

CARLO GAVAZZI

EM340

Installation and use instructions

65 A direct connection three-phase energy analyzer with Modbus, pulse or M-Bus interface

Code 8022035

The analyzer measures active and reactive energy, summing (easy connection mode on) or separating (imported energy mode on) energy. It manages two energy tariffs using a digital input or Modbus command. It can be equipped with an optional output to communicate measurements: pulse output, RS485 Modbus ports or M-Bus port. It measures three DIN modules, with backlit LCD display with sensitive touch screen areas for page scrolling and parameters setting.

安裝及使用指示

65 A 直接連接三相電能分析儀，搭配 Modbus、脈沖或 M-Bus 介面

代碼：8022035

分析儀可測量有功及無功電能，加總(簡易連接模式開啟狀態下)或分離輸入電能與輸出電能。它可用數位輸入或 Modbus 命令管理兩個電能費率表。可裝配選選的輸出以傳輸度數、脈衝輸出、RS485 Modbus 連接埠或 M-Bus 連接埠。可測量三個 DIN 模組，搭配背光 LCD 顯示屏，配有靈敏觸控螢幕區(用於捲動頁面與設定參數)。

安裝和使用說明

65 A 直接連接三相電能分析儀，帶有 Modbus、脈沖或 M-Bus 接口

代碼 8022035

分析儀可測量有功和無功電能，合併(簡易連接模式或 Modbus 命令管理兩項電能費率表。該分析儀可以加總一個可選的輸出來傳輸測量值，同時輸出到 RS485 Modbus 端口或 M-Bus 端口。可測量三個 DIN 板塊，配備靈敏觸控屏區域的背光 LCD 顯示屏，用于頁面滾動和參數設置。

EN: Features

Electrical specifications

Self-governed (via measured voltage)
 Consumption 1.5 W, 10 VA
 Base current 5 A
 Maximum current (continuing) 65 A
 Minimum current 0.25 A
 Start up current 0.02 A
 Working voltage 208-400 V L-L ac (main voltage)
 Frequency 50/60 Hz (PF option); 45-65 Hz (X option)
 Accuracy class Active energy: Class 1 (EN62052-21) / Class B (EN62052-31)
 Reactive energy: Class 2 (EN62053-23)

Environmental specifications

Working temperature From -25 to +55°C/From -13 to +131°F (PF option, standard or with suffices from 0 to 10) / From -25 to +70°C/From -13 to +156°F (PF option, suffices from 6 to 9) / From -25 to +65°C/From -13 to +149°F (X option)
 Storage temperature From -30 to +80°C/From -22 to +176°F
 Humidity From 10 to 90% non-condensing @ 4°C / From 10 to 90% non-condensing @ 40°C
 Environment Intended for indoor use only

Output specifications

Pulse output 1000 impulses/kWh. Proportionate to measured active energy (EN62052-31) / Modbus protocol (EN13757-1) / Modbus RTU (EN13757-1), 5 frames. NOTE: NOTE: for further details, see relevant protocol available on our website. To see output parameters, see Parameters menu (Fig. 17)
 Modbus RS485 port details M-Bus protocol, (EN13757-1), 5 frames. NOTE: NOTE: for further details, see relevant protocol available on our website. To see output parameters, see Parameters menu (Fig. 17)
 LED specifications 1000 impulses/kWh (EN50470-3, EN62052-11) / 90 ms / Red and orange

General features

Terminals 1-6: section 2.5-1.6 mm² torque 2.8 Nm / 7-12: N: section 1.5 mm² torque 0.4 Nm / Front: IP54, terminals: IP20 / Size: 93 mm

Cleaning

Use a slightly dampened cloth to clean the instrument display, do not use abrasives or solvents.

中文繁體：功能

電氣規格

功率 自負電源(透過測量的電壓)
 消耗電流 1.5 W、10 VA
 基本電流 5 A
 最大電流(連續) 65 A
 最小電流 0.25 A
 啟動電流 0.02 A
 工作電壓 AV2: 208-400 V L-L ac (電壓電壓)
 50/60 Hz (PF 選單); 45-65 Hz (X 選單)
 頻率 50/60 Hz (PF 選單); 45-65 Hz (X 選單)
 精度等級 主動電能: 第 1 類 (EN62052-21) / B 類 (EN620470-3)
 無功電能: 第 2 類 (EN62053-23)

環境規格

工作溫度 從 -25 至 +55 °C/從 -13 至 +131 °F (PF 選單，標準或具有以下後綴)
 從 -25 至 +70 °C/從 -13 至 +156 °F (PF 選單，具有 6 到 9 的後綴)
 從 -25 至 +65 °C/從 -13 至 +149 °F (X 選單)
 儲存溫度 -30 至 +80°C/-22 至 +176°F
 濕度 從 10% 到 90% 非凝結 @ 4°C / 從 10% 到 90% 非凝結 @ 40°C
 環境 僅用於室內使用。

輸出規格

脈沖輸出 1000 脈沖/kWh，與所測量的有功電能成正比 (EN62052-31)
 Modbus RS485 通訊輸出 Modbus RTU 通訊協定
 M-Bus 通訊輸出 M-Bus 通訊協定 (EN13757-1)，5 個報文
 備註：備註：如需進一步的詳細資訊，請參閱我們網站上提供的相關協議。若要設定輸出參數，請參閱參數功能表 (圖 17)。

LED 燈規格

顯示 1000 脈沖/kWh (EN50470-3、EN62052-11)
 90 毫秒
 顏色 紅色和橙色

一般功能

端子 1-6：線徑 2.5-1.6 平方公釐，扭力 2.8 Nm / 7-12：N：線徑 1.5 平方公釐，扭力 0.4 Nm
 防護等級 正面：IP54，端子：IP20
 尺寸 93 毫米

清潔

使用略微濕潤的布清潔儀器顯示屏，不要使用研磨劑或溶劑。

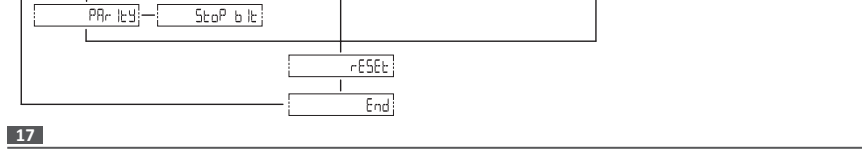
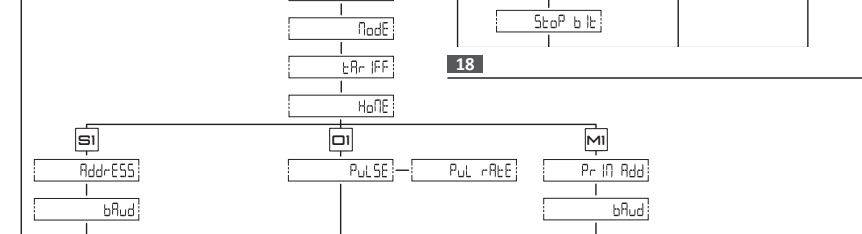
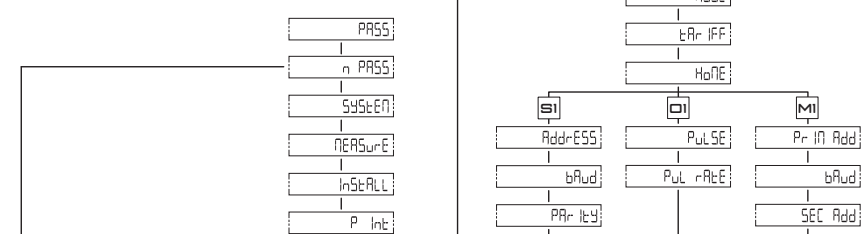
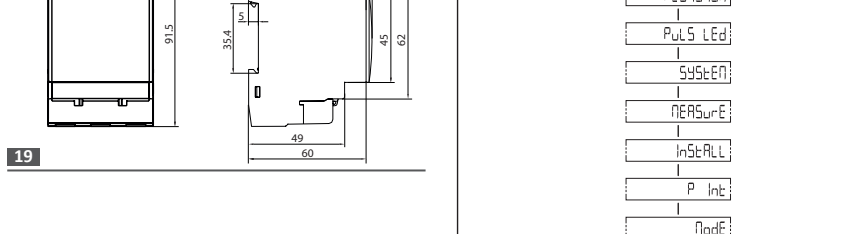
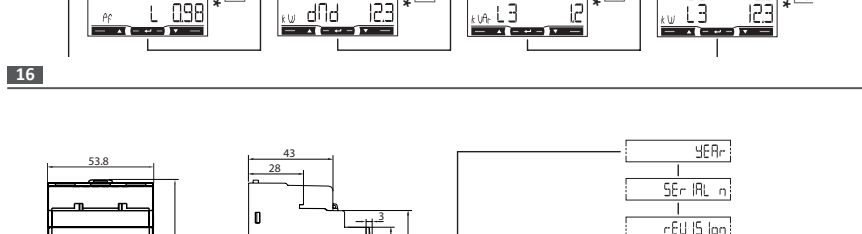
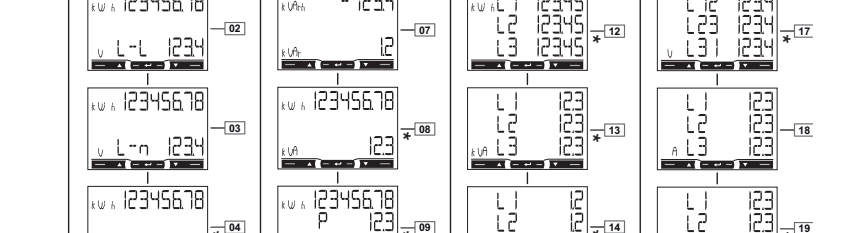
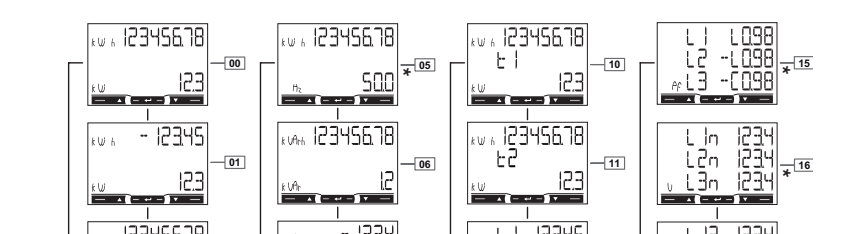
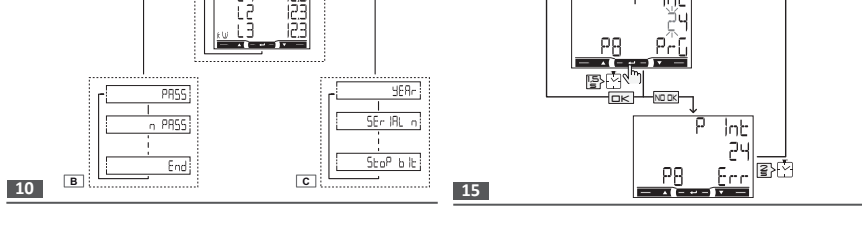
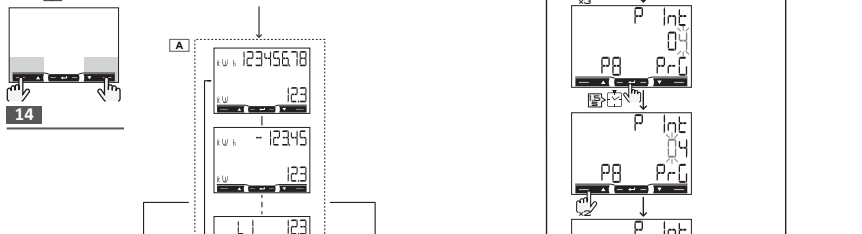
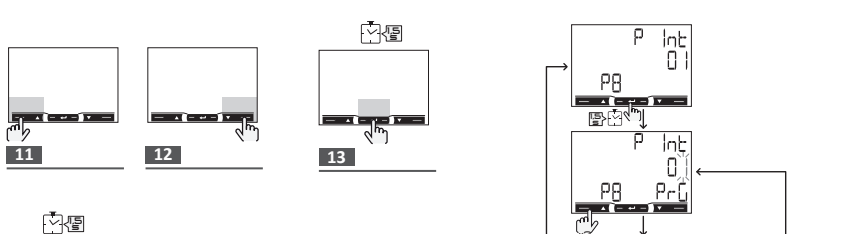
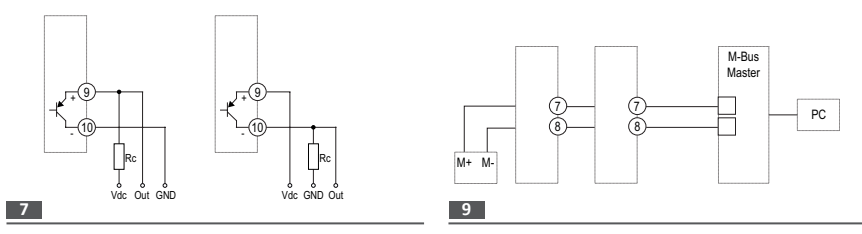
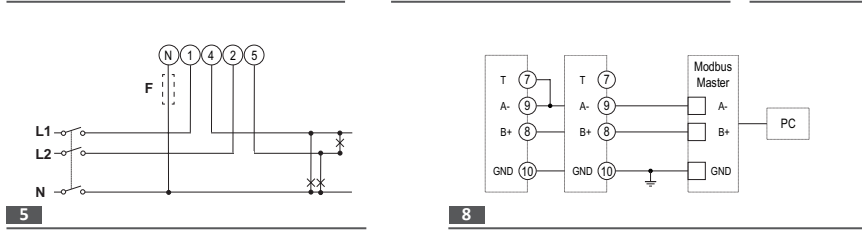
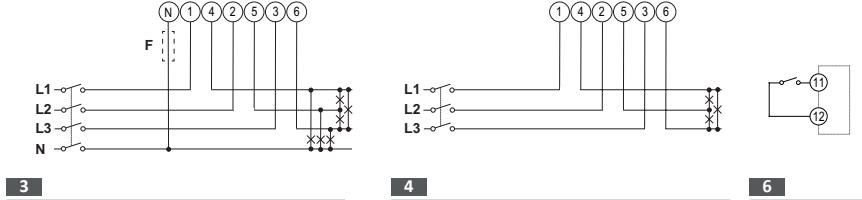
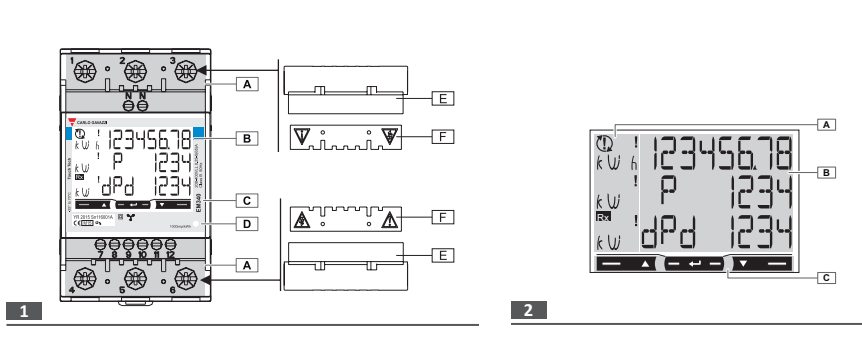
服務與保固

若功能異常、發生故障或需要更多資訊，請聯絡您在國家/地區的分公司或經銷商。

中文简体：功能

电气规格

功率 自供电(通过测量的电压)
 消耗电流 1.5 W、10 VA
 基本电流 5 A
 最大电流(连续) 65 A
 最小电流 0.25 A
 启动电流 0.02 A
 工作电压 AV2: 208-400 V L-L ac (电压电压)
 50/60 Hz (PF 选项); 45-65 Hz (X 选项)
 频率 50/60 Hz (PF 选项); 45-65 Hz (X 选项)
 精度等级 主动电能: 第 1 类 (EN62052-21) / B 类 (EN620470-3)
 无功电能: 第 2 类 (EN62053-23)



GENERAL WARNINGS

! DANGER: Live parts. Heart attack, burns and other injuries. Disconnect the power supply and load before installing the analyzer. Protect terminals with covers.
 The energy analyzer should only be installed by qualified/authorized personnel.

These instructions are an integral part of the product. They should be consulted for all situations tied to installation and use. They should be kept with every copy of operators, in a clean place and in good conditions.

Important connection note

Before connecting any input/output wire, the protection cover (Fig. 1, F) must be correctly installed. The metallic part of the wire or ferrule must be completely inserted into the terminal.

Code key (analyzer side) EM340-DIN

AV2: 208-400 V L-L ac, 5(6)S/A, direct connection
 3 Three or four-wire three-phase current system, two-phase current system, 3-wire
 X Self-powered (via measured voltage)
 a1 01: pulse S1: Modbus RS485 port M1: M-Bus port
 X PFA: total energy (sum of + and - energy) confirmed according to MID
 PFB: only positive energy certified according to MID

Product (Fig. 1)

A Current and communication connection terminals.
 B Backlit LCD display with sensitive touch screen areas.
 C Model, feature summary and serial number.
 D LED.
 E blinking red: 1 pulse = 1 Wh
 F orange: total active power negative. Control only run if the imported and exported energies are measured separately (Measure = b).
 G Scalable terminal cap.
 H Terminal protection covers.

Display (Fig. 2)

A Unit of measure and signal area:
 B incorrect voltage connections
 C type, functional summary and serial number.
 D LED:
 E blinking red: 1 pulse = 1 Wh
 F orange: total active power negative. Control only run if the imported and exported energies are measured separately (Measure = b).
 G Scalable terminal cap.
 H Terminal protection covers.

In case you want to mount the sealing terminal caps (Fig. 1 E) remember to lock them with the appropriate cable sealing.

Connection diagrams

Diagram Description
 Fig. 3 Three-phase system, 4-wire, 315 mA fuse (F), if required by local law.
 Fig. 4 Three-phase system, 3-wire.
 Fig. 5 Two-phase system, 3-wire, 315 mA fuse (F), if required by local law.
 Fig. 6 Digital input, Open contact + tariff 1, closed contact + tariff 2.
 Fig. 7 Pulse output (two possible connections)
 Vdc: external voltage (direct current)
 GND: ground output contact (transistor PNP open collector)
 Open collector outputs: the load resistance (RL) must be designed so that the closed contact current is under 100 mA (V_{dc} is equal to 1 V dc). DC voltage (V_{dc}) must be less than or equal to 80 V.
 Fig. 8 RS485 Modbus with Master
 Note: additional instruments with RS485 are connected in parallel. The serial output must only be terminated on the last network device connecting terminals A- and T. For connections longer than 1000 m use a signal repeater. Maximum 247 transceivers on the same bus.
 Fig. 9 M-Bus with Master. Note: Maximum 250 transceivers on the same bus (1 M-Bus load).

Connection check

The analyzer checks whether connections are correct and signals any faults. The check can be disabled using the **Install**, parameter, see **Parameter menu (Fig. 17)**.

Initial assumptions

The check is based on some initial assumptions on the system to be measured. Specifically, it is assumed that each system phase is characterized by:
 • a load with PF=0.766 (<40°) power factor if inductive or PF=0.996 (<5°) if capacitive
 • current at least equal to 10% rated value (IS A)

Controls and signals

Following are the controls in the order in which they are run and corresponding signals:
 Voltage order
 Current direction
 NOTE *: control only run if the imported and exported energies are measured separately (Measure = b).

Menu map (Fig. 10)

A Measurement menu. Measurements displayed by default when turned on. Pages are characterized by the reference unit of measure.
 B Parameter menu. Parameter settings pages. Require login password.
 C Information menu. The pages display information and set parameters without having to enter a password.

Commands

Navigation	Command	Parameter settings	Command
View the next page	Fig. 11	Increase a parameter value	Fig. 11
View the previous page	Fig. 12	View the next value option	Fig. 11
Open the parameter menu	Fig. 13	Decrease a parameter value	Fig. 12
Exit the parameter menu	Fig. 13 (page End)	View the previous value option	Fig. 12
Open the information menu	Fig. 14	Confirm a value	Fig. 13
Exit the information menu	Fig. 14	Open the parameter settings page	Fig. 13
Open the parameter settings page	Fig. 14	Quickly confirm the 0000 default password	Fig. 14

NOTE: after 120 s of disuse, the measurement page set in Home is displayed and the command only works if touched twice in the first touch command area touch, the display back light turns on.

Setting a parameter (Fig. 15)

Procedure example: how to set P Int=24.
 NOTE: the first displayed value is the current one. Settings are applied when the value is confirmed. The value is being edited if Prg appears, the set value is out of range if Err appears. After 120 s of disuse on a value being set, the title page is displayed (if P Int in the figure) and Prg disappears. After another 120 s, the Err message set in Home returns.

Measurement menu (Fig. 16)

NOTE *: only displayed if full display mode is set (Mode = Full).

General measurement pages

Page	Description	Page	Description
00	Total imported active energy**	08	Total imported active energy**
01	Total active power	09	Total active power
02	Total exported active energy***	10	Total imported active energy**
03	Average system mains voltage**	11	Total imported active energy**
04	Total imported active energy**	12	Imported active energy (I: easy connection is on (Measure = A), I: measured total energy without considering the direction)
05	Total imported active energy**	13	Apparent power
06	Total imported active energy**	14	Imported reactive energy
07	Total exported reactive energy**		

NOTE **: If easy connection is on (Measure = A), it indicates total energy without considering the direction.
 NOTE ***: displays whether imported and exported energy are measured separately (Measure = b).

Single phase measurement pages

NOTE: the phase measurement pages and indicated information for each depend on the type of system analyzed.

Page	Description	Page	Description
12	Imported active energy (I: easy connection is on (Measure = A), I: measured total energy without considering the direction)	15	Power factor (L = inductive, C = capacitive)
13	Apparent power	16	Phase voltage
14	Imported reactive energy	17	Mains voltage
		18	Current
		19	Active power

Parameter menu (Fig. 17)

Shared pages

Code	Description	Values *
PASS	P1 Enter current password	Current password.
nPASS	P2 Change password	Four digits (0000-9999)
SYSTEM	P3 System type	3Ph: three phase system, 4-wire/3P: three-phase system, 3-wire/2P: two-phase system, 3-wire

MEASURE P6 Measurement type (only X option)

INSTALL P7 Connection check

P INT P8 Average power calculation interval (minutes)
 MODE P9 Display mode

Full: complete mode / Easy: reduced mode. Measurements not displayed are still sent via serial port.

On: enabled / Off: disabled

On: enabled / Off: disabled

For full display mode (Mode = Full): 0-19
 For reduced display mode (Mode = Easy): 0-3, 6, 7, 10, 11, 18

To learn the page code see **Measurement menu (Fig. 16)**.

No: cancel reset / Yes: enable reset

Pages specific to the S1 version

Page	Code	Description	Values *
Address	P14	Modbus address, 01 by default.	1-247
BAUD	P15	Baud rate (kbps)	9.6/ 19.2/ 38.4/ 57.6/ 115.2
PARITY	P16	Parity	Even / No
STOP bit	P16-2	Only if no parity. Stop bit.	1/2

Pages specific to the O1 version

Page	Code	Description	Values *
PULSE	P12	Pulse width (ON time, milliseconds)	30/ 100
PulRate	P12-2	Pulse weight. Multiples of 100 impulses/kWh. For 30 ms: 100-1500 (1000) For 100 ms: 100-500	

Pages specific to the M1 version

Page	Code	Description	Values *
Pr I Add	P13	M-Bus primary address	1-250 (01)
BAUD	P15	Baud rate (kbps)	0.3/ 2.4/ 9.6

NOTE *: default values are underlined.

Information menu (Fig. 18)

Shared pages

Page	Code	Description	Page	Code	Description
Year	INF0 1	Year of manufacture	SYSTEM	P3	System type
Serial N	INF0 2	Serial number, corresponds to the one indicated on the front print, without the initial 'X'	MEASURE	P6	Measurement type (only X option)
REVISION	INF0 3	Firmware revision - XY.nm: X: none-standard, A: PFA, B: PFB + Y: A-pulse output, B: Modbus serial C: M-Bus serial, n: sequential revision number (ie: 01, 01, 02)	INSTALL	P7	Enabling connection check
			MODE	P9	Display mode
			TARIFF	P10	Enabling tariff management and any current tariff
			HOME	P11	Measurement page set as home page (only X option)

Pages specific to the S1 version

Page	Code	Description	Page	Code	Description
Address	P14	Modbus address, 01 by default.	Pr I Add	P13	M-Bus primary address
BAUD	P15	Baud rate	BAUD	P15	Baud rate
PARITY	P16	Parity	PARITY	P16	Parity
STOP bit	P16-2	Stop bit	STOP bit	P16-2	Stop bit

Pages specific to the O1 version

Page	Code	Description	Page	Code	Description
PULSE	P12	Pulse width	PULSE	P12	Duration
PulRate	P12-2	Pulse weight	PulRate	P12-2	Pulse weight

ENGLISH

一般警告

危險！帶電零件。可能導致心臟病發作、燒傷及其他傷害。安裝分析儀前請先切斷電源及負載。以蓋子保護端子。
 電能分析儀只可由合格/授權人員安裝。

這些說明是本產品不可或缺的一部分。與安裝及使用相關的所有情況皆需參閱本指示。這些說明應方便操作者取得，並置於整潔位置且維持完好狀況。

重要連接注意事項

在連接任何輸入/輸出線之前，必須先正確安裝保護蓋(圖 1, F)。電線的金屬部分或絕緣層必須完全插入端子中。

代碼鍵 (分析儀側) EM340-DIN

AV2: 208-400 V L-L ac, 5(6)S/A, 直接連接
 3 三相或四線三相電流系統; 二相電流系統, 三線
 X 自負電源(透過測量的電壓)
 01: 脈沖 S1: Modbus RS485 連接埠 M1: M-Bus 連接埠
 X PFA: 總電能(和-電能)加總認證符合 MID
 PFB: 只有正電能認證符合 MID

產品 (圖 1)

A 電流及通訊連接端子。
 B 搭配背光觸控螢幕的背光 LCD 顯示器。
 C 型號、功能摘要和序號。
 D LED。
 E 閃爍紅色: 1 脈衝 = 1 Wh
 F 橘色燈亮: 總有功功率負向。只有在分開測量輸入和輸出的電能時，控制項才會執行(測量 = b)。
 G 可密封端子蓋
 H 端子保護蓋

顯示器 (圖 2)

A 測量單位和訊號區域:
 B 電壓連接不正確
 C 特定於單相、錯誤電壓方向
 D 特定於單相、錯誤電壓方向
 E 限 S1 版。Modbus 命令已正確接收。
 F 限 S1 版。Modbus 命令已正確傳送至上主機。
 G 具有特定區域資訊的區域
 H 命令區

若要安裝密封端子蓋(圖 1 E)，請記得用適當的鐵線密封鎖頭鎖住端子蓋。

接線圖

說明
 圖 3 三相系統，4 線，315 mA 保險絲 (F) (若當地法律要求)。
 圖 4 三相系統，3 線。
 圖 5 雙相系統，3 線，315 mA 保險絲 (F) (若當地法律要求)。
 圖 6 數位輸入，閉接接觸器。費率表 1 閉接接觸器-費率表 2。
 圖 7 脈衝輸出 (兩種可能連接)
 Vdc: 外部電壓 (直流電)
 GND: 接地輸出接觸器 (電晶體 PNP 開集極)
 Out: 輸出接觸器 (電晶體 PNP 開集極)
 GND: 接地輸出接觸器 (電晶體 PNP 開集極)
 脈衝輸出: 負載電阻 (R_L) 必須加以設計，以便開關接觸電流低於 100 mA (V_{dc} 等於 1 V dc)。直流電壓 (V_{dc}) 必須小於或等於 80 V。
 圖 8 RS485 Modbus (附主機)
 備註: RS485 的其他設備也以並聯方式連接。串列輸出只能在連接端子 A 和 T 的最後一個網路裝置上端接。針對長度超過 1000 公尺的連接，請使用信號放大器。同一線路上最多 247 個收發器。
 圖 9 M-Bus (附主機)。備註: 同一線路上最多 250 個收發器 (1 M-Bus 負載)。

連接檢查

分析儀會檢查連接是否正確以及訊號是否有效。
 使用安裝，參數即可停用檢查，請參閱**參數功能表 (圖 17)**。

初始假設

檢查程序以待測系統上的一些初始假設為依據。具體而言是假設各系統相位的特性為:
 • 負載的功率因數為 PF=0.766 (<40°) (若為電感) 或 PF=0.996 (<5°) (若為電容)
 • 電流至少等於 10% 額定電流 (IS A)

控制項和訊號

以下是依照執行順序排序的控制項和對應的訊號:
 電壓順序
 電流方向
 NOTE *: 只有在分開測量輸入和輸出的電能時，控制項才會執行 (Measure = b)。

功能表地圖 (圖 10)

A 測量菜單。測量顯示為預設值。頁面根據參考測量單位進行特色化。
 B 參數功能表。參數設置頁面。需要登入密碼。
 C 資訊功能表。本頁面顯示資訊和設定參數，無需輸入密碼。

命令

功能	命令	參數設定	命令
操作	圖 11	增加參數值	圖 11
查看上一頁	圖 12	查看下一個選項	圖 11
打開參數菜單	圖 13	減少參數值	圖 12
打開信息菜單	圖 13 (頁尾)	檢查一個選項	圖 12
退出參數菜單	圖 13 (頁尾)	查看上一個選項	圖 13
退出信息菜單	圖 14	檢查一個選項	圖 13
快速確認 0000 預設密碼	圖 14	打開參數設置頁面	圖 13
		快速確認 0000 預設密碼	圖 14

備註: 每次停留 120 秒後，將顯示 HOME 設置的測量頁面，且此狀態將導致命令失去生效。初次接觸控制命令區後，顯示屏將允許打開。

設定參數 (圖 15)

程序範例: 如何設定 P Int=24
 備註: 第一個顯示的數值是當前值。設定在確認後生效。如果顯示 Prg，表示正在修改值; 如果顯示 Err，表示設置值超出範圍。在設置值後使用 120 秒後，將顯示標題頁 (圖中的 P Int)，同時 Prg 會消失。再過 120 秒後，返回 HOME 中設定的測量頁面。

度量功能表 (圖 16)

備註: 設定為完整顯示模式 (Mode = Full) 時才會顯示。

一般度量頁面

頁	說明	頁	說明
00	總輸入有功電能**	08	總輸入有功電能**
01	總有功功率	09	總輸入有功電能**
02	總輸出有功電能***	10	總輸入有功電能**
03	平均系統電壓**	11	總輸入有功電能**
04	總輸入有功電能**	12	輸入有功電能 (I: 易連接處於開啟狀態 (Measure = A), I: 測量總電能而不考慮方向)
05	總輸入有功電能**	13	視在功率
06	總輸出有功電能**	14	輸入有功電能
07	總輸出有功電能**	15	有功功率

備註 **: 若開啟易連接 (Measure = A)，則該項指示總電能而不考慮方向。
 備註 ***: 顯示輸入和輸出電能是否單獨測量 (Measure = b)。

參數功能表 (圖 17)

共享頁面

頁	說明	頁	說明
PASS	P1 輸入當前密碼	SYSTEM	P3 系統類型
nPASS	P2 變更密碼	MEASURE	P6 測量類型 (限 X 選項)
SYSTEM	P3 系統類型	INSTALL	P7 啟用連接檢查
MEASURE	P6 測量類型 (限 X 選項)	MODE	P9 顯示模式
INSTALL	P7 連接檢查	TARIFF	P10 啟用電費管理
MODE	P9 顯示模式	HOME	P11 將測量頁面設置為首頁 (僅限 X 選項)

MEASURE P6 測量類型 (限 X 選項)

Pages specific to the S1 version

頁	說明	頁	說明
Address	P14 Modbus 地址	Pr I Add	P13 M-Bus 主要地址