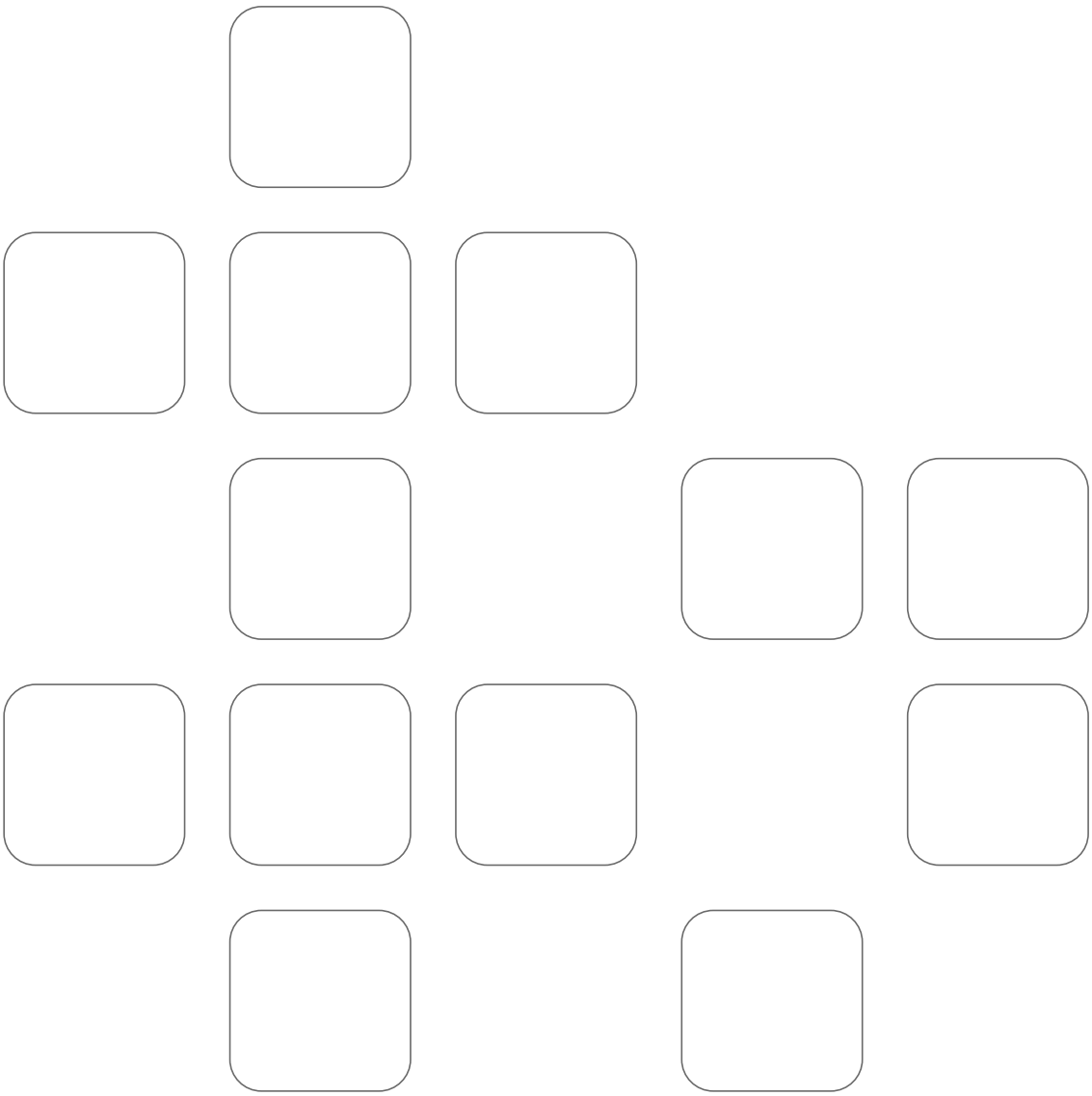
EC700

Pulses concentrator

GB User instructions



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Hazards and warning

Qualified personnel and correct operation

The equipment described in this document may only be installed, commissioned and operated by trained, qualified personnel. Failure to follow the procedures given in these instructions does not imply liability on the part of the manufacturer. Standards, directives, legal provisions and local regulations must be complied with.

Risk of electrocution, burns or explosion

- before working on the device, isolate all dangerous live components,
- always use an appropriate voltage detection device to confirm the absence of voltage
- replace all components, doors and covers before reconnecting this device to the power supply
- always use the appropriate specified voltage to supply this device.

Failure to comply with these precautions could result in serious injuries.

Risk of damage to the device

Ensure the correct:

- voltage across the AUX SUPPLY power supply terminals, 110- 400 Vac / 50-60 Hz
- voltage across the OUTPUT relay, 250 Vac or 30 Vdc.

Initial checks

For the safety of personnel and equipment, it is essential to read all of these instructions before using the device for the first time. Confirm the following points upon receipt of the package containing the EC700:

- the packaging is in good condition
- the product is in good condition
- the device part number matches that specified on your order
- the contents of the package:
  - 1 product
  - 1 resistance for line impedance
  - 1 mini CD
  - 1 quick start instructions.

Introduction

The EC700 is a pulse concentrator equipped with 7 digital inputs (logic or pulse signal) and an RS485 connection to the JBUS/MODBUS protocol.

It centralises and memorises pulses or logical signals in the output of electrical, gas, heating oil, water and compressed air meters or measurement units in order to:

- send them via the RS485 communication output to a remote energy management system (ENERGY REPORTING…)
- display a large number of these items on its local display screen for direct reading of information
- generate event alarms (1 dedicated relay output).

The EC700 enables advanced customisation of all items, facilitating direct reading of information concentrated in this way:

- metering unit per input: kWh, m³
- currency / input: €, K€, £, $…
- logical inputs (NO/NF, delay) or pulses (weight, synchronisation source, time intervals for load graphs)
- logical output: configurable alarm, NO/NF and time delay.

It is also possible to display, at any time:

- the physical status of each of the 7 digital inputs (contact open or closed, pulses present or not),
- the physical and functional status of the logical output (contact open or closed, output active or inactive),
- the status of 5 customisable events: date, activation time, duration, type (logical, threshold, or combination of 2 events), severity (4 information levels)
- the relative value (%) and absolute value (in the chosen unit) of the 2 analog inputs.

The communication interface of EC700 is 2-wire RS485 type using JBUS/MODBUS protocol and enables:

- remote access to all information produced by pulses concentrators units, above and beyond that displayed on its screen (cf. application note or JBUS/MODBUS table),
- this device to be operated from a PC or programmable logical controller (API/PLC).

This product can be configured locally (PROG menu) or by remote communication.

The device has the following functionalities, with direct reading on the display and values saved to memory:

- total and partial metering in the chosen unit with currency equivalent
- daily, weekly, monthly or annual metering
- partial metering from the last synchro trigger (in progress)
- metering on customised trigger (Perso)
- for each input, it memorises pulses by integrating them over a programmable interval (from 1 to 60 minutes in 1 miniute steps) to reconstitute a load graph.

Whatever the chosen integration interval, the load graph is created over a sliding period of 17 days.

- All information is accessible through JBUS/MODBUS.

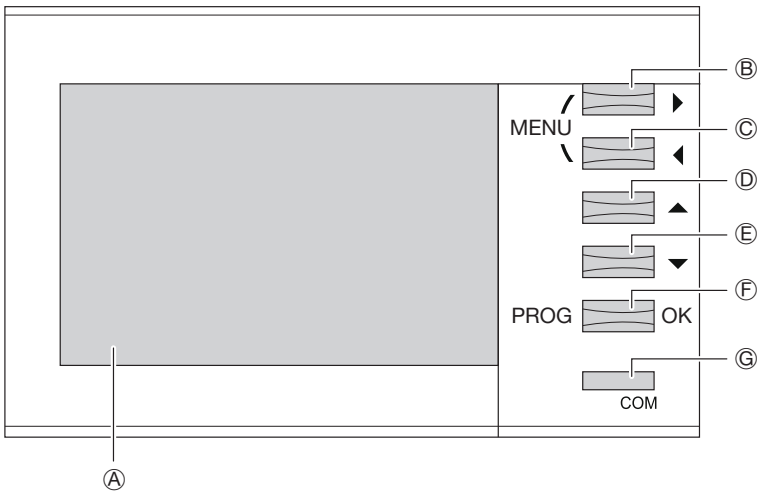
Ⓐ: backlight LCD display

Ⓑ and Ⓒ: keys to scroll through Menu functions (right-left)

Ⓓ: and Ⓔ: keys to scroll through Menu sub-functions (top-bottom)

Ⓕ: access key for programming functions (PROG)

Ⓖ: LED to indicate communication frame on RS485 port addressed by it



Jbus/modbus communication

RS485 MEDIA

In a standard configuration, one RS485 connection enables 32 UL* to be connected to a PC or PLC over 1200 metres using the JBUS/MODBUS® protocol.
*1 UL = 1 EC700.

Recommendations

An LIYCY type shielded twisted pair must be used.

In a disturbed environment, we recommend using a shielded twisted pair with general LIYCY-CY shielding.

If the distance is greater than 1200 metres and/or there are more than 32 devices, it is necessary to connect a repeater (1 channel) or a spark arrester (2 channels) to enable the connection of additional device (with communication interface over more than 1200 metres).

Important

It is essential to connect a resistance of 120 ohms to the 2 ends of the connection; this can be found in the product packaging. Other solutions are available (modem, fibre optic, etc.); please ask for details.

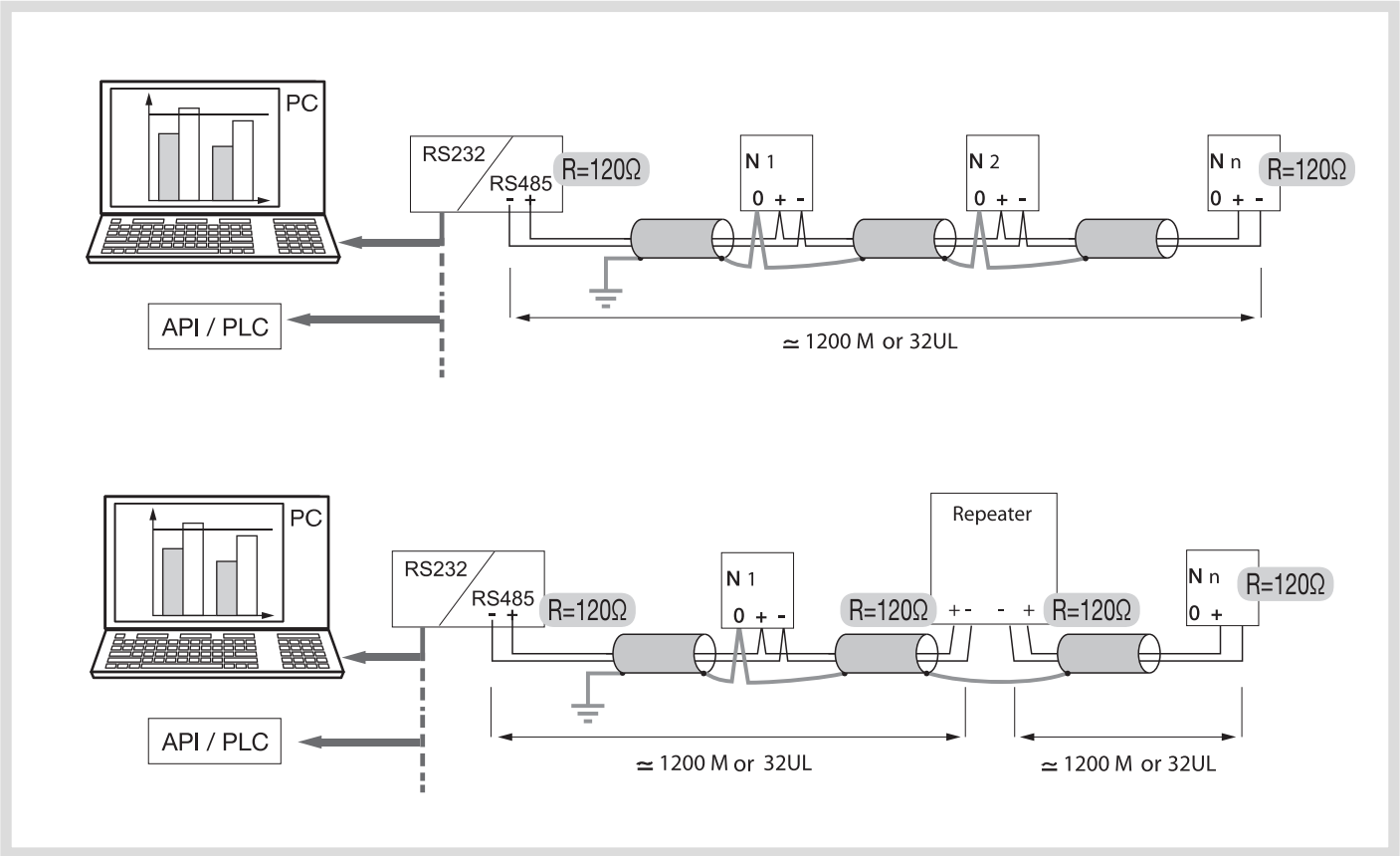
JBUS/MODBUS PROTOCOL

The JBUS/MODBUS protocol operates on a master/slave structure:
- Reading (Function 3),
- Writing (Function 6 or 16), broadcast option at address 0.

The communication method is RTU (Remote Terminal Unit) with hexadecimal characters comprising a minimum of 8 bits.

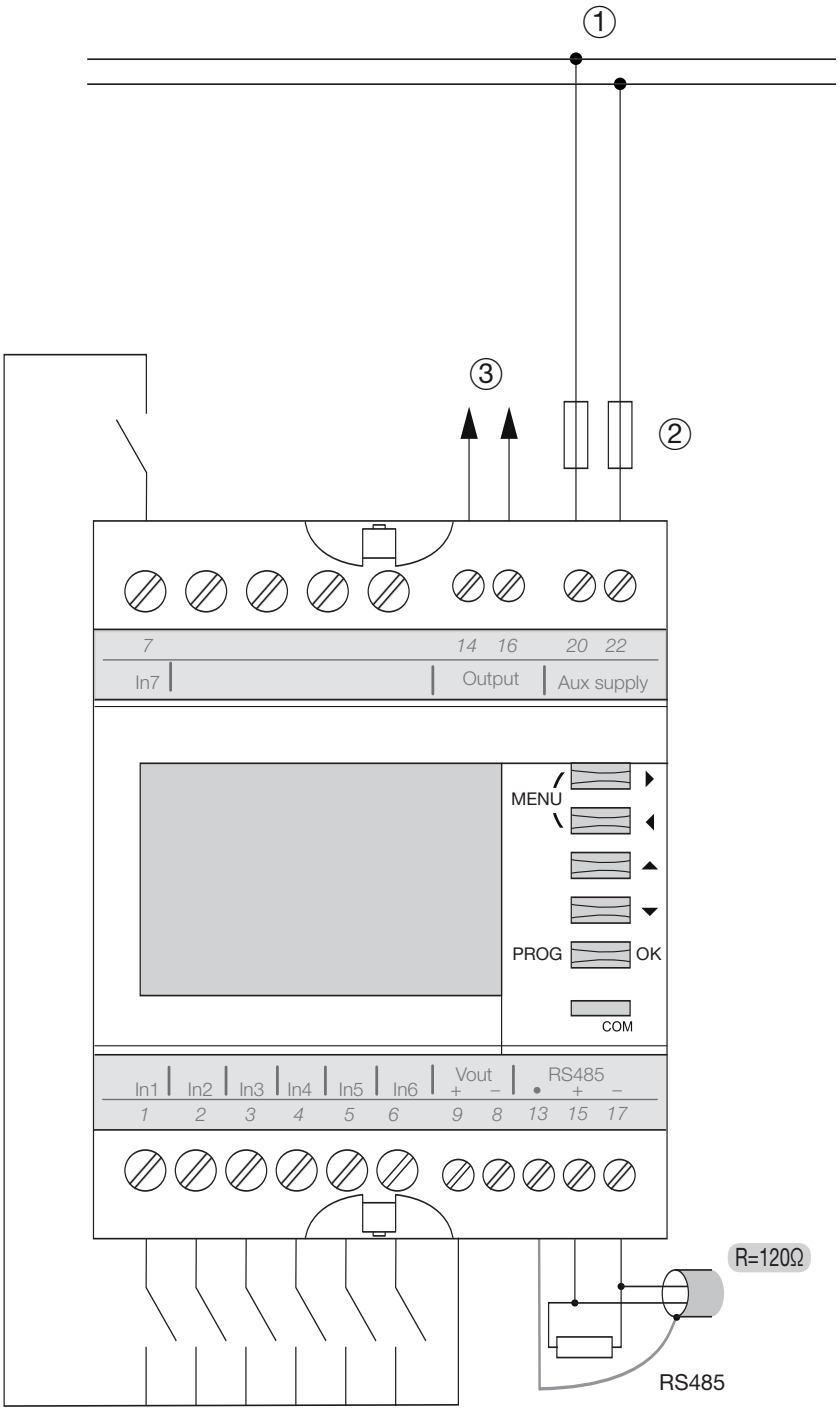
JBUS/MODBUS TABLE

The communication tables are available on the CD-Rom supplied with the EC700.

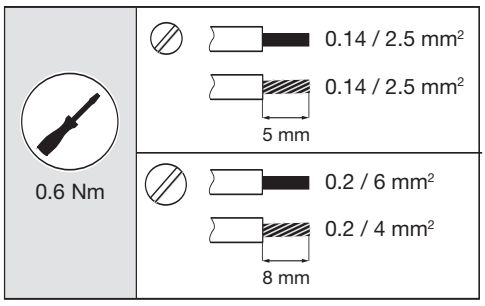


Installation

The EC700 meter can be mounted on a 35 mm rail. It must be used inside electrical cabinets.

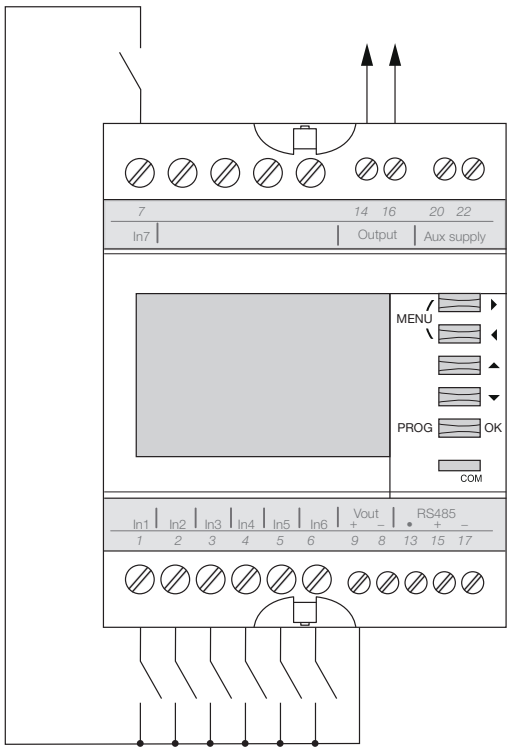


① Aux. 110 … 400 Vac
120 … 300 Vdc
② Fus. 0.5 A gG/BS 88 2A gG
③ 250 Vac 3A Relais
30 Vdc/1A

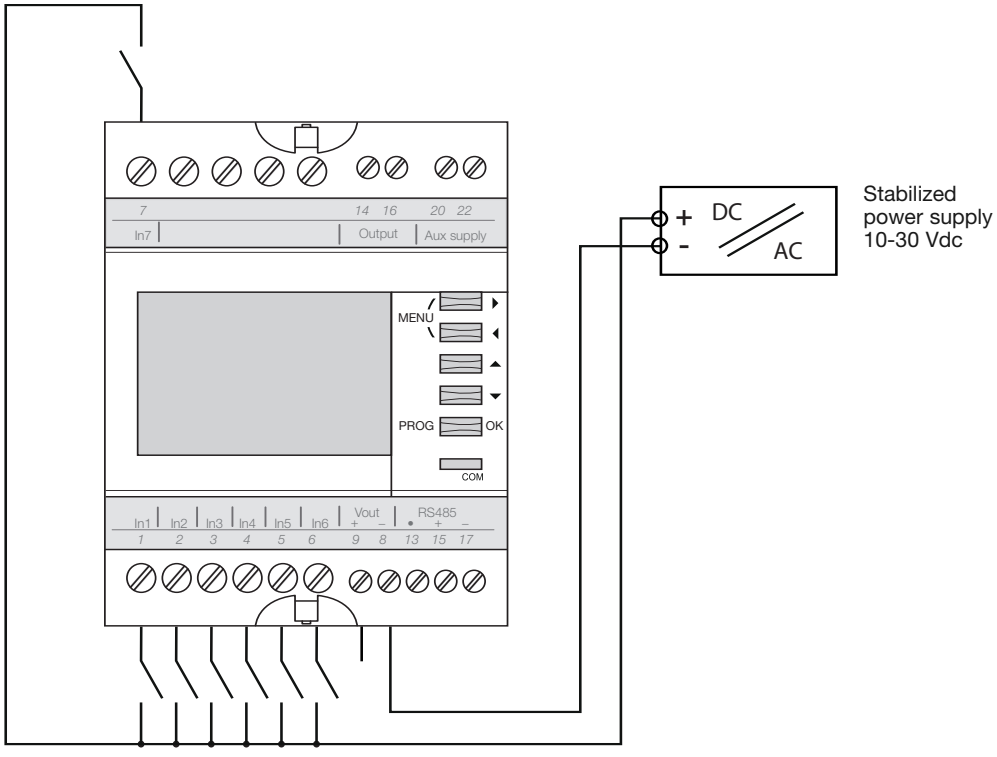


Connecting logical inputs

Internal polarisation, cable length 1000 m. max, 1.5 mm² min.



External polarisation, cable length 1000 m. max, 1.5 mm² min.



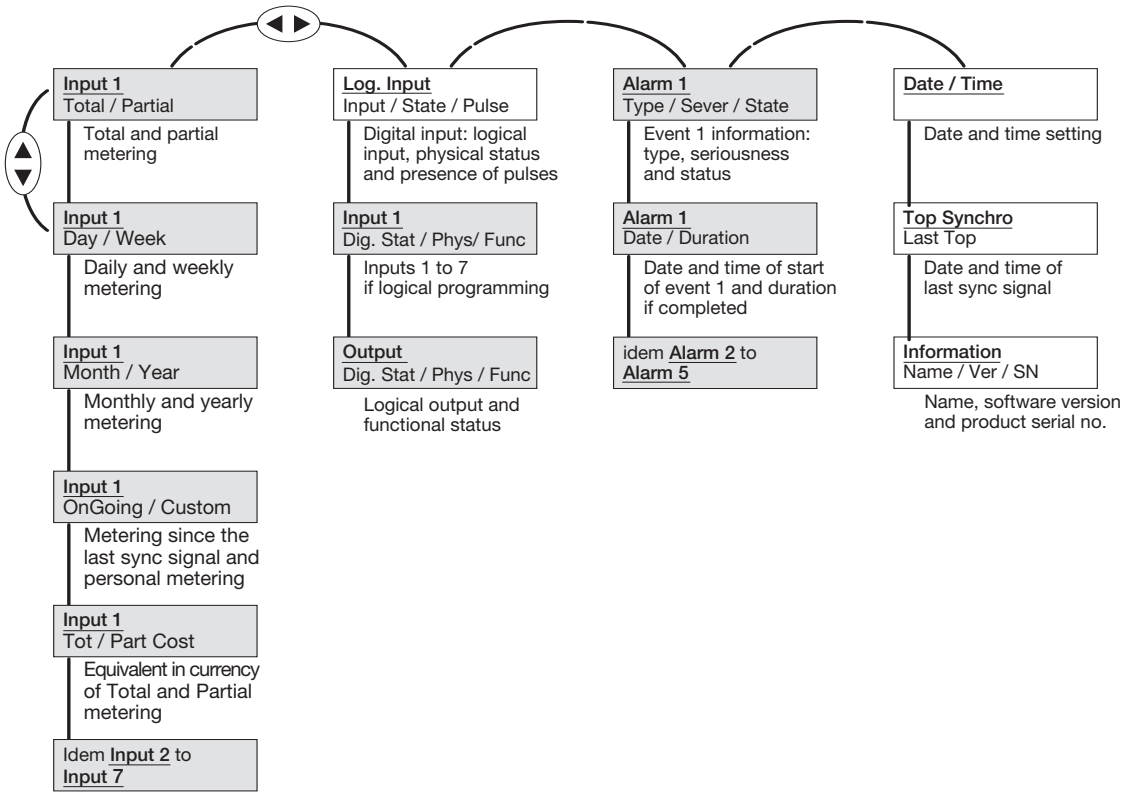
Notes

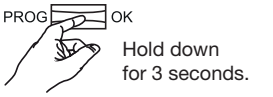
Configuration

- To enter configuration mode, press the PROG key for 3 seconds.
- You are asked for a code :
  - Normal user: code 1000 (default value, configurable number): all parameters can be modified EXCEPT those locked by the code 6825.
  - Advanced user: code 6825 (not configurable): allows access to all parameters accessible with the code 1000, as well as sensitive "maintenance" parameters: factory settings and Input Reset.
- After 1 minute if a key is not pressed = automatic exit from programming mode.
- The configuration is not saved.
- To save and quit programming mode, press and hold PROG.

Use

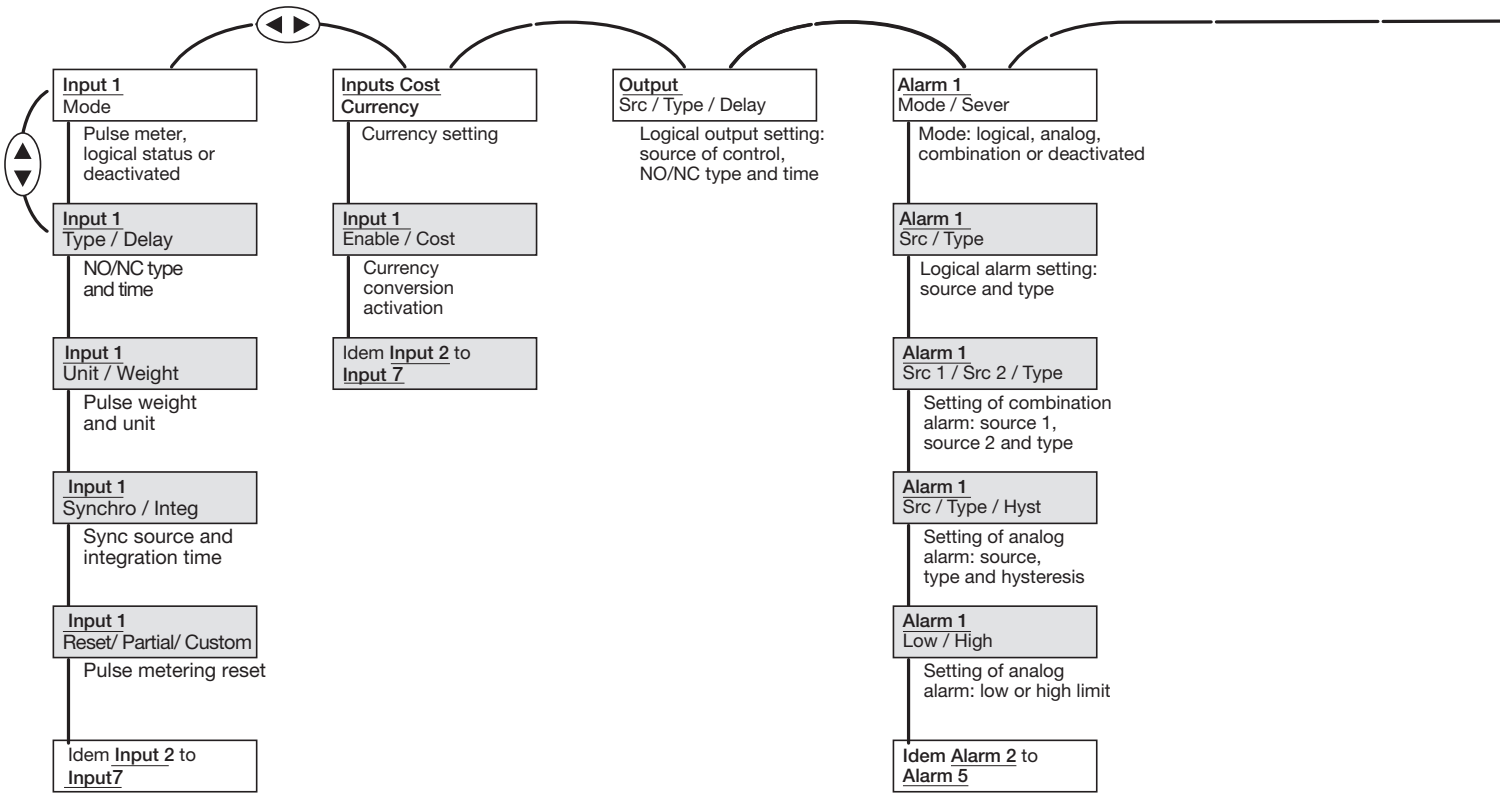
The screens presented in the USAGE / PROGRAMMING charts are not all visible: their display depends on the version of your EC700 and their configuration.





Hold down
for 3 seconds.

The screens presented in the USAGE/PROGRAMMING charts are not all visible : their display depends on the version of your EC700 and their configuration



MANUAL mode

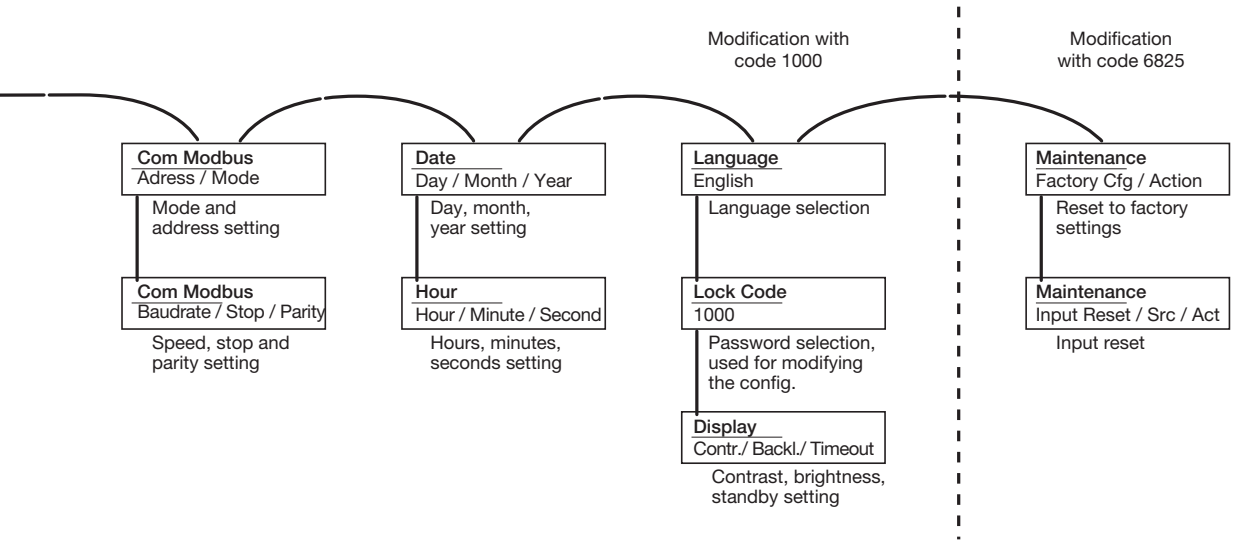
This mode enables manual configuration of all communication parameters JBUS/MODBUS: address, speed, parity, stop bit.

AUTO mode

This mode enables automatic configuration of most of the communication parameters (speed, parity, stop bit).
Only the communication address for the EC700 has to be entered.

The mode only functions under the following conditions:

- Communication speed between 9600 and 38400 baud.
- JBUS/MODBUS frame format:
  - 8 bits + 2 stop + no parity
  - 8 bits + 1 stop + parity.


Modification with code 1000
Modification with code 6825
Com Modbus
Adress / Mode
Mode and address setting
Com Modbus
Baudrate / Stop / Parity
Speed, stop and parity setting
Date
Day / Month / Year
Day, month, year setting
Hour
Hour / Minute / Second
Hours, minutes, seconds setting
Language
English
Language selection
Lock Code
1000
Password selection, used for modifying the config.
Display
Contr./ Backl./ Timeout
Contrast, brightness, standby setting
Maintenance
Factory Cfg / Action
Reset to factory settings
Maintenance
Input Reset / Src / Act
Input reset

Technical characteristics

Descriptions	Min	Max	Units	Comments
Auxiliary power supply				
AC voltage	110	400	Vac	+/-10%, 45/65 Hz,
DC voltage	120	300	Vdc	+/-10%, 5 VA
Climate				
Ambient temperature	-10	55	°C	IEC 60068-2-1/ -2-2
Storage temperature	-20	70	°C	IEC 60068-2-1/ -2-2
Ambient humidity		95	% RH	IEC 60068-2-30
Vibration				
Vibration		2	G	IEC 60068-2-6 10 to 100 Hz
Case				
Dimensions		73 x 90 x 67	mm	L x W x H
Weight		215	g	
Protection index of enclosure		IP51 / IP20		Front/Case
Electrical safety				
Cat. Install. /degree of pollution		III / 2		IEC 61010-1 ed. 3 (300 Vac Ph/N)
Updating period				
Display		1	Sec	
RS 485 communication		0,5	Sec	
Digital inputs				
Direct voltage	10	30	Vdc	Terminal 8 reference
Current	2	15	mA	According to IEC 62053-31 Class B
Line length		1000	m	Min. section 1.5 mm² (#16AWG)
Pulse duration	30		ms	max. 16 Hz
Power consumption per input		0,4	VA	
Internal digital input polarisation power supply				
Voltage	10	15	Vdc	Max. 35 mA
Relay output				
Set-up (contact setting)	1 contact (NO, NF)			
Mechanical strength	10^5 cycles			
AC breaking		250 Vac / 3A		
DC breaking		30 Vdc /1A		
RS485 bus communication (JBUS/MODBUS protocol)				
Line length		1200	m	
Number of equipment		32		2 shielded wires + half duplex
Modulation speed	9.6 K, 19.2 K, 38.4 Kbds			

Troubleshooting

• Device not switched on

Check the power supply cable

110…400 Vac or 120…300 Vdc between terminals 20 and 22, if there is voltage present and the device does not switch on, please return the device to us.

• Faulty communication

Check configuration in MANUAL mode: address, speed, parity, stop bit (p.10) and cabling (p. 5).

• The meter does not advance incrementally

Poor connection

Go to the Input 1 to 7 (p. 9)
Connect the input to be tested to terminal + 51 (p. 7) to verify that the "pulse detected" pictogram changes state correctly.

CE EC700 complies with the following european directives:
- Electromagnetic compatibility directive, no. 2004/108/EC (2004/12/15)
- Low voltage directive, no. 2006/95/EC (2006/12/12)

Device fully protected with double insulation.

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