 to 99999999 kWh	0,5	-
Era	0 to 99999999 kVarh	2	-
Eapv	0 to 99999999 kVAh	1	-
f	45 to 65 Hz	0,1	-
I	5 % to 120 % In	0,2	-
In, Inc	5 % to 120 % In	0,5	-
U	50 to 600V AC ph/ph	0,2	30 to 350 V AC ph/n
PFv	0.5 ind to 0.8 cap	0,5	-
Pst, Plt	Unavailable function on A80		
Udip	5 to 100 % Un	0,5	-
Uswl	100 to 120 % Un	0,5	-
Utr	Unavailable function on A80		
Uint	0 to 5 % Un	0,5	-
Unba	Unavailable function on A80		
Unb	0,5		
Uh	Fn = 50 Hz - rank 1 to 63	1	-
THDu	Fn = 60 Hz - rank 1 to 63	1	-
THD-Ru	Unavailable function on A80		
Ih	Fn = 50 Hz - rank 1 to 63	1	-
THDi	Fn = 60 Hz - rank 1 to 63	1	-
THD_Ri	Unavailable function on A80		
Msv	Unavailable function on A80		



Characteristics of the "evaluation functions of the quality of supply"			
Symbol of the functions	Measurement range	Operational performance category according to IEC 61557-12	Other additional characteristics
f	45 to 65 Hz	0,1	-
I	5 % to 120 % In	0,2	-
In, Inc	5 % to 120 % In	0,5	-
U	50 to 600 VAC ph/ph	0,2	30 to 350 V AC ph/n
Pst, Plt	Unavailable function on A80		
Udip	5 to 100 % Un	0,5	-
Uswl	100 to 120 % Un	0,5	-
Uint	10 to 5 % Un	0,5	-
Unba	Unavailable function on A80		
Unb	Unavailable function on A80		
Uh	Fn = 50 Hz - rank 1 to 41 Fn = 60 Hz - rank 1 to 35	1	-
Ih	Fn = 50 Hz - rank 1 to 55 Fn = 60 Hz - rank 1 to 51	1	-
Msv	Unavailable function on A80		

## RCM CHARACTERISTICS ACCORDING TO IEC 62020

### MEASUREMENTS

Inputs number:	1x I $\Delta$ n and 1x I <sub>PE</sub>
Differential current transformer:	1:600 SOCOMEC $\Delta$ IC range
I $\Delta$ n / I <sub>PE</sub> current:	6 mA ... 30 A (Type A)
Accuracy:	1 %

### ALARM ON I $\Delta$ n AND I<sub>PE</sub>

I $\Delta$ n / I <sub>PE</sub> threshold:	Automatic adjustment according to load current
Alarm delay:	0 to 10 s
Curves:	Memorization up to 60 short curves 1.2 s (10 ms resolution) and 8 long curves 12 min., 1 hour or 10 hours (200 ms, 1 s or 10 s resolution) with I $\Delta$ n and I <sub>PE</sub> values. Synchronization possible with 10 event cruves I1, I2, I3, In, V1, V2, V3, U12, U23, U31
Number of alarms:	1000 max

### MONITORING

Significant variations:	Memorization
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### INPUT: OPTOCOUPLER

Number:	1 (according to reference)
Power supply:	5 to 30 VDC
Minimum signal width:	10 ms
Minimum length between 2 impulses:	20 ms
Type:	optocoupler

### OUTPUT CONTACT

Number:	1 or 2 (according to reference)
Type of contact:	Relay 230 VAC - 1 A

### CONNECTION

I $\Delta$ n / I <sub>PE</sub> differential current transformer:	Disconnectable terminals 0.14 to 1.5 mm <sup>2</sup>
Input / Output:	Disconnectable terminals 0.2 to 2.5 mm <sup>2</sup>

# DIRIS A80

## TECHNICAL CHARACTERISTICS

### CE MARKING

**DIRIS A80** COMPLIES WITH THE EUROPEAN GUIDELINES FOR:

- ELECTROMAGNETIC COMPATIBILITY NO. 2004/108/CE DATED 15 DECEMBER 2004.
- LOW VOLTAGE NO. 2006/95/CE DATED 12 DECEMBER 2006.

### CLIMATE

OPERATING-TEMPERATURE RANGE:	IEC 60068-2-1/IEC 60068-2-2 -10 °C to +55 °C
STORAGE TEMPERATURE RANGE:	IEC 60068-2-1/IEC 60068-2-2 -25 °C to +85 °C
HUMIDITY:	IEC 60068-2-30 - 95 % HR

### Mechanical characteristics

Vibration from 10 AND 100 HZ :	IEC 60068-2-6 - 2 G
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### Insulation

ELECTRIC SECURITY:	IEC 61010-1
INSTALLATION CATEGORY:	III (300 VAC PH/N)
DEGREE OF POLLUTION:	2


### REFERENCES

<b>DIRIS A80</b> WITH 2 OUTPUTS	4825 0213
<b>DIRIS A80</b> WITH 1 INPUT AND 1 OUTPUT	4825 0214

## GLOSSARY OF ABBREVIATIONS

1BL	Single-phase network, 2 wires with 1 CT
2BL	Two-phase network, 2 wires with 1 CT
3BL	Balanced three-phase network, 3 wires with 1 CT
3NBL	Unbalanced three-phase network, 3 wires with 2 or 3 CT's
4BL	Balanced three-phase network, 4 wires with 1 CT
4NBL	Unbalanced three-phase network, 4 wires with 3 or 4 CT's
ACK	Acknowledgment of $I_{\Delta n}$ / $I_{PE}$ alarm
AUX	Auxiliary supply
AVG	Average value
bACLt	LCD start-up (U or I or Aux. Condition)
Ct	Current transformers
Ct In	Neutral current transformer
dAtA	Event storing
dAtE	Days / months / years
DLY / DELAY	Temporisation
EA-	Negative active power (-kWh)
EA+	Positive active power (+kWh)
ER-	Negative reactive power (-kvarh)
ER+	Positive reactive power (+kvarh)
ES	Apparent power (-kVAh)
EXT	External
HySt	Hysteresis
HOUr	Hour run meter
HOUr	Hour meter start-up (U or I or Aux. condition)
IDN / $I_{\Delta n}$	Residual current ( $I_1+I_2+I_3+I_n$ )
INT	Internal
$I_{PE}$	Earth current
LD	Load
MAX	Maximum mean values
MAX P-	Active power maximum negative mean value
MAX P+	Active power maximum positive mean value
MAX Q-	Reactive power maximum negative mean value
MAX Q+	Reactive power maximum positive mean value
MAX S	Effective power maximum mean value
MOdE PrE-POSt	Ratio locating the event on the record curves
nEt	Network type
NO	No
P+	Positive power consumption demand
P-	Active power consumption demand
PF	Power factor
Q+	Positive reactive power consumption demand
Q-	Negative reactive power consumption demand
RCM	Residual current monitoring
rSET	Reset
SAG	Voltage dip
SErI	Serial number
SOft	Software version
SWELL	Overvoltage
tAn PHI	PHI tangent
TH	Threshold
THD I	Current harmonic distortion rate
THD In	Neutral current distortion rate
THD U	Phase-to-phase voltage distortion rate
THD V	Phase-to-neutral voltage distortion rate
tIME	Hours / minutes / seconds
tIME	Synchronisation period
tIME 4I	Integration times for mean and maximum current values
tIME F	Integration times for mean and maximum frequency values
tIME P/Q/S	Integration times for mean and maximum power values
tIME U	Integration times for mean and maximum voltage values
TOP	Synchronizing pulses
unb	Unbalance
Ut	Voltage transformer

## GLOSSARY OF ABBREVIATIONS

U nOM	Nominal voltage
Ut PR	Voltage transformer primary
Ut SE	Voltage transformer secondary
YES	Yes
	Hour run meter

# DIRIS A80

## NOTES

IΔn	LD: Load	TH: Threshold	I <sub>PE</sub>	LD: Load	TH: Threshold
Pt1: point 1	A	A	Pt1: point 1	A	A
Pt2: point 2	A	A	Pt2: point 2	A	A
Pt3: point 3	A	A	Pt3: point 3	A	A
Pt4: point 4	A	A	Pt4: point 4	A	A
Pt5: point 5	A	A	Pt5: point 5	A	A
Pt6: point 6	A	A	Pt6: point 6	A	A
Hyst: Hysteresis		%	Hyst: Hysteresis		%
Dly : Delay		s	Dly : Delay		s

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