CHAUVIN ARNOUX ENERGY

ULYS MCM

Multi-channel power meter

You have just acquired the **ULYS MCM**, a three-phase digital power meter, and we thank you for your confidence. To get the best service from your device:

- **Read** this user manual carefully before installing and using the device;
- **Observe** the precautions for use.

	The operator must refer to this manual whenever this danger symbol appears.		Application or withdrawal not authorized on conductors carrying dangerous voltages. Type B current sensor as per IEC 61010 2 032.
	The appliance is fully protected by double or reinforced insulation.		Alternating current: single-phase alternating current circuit.
	The rubbish bin with a line through it indicates that, in the European Union, the product at end of life must be disposed of by collection in accordance with the WEEE directive 2012/19/EC: this equipment must not be treated as household waste.		The CE marking indicates compliance with the requirements (directives and regulations) of the European Union relating to "LVD", "EMC", "RoHS" and "WEEE".

	WARNING This symbol/wording alerts that ignoring an instruction or incorrect action may cause death or serious injury.		CAUTION This symbol/wording alerts that ignoring an instruction or incorrect action may cause minor injury or damage to the product.

1 PRECAUTIONS FOR USE

This device complies with the safety standard IEC 61010-2-030, for voltages up to 300 V in overvoltage category II and for voltages up to 600 V in measurement category III. The current sensors comply with IEC 61010-2-032, for voltages up to 1000 V in measurement category III.

Failure to observe the safety instructions may result in electric shock, fire, explosion, destruction of the appliance and installations.

- The operator and/or the responsible authority must read carefully and have a good understanding of the various precautions for use. A good knowledge and full awareness of the risks of electrical hazards is essential for any use of this equipment.
- If you use this instrument in a way that is not specified, the protection it provides may be compromised, thus putting you at risk.
- Before each use, check that the insulations of the housings, the toroid of the current sensors and accessories are in good condition. Any item with damaged insulation (even partially) must be consigned for repair or disposal.
- Do not use the device on networks with voltages or overvoltage and/or measurement categories higher than those mentioned.
- Do not use the unit if it appears damaged, incomplete or improperly closed.
- Always use individual safety protections.
- Do not keep your hands near the terminals of the unit.
- The unit does not allow you to check that there is no voltage on a network. To do this, use a suitable tool (a VAT) before carrying out any work on the installation.
- Respect the environmental conditions.
- The current sensors are specifically designed to work in conjunction with this device.
- Do not modify the unit. Any troubleshooting or metrological verification procedure must be carried out by competent and approved personnel.

WARNING

Incorrect handling of voltages during installation and operation of the product may result in serious injury or death.

- When the unit is powered on, dangerous voltages are accessible at the voltage measurement input terminal block, the digital input/output terminal block and the auxiliary power supply terminal block.
- When installing and maintaining the product, be sure to follow the safety instructions in the Quick Start Guide and User's Manual. Keep technical specifications and electrical regulations handy.
- Be careful not to touch the terminals and cable shields after wiring is completed.

CAUTION

Measurement category IV is reserved for measurements taken at the source of the building's low-voltage network installation.

Measurement category III is reserved for measurements carried out on parts of the building's low-voltage network installation.

Measurement category II is reserved for measurements carried out on circuits connected directly to the points of use of the low-voltage network.

CLEANING

CAUTION

Disconnect all connections to the unit.

Wipe with a soft, clean and dry cloth. Do not use alcohol, solvents or hydrocarbons.

For current sensors:

- Make sure that no foreign objects interfere with the operation of the sensor's latching device.
- Keep the air gaps of the current sensors perfectly clean.

The safety of any system incorporating the device is the responsibility of the system assembler.

CONTENTS

2 EQUIPMENT DESCRIPTION

2.1 GENERAL PRESENTATION

2.1.1 UNPACKING

Designation	*Quantity*
ULYS MCM	1
Screw terminal block (mounted on the device)	3
8 GB Micro SD card (in the unit)	1
Temperature sensor	1
Quick Start Guide	1

2.1.2 ACCESSORIES

Our opening current sensors:

Flexible opening current sensors (Rogowski coil) and opening current transformers make it possible to measure the current flowing in a cable without having to open the circuit. They also allow the user to be isolated from dangerous voltages in the circuit.

You must use current transformers that are approved and/or compatible for ULYS MCM and conforming to IEC standards.

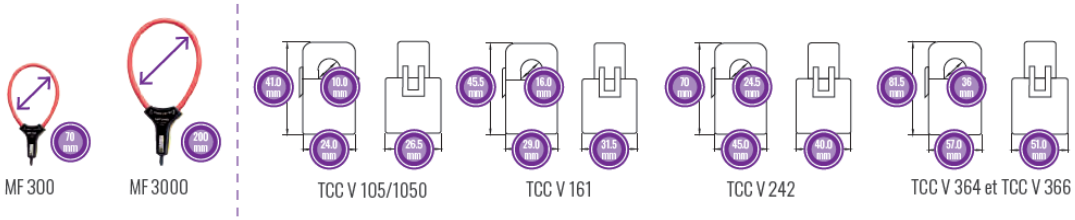
In order to help you choose the product references, you will need to answer the following questions:

- Which sensors to choose according to the feeder?

Reference	*Designation (supplied in packs of 3)*	*Ratio (or primary current)*	*Clamping diameter*
P01379631	MF300	600 A	70 mm
P01379633	MF3000	3 000 A	200 mm
P01379626	TCC V 1050	50 A / 333 mV	10 mm
P01379616	TCC V 105	5 A / 333 mV	10 mm
P01379619	TCC V 161	100 A / 333 mV	16 mm
P01379620	TCC V 242	250 A / 333 mV	24 mm
P01379622	TCC V 364	400 A / 333 mV	36 mm
P01379624	TCC V 366	600 A / 333 mV	36 mm

Our opening MiniFlex sensors (Rogowski coil)

Our opening Current Transformers



- What is the cable distance between your ULYS MCM and your sensors according to the feeder?

Reference	*Designation*	*Length*
P01379641	RJ12M-RJ12M M	≤ 3 metres
P01379642	RJ12M-RJ12M L	≤ 9 metres

- Do you need to equip your ULYS MCM with a remote screen?

Reference	*Designation*	*Description*
P01331065	ULYS MCM D	Screen
P01379640	RJ45M-RJ45M M	Connecting cable*

**Cable required to connect the display*

2.1.3 INTRODUCTION

Installed inside an electrical cabinet or panel, the ULYS MCM allows you to measure and monitor several electrical loads within your production lines or the equipment in your installations for detailed analysis and diagnosis of your energy consumption. ULYS MCM is a valuable tool for improving processes in electrical installations and making energy savings. All information about the power supply is transmitted to the host via Ethernet and/or serial communication (RS-485). Electrical measurements can be performed on up to 54 single-phase power supplies or 18 feeders for 3-phase 3- or 4-wire circuits or for single-phase circuits. Thanks to this flexibility of settings, the ULYS MCM offers you an efficient system for monitoring and recording data from electrical networks in various environments such as factories, data centres, office buildings or shopping centres. It also allows you to carry out energy analyses and power consumption checks on lighting and HVAC systems in order to achieve real energy savings, but also to detect possible failures to allow for proactive maintenance interventions.

2.1.4 GENERAL CHARACTERISTICS

The main characteristics of the ULYS MCM are:

- Measurement and monitoring of several electrical loads.
- Electrical measurement on up to 54 single-phase power supplies or 18 3P4F feeders - Flexibility of settings for all feeders.
- Measured electrical values: V, U, I, F, PF, Voltage and current unbalances, Power (P,Q,S) and Energies (Ea, Er, Eap).
- Accuracy class 1.0/0.5 for electrical measurements according to IEC 62053-21 / IEC 62053-22.
- Compatibility with current sensors: flexible opening sensors (Rogowski coil) and 1/3 V opening current transformers.
- Triggering of the digital output (DO) on the alarms: voltage sag / swell / overcurrent / temperature / average power.
- Temperature measurement: 1analog input terminal (NTC or 4-20 mA).
- Supports RS232 / RS485 (Modbus RTU) and Ethernet (Modbus TCP) serial communications.

2.1.5 TECHNICAL SPECIFICATIONS

Designation		***Specification***
Electrical system		1P2F, 3P3F, 3P4F
Nominal input specifications	Voltage (Umin - Umax)	43-690 V~ between phases
	Voltage (Vmin - Vmax)	25-400 V~ between phase and neutral
	Measurement category	600 V Cat III
	Frequency	45-65 Hz
	Current	0-333 mV (max 0.5 V p-p) | Impedance: 20 kΩ
	TOR (DI)	1-point,80-250 V~, external power supply
	NTC temperature	25°C, 10 kΩ, (β(25/85) = 3,970°k)
Auxiliary power supply	Voltage	100-240 V~
	Frequency	50-60 Hz
	Max. voltage (L-N)	Short-term: 1,440 V~ - Long-term: 490 V~
	Consumption	0.05-0.08 A
	Overvoltage category	300 V Cat II
Communication		Modbus RS485 Modbus TCP RS232
Digital output contact (DO)		1 NO (normally open) SPST (unipolar and unidirectional)

2.1.6 NORMATIVE CHARACTERISTICS

The table below details the normative conformity of the product to the various safety and EMC standards in force:

Safety tests	
Protection against electrical hazards	IEC 61010-1: 2010 IEC 61010-2-030: 2010 IEC 61557-12: 2018
Immunity tests (EMC)	
Electrostatic discharges	IEC 61000-4-2: 2008
Shock waves	IEC 61000-4-5: 2014
Emission tests (EMC)	
Conducted emissions	CISPR 11: 2009/A1:2010
Radiated emissions	CISPR 11: 2009/A1: 2010

2.1.7 MEASUREMENT PERFORMANCE CHARACTERISTICS

The table below shows the accuracy class of the ULYS MCM's electrical measurements according to the sensors to which it can be connected:

Measurement	***Standard***	***ULYS MCM***	***ULYS MCM and MF300/MF3000***
Measurements of active power (P)	IEC 61557-12: 2018	0.5	1
Active Energy (Ea)	IEC 61557-12: 2018 IEC 62053-21: 2003 IEC 62053-22: 2003	0.5	1
Reactive power measurements (Q)	IEC 61557-12: 2018	1	2
Reactive energy (Er)	IEC 61557-12: 2018 IEC 62053-23: 2003	2	2
Measurements of apparent power (S) and apparent energy (Eap)	IEC 61557-12: 2018	1	2
Frequency measurements (f)	IEC 61557-12: 2018	0.1	0.1
RMS measurements of phase current (I)	IEC 61557-12: 2018	0.2	0.5
RMS voltage measurements (U/V)	IEC 61557-12: 2018	0.1	0.1
Power Factor (PF) measurements	IEC 61557-12: 2018	1	2

2.1.8 ELECTRICAL VALUES

The above table shows the measured electrical values and their resolution:

Designation	*Unit*	*Value*	*Remark*
Phase voltage	V	0.00 – 9,999,999.99	
Line voltage	V	0.00 – 9,999,999.99	
Line current	A	0.00 – 9,999,999.99	
Active power	W	±0 – 999,999,999	(1)
Reactive power	Var	±0 – 999,999,999	(2)
Apparent power	VA	0 – 999,999,999	(3)
Frequency	Hz	45.00 – 65.00	
Power factor	%	± 100.00	(7)
NTC temperature	°C	-20.0 – 100.00	
Voltage unbalance	%	0.0 – 100.00	Unbalance of a phase in voltage = $\frac{\lvert V_{phase} - V_{average} \rvert}{V_{average}} \times 100\%$
Current unbalance	%	0.0 – 100.00	Current unbalance of one phase = $\frac{\lvert I_{phase} - I_{average} \rvert}{I_{average}} \times 100\%$
Phase shift angle	°	0.0 – 360.00	Phase angle between current and current
Total Harmonic Distortion	%	0.0 – 100.00	(4) (5) (6) (8)
Active energy	KWh	0.0 – 99,999,999.9	
Reactive energy	KVarh	0.0 – 99,999,999.9	
Apparent energy	KVAh	0.0 – 99,999,999.9	

(1) $Total\ W = \sum Phase\ Watt$

(2) $Total\ Var = \sum Var\ phase$

(3) $Total\ VA = \sum Phase\ VA$

(4) $Total\ fundamental\ W = \sum Phase\ fundamental\ Watt$

(5) $Total\ fundamental\ Var = \sum Fundamental\ phase\ Var$

(6) $Total\ fundamental\ VA = \sqrt{Total\ fundamental\ W^2 + Total\ fundamental\ Var^2}$

(7) $Total\ PF = \frac{Total\ W}{Total\ VA} \times 100\ \%$

(8) $Total\ THD = \frac{\sqrt{Total\ VA^2 + Total\ fundamental\ VA^2}}{Total\ fundamental\ VA} \times 100\ \%$

2.2 MECHANICAL INSTALLATION

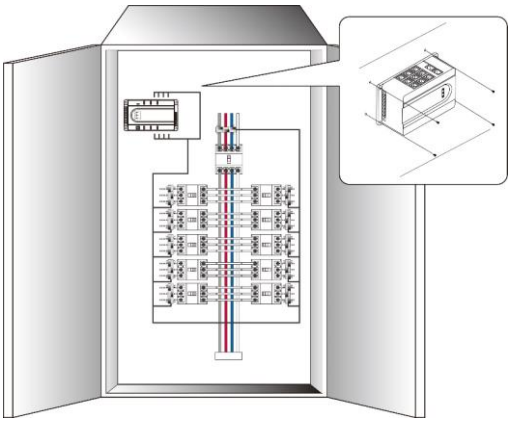
2.2.1 INSTALLATION CONDITIONS

Please avoid locations subject to direct interference, high temperatures or electromagnetic fields.

Check the environmental conditions indicated below to ensure that the ULYS MCM operates correctly.

Description	***Condition***
Temperature	-10°C to +55°C (nominal operating range) -25°C to +70°C (storage range)
Relative humidity	5-80% RH non-condensing
Altitude	≤ 2,000 m
Degree of pollution	2
Location	Interior

2.2.2 INSTALLATION PROCEDURE



DANGER

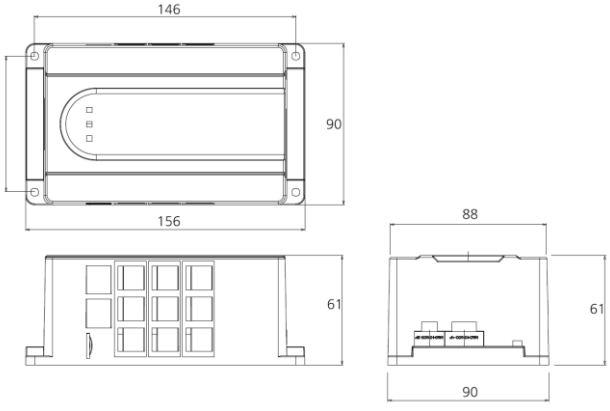
The ULYS MCM must be installed inside an electrical cabinet or switchboard to prevent access after installation. It has been designed for indoor use, so care must be taken not to expose it directly to the outside environment.

On receipt of the appliance, check that it has not been damaged in transit. If there is a problem, contact customer service for repair or replacement. (Do not connect the appliance).

The ULYS MCM is normally mounted in a vertical position.

Fix the ULYS MCM with 4 screws with a diameter of 4 mm.

The general dimensions of the product are shown below.



2.3 ELECTRICAL INSTALLATION

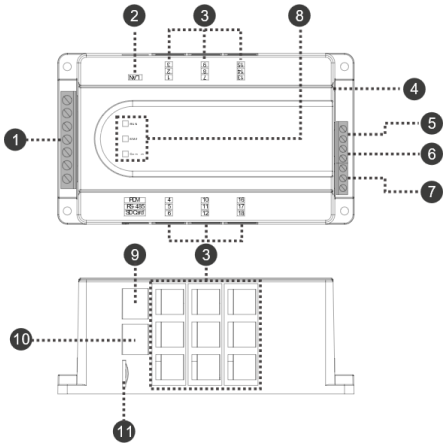
2.3.1 DUE DILIGENCE

Before installing the unit:

- Check that the electrical network is disconnected and secured in accordance with electrical safety regulations.
- Check that the operating voltage and the mains voltage are the same.

Wiring must be carried out in accordance with good engineering practice. Communication lines and digital/inputs/outputs must be separated from power supply lines. Depending on the installation, shielded cables must be used for low level signals, connecting the shield to the reference potential.

2.3.2 CONNECTION



#	***Designation***	***Description***	***Ref.***
1	Input voltage* *Volt Measurement*	Input voltage terminal for measurements	2.3.2.2
2	Ethernet port *LAN*	Communication with master (Modbus slave) Protocol: Modbus TCP/IP Speed: 10/100 Mbit/s	0
3	TC port 1 to 18	RJ12 connectors for connection to the current sensor	2.3.2.3
4	Temperature sensor *NTC*	NTC temperature sensor (measures the temperature by NTC at the port)	2.3.6
5	Discrete output* *DO (A/B)*	Discrete output terminal Rated specifications: 250 V~/5 A, 30 VDC/5A resistive	2.3.4.1
6	Discrete input* *DI (A/B)*	Discrete output terminal Rated specifications: 80-250 V~locking input voltage required	2.3.4.1
7	Auxiliary power supply* *POWER (N/L)*	Auxiliary power supply to ULYS MCM	2.3.2.1
8	Status LED *RUN / STAT / Comm*	RUN: normal operation STAT: normal counting Comm: normal communication (LED flashing in normal status)	2.3.3
9	RS232 port *PDM*	Communication with the computer or the remote display ULYS MCM D	2.3.5.3
10	RS485 port *RS-485*	RS485 port for connecting the computer or an external PLC	2.3.5.2
11	SD card slot	Do not disconnect the card: system use	

**The cross-section of the connecting cables must be 0.5 mm² to 2.5 mm² (minimum: AWG 26, maximum: AWG 12)*
The tightening torque is 0.4 Nm .

2.3.2.1 Auxiliary power supply to appliance

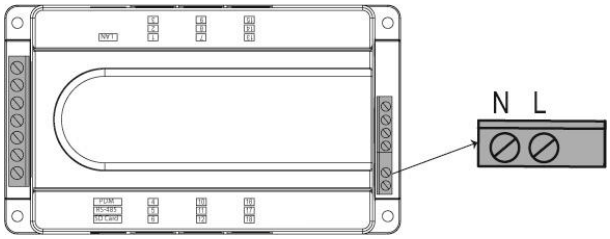
The ULYS MCM does not have a switch.

An isolating device (switch or circuit breaker) must be provided in the electrical installation. The appliance must not be positioned in such a way as to make it difficult to operate the isolating device.

The electrical installation must:

- ensure that the power supply inputs (auxiliary and digital inputs) are protected by fuses (one on phase and one on neutral) or a circuit breaker (2 A);
- ensure that the fuses, circuit breaker or switch are correctly positioned and easily accessible;
- provide for the marking of the fuses, circuit breaker or switch as a device for disconnecting the device.

The ULYS MCM can be supplied with an AC voltage from 100 to 240 V~, and the electrical connection must be made as shown below:



Pin no.	*Description*
L	Phase (AC)
N	Neutral (AC)

2.3.2.2 Voltage measurement input

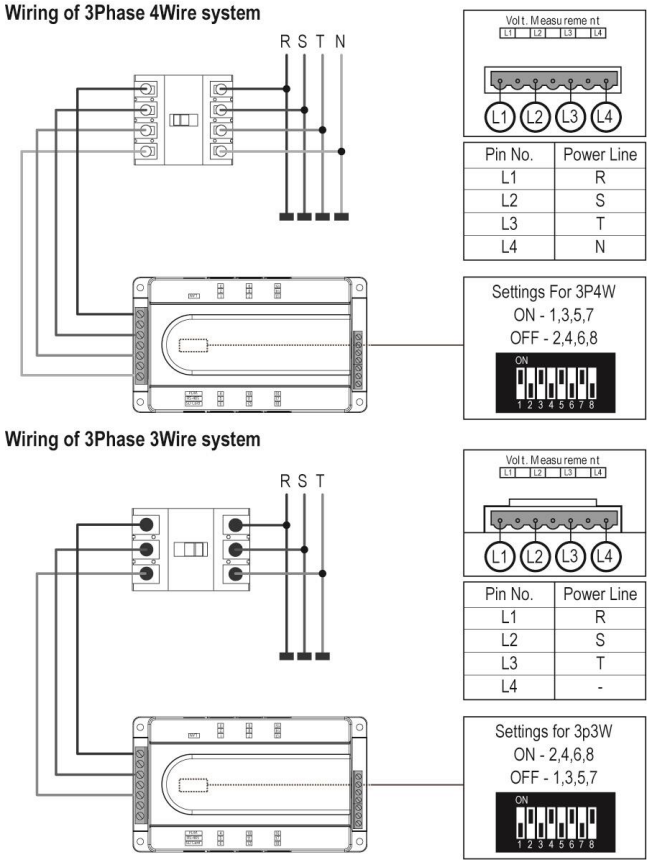
The electrical installation must ensure that the measuring inputs are protected by fuses or a circuit breaker.

Before switching on the measurement inputs, make sure that the voltage level to be connected is compatible with the electrical characteristics of the product mentioned in the Technical Specifications (see section 2.1.5).

To measure the voltage correctly, the voltage phasing must be observed.

The connection diagram 3P4F and 3P3F depends on the position of the switches on the back of the product.

Below you will find the main connection diagrams:



2.3.2.3 Current measurement inputs

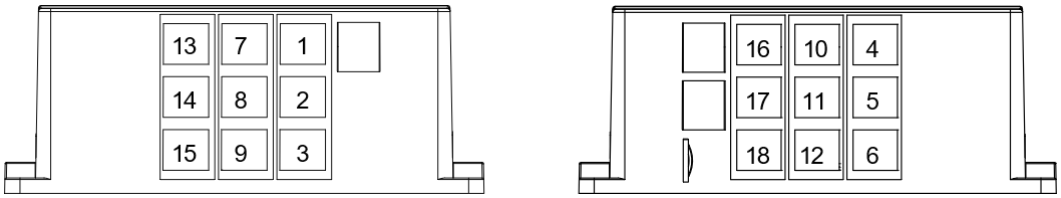
2.3.2.3.1 Precautions for use

The ULYS MCM can be connected to different types of current sensors (see section 0.2).

The ULYS MCM will have to be configured from the ULYS MCM D remote screen or from the Ulys MCM Utility software to select the type of sensor for each channel.

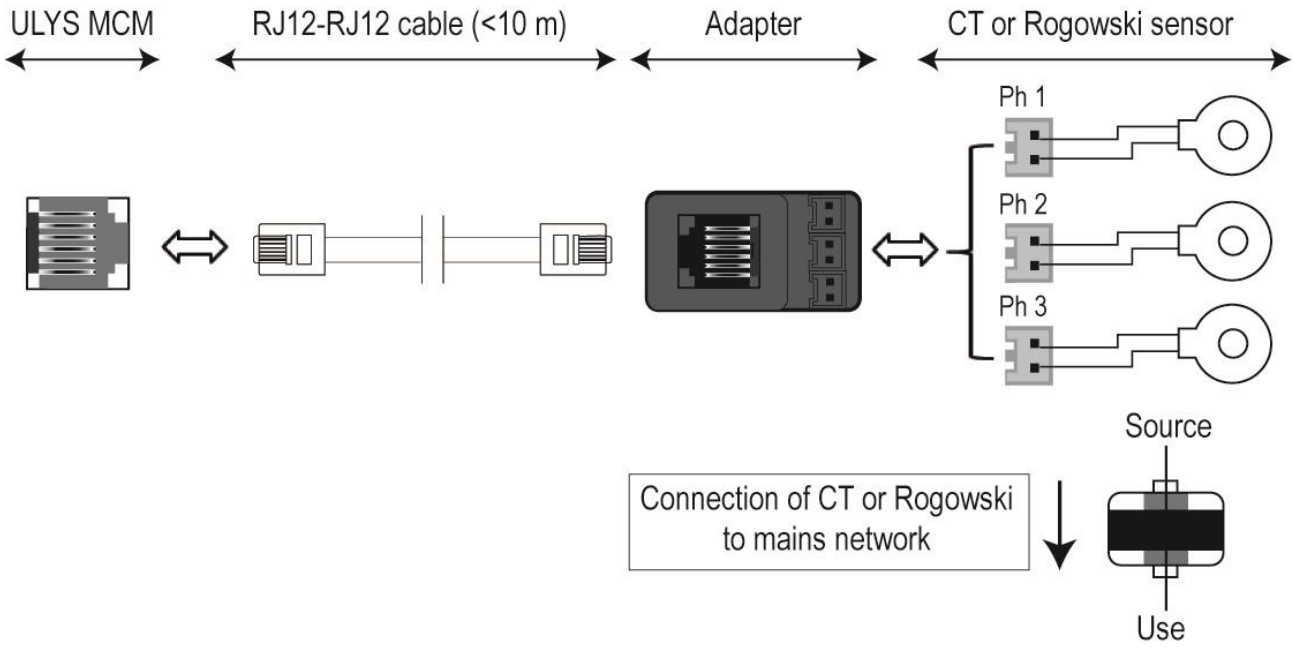
The ULYS MCM can accommodate up to54 single-phase electrical feeders (3 per channel), or up to18 three-phase electrical feeders (1 per channel). The current sensors must be of the same type for each outgoing feeder.

A channel is physically represented by an RJ12 connector as shown in the side views of the product below (example of the ULYS MCM 18 which has 18 physical ports (9 on each side):



The channel number is indicated on the top of the ULYS MCM (the measurement channels closest to the front panel start the numbering). For the ULYS MCM 9, channels 10 to 18 are blocked.

For the connection of current sensors measuring a three-phase electrical feeder, the following measuring chain is suggested:



RJ12 connection cables are offered by Chauvin Arnoux Energy in 3 m (ref. P01379641) and 9 m (ref. P01379642) versions. For special arrangements with a length of more than 10 metres, please consult us.

ULYS MCM compatible current sensors are directly delivered with connectors compatible with theRJ12 adapter).

The connectors are equipped with a coding system to avoid connection errors.

It is important to observe the following instructions to ensure consistent measurement by the product:

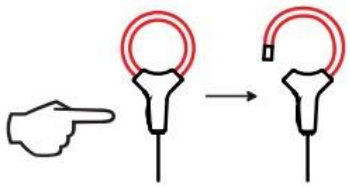
- In the case of a three-phase connection, it is important to respect the phase order in the installation of the current collectors in coherence with the phase order of the voltages previously wired (be sure to follow the numbering 1, 2 and 3 on the adapter).
- In the case of a single-phase connection, the phase must be connected to terminal number 1 on the adapter.
- The direction of installation of the current sensors around the conductors to be measured must be respected (follow the direction of the arrow on the product and the diagram above).

2.3.2.3.2 Current sensors for use with ULYS MCM

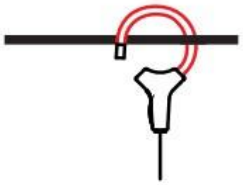
Openable flexible current sensors (Rogowski coil) type MF300 and MF3000:

USE

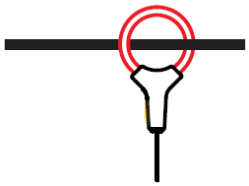
- Press the yellow opening device to open the flexible torus.



- Open it and place it around the conductor through which the current to be measured flows (only one conductor in the sensor).
- Make sure that the direction of the arrow engraved on the side of the flexible torus is pointing in the direction of the current flow in the cable.



- Close the torus. In order to optimise the quality of the measurement, the conductor should be centred in the torus and the torus should be as circular as possible.



GENERAL CHARACTERISTICS

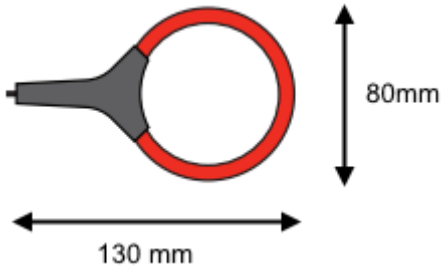
Measuring range	MF300: 2.4 A to 600 A MF3000: 2.4 A to 3,000 A
Max. clamping diameter	MF300: length = 250 mm; Ø = 70 mm MF3000: length = 700 mm; Ø = 200 mm
Output	39.1 µV/A
Accuracy (current measurement)	Class 0.5 according to IEC 61557-12 (complete ULYS MCM measuring chain and coils)
Output connections	Type HY-Y

ENVIRONMENTAL CONDITIONS

Temperature	-10°C to +55°C (nominal operating range) -40°C to +70°C (storage range)
Relative humidity	10% to 85% RH (nominal range of use) 10% to 90% RH (storage range)
Altitude	≤ 2,000 m
Degree of pollution	2

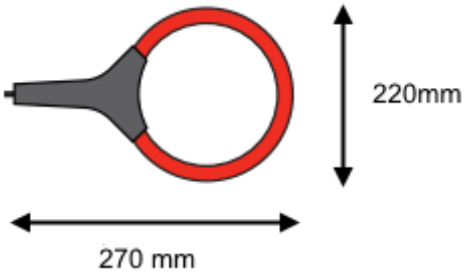
MECHANICAL CHARACTERISTICS

MF300



Height: 12 mm

MF3000



Height: 12 mm

Clamping diameter	MF300: length = 250 mm; Ø = 70 mm MF3000: length = 350 mm; Ø = 100 mm
Length of the connecting cable (between the output connector and the reel)	1;5 metre
Degree of protection provided by the envelopes	IP50 according to IEC 60529
Degree of protection against mechanical impact	IK04
Mass	MF300: 60 g approximately MF3000: 90 g approximately

ELECTRICAL SAFETY

Conformity to the standard	IEC 61010-2-032
Measurement category	1,000 V CAT III

ELECTROMAGNETIC COMPATIBILITY

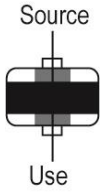
Conformity to the standard	IEC 61326-1 (Emission and immunity in industrial environments)

CT CLIP sensors type TCC V 105, TCC V 1050, TCC V 161, TCC V 242, TCC V 364, TCC V 366:

USE

- Unclip the opening device of the CT.
- Open it and place it around the conductor through which the current to be measured flows (only one conductor in the sensor).

- Close the CT primary, making sure that it is clipped in place. Make sure that the direction of the arrow on the side of the CT is pointing in the direction of the current flow in the cable.



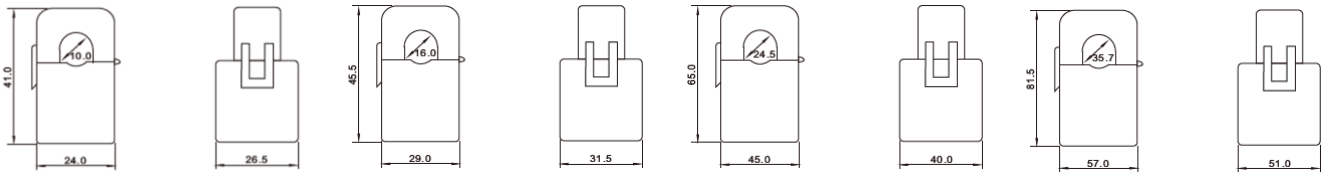
GENERAL CHARACTERISTICS

Rated current (In)	TCC V 105: 5 A TCC V 1050: 50 A TCC V 161: 100 A TCC V 242: 250 A TCC V 364: 400 A TCC V 366: 600 A
Clampingdiameter	TCC V 105 / 1050: 10 mm TCC V 161: 16 mm TCC V 242: 24 mm TCC V 364: 36 mm TCC V 366: 36 mm
Frequency	50-60 Hz
Output	333 mV
Accuracy (current measurement)	Class 0.5 from 100 to 120% of In according to IEC 61869-2 Class 1 from 20 to 120% of In
Output connections	Type HY-Y

ENVIRONMENTAL CONDITIONS

Operating temperature	-15°C to +60°C
Relative humidity	< 85%

MECHANICAL CHARACTERISTICS



TCC V 105 / 1050 TCC V 161 TCC V 242 TCC V 364, TCC V 366

ELECTRICAL SAFETY

Insulation voltage	600 V~
Measurement category	600 V CAT III

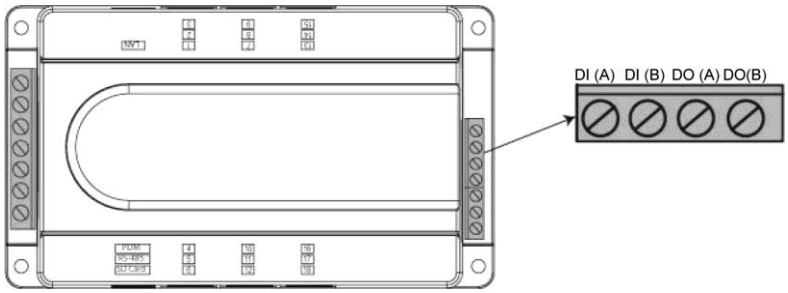
2.3.3 STATUS LEDS

The ULYS MCM is equipped with 3 indicator lights giving the following information concerning the correct operation of the device:

Status / ***LED***	RUN (left)	STAT (centre)	Comm. (right)
Connection to power supply	Lighted		
Digital communication with the product	Off	Off	Lighted
Energy metering	Off	Lighted	Off
Firmware update	Flashing light		

2.3.4 TERMINALS

2.3.4.1 Digital input and output terminals



Pin marker	***Description***
DI (A)	Entrance A
DI(B)	Entrance B
DO (A)	Exit A
DO (B)	Output B

The digital output terminal can be used as:

- Temperature alarm: if the temperature is held at its highest level for 5 seconds.
- Event alarm: in the event of voltage sag, overvoltage or temperature threshold overrun.
- Average power overrun alarm.
- Remote control.

The digital output is reset in the following cases:

- Change in the status of the event.
- Reset via the digital input terminal (DI).

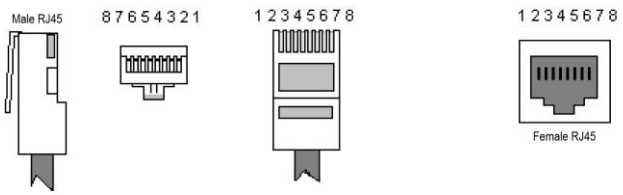
The discrete input can be used to detect a change of status. The status change information can be accessed by reading in the Modbus mapping and from the Ulys MCM Utility software.

Technical data:

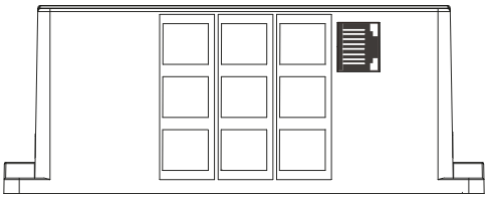
- Discrete output terminal: 250 V~/5 A, 30 VDC/5A resistive (normally open state at rest).
- Discrete input terminal: 80-250 V~ status change input voltage required.

2.3.5 PORTS

To exchange with a PLC or a SCADA PC, the ULYS MCM can communicate on Ethernet or RS485 media. For more details, please refer to the communication table (page 47).



2.3.5.1 Ethernet port (LAN)



Default address: 192.168.0.1

Default port: 502

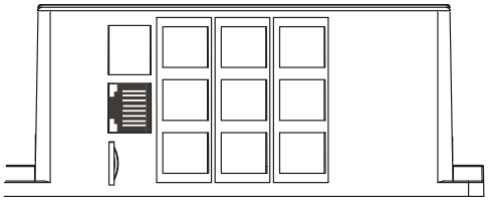
Mode: communication with master (Modbus slave)

Protocol: Modbus TCP/IP

Speed: automatic selection 10/100 Mbit/s

RJ-45 pin no.	*Description*
1	Transmission+.
2	Transmission-
3	Reception+.
6	Reception-

2.3.5.2 RS-485 port (RS-485)



Communication speed (default): 115,200 bit/s

Binary structure: 8 bits, 1stop bit

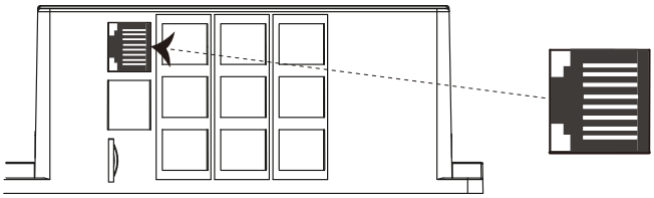
Parity: none

RS-485 pin no.	*Description*
1	Transmission+.
2	Transmission-
7, 8	Earth

- This port allows RS485 serial communication to be established with a host as a Modbus slave.
- Communication settings can be made using the ULYS MCM D remote display.

2.3.5.3 PDM ports (RS-232)

This port allows the connection of the ULYS MCM D remote display to display measurement data and setting values.



Serial communication type: RS-232C

Binary structure: 8 bits, 1 start bit, 1stop bit

Parity: none

Communication speed: 115,200 bit/s

Modbus ID: 1

RJ-45 pin no.	*Description*
3, 6	Earth
4	Transmission
5	Reception

2.3.6 TEMPERATURE SENSOR

The temperature sensor measures the temperature via NTC or a 4~20 mA signal input at the port.

Sensor type	*Pin no.*
NTC	1, 2
4~20 mA	2: +
	3: -

Temperature settings can be made using the ***Temp Ai Type*** option of the Ulys MCM Utility software. For details, refer to "4.4.1.1 Description of the CONFIG settings" on page 39.

When using the NTC sensor, the following characteristics must be observed:

Temperature	*Resistance*
0°C	32.65 kΩ
50°C	3.603 kΩ
100°C	0.68 kΩ

When inputting the 4~20 mA signal, the following temperature settings must be observed:

Designation	*Description*
MinTemp	The minimum temperature must be equal to 4 mA
MaxTemp	The maximum temperature must be equal to 20 mA

3 ULYS MCM D

3.1 DESCRIPTION OF THE ULYS MCM D

The ULYS MCM can be associated with a ULYS MCM D remote display for the display of all measurements and the product configuration. It is directly self-powered by the ULYS MCM.

This display is portable and mobile, allowing it to be used flexibly according to the user's working environment and to connect to several ULYS MCMs in succession.

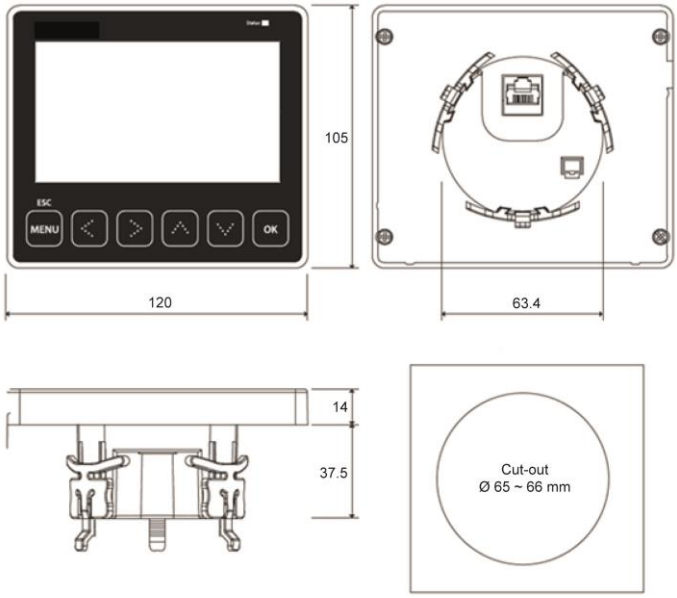
3.1.1 CHARACTERISTICS OF THE ULYS MCM D

- The ULYS MCM D remote display is used to display monitored electrical equipment in the field. It can display values for up to 54 single-phase (3 per channel) or up to18 three-phase (1 per channel) feeders.
- Clear display of information thanks to a high definition 4.3" TFT LCD screen.
- Intuitive operation using the front touch-sensitive buttons.
- Quick installation on front panels with fixing devices that comply with international standards.
- Firmware update via the USB port on the side.

3.1.2 TECHNICAL SPECIFICATIONS

Designation		***Specification***
Power supply		5 Vdc (self-powered by ULYS MCM)
Power consumption		1.2 W
Dimensions (mm)		120 (W) x 105 (H) x 50 (D)
Weight		196 g
Mounting		Mounting on electrical cabinet / Portable use
Conditions of use		Operating temperature: 10°C to +55°C Storage temperature: -25°C to+70°C Humidity: 5 to 80% non-condensing Altitude: ≤ 2,000 m
Screen		4.3-inch (480 (W) x 272 (H) mm) TFT LCD
Key	ESC / MENU	Go to the previous menu or cancel / Go to the setup menu
	LEFT	Move to the left
	RIGHT	Move to the right
	UP	Move up
	DOWN	Move down
	OK	Change channel selection or display mode

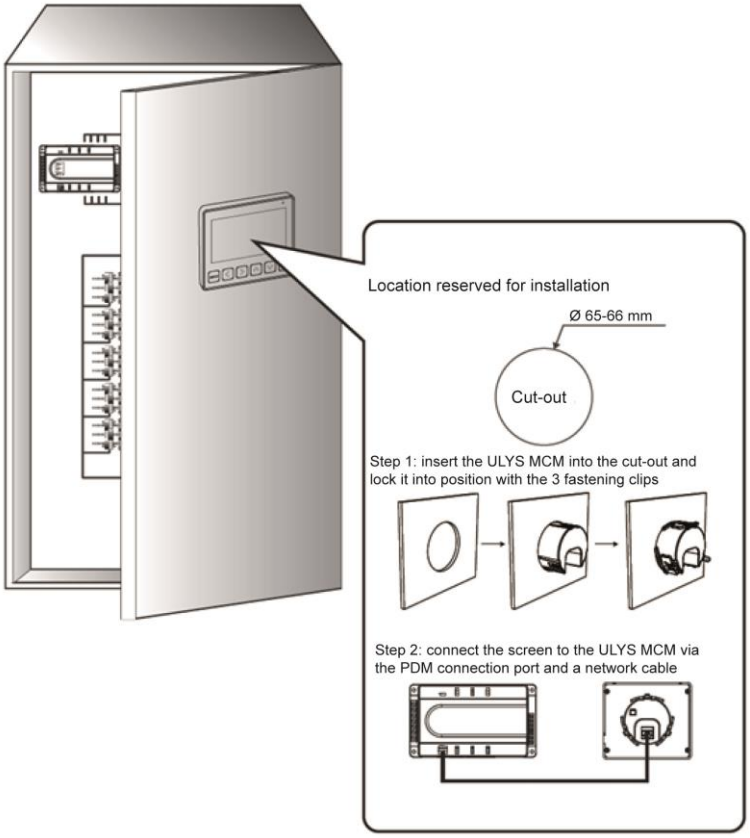
3.1.3 DIMENSIONS OF THE ULYS MCM D REMOTE SCREEN



3.1.4 INSTALLATION CONDITIONS AND METHODS

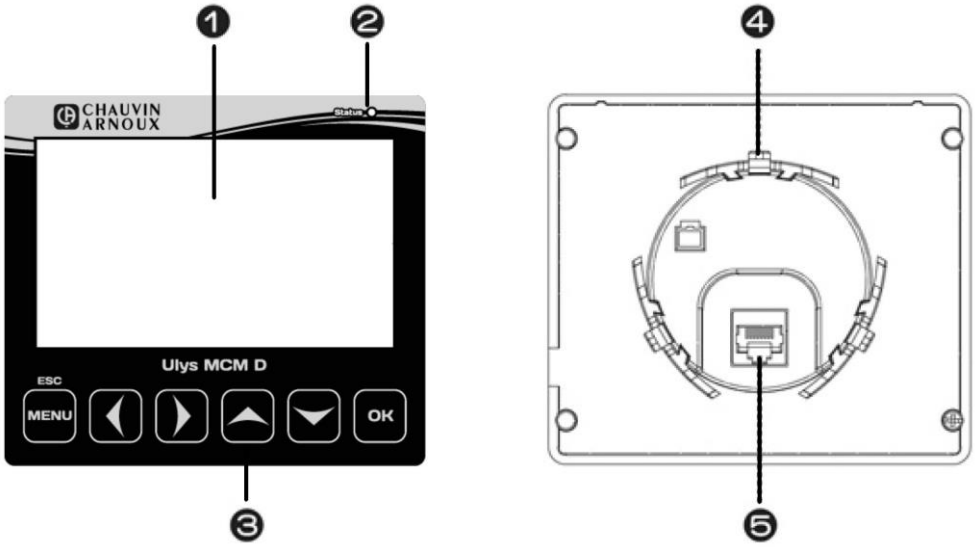
ULYS MCM D must be installed exclusively indoors. Avoid environments with high temperatures and the presence of strong electric fields.

Please refer to the diagram below when mounting the remote display on an electrical cabinet.



3.1.5 DESCRIPTION

The ULYS MCM D remote display is composed of the following elements:



#	***Designation***	***Description***
1	LCD screen	4.3" TFT colour LCD
2	Status LED	Operating status display
3	Keys	Tactile operating buttons
4	Mounting clip	For fixing to an electrical cabinet
5	Communication port	For connection to the ULYS MCM

3.2 BEHAVIOUR OF THE ULYS MCM D AND LAYOUT OF THE MENUS

3.2.1 USES OF THE REMOTE SCREEN

When connected to the ULYS MCM, the remote screen allows you to perform the following operations:

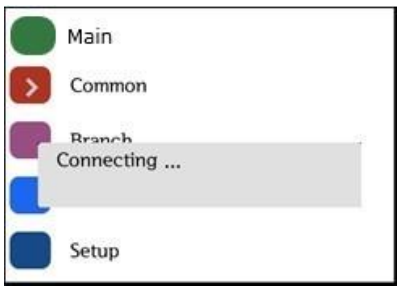
Designation			***Description***
Real-time monitoring	Common	Voltage	Phase and line voltage measurement
		Temperature	NTC temperature measurement
		Frequency	Frequency measurement
		Discrete input	ON/OFF status display
		Sags	Event display (R / S / T)
		Swell	Event display (R / S / T)
	Specific to each feeder	Electric current	Instantaneous current
		Power	Active / reactive/ apparent power per phase
		Energy	Cumulative active power
Configuration/ Product status	Communication	ID	ID Modbus serial link RS485
		LAN port	TCP Modbus communication port
		IP/GW/SM	IP Address / Gateway / Subnet Mask
		MAC	MAC address
	Type		Model name
	No. of channels		Number of channels used
	Frequency used		Frequency of installation
	Temperature alarm		An alarm sounds when the measured value is higher than the configured value.
	Starting current		When the measured value is less than or equal to the starting current, a zero is displayed.
	CT Report		Information about the current transformer to be used
	Level / Sag cycle		Voltage sag indication
	Level / Swell cycle		Overvoltage indication

3.2.2 MENU LAYOUT

The menus on the ULYS MCM D remote screen allow the different measured values to be viewed and the product to be configured.

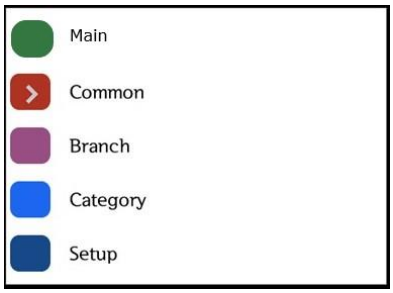
3.2.2.1 Screen layout

When communication is established with the ULYS MCM, the screen below appears before displaying the menu screen.



To access the menu screen, press the MENU button, then select an item using the Up or Down button.

Use the up and down arrows to select a menu, then press OK to access it.



3.2.2.2 Layout of the display and configuration menus

Please find below the composition of the display and configuration menus.

Viewing menus

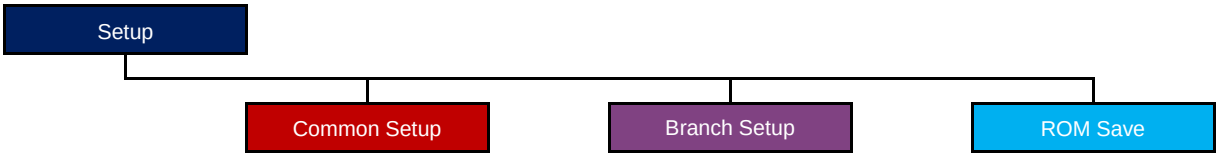
Common	Branch		Category
	Summary / Auto mode / Hold mode		
Voltage	Current	I-Unbalance	Current
Line Voltage	Active Power	Kwh	Active Power
Frequency	Reactive Power	Kvarh	Reactive Power
V-Unbalance	Apparent Power	Kvah	Apparent Power
Temperature	Power Factor	Fresnel diagram	I-Unbalance
Status	Power THD		Kwh
			Kvah

Common: display of the values common to all measurement channels.

Branch: display of the values measured per phase and total for each measurement channel.

Category: display of the values measured by category for all measurement channels simultaneously.

Configuration menus



Common Setup: configuration of parameters common to all measurement channels.

Branch Setup: configuration of the channel-specific parameters.

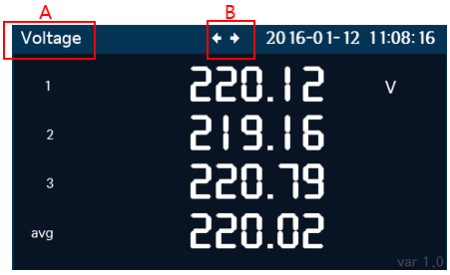
ROM Save: save and transfer the configuration to the ULYS MCM. To be carried out each time a modification is made.

3.3 VIEWING MENUS

3.3.1 COMMON MENU

Press the MENU button to access the menu screen, then press the Down button to select the Common menu and press OK to confirm.

The Common menu includes all the sizes that are not specific to each channel. It displays measured values such as phase and line voltages, frequency, voltage unbalance, temperature and event status. Use the Left or Right key to switch between measurement types.



A: indicates the type of element measured

B: indicates the available arrow keys

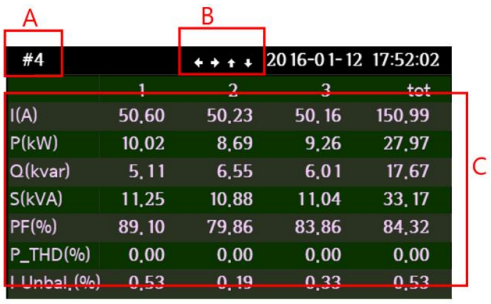
Designation	***Description***
Voltage	Displays single three-phase voltage measurements
Line Voltage	Displays three-phase line voltage measurements
Frequency	Displays the currently configured frequency
V-Unbalance	Displays the voltage unbalance rate for each phase
Temperature	Displays the current temperature
Status	Displays status of discrete input events, voltage sags and swells

3.3.2 BRANCH MENU

Press the MENU button to access the menu screen, then press the Down button to select the Branch menu and press OK to confirm.

The Branch menu gives all the quantities specific to each measurement channel.

All channel values are grouped together on the same screen. There are as many screens as there are channels defined on the device.

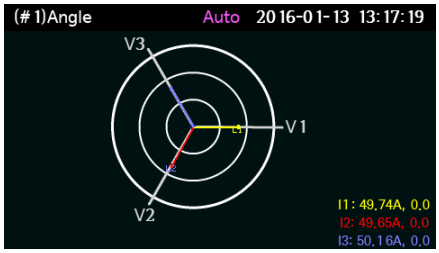


A: Indicates the channel number. Press the Left or Right key to change channels.

B: Indicates the available arrow keys.

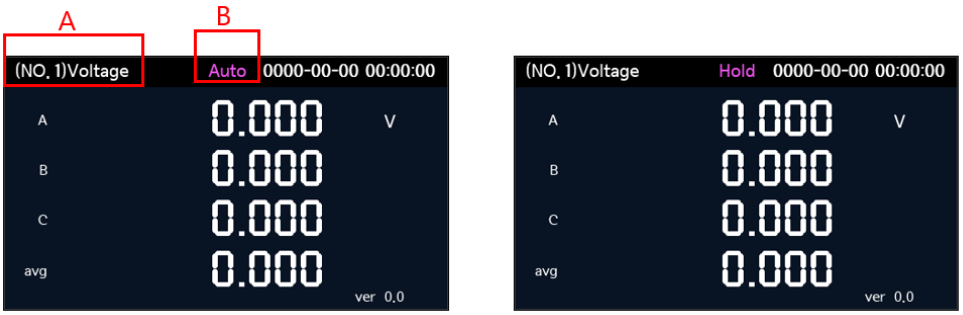
C: Displays all the channel information.

In the table of values for each feeder or channel, move down using the Down key to display the "Fresnel diagram", a screen that offers a vector representation of the three-phase network (voltage and current of each phase with associated phase shifts).



3.3.2.1 Auto and Hold modes

When you are in the Branch menu and press the OK button, the measured values of the corresponding channel are scrolled in Auto mode. Press OK again to enter Hold mode and hold a specific screen.



A: Indicates the type of screen. In Auto mode, the screen changes automatically. In Hold mode, press the Left or Right key to change the screen.

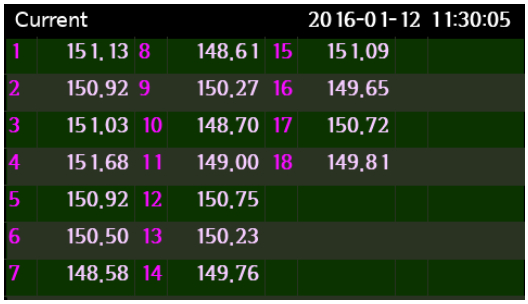
B: Displays the current mode. Press the OK button to change the mode.

Designation	*Description*
Voltage	Displays phase voltage measurements
Line Voltage	Displays line voltage measurements
Current	Displays the intensity of the electric current
Active Power	Displays active power
Reactive Power	Displays the reactive power
Apparent Power	Displays apparent power
Power Factor	Displays the power factor
Power THD	Displays the total harmonic distortion
I-Unbalance	Displays the rate of current unbalance
Energy	Displays the amount of energy

3.3.3 CATEGORY MENU

Press the MENU button to access the menu screen, then press the Down button to select the Category menu and press OK to confirm.

This menu displays the measured values of all channels by category. To move to the next page of values, press the Down key. To go to the previous page of values, press the Up key. To change the category, press the Left or Right key.



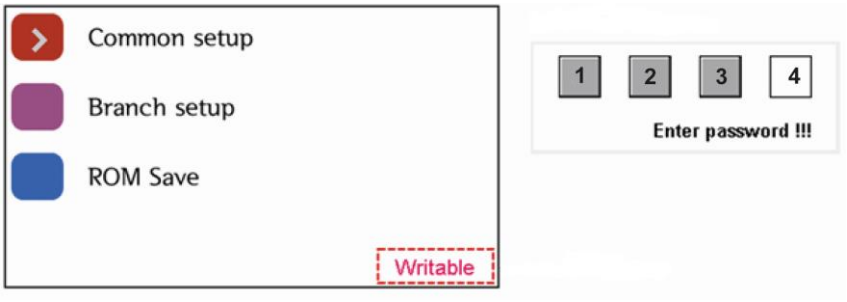
Designation	*Description*
Current	Displays the intensity of the electric current
Active Power	Displays active power
Reactive Power	Displays the reactive power
Apparent Power	Displays apparent power
I-Unbalance	Displays the current unbalance rate
kWh	Displays active energy
kvarh	Displays the reactive energy consumed
kVAh	Displays apparent energy

3.4 CONFIGURATION MENUS

Press the MENU button to access the menu screen, then press the Down button to select the Setup menu and press OK to confirm.

If you only want to view the configuration settings, press OK.

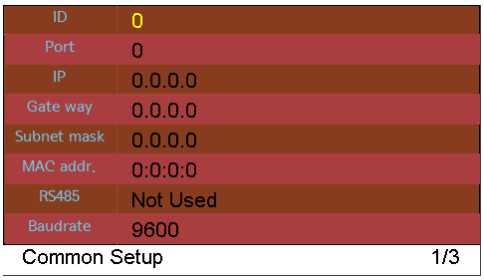
To change them, you must enter the password of the ULYS MCM D remote screen. The password, "1234", is factory set and cannot be changed. In case of an input error, the message "Read Only" is displayed at the bottom right of the screen and you can only view the settings.

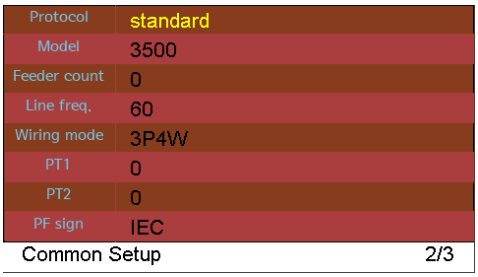


To enter the password, press the Up key repeatedly until the number "1" is displayed. Then press the Right key to select the second box and press the Up key repeatedly until the number "2" is displayed. Continue in this way until you have finished entering the password and press OK to confirm. The message "Writable" is displayed at the bottom right of the screen to indicate that you can change the settings.

3.4.1 COMMON SETUP MENU

Select the Common setup menu and press OK to confirm. This menu consists of a total of four screens.



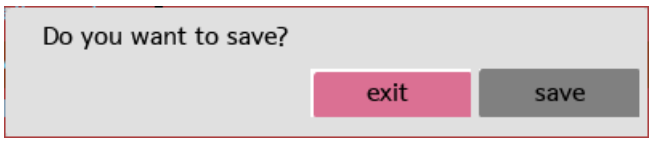


3.4.1.1 Changing settings

Use the Up or Down key to scroll to the setting to be changed and press OK to select it. You can change the setting in the pop-up window that appears. Enter the desired value using the Up or Down key and press OK to confirm. Press the MENU button to cancel. Then select the ROM Save menu and press OK if you wish to permanently transfer the new settings to the ULYS MCM.

3.4.1.2 Saving settings

When the settings are completed, press the MENU button to display the registration screen shown below. Select Exit to exit without registering. Select Save to save and return to the previous menu.

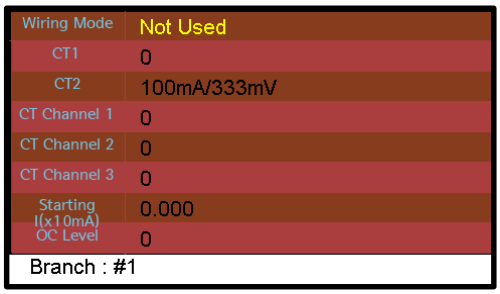


Designation	***Description***
ID	Display / Change ID (modbus address)
Port	Check / Change Ethernet port
IP	Check / Change IP address
Subnet mask	Check / Change subnet mask
Gateway	Checking / Changing the gateway
MAC addr.	Show MAC address
RS485	Check / Change network type
Baudrate	Check / Change the speed of the RS485 network (9600, 19200, 38400, 57600, 115200)
Protocol	Check / Change protocol (standard or non-standard)
Model	Display model manufacturer code (3500)
Feeder count	Configure the number of channels to be used
Line Freq.	Checking / changing the nominal frequency of the grid
Wiring Mode	Check / Change wiring mode (3P4W, 3P3W, 1P3W)
PT1	Checking / Changing the primary voltage
PT2	Check / Change secondary voltage
PF sign	Checking / Modifying the power factor calculation reference system (IEC, IEEE)
Sag level(V)	Checking / Changing the voltage sag threshold value
Sag count	Check / change the number of half-cycles (10 ms for 50 Hz) of voltage sag (duration of voltage sag)
Swell level(V)	Checking / Changing the value of the overvoltage threshold
Swell count	Check / change the number of half-cycles (10 ms for 50 Hz) of overvoltage (duration of overvoltage)
VA type	Display apparent power type / Change calculation method
Backlight(min)	Checking / changing the backlight duration in minutes
Rotation(sec)	Check / Change the automatic update time in seconds
Brightness (%)	Check / Change the LCD brightness in percent
Temp AI type	Check total intensity calculation (sum or average)
SNTP use	Check / Change the use of the SNTP protocol
SNTP IP1	Check / Change SNTP IP1 setting
SNTP TZ	Check / Change the SNTP TZ setting.

3.4.2 BRANCH SETUP MENU

Select the Branch setup menu and press OK to confirm. This menu displays the setting values for each channel. The channel is displayed at the bottom left of the screen.

Press the Left or Right key to change channels.

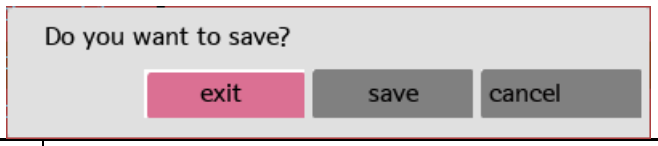


3.4.2.1 Changing settings

Use the Up or Down key to scroll to the setting to be changed and press OK to select it. You can change the setting in the pop-up window that appears. Enter the desired value using the Up or Down key and press OK to confirm. To change the channel, press the Left or Right button. If you change the channel without saving, the changed value is automatically cancelled.

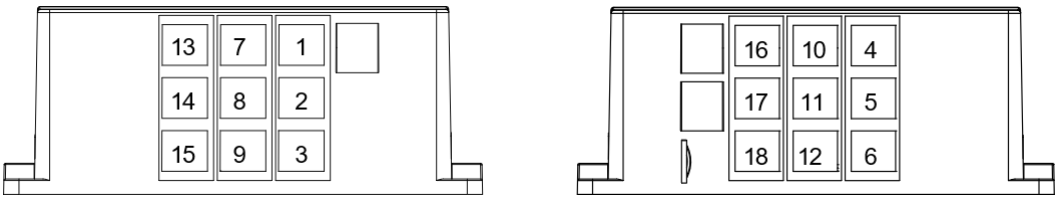
3.4.2.2 Saving settings

When the settings are completed, press the MENU button to display the registration screen shown below. Select Exit to exit without registering. Select Save to save and return to the previous menu. Select Cancel to return to the setting change page. Then select the ROM Save menu and press OK if you wish to permanently transfer the new settings to the ULYS MCM.



Designation	***Description***
Wiring Mode	Selecting the wiring mode on the electrical network
CT TYPE	Select the type of current sensor: ROGOWSKI: use of MF300 and MF3000 flexible cores CLAMP (mV): use of 333 mV CT cores
CT1	In the case of the current transformer (CLAMP (mv)): enter the value of the primary current or the CTs connected In the case of the Rogowski coils (ROGOWSKI): do not enter anything
CT2	Always select the signal type at 100 mA / 333 mV
CT channel 1	Indicate the channel corresponding to phase 1*.
CT channel 2	Indicate the channel corresponding to phase 2*.
CT channel 3	Indicate the channel corresponding to phase 3*.
Start-I(x10mA)	Setting the starting current
OC Level	Setting the overcurrent level

* *Values from the following table to be indicated in the programming of the parameters for CT channel 1, CT channel 2 and CT channel 3 according to the channel used for the connection of the current sensors*
Example: If all 3 current sensors are connected to channel 1, the value to be programmed for CT channel 1 is 01, for CT channel 2 the value is 02 and for CT channel 3 the value is 03.



	Ch. 1	*Ch. 2*	*Ch. 3*	*Ch. 4*	*Ch. 5*	*Ch. 6*	*Ch. 7*	*Ch. 8*	*Ch. 9*	*Ch. 10*	*Ch. 11*	*Ch. 12*
CT channel 1	01	04	07	10	13	16	19	22	25	28	31	34
CT channel 2	02	05	08	11	14	17	20	23	26	29	32	35
CT channel 3	03	06	09	12	15	18	21	24	27	30	33	36

CAUTION

Make sure to use current sensors compatible with the ULYS MCM (see section 2.1.2).

3.5 ROM SAVE MENU

The ROM Save menu is used to permanently save the changed values.

CAUTION

If you do not execute the ROM Save function, the previous power supply values will be restored when the ULYS MCM D is restarted.

After the settings are completed, be sure to execute this function to save the final settings.

4 ULYS MCM UTILITY

4.1 QUICK OVERVIEW

Ulys MCM Utility is the real-time configuration and visualisation software for the ULYS MCM. It allows the user to configure the settings and easily check the data for each load.

It is not designed to collect data from your system, but you can develop your own management software from our mapping table provided in Chapter 6.

4.1.1 PREREQUISITES

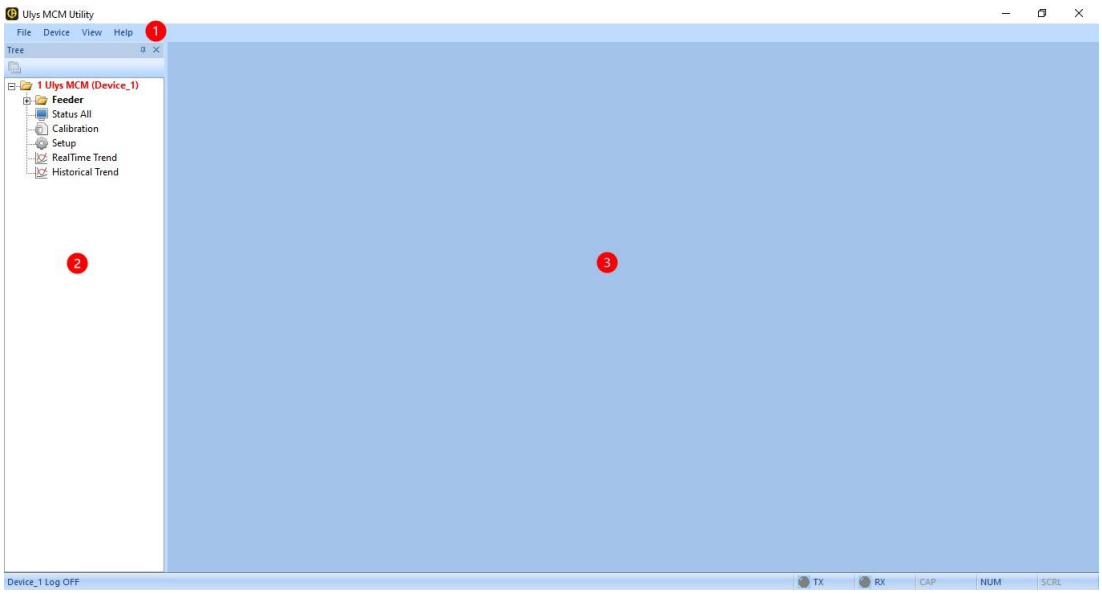
The Ulys MCM Utility software is compatible with the following operating systems:

- Windows 7 (32/64 bits)
- Windows 8 (32/64 bits)
- Windows 10 (32/64 bits)

It must first be installed on your PC. The Ulys MCM Utility software is available on our website: https: //www.chauvin-arnoux-energy.com/en/support/telechargement.

4.2 FUNCTIONS OF THE SOFTWARE

When you start the Ulys MCM Utility software, the following window appears:



The software comprises a menu bar with four drop-down menus ①, a tree view on the left pane with various device management options ② and a display view of settings and information on the right pane ③.

4.2.1 DESCRIPTION OF THE DROP-DOWN MENUS

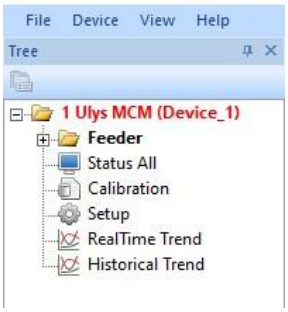
The drop-down menus of the Ulys MCM Utility software are arranged as follows:

Menu	***Option***	***Description***
File	Config Write	Save the settings of the Ulys MCM Utility software (as a configuration file in.ini format).
	Config Read	Read and load the configuration information of a backup made with Config Write (from a configuration file in.ini format).
	Font Size Change	Change the font and window sizes (close the window to apply the change)
	Exit	Exit the software
Device	Add/Remove	Adding or removing a device from the tree structure
	Status View	Zone reserved for the manufacturer
	IP Finder	Scanning the network for device IP addresses
View	Communication Frame	Viewing RX/TX communication frames with devices
Help		View the version of Ulys MCM Utility software

The communication logs from the ***Communication Frame*** option can be retrieved in the following sub-folder: \Ulys\Log (.txt file generated at the current date).

4.2.2 DESCRIPTION OF TREE OPTIONS

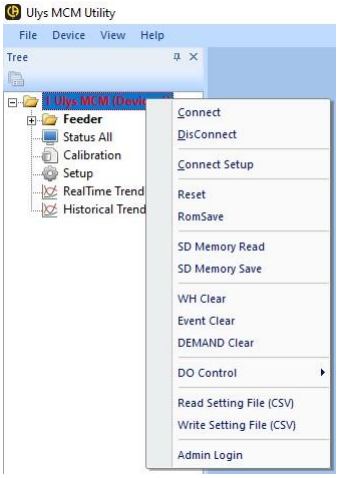
The options in the tree structure of the left pane of the Ulys MCM Utility software window are used to configure the ULYS MCM.



Option	***Description***
Ulys MCM (Device-1)	Type of equipment installed, and name given to the device
Feeder	Monitor the data measured by the ULYS MCM per feeder. If you expand the tree structure, you can consult individually the information for each feeder (up to 54 single-phase feeders or 18 three-phase feeders) (voltage, current, energy, power factor, harmonic power, unbalance rate, Fresnel diagram, etc.).
Status All	Display all the measured values of all the feeders on a single screen
Calibration	Option reserved for the manufacturer accessible only with an administrator account.
Setup	Modify the ULYS MCM settings (general settings and settings of each of the feeders)
Real Time Trend	Display in real time the main information on the feeders in a graph.
Historical Trend	Display historical information on feeders in a chart

4.2.3 DESCRIPTION OF CONTEXT MENU OPTIONS

If you right-click on the name of your ULYS MCM in the tree view, a context menu appears. It contains various options for managing your equipment.



Option	***Description***
Connect	Establish a connection between the ULYS MCM and the PC (the next time the software is started, the connection is automatic).
DisConnect	Disconnect the ULYS MCM from the PC
Connect Setup	Setting the communication settings
Reset	Restore factory settings in the connected equipment
RomSave	Saving the settings in the memory of the ULYS MCM
SD Memory Read	Reading the configuration from the SD memory card of the ULYS MCM
SD Memory Save	Save the configuration in the SD memory card the ULYS MCM.
WH Clear	Reset the consumption indexes to zero
Event Clear	Reset events, average and maximum values, Demand Current accumulated variable (enter password)
REQUEST Clear	Reset the average and maximum values, the Demand Current accumulated variable to zero.
DO Control	Force the activation of the ULYS MCM digital output DO: On (output enabled) - Off (output disabled)
Read Setting File (CSV)	Reading and loading data from a ULYS MCM MCM configuration settings file (.csv format)
Write Setting File (CSV)	Create and save the data of a ULYS MCM configuration settings file (.csv format).
Admin Login	Establish an administrator login (this option is reserved for the manufacturer)

4.3 CONNECTING TO AND DISCONNECTING FROM THE ULYS MCM

You can establish a connection between the Ulys MCM Utility software installed on your PC and the ULYS MCM using the serial port or the LAN port.

4.3.1 PREREQUISITES

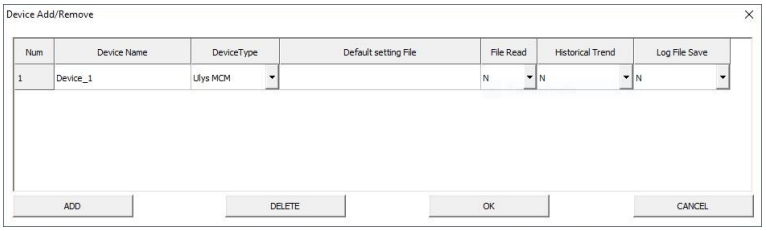
- Serial port (PDM port or RS485 port)
  Default: 115,200 bits/s, no parity, 8 bits, 1stopbit
- LAN port
  Default IP address: 192.168.0.1, Port number: 502

CAUTION

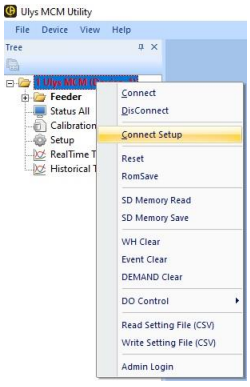
To connect to the product via the LAN, the IP address of the PC or PLC must be compatible with that of the ULYS MCM.

4.3.2 OPERATING MODE

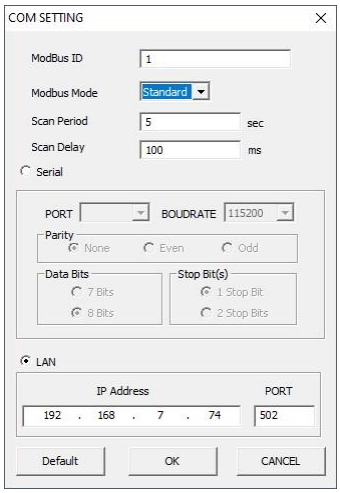
- To establish a LAN connection, set the IP address of the PC to "192.168.0.xxx" (xxx other than 001).
- Connect the LAN cable between the ULYS MCM and the PC.
- Check the communication using the Ping command.
- Start the Ulys MCM Utility software installed on the PC.
- If you are using the software for the first time, select ***Add/Remove*** from the ***Device*** menu to add a device. The window below appears:



  - ***Device Name***: Enter the device name. Choose a name that will make it easier to identify it, for example, by indicating its place of installation: Ulys MCM (floor 1).
  - ***Device Type***: to date only the ULYS MCM is available.
  - ***Default Setting File***: reserved for the manufacturer.
  - ***File Read***: reserved for the manufacturer.
  - ***Historic Trend:*** reserved for the manufacturer.
  - ***Log File Save:*** Select "Y" to find the communication logs of the unit in the software folder named Log.
  - Press the ***ADD*** button to add a device. You can register up to100 devices.
  - To delete a device, press ***DELETE*** after selecting it. Only one device can be deleted at a time.
- In the left pane, right-click the device name and select ***Connect Setup*** to configure the connection.



- In the ***COM SETTING*** window that appears, select the ***LAN*** option and enter the IP address of the unit (default IP address: 192.168.0.1, Port: 502), and then click ***OK***.

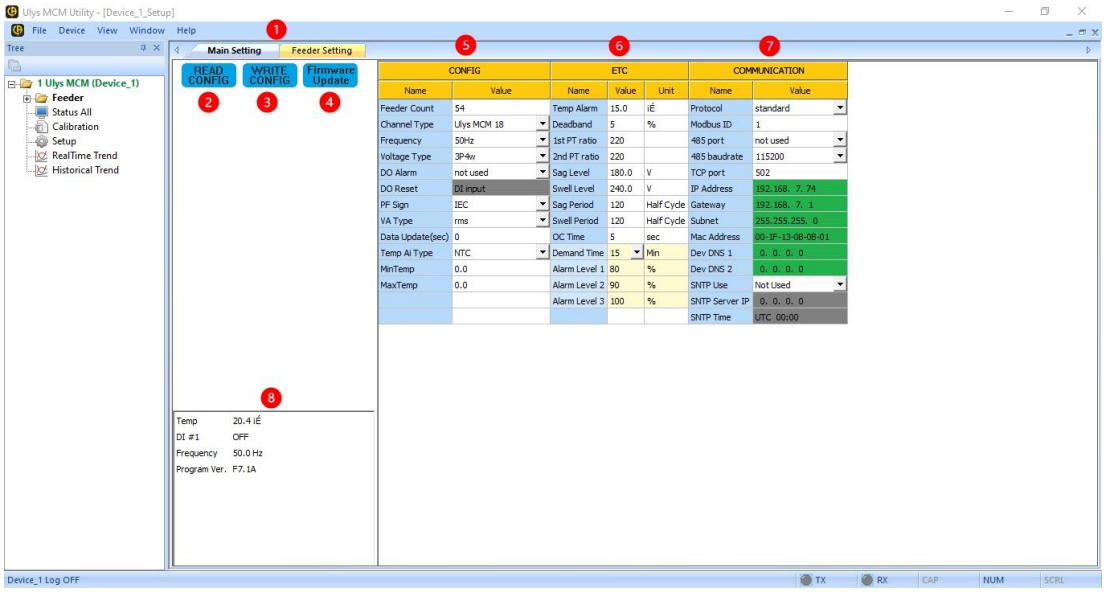


- In the left pane, click on the device name with the right mouse button and select ***Connect*** to establish the connection between the PC and the ULYS MCM. The device name will change from red (no communication) to green (communication established) Click ***DisConnect*** to disconnect it.
- To check the connection status, check the following items on the screen:

#	***Designation***	***Connected***	***Disconnected***
①	Name of device	Green	Red
②	TX	Flashing red	Grey
③	RX	Blinking green	Grey

4.4 PROGRAMMING THE ULYS MCM

The ULYS MCM is programmed using the ***Setup*** option in the tree view of the Ulys MCM Utility software. When you double-click this option, the right-hand pane displays the information described below.

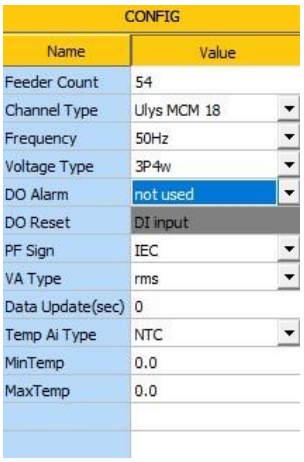


#	Option	Description
①	Tabs for changing screens	The ***Main Setting*** tab shows the main settings of the ULYS MCM. The ***Feeder*** Setting tab details the setting values of each of the feeders.
②	READ CONFIG	Press the ***READ CONFIG*** button to load the current ULYS MCM settings.
③	WRITE CONFIG	Press the ***WRITE CONFIG*** button to temporarily save the settings in the ULYS MCM.
④	Firmware Update	Press the ***Firmware Update*** button to update the firmware of the ULYS MCM.
⑤	CONFIG	In this section, you can view or change the settings for connecting the feeders.
⑥	ETC	This section allows you to view or change various settings such as alarms, voltage sags and swells.
⑦	COMMUNICATION	This section allows you to view or change the settings for connecting to various communication ports.
⑧	Condition shutter	Displays temperature (if a sensor is connected), status of the DI input, mains frequency and software version.

4.4.1 DESCRIPTION OF THE MAIN SETTING TAB

4.4.1.1 Description of the CONFIG settings

The settings for connecting the feeders are grouped together in the ***CONFIG*** section.



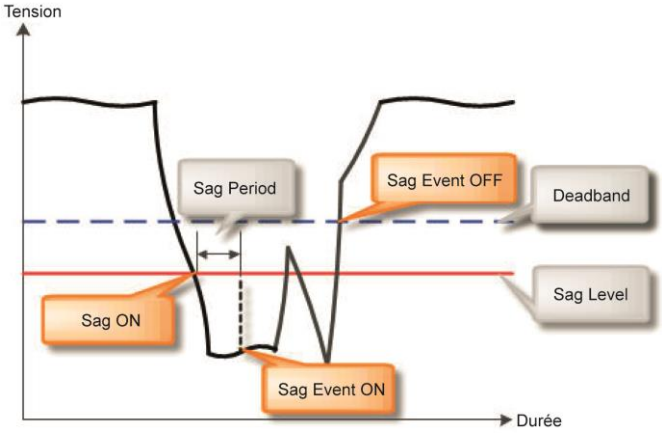
- ***Feeder Count***: indicate the number of feeders that can be used (≤ 54).
- ***Channel Type:*** select the type of ULYS MCM used (number of channels).
- ***Frequency:*** Select the frequency used.
- ***Voltage Type:*** select the type of the voltage network (number of voltage phases and number of connected wires): 3P4W, 3P3W or 1P3W.
- ***DO Alarm:*** the closing of the DO digital output can be associated with different types event to be activated:
  - ***not used***: not used.
  - ***temp alarm***: temperature threshold exceeded.
  - ***sag swell, temp alarm***: detection of an event such as voltage sag or swell, or temperature threshold exceeded.
  - ***demand alarm***: exceeding an average target power (“Demand total prediction” value in W) whose threshold is set in the Feeder Setting tab, Target Demand column (kW) x value set in the Alam Level 3 variable in the ETC settings.
  - **Remote Control**: remote control.
- ***DO Reset:*** Indicates the type of reset of the digital output:
  - **Status Change**: on status change.
  - ***DI Input***: Detection of a change of state.
  - ***Comm:*** via communication (see section 5.1 Mapping of the ULYS MCM Modus values).
- ***PF Sign:*** select the power factor calculation reference frame (IEC or IEEE).
- ***VA Type:*** select the type of apparent power.
  - ***Rms:*** The power factor is calculated according to the RMS value of the voltage of the power supply network.
  - ***Vector:*** the power factor is the vectorial sum of the active power (measured in watts (W)) and the reactive power (measured in reactive voltamperes (VAr)) of a circuit without taking harmonics into account.
- ***Temp Ai Type:*** Select the type of use of the analog input (NTC temperature sensor or 4~20 mA).
- ***MinTemp / MaxTemp:*** Specify the minimum (at 4 mA) and maximum (at 20 mA) temperature.

4.4.1.2 Description of ETC settings

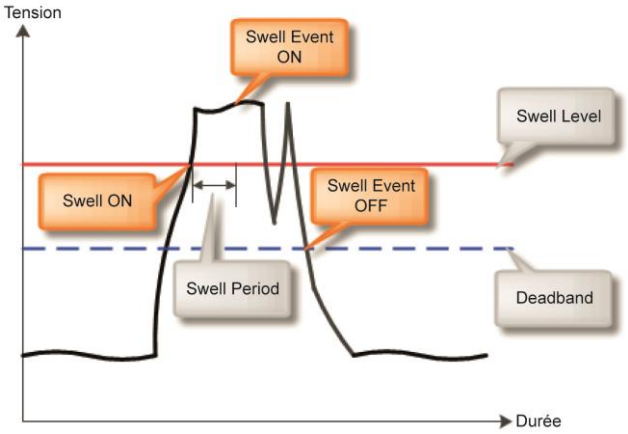
Settings such as alarms, voltage sags and swells are grouped together in the ***ETC*** section.

ETC		
Name	Value	Unit
Temp Alarm	15.0	iÉ
Deadband	5	%
1st PT ratio	220	
2nd PT ratio	220	
Sag Level	180.0	V
Swell Level	240.0	V
Sag Period	120	Half Cycle
Swell Period	120	Half Cycle
OC Time	5	sec
Demand Time	15	Min
Alarm Level 1	80	%
Alarm Level 2	90	%
Alarm Level 3	100	%

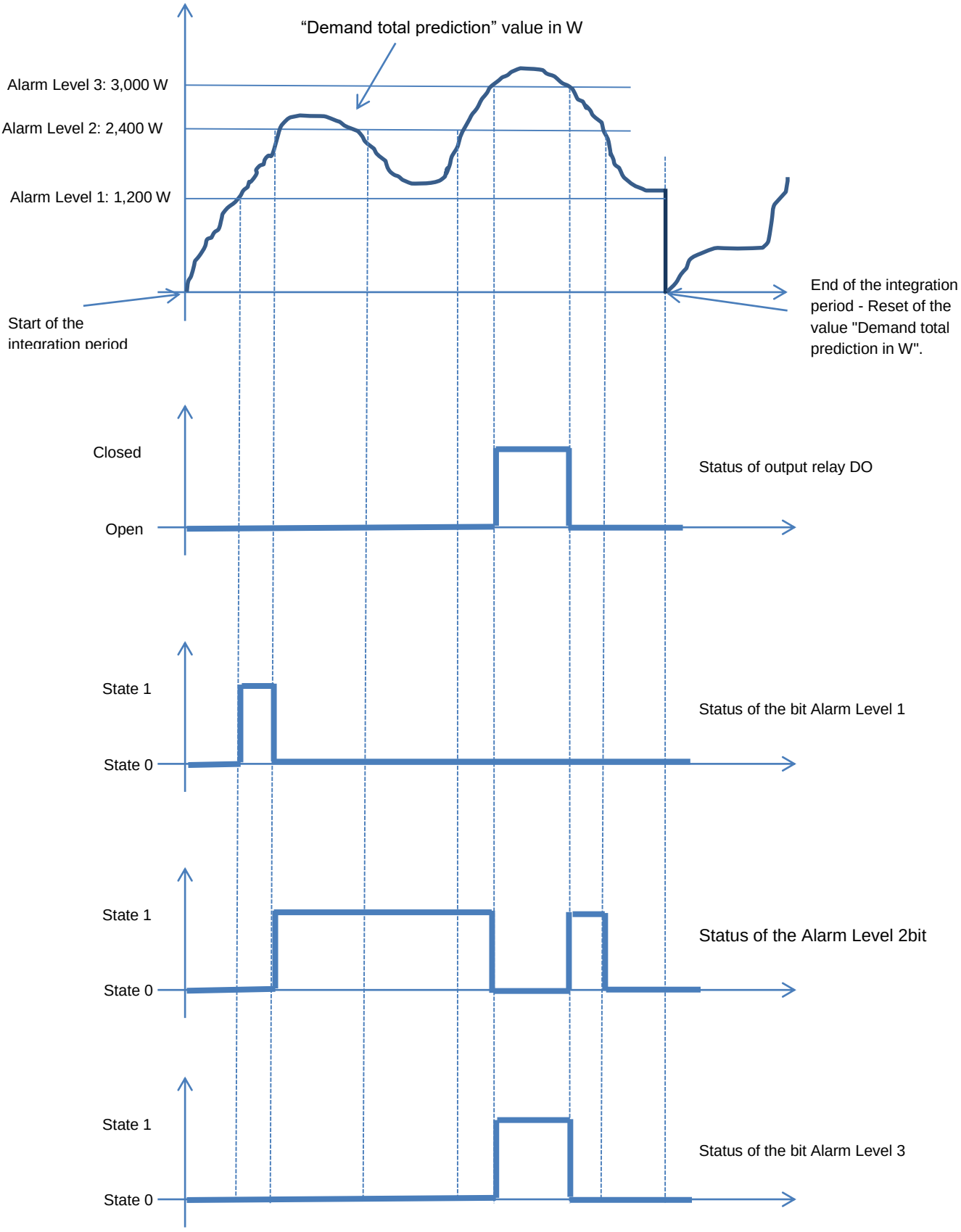
- ***Temp Alarm***: indicate the temperature value to trigger an alarm. If the temperature is higher than this set value, the digital output DO is activated; if the temperature is lower, the digital output DO is deactivated (if the DO Alarm parameter is set to "temp alarm " or " sag, swell, temp alarm"; see paragraph 4.4.1.1 Description of the CONFIG settings).
- ***Deadband:*** indicate the percentage value of the insensitivity range (hysteresis) for the return to the non-active state of temperature alarm. Applied downwards for a high threshold.
- ***1st PT ratio:*** indicate the value of the primary voltage (in case of the use of potential transformers).
- ***2nd PT ratio:*** indicate the value of the secondary voltage (in case of the use of potential transformers).
- ***Sag Level:*** Indicate the trip level for voltage sag (see figures below).
- ***Swell Level:*** indicate the swell trip level (see figures below).
- ***Sag Period:*** indicate the minimum period for detecting a voltage sag (the unit of period is half a cycle, e.g. 10 ms for a mains frequency of 50 Hz).
- ***Swell Period:*** indicate the minimum period to detect an overvoltage (the unit of period is the half-cycle, e.g. 10 ms for a mains frequency of 50 Hz).
- ***OC Time:*** indicate the time allowed for the overcurrent value allowed and set in the Feeder Setting tab, OC Level column.
- ***Demand Time:*** Select the average value integration period (15/30/60 min).
- ***Alarm Level 1/2/3:***
  - The values of Alarm Level 1, Alarm Level 2 and Alarm Level 3 apply to the target value programmed on the Target Demand (kW) variable (Setup menu - Feeder Setting tab - Target Demand (kW) column).
  - Exceeding the Alarm Level 1, Alarm Level 2 and Alarm Level 3 thresholds respectively triggers the Alarm bits 1, 2 and 3 of table 2 (Feeder Status) of the Modbus mapping to change from 0 to 1 if the "Demand Alarm" parameter (Setup menu - Feeder Setting tab - Demand Alarm column) is set to "1: Internal DO use".
  - Exceeding the Alarm Level 3 threshold triggers the closing of the DO output contact, if the parameter in the CONFIG section "DO Alarm" is set to "Demand Alarm" status.
  - The thresholds are applied to the “Demand total prediction” value calculated in W.
    Example: - Target Demand: 3 kW
    - Alarm Level 1: 40%; applied threshold equal to 3,000 x 0.4 = 1,200 W
    - Alarm Level 2: 80%; applied threshold equal to 3,000 x 0.8 = 2,400 W
    - Alarm Level 3: 100%; applied threshold equal to 3,000 x 1.0 = 3,000 W
    - Alarm Level 1, 2 and 3 thresholds apply to the "Demand total prediction" value in W.



Occurrence and reset of a voltage sag event



Occurrence and reset of a swell event


“Demand total prediction” value in W
Alarm Level 3: 3,000 W
Alarm Level 2: 2,400 W
Alarm Level 1: 1,200 W
Start of the integration period
End of the integration period - Reset of the value "Demand total prediction in W".
Closed
Open
Status of output relay DO
State 1
State 0
Status of the bit Alarm Level 1
State 1
State 0
Status of the Alarm Level 2bit
State 1
State 0
Status of the bit Alarm Level 3

4.4.1.3 Descriptions of the COMMUNICATION settings

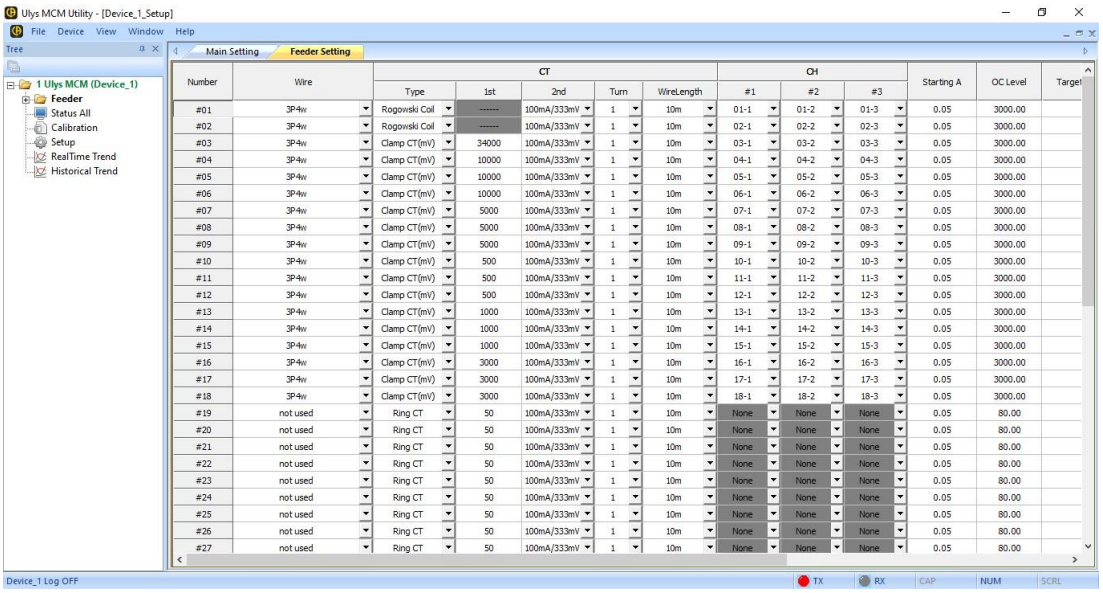
LAN connection settings are grouped in the ***COMMUNICATION*** section.

COMMUNICATION	
Name	Value
Protocol	standard
Modbus ID	1
485 port	not used
485 baudrate	115200
TCP port	502
IP Address	192.168. 7. 74
Gateway	192.168. 7. 1
Subnet	255.255.255. 0
Mac Address	00-1F-13-0B-0B-01
Dev DNS 1	0. 0. 0. 0
Dev DNS 2	0. 0. 0. 0
SNTP Use	Not Used
SNTP Server IP	0. 0. 0. 0
SNTP Time	UTC 00:00

- ***Protocol***: Select the " standard "protocol.
- ***Modbus ID:*** Specify the Modbus ID.
- ***485 port:*** Define the use of the RS485 port:
  - ***not used***: the RS485 port is not used.
  - ***Ext IO***: reserved for the manufacturer and is used to add external devices.
  - ***modbus slave:*** use as a Modbus slave.
  - ***Ext ZCT:*** reserved for the manufacturer and used to add external devices.
- ***485 baudrate:*** Select the speed of the RS485 network (9600, 19200, 38400, 57600), 115200).
- ***TCP port:*** Specify the TCP port number.
- ***IP Address:*** Specify the IP address of the ULYS MCM.
- ***Gateway:*** Specify the IP address of the gateway.
- ***Subnet:*** Specify the mask IP address of the subnet.
- ***Mac Address:*** check the MAC ***address.***
- ***Dev DNS 1/2:*** option is reserved for the manufacturer.
- ***SNTP Use:*** Indicate whether the SNTP protocol is to be used.
- ***SNTP Server IP:*** Specify the IP address of the SNTP server.
- ***SNTP Time:*** Set the SNTP time.

4.4.2 DESCRIPTION OF THE FEEDER SETTING TAB

If you click on the ***Feeder Setting*** tab, the window below appears. It allows you to view and change the setting values of each of the feeders individually.



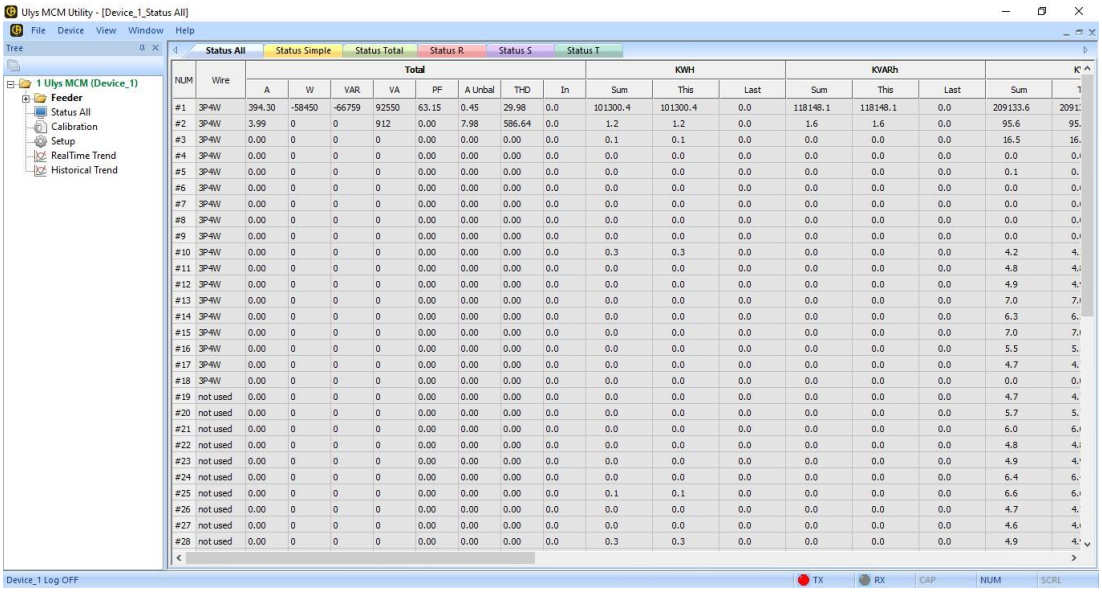
Option	***Description***
Number	Displays the channel number
Wire	Display / Change the type of wiring (3P4W, 3P3W or 1P3W)
CT Type	Display / Change the type of current sensor (Rogowski coil or CLAMP TC (mV))
CT 2nd	Display / Change the main / secondary value of the current transformer connected to the feeder Note : this value must not be changed when using Rogowski coils.
Turn	Selecting the number of loops in the current sensor
Wire Length	Display / Change the length of the current sensor wiring (Default: do not change)
CH #1/2/3	Displaying / Changing the numbers of the input terminals connected to the feeders
Starting A	Display the value of the starting current of each feeder
OC Level	Display the over current alarm trigger level. This setting is linked to the value defined in the ***OC Time*** setting in the ***ETC*** tab.
Target Demand (kW)	Display the target value of the “Demand total prediction” value in W (refer to "Description of ETC settings" for event operation).
Demand Alarm	Select the type of device activated by exceeding the Alarm Level 1, Alarm Level 2 and Alarm Level 3 thresholds on Target Demand (kW) ("1: Internal DO use" corresponds to the changes in state of the alarm bits in table 2 of the Modbus mapping).
Demand Ext. DO ID	Manufacturer's option for use when using an external digital output device.
Demand Ext. DO Point	Manufacturer's option for use when using an external digital output device.

4.5 VISUALISATION OF MEASURED VALUES

The ***Status All***, ***Real Time Trend*** and ***Historical Trend*** options in the tree view of the Ulys MCM Utility software allow you to view the various values of all the feeders.

4.5.1 DESCRIPTION OF THE STATUS ALL OPTION

When you double-click the ***Status All*** option, all available information is displayed on the screen-below.

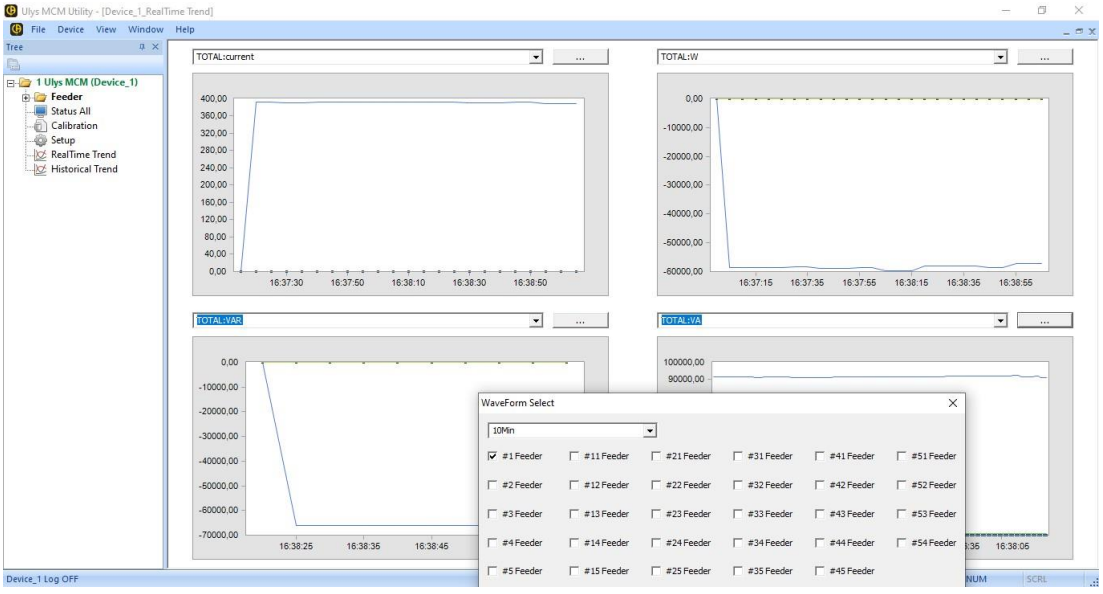


NUM	Wire	Total								KWH			KVARh				
		A	W	VAR	VA	PF	A Unbal	THD	In	Sum	This	Last	Sum	This	Last	Sum	
#1	3P4W	394.30	-58450	-66759	92550	63.15	0.45	29.98	0.0	101300.4	101300.4	0.0	118148.1	118148.1	0.0	209133.6	2091
#2	3P4W	3.99	0	0	912	0.00	7.98	586.64	0.0	1.2	1.2	0.0	1.6	1.6	0.0	95.6	95.
#3	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.1	0.1	0.0	0.0	0.0	0.0	16.5	16.
#4	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#5	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.
#6	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#7	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#8	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#9	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#10	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.3	0.3	0.0	0.0	0.0	0.0	4.2	4.
#11	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	4.
#12	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	4.
#13	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	7.
#14	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.
#15	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	7.
#16	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.
#17	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.
#18	3P4W	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
#19	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.
#20	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7	5.
#21	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.
#22	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	4.
#23	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	4.
#24	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	6.
#25	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.1	0.1	0.0	0.0	0.0	0.0	6.6	6.
#26	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	4.
#27	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.
#28	not used	0.00	0	0	0	0.00	0.00	0.00	0.0	0.3	0.3	0.0	0.0	0.0	0.0	4.9	4.

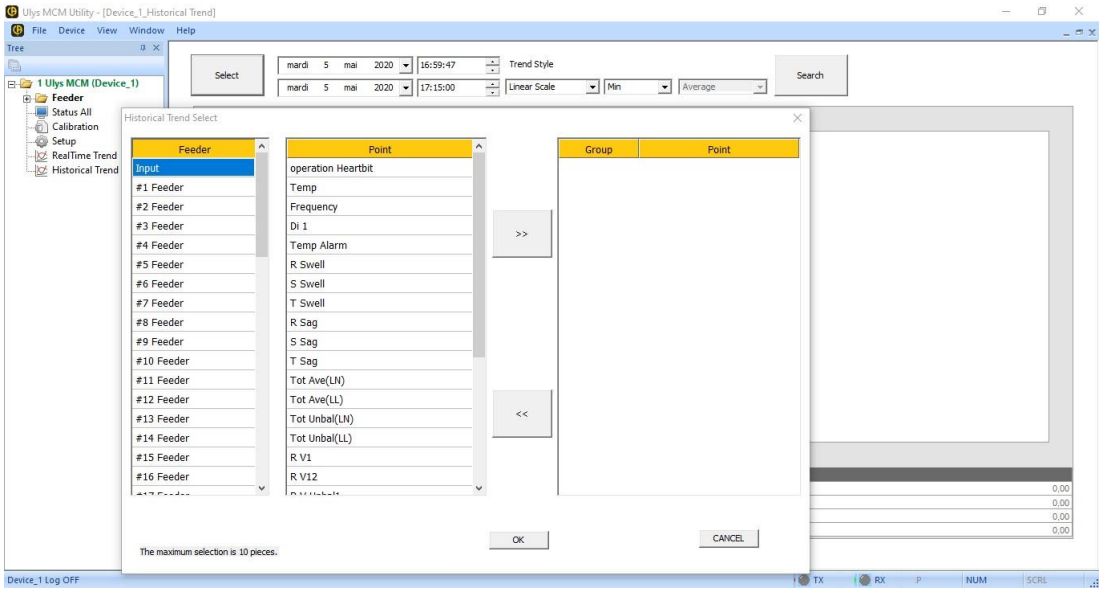
- The ***Status All*** tab provides a complete display of real-time information for all feeders.
- The ***Simple Status*** tab offers a simplified display of real-time information for all feeders.
- The ***Total Status*** tab provides a complete display of real-time information of the total quantities of all the feeders.
- The ***Status R***, ***Status S*** and ***Status T*** tabs offer a complete display of real-time information of the quantities per phase of all the feeders.

4.5.2 DESCRIPTION OF THE REALTIME TREND AND HISTORICAL TREND OPTIONS

When you double-click the ***Real Time Trend*** option, four graphs representing the trend of the real-time measurements are displayed. In each of the drop-down lists, you can choose the values to be measured, and then press the button on the right to display the ***Wave Form*** Select window and select the relevant feeders.



You can also analyse the historical trend of certain measured values. Double-click the ***Historical Trend*** option to display the window below. Select the time range to be analyzed using the Date and Time drop-down lists, and then choose the graph style using the ***Trend*** Style drop-down list. You can also select the feeders and values to be measured by pressing the ***Select*** button.



The historical figures available for consultation correspond to the previous periods in which the ***Real Time Trend*** option was used.

The values are recorded in the following sub-folder: \Ulys\Trend.

5 MODBUS MAPPING

5.1 ULYS MCM MODBUS VALUE MAPPING

- Type of communication:
  - Two types of remote communication can be used on the ULYS MCM: conventional Modbus/RTU on RS-485 bus or/and Modbus/TCP on TCP/IP network.
  - Both types of communication can be used simultaneously.
  - The full protocol specifications are available at http://www.MODBUS.org.
- Supported functions:
  - Functions 3, 4 for reading and 16 for writing are applicable.
  - The 3/16 functions are used in mapping on the part: date-time table and reset and request values.
- Tables of variables (see ULYS MCM-Mapping Modbus v01):
  - Reduced table of measures
  - Complete table of measures
  - Table of Average, Maximum, Minimum values.
  - Table of energy values
  - Table of current values

5.2 STATUS WORDS

5.2.1 TABLE 1

Table 1. internal STATUS															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
reserved	reserved	reserved	T-Sag	S-Sag	R-Sag	T-Swell	S-Swell	R-Swell			temp Alarm				DI 1 (Digital Input)
			Value 0 : not active / Valeur 0 : non actif Value 1 : active / Valeur 1 : actif								Value 0 : not active / Valeur 0 : non actif Value 1 : active / Valeur 1 : actif				0 - off (à confirmer) 1 - on (à confirmer)
			R=V1 - S=V2 - T=V3												

- Voltage sag and overvoltage: T-Sag, S-Sag, R-Sag, T-Swell, S-Swell, R-Swell
  - Refer to paragraph 4.4.1.2 " Description of ETC settings " for the operation of these variables.
    - R, S, T correspond respectively to the voltages phase 1 (V1), phase 2 (V2), phase 3 (V3).
    - The value 0 corresponds to the "non-alarm" state and the value 1 corresponds to the "alarm" state (violation of the set threshold value).
- Variable Temp Alarm
  - Refer to paragraph 4.4.1.2 " Description of ETC settings " for the operation of this variable.
    - The value 0 corresponds to the "non-alarm" state (no exceeding of the set threshold value) and the value 1 corresponds to the "alarm" state (exceeding of the set threshold value).
- Variables DI 1 (Digital Input)
  - Refer to paragraph 4.4.1.2 " Description of CONFIG settings " for the operation of this variable.
    - The variable is at value 0 (Off) if no voltage is applied to the DI contact.
    - The variable is at value 1 (On) if a voltage is applied to the DI contact.
- Example
  - The value read in hexadecimal is 1C11 (0001110000010001 in binary).
    - T-Sag, R-Sag and R-Sag at value 1: voltage sag detected on the voltage phases R, S and T
    - Temp Alarm at value 1: Detection of temperature threshold being exceeded
    - DI 1 to value 1: DI (Digital Input) input is live

5.2.2 VOLTAGE SAG (T-SAG, S-SAG, R-SAG) AND SWELL (T-SWELL, S-SWELL, R-SWELL) VARIABLES

- The variables associated with the operation of voltage sag and swell events are as follows:
  - Values of the thresholds programmed on voltage sags (Sag Level) and swells (Swell Level) (see paragraph 4.4.1.2 - Description of ETC settings).
  - T-Sag, S-Sag, R-Sag, T-Swell, S-Swell, R-Swell (see paragraph 5.2.1 - Table 1)
  - Date and Time for voltage sags: addresses 5C to 61 (Hexa)in the reduced measurement table or 958 to 95D (Hexa) in the full measurement table.
    - The Date and Time variables for a voltage sag are updated every second between the start and end of the event, to allow the duration of the voltage sag to be calculated. The values are locked when the voltage sag fault disappears.
  - Date and Time for voltage swells: addresses 62 to 67 (Hexa) in the reduced table of measurements or 95E to 963 (Hexa) in the full table of measurements.
    - The Date and Time variables for an overvoltage record the time when the overvoltage threshold is exceeded. They are updated when the next overvoltage threshold is detected. The recorded values are the date and time of the last detected overvoltage.

5.2.3 TABLE 2

Table 2. Feeder status

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
									Alarm 3	Alarm 2	Alarm 1	T OC	S OC	R OC	operate
									fonction non applicable pour ULYSMCM			Value 0 : not active / Valeur 0 : non actif Value 1 : active / Valeur 1 : actif			Value 0 : not use / Valeur 0 : non opérationnel Value 1 : use / Valeur 1 : opérationnel

- Alarm status variables for the variable “Demand total prediction in W": Alarm 1, Alarm 2 and Alarm 3.
  - Refer to paragraphs "4.4.1.2 Description of ETC settings " and "4.4.2 Description of the Feeder Setting tab" for the operation of these variables.
- Variables Overcurrent alarms: T OC, S OC and R OC
  - Refer to " 3.4.2.2 Saving settings " and " 4.4.2 Description of the Feeder Setting tab " for operation of this variable.
    - R, S, T correspond respectively to the intensities phase 1 (I1), phase 2 (I2), phase 3 (I3).
    - The value 0 corresponds to the" non-alarm "state (no exceeding of the set threshold value).
    - The value 1 corresponds to the" alarm " state (exceeding the permitted time and the set threshold value).
- Variable Parameter setting of the type of connection of the voltage and current inputs: Operate
  - Refer to paragraphs 3.4.2.2 " Saving settings " and 4.4.2 " Description of the Feeder Setting tab " for operation of this variable.
    - The value of the variable " Operate " depends on the parameter values for the variables " Wire " (type of connection) and " CH " (parameterisation of the current measurement channels).
    - The value 0 corresponds to the status "Equipment not operational" (the variables "Wire" or “CH" are not correctly set).
    - The value 1 corresponds to the status "Equipment operational" (the variables "Wire" and "CH" are correctly set).

5.3 COMMAND WORDS

- "Demand Reset": address x0120
  - Reset average values (Demand)
  - Values updated every second in the mapping

5.4 TYPES OF MAPPING VARIABLES

Name of variables in the mapping	Type of variable	Description	Update	Reset
V, U, V unbalance, I, I total, I total unbalance, W, VAR, VA, Power THD, Power THD average, Angle, PF, Frequency, Temperature	1 sec Instantaneous values	Real time values of the measured quantities	every second	-
I total	I total	The calculation of this value depends on the value of the "Amp_Type" parameter programmed with the ULYS MCM D remote display: - "Amp_Type = total" > I total = I1 + I2 + I3 - "Amp_Type = average" > I total = (I1 + I2 + I3)/3	every second	-
Demand I, Demand I total, Demand W, Demand W total	Average values over 15, 30 or 60 minutes	Values recorded on average values over the last integration period of 15, 30 or 60 minutes elapsed	every 15, 30 or 60 minutes	Change of parameter on type and value of CT
V123(LN) arithmetic average, V123(LL) arithmetic average, I total average, PF arithmetic average, Power THD arithmetic average	Arithmetic average values	Arithmetic average values calculated with the values of each phase [e.g.: PF Average = (PF Phase1 + PF Phase2 + PF Phase3)/3]	every second	-
Max Demand I, Max Demand W, Max Demand I total, Max Demand W total	Max. values over 15, 30 or 60 minutes	Max values on quantities: Demand I, Demand I total, Demand W, Demand W total	when a new max value higher than the present value is calculated, or after a reset of the max values	Reset by using the "Demand Clear" command of the ULYS MCM UTILITY software
Demand W total prediction W	Demand W total prediction W	Value of the total active power (W), calculated every second, that would be reached at the end of the current 15, 30 or 60 minute period	every second	At the beginning of each new period 15, 30 or 60 minutes
Demand Current accumulated Wh	Demand Current accumulated Wh	Value of the total energy kWh accumulated in the current 15, 30 or 60 minute integration period.	every second	At the beginning of each new period 15, 30 or 60 minutes
V1 integrated average, V1 Min, V1 Max, V2 integrated average, V2 Min, V2 Max V3 integrated average, V3 Min, V3 Max, V1-2 integrated average, V1-2 Min, V1-2 Max, V2-3 integrated average, V2-3 Min, V2-3 Max, V3-1 integrated average, V3-1 Min, V3-1 Max	Voltage Previous Data	Recorded values of the variables on the voltages V, over the last integration period of 15, 30 or 60 minutes elapsed	every 15, 30 or 60 minutes	-
	Voltage Present Data	Real-time values of the variables on the voltages V	every second	-
Temp integrated average, Temp Min, Temp Max	Temp Previous Data	Recorded values of the temperature variables over the last integration period of 15, 30 or 60 minutes elapsed	every 15, 30 or 60 minutes	-
	Temp Present Data	Real-time values of temperature variables	every second	-
Operation Heartbit	Time counter	Cumulative operating time in steps of 100 ms	every 100 ms	-
Present CO2 Use Month	CO2 rate	Quantity of CO2 produced, calculated from the total energy consumption in kWh Amount of CO2 = total energy kWh x 0.42 (fixed rate not modifiable)	every second	-

5.5 MAPPING OF THE MODBUS VALUES OF ULYS MCM

The data format for each byte in RTU mode:

Coding System:	8-bit per byte
Data Format:	4 bytes (2registers) per parameter Most significant register first (Default)
Error Check Field:	2 byte Cyclical Redundancy Check (CRC)
Framing:	1 start bit 8 data bits, least significant bit sent first 1 bit for even/odd parity (or no parity) 1 stop bit if parity is needed; 1or 2 bits if no parity

The data coding information:

All data values are transferred as 32 bit IEEE754 floating point numbers, each value is transferred using two Modbus Protocol 16 bit registers. Bytes arrangement is big-endian (4-3-2-1). All registers read requests must specify an even number of registers.

The table below is an extract from the device mapping. The full table of Modbus variables is available in Excel format and can be downloaded from the CA Energy website.

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
Reduced Measurement Table - Table des mesures réduite										Input Words - (3x)
Full Measurement Table - Table des mesures complète										Input Words - (3x)
3x2301	2300	8FC	system		operation Heartbit	04	2	UINT16	1	increase per 100ms
3x2302	2301	8FD			temperature	04	2	INT16	10	
3x2303	2302	8FE			frequency	04	2	UINT16	100	
3x2304	2303	8FF			program version	04	2	UINT16	1	V1.01=>0x0101
3x2305	2304	900			present CO2 use(month)	04	2	UINT16	10	
3x2306	2305	901			reserved	04	6			
3x2307	2308	904	status		internal status	04	2	UINT16	1	See Table 1
3x2308	2309	905			feeder #1 status	04	2	UINT16	1	See Table 2
3x2309	2310	906			feeder #2 status	04	2	UINT16	1	
3x2310	2311	907			feeder #3 status	04	2	UINT16	1	
3x2311	2312	908			feeder #4 status	04	2	UINT16	1	
3x2312	2313	909			feeder #5 status	04	2	UINT16	1	
3x2313	2314	90A			feeder #6 status	04	2	UINT16	1	
3x2314	2315	90B			feeder #7 status	04	2	UINT16	1	
3x2315	2316	90C			feeder #8 status	04	2	UINT16	1	
3x2316	2317	90D			feeder #9 status	04	2	UINT16	1	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x2360	2361	939	status		feeder #53 status	04	2	UINT16	1	
3x2361	2362	93A			feeder #54 status	04	2	UINT16	1	
3x2362	2363	93B			reserved	04	2			
3x2363	2364	93C	voltage	total	V123(LN) average	04	4	UINT32	100	
3x2364	2366	93E			V123(LL) average	04	4	UINT32	100	
3x2365	2368	940			V123(LN) unbalance	04	2	UINT16	100	
3x2366	2369	941			V123(LL) unbalance	04	2	UINT16	100	
3x2367	2370	942		1	V1	04	4	UINT32	100	
3x2368	2372	944			V12	04	4	UINT32	100	
3x2369	2374	946			V1 unbalance	04	2	UINT16	100	
3x2370	2375	947			V12 unbalance	04	2	UINT16	100	
3x2371	2376	948		2	V2	04	4	UINT32	100	
3x2372	2378	94A			V23	04	4	UINT32	100	
3x2373	2380	94C			V2 unbalance	04	2	UINT16	100	
3x2374	2381	94D			V23 unbalance	04	2	UINT16	100	
3x2375	2382	94E		3	V3	04	4	UINT32	100	
3x2376	2384	950			V31	04	4	UINT32	100	
3x2377	2386	952			V3 unbalance	04	2	UINT16	100	
3x2378	2387	953			V31 unbalance	04	2	UINT16	100	
3x2379	2388	954			reserved	04	8			
3x2380	2392	958	sag		year	04	2	UINT16		
3x2381	2393	959			mon	04	2	UINT16		
3x2382	2394	95A			day	04	2	UINT16		
3x2383	2395	95B			hour	04	2	UINT16		
3x2384	2396	95C			min	04	2	UINT16		
3x2385	2397	95D			sec	04	2	UINT16		
3x2386	2398	95E	swell		year	04	2	UINT16		
3x2387	2399	95F			mon	04	2	UINT16		
3x2388	2400	960			day	04	2	UINT16		
3x2389	2401	961			hour	04	2	UINT16		
3x2390	2402	962			min	04	2	UINT16		
3x2391	2403	963			sec	04	2	UINT16		
3x2392	2404	964			reserved	04	32			

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
			status							
3x2393	2420	974	#1	total	type	04	2	UINT16	1	0 : not used, 1: 1P2w_A, 2: 1P2w_B, 3: 1P2w_C, 4: 3P3W(2CT), 5 :3P4W, 6 : 3P3W(3CT)
3x2394	2421	975			reserved	04	2			
3x2395	2422	976			I total	04	4	UINT32	100	
3x2396	2424	978			W	04	4	INT32	1	
3x2397	2426	97A			VAR	04	4	INT32	1	
3x2398	2428	97C			VA	04	4	UINT32	1	
3x2399	2430	97E			PF average	04	2	INT16	100	
3x2400	2431	97F			reserved	04	2			
3x2401	2432	980			I total unbalance	04	2	UINT16	100	
3x2402	2433	981			Power THD average	04	2	UINT16	100	
3x2403	2434	982			reserved	04	4			
3x2404	2436	984		1	V1	04	4	UINT32	100	
3x2405	2438	986			I1	04	4	UINT32	100	
3x2406	2440	988			W	04	4	INT32	1	
3x2407	2442	98A			VAR	04	4	INT32	1	
3x2408	2444	98C			VA	04	4	UINT32	1	
3x2409	2446	98E			V1 unbalance	04	2	UINT16	100	
3x2410	2447	98F			I1 unbalance	04	2	UINT16	100	
3x2411	2448	990			Angle (degré)	04	2	UINT16	100	
3x2412	2449	991			PF	04	2	INT16	100	
3x2413	2450	992			Power THD	04	2	UINT16	100	
3x2414	2451	993			reserved	04	2			
3x2415	2452	994		2	V2	04	4	UINT32	100	
3x2416	2454	996			I2	04	4	UINT32	100	
3x2417	2456	998			W	04	4	INT32	1	
3x2418	2458	99A			VAR	04	4	INT32	1	
3x2419	2460	99C			VA	04	4	UINT32	1	
3x2420	2462	99E			V2 unbalance	04	2	UINT16	100	
3x2421	2463	99F			I2 unbalance	04	2	UINT16	100	
3x2422	2464	9A0			Angle (degré)	04	2	UINT16	100	
3x2423	2465	9A1			PF	04	2	INT16	100	
3x2424	2466	9A2			Power THD	04	2	UINT16	100	
3x2425	2467	9A3			reserved	04	2			

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x2426	2468	9A4	#1	3	V3	04	4	UINT32	100	
3x2427	2470	9A6			I3	04	4	UINT32	100	
3x2428	2472	9A8			W	04	4	INT32	1	
3x2429	2474	9AA			VAR	04	4	INT32	1	
3x2430	2476	9AC			VA	04	4	UINT32	1	
3x2431	2478	9AE			V3 unbalance	04	2	UINT16	100	
3x2432	2479	9AF			I3 unbalance	04	2	UINT16	100	
3x2433	2480	9B0			Angle (degré)	04	2	UINT16	100	
3x2434	2481	9B1			PF	04	2	INT16	100	
3x2435	2482	9B2			Power THD	04	2	UINT16	100	
3x2436	2483	9B3			reserved	04	2			
3x2437	2484	9B4	#2	total	type	04	2	UINT16	1	
3x2438	2485	9B5			reserved	04	2			
3x2439	2486	9B6			I total	04	4	UINT32	100	
3x2440	2488	9B8			W	04	4	INT32	1	
3x2441	2490	9BA			VAR	04	4	INT32	1	
3x2442	2492	9BC			VA	04	4	UINT32	1	
3x2443	2494	9BE			PF average	04	2	INT16	100	
3x2444	2495	9BF			reserved	04	2			
3x2445	2496	9C0			I total unbalance	04	2	UINT16	100	
3x2446	2497	9C1			Power THD average	04	2	UINT16	100	
3x2447	2498	9C2			reserved	04	4			
3x2448	2500	9C4		1	V1	04	4	UINT32	100	
3x2449	2502	9C6			I1	04	4	UINT32	100	
3x2450	2504	9C8			W	04	4	INT32	1	
3x2451	2506	9CA			VAR	04	4	INT32	1	
3x2452	2508	9CC			VA	04	4	UINT32	1	
3x2453	2510	9CE			V1 unbalance	04	2	UINT16	100	
3x2454	2511	9CF			I1 unbalance	04	2	UINT16	100	
3x2455	2512	9D0			Angle (degré)	04	2	UINT16	100	
3x2456	2513	9D1			PF	04	2	INT16	100	
3x2457	2514	9D2			Power THD	04	2	UINT16	100	
3x2458	2515	9D3			reserved	04	2			
3x2459	2516	9D4		2	V2	04	4	UINT32	100	
3x2460	2518	9D6			I2	04	4	UINT32	100	
3x2461	2520	9D8			W	04	4	INT32	1	
3x2462	2522	9DA			VAR	04	4	INT32	1	
3x2463	2524	9DC			VA	04	4	UINT32	1	
3x2464	2526	9DE			V2 unbalance	04	2	UINT16	100	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x2465	2527	9DF			I2 unbalance	04	2	UINT16	100	
3x2466	2528	9E0			Angle (degré)	04	2	UINT16	100	
3x2467	2529	9E1			PF	04	2	INT16	100	
3x2468	2530	9E2			Power THD	04	2	UINT16	100	
3x2469	2531	9E3			reserved	04	2			
3x2470	2532	9E4			V3	04	4	UINT32	100	
3x2471	2534	9E6			I3	04	4	UINT32	100	
3x2472	2536	9E8			W	04	4	INT32	1	
3x2473	2538	9EA			VAR	04	4	INT32	1	
3x2474	2540	9EC			VA	04	4	UINT32	1	
3x2475	2542	9EE		3	V3 unbalance	04	2	UINT16	100	
3x2476	2543	9EF			I3 unbalance	04	2	UINT16	100	
3x2477	2544	9F0			Angle (degré)	04	2	UINT16	100	
3x2478	2545	9F1			PF	04	2	INT16	100	
3x2479	2546	9F2			Power THD	04	2	UINT16	100	
3x2480	2547	9F3			reserved	04	2			
3x2745	2932	B74			type	04	2	UINT16	1	
3x2746	2933	B75			reserved	04	2			
3x2747	2934	B76			I total	04	4	UINT32	100	
3x2748	2936	B78			W	04	4	INT32	1	
3x2749	2938	B7A			VAR	04	4	INT32	1	
3x2750	2940	B7C		total	VA	04	4	UINT32	1	
3x2751	2942	B7E			PF average	04	2	INT16	100	
3x2752	2943	B7F			reserved	04	2			
3x2753	2944	B80			I total unbalance	04	2	UINT16	100	
3x2754	2945	B81			Power THD average	04	2	UINT16	100	
3x2755	2946	B82			reserved	04	4			
3x2756	2948	B84			V1	04	4	UINT32	100	
3x2757	2950	B86			I1	04	4	UINT32	100	
3x2758	2952	B88			W	04	4	INT32	1	
3x2759	2954	B8A			VAR	04	4	INT32	1	
3x2760	2956	B8C			VA	04	4	UINT32	1	
3x2761	2958	B8E		1	V1 unbalance	04	2	UINT16	100	
3x2762	2959	B8F			I1 unbalance	04	2	UINT16	100	
3x2763	2960	B90			Angle (degré)	04	2	UINT16	100	
3x2764	2961	B91			PF	04	2	INT16	100	
3x2765	2962	B92			Power THD	04	2	UINT16	100	
3x2766	2963	B93	#9		reserved	04	2			
3x2767	2964	B94			V2	04	4	UINT32	100	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x2766	2963	B93	#9		reserved	04	2			
3x2767	2964	B94		2	V2	04	4	UINT32	100	
3x2768	2966	B96			I2	04	4	UINT32	100	
3x2769	2968	B98			W	04	4	INT32	1	
3x2770	2970	B9A			VAR	04	4	INT32	1	
3x2771	2972	B9C			VA	04	4	UINT32	1	
3x2772	2974	B9E			V2 unbalance	04	2	UINT16	100	
3x2773	2975	B9F			I2 unbalance	04	2	UINT16	100	
3x2774	2976	BA0			Angle (degré)	04	2	UINT16	100	
3x2775	2977	BA1			PF	04	2	INT16	100	
3x2776	2978	BA2			Power THD	04	2	UINT16	100	
3x2777	2979	BA3			reserved	04	2			
3x2778	2980	BA4		3	V3	04	4	UINT32	100	
3x2779	2982	BA6			I3	04	4	UINT32	100	
3x2780	2984	BA8			W	04	4	INT32	1	
3x2781	2986	BAA			VAR	04	4	INT32	1	
3x2782	2988	BAC			VA	04	4	UINT32	1	
3x2783	2990	BAE			V3 unbalance	04	2	UINT16	100	
3x2784	2991	BAF			I3 unbalance	04	2	UINT16	100	
3x2785	2992	BB0			Angle (degré)	04	2	UINT16	100	
3x2786	2993	BB1			PF	04	2	INT16	100	
3x2787	2994	BB2			Power THD	04	2	UINT16	100	
3x2788	2995	BB3			reserved	04	2			
3x4681	5748	1674		total	type	04	2	UINT16	1	
3x4682	5749	1675			reserved	04	2			
3x4683	5750	1676			I total	04	4	UINT32	100	
3x4684	5752	1678			W	04	4	INT32	1	
3x4685	5754	167A			VAR	04	4	INT32	1	
3x4686	5756	167C			VA	04	4	UINT32	1	
3x4687	5758	167E			PF average	04	2	INT16	100	
3x4688	5759	167F			reserved	04	2			
3x4689	5760	1680			I total unbalance	04	2	UINT16	100	
3x4690	5761	1681			Power THD average	04	2	UINT16	100	
3x4691	5762	1682			reserved	04	4			

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x4691	5762	1682	#53		reserved	04	4			
3x4692	5764	1684		1	V1	04	4	UINT32	100	
3x4693	5766	1686			I1	04	4	UINT32	100	
3x4694	5768	1688			W	04	4	INT32	1	
3x4695	5770	168A			VAR	04	4	INT32	1	
3x4696	5772	168C			VA	04	4	UINT32	1	
3x4697	5774	168E			V1 unbalance	04	2	UINT16	100	
3x4698	5775	168F			I1 unbalance	04	2	UINT16	100	
3x4699	5776	1690			Angle (degré)	04	2	UINT16	100	
3x4700	5777	1691			PF	04	2	INT16	100	
3x4701	5778	1692			Power THD	04	2	UINT16	100	
3x4702	5779	1693			reserved	04	2			
3x4703	5780	1694		2	V2	04	4	UINT32	100	
3x4704	5782	1696			I2	04	4	UINT32	100	
3x4705	5784	1698			W	04	4	INT32	1	
3x4706	5786	169A			VAR	04	4	INT32	1	
3x4707	5788	169C			VA	04	4	UINT32	1	
3x4708	5790	169E			V2 unbalance	04	2	UINT16	100	
3x4709	5791	169F			I2 unbalance	04	2	UINT16	100	
3x4710	5792	16A0			Angle (degré)	04	2	UINT16	100	
3x4711	5793	16A1			PF	04	2	INT16	100	
3x4712	5794	16A2			Power THD	04	2	UINT16	100	
3x4713	5795	16A3			reserved	04	2			
3x4714	5796	16A4		3	V3	04	4	UINT32	100	
3x4715	5798	16A6			I3	04	4	UINT32	100	
3x4716	5800	16A8			W	04	4	INT32	1	
3x4717	5802	16AA			VAR	04	4	INT32	1	
3x4718	5804	16AC			VA	04	4	UINT32	1	
3x4719	5806	16AE			V3 unbalance	04	2	UINT16	100	
3x4720	5807	16AF			I3 unbalance	04	2	UINT16	100	
3x4721	5808	16B0			Angle (degré)	04	2	UINT16	100	
3x4722	5809	16B1			PF	04	2	INT16	100	
3x4723	5810	16B2			Power THD	04	2	UINT16	100	
3x4724	5811	16B3			reserved	04	2			

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x4725	5812	16B4	#54	total	type	04	2	UINT16	1	
3x4726	5813	16B5			reserved	04	2			
3x4727	5814	16B6			I total	04	4	UINT32	100	
3x4728	5816	16B8			W	04	4	INT32	1	
3x4729	5818	16BA			VAR	04	4	INT32	1	
3x4730	5820	16BC			VA	04	4	UINT32	1	
3x4731	5822	16BE			PF average	04	2	INT16	100	
3x4732	5823	16BF			reserved	04	2			
3x4733	5824	16C0			I total unbalance	04	2	UINT16	100	
3x4734	5825	16C1			Power THD average	04	2	UINT16	100	
3x4735	5826	16C2			reserved	04	4			
3x4736	5828	16C4		1	V1	04	4	UINT32	100	
3x4737	5830	16C6			I1	04	4	UINT32	100	
3x4738	5832	16C8			W	04	4	INT32	1	
3x4739	5834	16CA			VAR	04	4	INT32	1	
3x4740	5836	16CC			VA	04	4	UINT32	1	
3x4741	5838	16CE			V1 unbalance	04	2	UINT16	100	
3x4742	5839	16CF			I1 unbalance	04	2	UINT16	100	
3x4743	5840	16D0			Angle (degré)	04	2	UINT16	100	
3x4744	5841	16D1			PF	04	2	INT16	100	
3x4745	5842	16D2			Power THD	04	2	UINT16	100	
3x4746	5843	16D3			reserved	04	2			
3x4747	5844	16D4		2	V2	04	4	UINT32	100	
3x4748	5846	16D6			I2	04	4	UINT32	100	
3x4749	5848	16D8			W	04	4	INT32	1	
3x4750	5850	16DA			VAR	04	4	INT32	1	
3x4751	5852	16DC			VA	04	4	UINT32	1	
3x4752	5854	16DE			V2 unbalance	04	2	UINT16	100	
3x4753	5855	16DF			I2 unbalance	04	2	UINT16	100	
3x4754	5856	16E0			Angle (degré)	04	2	UINT16	100	
3x4755	5857	16E1			PF	04	2	INT16	100	
3x4756	5858	16E2			Power THD	04	2	UINT16	100	
3x4757	5859	16E3			reserved	04	2			

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x4757	5859	16E3			reserved	04	2			
3x4758	5860	16E4			V3	04	4	UINT32	100	
3x4759	5862	16E6			I3	04	4	UINT32	100	
3x4760	5864	16E8			W	04	4	INT32	1	
3x4761	5866	16EA			VAR	04	4	INT32	1	
3x4762	5868	16EC			VA	04	4	UINT32	1	
3x4763	5870	16EE		3	V3 unbalance	04	2	UINT16	100	
3x4764	5871	16EF			I3 unbalance	04	2	UINT16	100	
3x4765	5872	16F0			Angle (degré)	04	2	UINT16	100	
3x4766	5873	16F1			PF	04	2	INT16	100	
3x4767	5874	16F2			Power THD	04	2	UINT16	100	
3x4768	5875	16F3			reserved	04	2			
Demand values Table - Table des valeurs Demand										Input Words - (3x)
3x6001	6000	1770			Demand I	04	4	UINT32	100	
3x6002	6002	1772		1	Max Demand I	04	4	UINT32	100	
3x6003	6004	1774			Demand W	04	4	INT32	1	
3x6004	6006	1776			Max Demand W	04	4	INT32	1	
3x6005	6008	1778			Demand I	04	4	UINT32	100	
3x6006	6010	177A		2	Max Demand I	04	4	UINT32	100	
3x6007	6012	177C			Demand W	04	4	INT32	1	
3x6008	6014	177E			Max Demand W	04	4	INT32	1	
3x6009	6016	1780	#1		Demand I	04	4	UINT32	100	
3x6010	6018	1782		3	Max Demand I	04	4	UINT32	100	
3x6011	6020	1784			Demand W	04	4	INT32	1	
3x6012	6022	1786			Max Demand W	04	4	INT32	1	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x6012	6022	1786			Max Demand W	04	4	INT32	1	
3x6013	6024	1788		total	Demand I total	04	4	UINT32	100	
3x6014	6026	178A			Max Demand I total	04	4	UINT32	100	
3x6015	6028	178C			Demand W total	04	4	INT32	1	
3x6016	6030	178E			Max Demand W total	04	4	INT32	1	
3x6017	6032	1790			Demand W total prediction	04	4	INT32	1	
3x6018	6034	1792		1	Demand I	04	4	UINT32	100	
3x6019	6036	1794			Max Demand I	04	4	UINT32	100	
3x6020	6038	1796			Demand W	04	4	INT32	1	
3x6021	6040	1798			Max Demand W	04	4	INT32	1	
3x6022	6042	179A		2	Demand I	04	4	UINT32	100	
3x6023	6044	179C			Max Demand I	04	4	UINT32	100	
3x6024	6046	179E			Demand W	04	4	INT32	1	
3x6025	6048	17A0			Max Demand W	04	4	INT32	1	
3x6026	6050	17A2	#2	3	Demand I	04	4	UINT32	100	
3x6027	6052	17A4			Max Demand I	04	4	UINT32	100	
3x6028	6054	17A6			Demand W	04	4	INT32	1	
3x6029	6056	17A8			Max Demand W	04	4	INT32	1	
3x6030	6058	17AA		total	Demand I total	04	4	UINT32	100	
3x6031	6060	17AC			Max Demand I total	04	4	UINT32	100	
3x6032	6062	17AE			Demand W total	04	4	INT32	1	
3x6033	6064	17B0			Max Demand W total	04	4	INT32	1	
3x6034	6066	17B2			Demand W total prediction	04	4	INT32	1	
3x6137	6272	1880		1	Demand I	04	4	UINT32	100	
3x6138	6274	1882			Max Demand I	04	4	UINT32	100	
3x6139	6276	1884			Demand W	04	4	INT32	1	
3x6140	6278	1886			Max Demand W	04	4	INT32	1	
3x6141	6280	1888		2	Demand I	04	4	UINT32	100	
3x6142	6282	188A			Max Demand I	04	4	UINT32	100	
3x6143	6284	188C			Demand W	04	4	INT32	1	
3x6144	6286	188E			Max Demand W	04	4	INT32	1	
3x6145	6288	1890	#9	3	Demand I	04	4	UINT32	100	
3x6146	6290	1892			Max Demand I	04	4	UINT32	100	
3x6147	6292	1894			Demand W	04	4	INT32	1	
3x6148	6294	1896			Max Demand W	04	4	INT32	1	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x6148	6294	1896			Max Demand W	04	4	INT32	1	
3x6149	6296	1898		total	Demand I total	04	4	UINT32	100	
3x6150	6298	189A			Max Demand I total	04	4	UINT32	100	
3x6151	6300	189C			Demand W total	04	4	INT32	1	
3x6152	6302	189E			Max Demand W total	04	4	INT32	1	
3x6153	6304	18A0			Demand W total prediction	04	4	INT32	1	
3x6885	7768	1E58		1	Demand I	04	4	UINT32	100	
3x6886	7770	1E5A			Max Demand I	04	4	UINT32	100	
3x6887	7772	1E5C			Demand W	04	4	INT32	1	
3x6888	7774	1E5E			Max Demand W	04	4	INT32	1	
3x6889	7776	1E60		2	Demand I	04	4	UINT32	100	
3x6890	7778	1E62			Max Demand I	04	4	UINT32	100	
3x6891	7780	1E64			Demand W	04	4	INT32	1	
3x6892	7782	1E66			Max Demand W	04	4	INT32	1	
3x6893	7784	1E68	#53	3	Demand I	04	4	UINT32	100	
3x6894	7786	1E6A			Max Demand I	04	4	UINT32	100	
3x6895	7788	1E6C			Demand W	04	4	INT32	1	
3x6896	7790	1E6E			Max Demand W	04	4	INT32	1	
3x6897	7792	1E70		total	Demand I total	04	4	UINT32	100	
3x6898	7794	1E72			Max Demand I total	04	4	UINT32	100	
3x6899	7796	1E74			Demand W total	04	4	INT32	1	
3x6900	7798	1E76			Max Demand W total	04	4	INT32	1	
3x6901	7800	1E78			Demand W total prediction	04	4	INT32	1	
3x6902	7802	1E7A		1	Demand I	04	4	UINT32	100	
3x6903	7804	1E7C			Max Demand I	04	4	UINT32	100	
3x6904	7806	1E7E			Demand W	04	4	INT32	1	
3x6905	7808	1E80			Max Demand W	04	4	INT32	1	
3x6906	7810	1E82		2	Demand I	04	4	UINT32	100	
3x6907	7812	1E84			Max Demand I	04	4	UINT32	100	
3x6908	7814	1E86			Demand W	04	4	INT32	1	
3x6909	7816	1E88			Max Demand W	04	4	INT32	1	
3x6910	7818	1E8A	#54	3	Demand I	04	4	UINT32	100	
3x6911	7820	1E8C			Max Demand I	04	4	UINT32	100	
3x6912	7822	1E8E			Demand W	04	4	INT32	1	
3x6913	7824	1E90			Max Demand W	04	4	INT32	1	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x6148	6294	1896			Max Demand W	04	4	INT32	1	
3x6149	6296	1898		total	Demand I total	04	4	UINT32	100	
3x6150	6298	189A			Max Demand I total	04	4	UINT32	100	
3x6151	6300	189C			Demand W total	04	4	INT32	1	
3x6152	6302	189E			Max Demand W total	04	4	INT32	1	
3x6153	6304	18A0			Demand W total prediction	04	4	INT32	1	
3x6885	7768	1E58		1	Demand I	04	4	UINT32	100	
3x6886	7770	1E5A			Max Demand I	04	4	UINT32	100	
3x6887	7772	1E5C			Demand W	04	4	INT32	1	
3x6888	7774	1E5E			Max Demand W	04	4	INT32	1	
3x6889	7776	1E60		2	Demand I	04	4	UINT32	100	
3x6890	7778	1E62			Max Demand I	04	4	UINT32	100	
3x6891	7780	1E64			Demand W	04	4	INT32	1	
3x6892	7782	1E66			Max Demand W	04	4	INT32	1	
3x6893	7784	1E68	#53	3	Demand I	04	4	UINT32	100	
3x6894	7786	1E6A			Max Demand I	04	4	UINT32	100	
3x6895	7788	1E6C			Demand W	04	4	INT32	1	
3x6896	7790	1E6E			Max Demand W	04	4	INT32	1	
3x6897	7792	1E70		total	Demand I total	04	4	UINT32	100	
3x6898	7794	1E72			Max Demand I total	04	4	UINT32	100	
3x6899	7796	1E74			Demand W total	04	4	INT32	1	
3x6900	7798	1E76			Max Demand W total	04	4	INT32	1	
3x6901	7800	1E78			Demand W total prediction	04	4	INT32	1	
3x6902	7802	1E7A		1	Demand I	04	4	UINT32	100	
3x6903	7804	1E7C			Max Demand I	04	4	UINT32	100	
3x6904	7806	1E7E			Demand W	04	4	INT32	1	
3x6905	7808	1E80			Max Demand W	04	4	INT32	1	
3x6906	7810	1E82		2	Demand I	04	4	UINT32	100	
3x6907	7812	1E84			Max Demand I	04	4	UINT32	100	
3x6908	7814	1E86			Demand W	04	4	INT32	1	
3x6909	7816	1E88			Max Demand W	04	4	INT32	1	
3x6910	7818	1E8A	#54	3	Demand I	04	4	UINT32	100	
3x6911	7820	1E8C			Max Demand I	04	4	UINT32	100	
3x6912	7822	1E8E			Demand W	04	4	INT32	1	
3x6913	7824	1E90			Max Demand W	04	4	INT32	1	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x6913	7824	1E90			Max Demand W	04	4	INT32	1	
3x6914	7826	1E92			Demand I total	04	4	UINT32	100	
3x6915	7828	1E94			Max Demand I total	04	4	UINT32	100	
3x6916	7830	1E96		total	Demand W total	04	4	INT32	1	
3x6917	7832	1E98			Max Demand W total	04	4	INT32	1	
3x6918	7834	1E9A			Demand W total prediction	04	4	INT32	1	
Energies values Table - Table valeurs des énergies										Input Words - (3x)
3x8001	8000	1F40			sum	04	4	UINT32	10	kWH. Ex)101 -> 10.1kWH
3x8002	8002	1F42		KWh	this month	04	4	UINT32	10	
3x8003	8004	1F44			last month	04	4	UINT32	10	
3x8004	8006	1F46			sum	04	4	UINT32	10	
3x8005	8008	1F48	#1	KVARh	this month	04	4	UINT32	10	
3x8006	8010	1F4A			last month	04	4	UINT32	10	
3x8007	8012	1F4C			sum	04	4	UINT32	10	
3x8008	8014	1F4E		KVAh	this month	04	4	UINT32	10	
3x8009	8016	1F50			last month	04	4	UINT32	10	
3x8010	8018	1F52			sum	04	4	UINT32	10	
3x8011	8020	1F54		KWh	this month	04	4	UINT32	10	
3x8012	8022	1F56			last month	04	4	UINT32	10	
3x8013	8024	1F58			sum	04	4	UINT32	10	
3x8014	8026	1F5A	#2	KVARh	this month	04	4	UINT32	10	
3x8015	8028	1F5C			last month	04	4	UINT32	10	
3x8016	8030	1F5E			sum	04	4	UINT32	10	
3x8017	8032	1F60		KVAh	this month	04	4	UINT32	10	
3x8018	8034	1F62			last month	04	4	UINT32	10	
3x8073	8144	1FD0			sum	04	4	UINT32	10	
3x8074	8146	1FD2		KWh	this month	04	4	UINT32	10	
3x8075	8148	1FD4			last month	04	4	UINT32	10	
3x8076	8150	1FD6			sum	04	4	UINT32	10	
3x8077	8152	1FD8	#9	KVARh	this month	04	4	UINT32	10	
3x8078	8154	1FDA			last month	04	4	UINT32	10	
3x8079	8156	1FDC			sum	04	4	UINT32	10	
3x8080	8158	1FDE		KVAh	this month	04	4	UINT32	10	
3x8081	8160	1FE0			last month	04	4	UINT32	10	

Registre	Addr Deci	Addr Hexa	Item	Phase	Description	FC	Bytes	Type	Scale	Remark
3x8081	8160	1FE0			last month	04	4	UINT32	10	
3x8469	8936	22E8			sum	04	4	UINT32	10	
3x8470	8938	22EA		KWh	this month	04	4	UINT32	10	
3x8471	8940	22EC			last month	04	4	UINT32	10	
3x8472	8942	22EE			sum	04	4	UINT32	10	
3x8473	8944	22F0	#53	KVARh	this month	04	4	UINT32	10	
3x8474	8946	22F2			last month	04	4	UINT32	10	
3x8475	8948	22F4			sum	04	4	UINT32	10	
3x8476	8950	22F6		KVAh	this month	04	4	UINT32	10	
3x8477	8952	22F8			last month	04	4	UINT32	10	
3x8478	8954	22FA			sum	04	4	UINT32	10	
3x8479	8956	22FC		KWh	this month	04	4	UINT32	10	
3x8480	8958	22FE			last month	04	4	UINT32	10	
3x8481	8960	2300			sum	04	4	UINT32	10	
3x8482	8962	2302	#54	KVARh	this month	04	4	UINT32	10	
3x8483	8964	2304			last month	04	4	UINT32	10	
3x8484	8966	2306			sum	04	4	UINT32	10	
3x8485	8968	2308		KVAh	this month	04	4	UINT32	10	
3x8486	8970	230A			last month	04	4	UINT32	10	

Date-time table and reset demand values - Table date-heure et RAZ valeurs Demand										Holding Registres - (4x)
4x0001	0	0	Lock		write time set enable	03 / 16	2	UINT16	10	0x1234 : unlock, 0 : lock
4x0002	1	1			year	03 / 16	2	UINT16	10	2012
4x0003	2	2			month	03 / 16	2	UINT16	10	1~12
4x0004	3	3			day	03 / 16	2	UINT16	10	1~31
4x0005	4	4	Time		weekdays	03 / 16	2	UINT16	10	0 : sun, 1 : mon
4x0006	5	5			hour	03 / 16	2	UINT16	10	0~23
4x0007	6	6			min	03 / 16	2	UINT16	10	0~59
4x0008	7	7			sec	03 / 16	2	UINT16	10	0~59
4x0009	281	119	Demand		Demand Reset	03 / 16	2	UINT16	1	0x1234 : reset

6 WARRANTY, RESPONSIBILITY AND INTELLECTUAL PROPERTY

6.1 WARRANTY

Unless expressly stipulated, the warranty runs for twelve months after the date of supply of the monitor (extract from our General Conditions of Sale, available on request).

6.2 INTELLECTUAL PROPERTY RIGHTS

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6.3 COPYRIGHT

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6.4 END-OF-LIFE EQUIPMENT

ULYS MCM is a trademark registered by CAE.

6.5 END OF LIFE OF THE DEVICES

The products which we sell do not fall within the scope of Decree No. 2005-829 relating to the construction of electrical and electronic equipment and the disposal of waste arising from this equipment.

In accordance with Article L541-2 of the Environmental Code, it is the responsibility of the holder of the waste to dispose of it, or to make sure it is disposed of, appropriately.

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