



# M-LOG Plus

Electronics

A grayscale close-up photograph of a gas valve control panel, showing various electrical terminals and components. The text 'TECHNICAL MANUAL' is overlaid in large, white, bold, sans-serif capital letters across the bottom of the image.

**TECHNICAL MANUAL**

## **DISCLAIMER**

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The Manufacturer is by no means liable for the consequences of operations not performed in compliance with this manual.

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## 1 Features

**M-LOG PLUS** is an intrinsically safe RTU equipped with a **GPRS / GSM** modem (in option LaRaWan) designed for monitoring natural gas decompression plants. Data download, configuration setting and firmware update are possible both remotely and via local connection.

An optical serial port is available for local communication.

The man-machine interface consists of a liquid crystal display and a keyboard through which it is possible to navigate through the data presentation menus.

The equipment has the following interface channels:

- 3 Pressure inputs (Absolute/relative) from integrated transducers
- 2 Temperature input from a two wires PT1000 sensor
- 2 Auxiliary analog inputs with 0÷5 Volt input range
- 10 Digital inputs
- 4 Digital outputs
- 1 RS485 Expansion line

**M-LOG PLUS** has been designed to ensure maximum installation versatility and to be powered by a continuous 12VDC power supply via a dedicated **M-POWER** power supply, as well as a battery.

Three different versions are available: **A, B, T**.

**M-LOG PLUS A** is equipped with a GSM/GPRS integrated modem and is battery powered.

**M-LOG PLUS B** is not equipped with an integrated modem.

It is designed for the use of the **M-POWER** remote power supply (installed in a safe area) to which it is possible to communicate the acquired data via an RS485 serial line.

**M-LOG PLUS T** is equipped with an integrated GSM/GPRS modem (different from the one for **M-LOG PLUS A**). It is designed for the use of the **M-POWER** remote power supply (installed in a safe area) to which it is possible to communicate the acquired data via an RS485 serial line.

## 2 Certifications

### 2.1 ATEX 2014/34/UE directive

The **M-LOG PLUS** series is certified according to Directive **2014/34 / EU (ATEX)** both as intrinsically safe equipment for use in applications in potentially explosive atmospheres and as associated equipment.

Certificate: **0425 ATEX 004371 X**

Marking as intrinsically safe equipment:

Version **A**:  **II 1 G Ex ia IIA T3 Ga Tamb = -25°C ÷ +60 °C**

Version **B**:  **II 1 G Ex ia IIB T3 Ga Tamb = -25°C ÷ +60 °C**

Version **T**:  **II 1 G Ex ia IIA T3 Ga Tamb = -25°C ÷ +60 °C**

Marking as associated equipment:

All versions:  **II (1) G [Ex ia Ga] IIB**



Versions **M-LOG PLUS A** and **M-LOG PLUS T** can only be used with gas from the group **IIA** while the version **M-LOG PLUS B** can also be used with gas from the group **IIB**.



**EXPLOSION RISK:** Installation must be carried out in compliance with the prescriptions contained in this manual



### 3 Suitability of the equipment for the installation place

In the case of use in areas with danger of explosion, it must be checked that the equipment provided is suitable for the classification of the area and any flammable substances present.

The essential safety requirements against the risk of explosion in classified areas are established by Directive 2014/34 / EU of the European Parliament and of the Council of 26 February 2014 (as regards equipment) and 1999/92 / EC of 16 December 1999 (as regards the plants).



The criteria for the classification of areas with risk of explosion are given by the EN60079-10 standard. The technical requirements of electrical systems in classified areas are given by the EN60079-14 standard.

The following table shows the legend of the marking for use in a hazardous area as intrinsically safe equipment.

<b>II 1 G</b>	Equipment for surface systems with the presence of gas or vapours, category 1 suitable for zone 0 and with redundancy for zones 1 and 2
<b>Ex ia</b>	Intrinsically safe equipment, category ia
<b>IIA</b>	Equipment of group IIA suitable for substances (gases) of groups IIA.
<b>IIB</b>	<b>(version B only)</b> Group IIB equipment suitable for substances (gases) of groups IIB.
<b>T3</b>	Equipment temperature class (maximum surface temperature)
<b>Ga</b>	Equipment protection level
	Conformity marking to applicable European directives
	Marking of conformity to directive 2014/34 / EU and related technical standards
<b>0425 ATEX 004371 X</b>	<b>0425</b> Number of the laboratory that issued the CE certificate <b>ATEX</b> Reference directive <b>004371</b> Certificate number. <b>X</b> indicates that there are particular conditions of use which are indicated in the manual with safety instructions.
<b>1370</b>	Number of the Notified Body (Bureau Veritas) which carries out the surveillance of the production system.
<b>Tamb</b>	Ambient operating temperature of the equipment

Equipment with temperature class T3 are also suitable for substances with higher temperature class (T2, T1)

The following table shows the legend of the marking for use in a safe area as associated equipment.


<b>II (1) G</b>	Associated equipment of category (1), to be installed in a safe area, for surface installations.
<b>[Ex ia Ga]</b>	Associated equipment of category ia with EPL Ga
<b>IIB</b>	Equipment of group IIB suitable for substances (gases) of groups IIB.
	Conformity marking to applicable European directives
	Marking of conformity to directive 2014/34 / EU and related technical standards
<b>0425 ATEX 004371 X</b>	<b>0425</b> Number of the laboratory that issued the CE certificate <b>ATEX</b> Reference directive <b>004371</b> Certificate number. <b>X</b> indicates that there are particular conditions of use which are indicated in the manual with safety instructions.
<b>1370</b>	Number of the Notified Body (Bureau Veritas) which carries out the surveillance of the production system.
<b>Tamb</b>	Ambient operating temperature of the equipment

## 4 Power supply

### 4.1 Battery (M-LOG PLUS A version)


**M-LOG PLUS A** can use different battery models:

BATTERY CODE	FUNCTION	BATTERY TYPE	DESCRIPTION
HP2 – BP	Modem Power supply	Lithium	Standard
LE-BP	CPU Power supply	Lithium	Standard
HP1-BP <sup>1</sup>	Modem Power supply	Lithium	Optional

 The battery packs have been approved by the Notified Body which issued the ATEX type certificate and it is therefore absolutely mandatory to use only the model provided.

#### **RISK OF EXPLOSION**



 Do not short circuit. Do not heat or incinerate. Do not disassemble. Do not immerse in water. Do not recharge.


 Do not use the BU-BP battery pack for the **M-LOG PLUS** versions A and B. Use exclusively with the T version





Exhausted batteries contain substances that are hazardous to the environment and are subject to mandatory separate collection: dispose of in accordance with the laws in force to allow for recycling. CER code 160605.



#### 4.1.1 Replacement

 Battery packs must always be replaced in the absence of an explosive atmosphere. Check the operating conditions with suitable instruments before proceeding.

 Replacing a battery pack involves removing the NON-metrological hardware seals.

 It is not possible to insert two LE-BP batteries permanently

 After replacing a battery, it is necessary to realign the residual autonomy indicators.

To minimize the risk of data loss, two **LE - BP** batteries can be temporarily connected together on the **CPU** board. Before extracting the exhausted battery, connect the new one to the free battery connector (**BT2A or BT2B**).

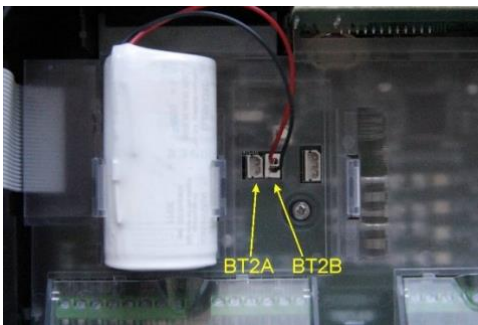
To replace an **HP2 - BP** or **HP1-BP** battery, simply extract the exhausted pack and replace it with a new one.

The realignment of the residual autonomy indicators must be done through the following procedure:

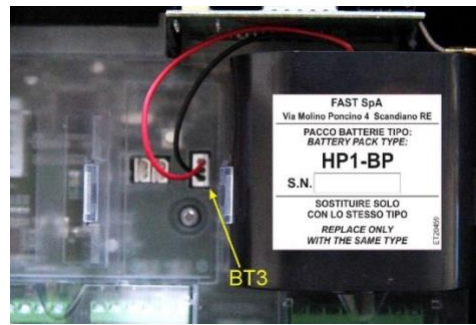
1. Turn on the display.
2. Press the key **↓** until reaching the menu **Battery**.
3. Press the key **→** to access the sub menu **RTU Battery**.
4. Press again the key **→** to access the sub menu **Change RTU Batt**.
5. Press the key **OK** to realign the indicators for the RTU battery.
6. From the sub menu **RTU Battery** press the key **↓** to access **GSM Battery**.
7. Press the key **→** to access the sub menu **Change GSM Batt**.

Press the key **OK** to realign the indicator for the modem battery.

<sup>1</sup> It is possible to use the equivalent battery **HP1-BP** instead of the standard battery **HP2-BP**



**Figure 1: CPU Battery**



**Figure 2: Modem Battery**



After installing the RTU or replacing the battery pack, it is necessary to realign the battery meters.

The realignment of the residual autonomy indicators must be done through the following procedure:

1. Turn on the display.
2. Press the key ↓ until reaching the menu **Battery**.
3. Press the key → to access the sub menu **RTU Battery**.
4. Press the key ↓ to access **GSM Battery**.
5. Press the key → to access the sub menu **Change GSM Batt.**
6. Press the key **OK** to realign the indicator for the modem battery.



## 4.2 External power supply (M-LOG PLUS T version)

### **RISK OF EXPLOSION**



the installation of the remote power supply must be carried out in accordance with the requirements contained in the MT342-I M-POWER User Manual. Never use models other than the one provided.



It is **NOT** allowed to use the external power supply and a battery pack other than BU-BP at the same time.

**M-LOG PLUS** is powered by an external device, the **M-POWER**.

The remote power supply is available both for solar panel source (PP version) and for mains power supply with 12Vdc output (INS version).

Both versions are available in the version for DIN rail or wall installation.



Figure 4: M-POWER wall version

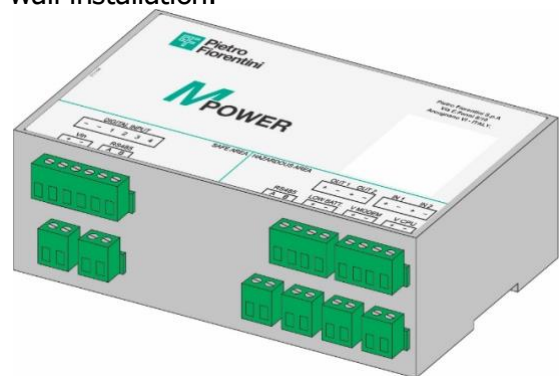


Figure 3: M-POWER DIN rail version

To ensure continuity of service in case of interruption of the primary power source, a backup battery must be considered, the capacity of which must be determined according to the requirements of the specific use case. The backup battery ensures full system functionality during a power failure.

It is possible to use as a secondary backup an optional lithium battery (BU-BP) capable of keeping only the conversion function active in case of the main battery failure.

It is **NOT** allowed to simultaneously use the external power supply and a battery pack other than BU-BP.

The sizing of the mains power supply, the solar panel controller and the backup batteries must be carried out considering the requirements of the specific application.

## 5 User's menu

Under normal operating conditions **M-LOG PLUS** keeps the display off. To access the main menu, press the **OK** button.

You can navigate in the menu using the keys **↓ ↑**. the key allows you to access the submenus if available. The key **←** allows you to return to the previous menu.

The menu can only be used to view quantities already configured in the equipment or to force predefined actions. It is not possible to edit the configurations set.

		<b>MENÙ</b>		
<b>Ok</b>				<i>RTU state (Operating, Excluded, Calibration)</i>
	<b>Id Device</b>	→	<b>Set ID - Inbound</b>	<i>Device's identification Number</i>
↓	<b>Date&amp;Time</b>	→		Current Date and Time
			<b>Historicization</b>	Historicization Interval
			<b>Residual Shift</b>	Residual time shift
↓	<b>Input State</b>	→	<b>Analog Inputs</b>	
			→ <b>AN1</b>	Current value of analogue input 1
			↓ <b>AN2</b>	Current value of analogue input 2
			↓ <b>AN3</b>	Current value of analogue input 3
		↓	<b>Digital Inputs</b>	
			→ <b>DI1</b>	Current Value Digital Input 1
			↓ <b>DI2</b>	Current Value Digital Input 2
			↓ <b>DI3</b>	Current Value Digital Input 3
			↓ <b>DI4</b>	Current Value Digital Input 4
			↓ <b>DI5</b>	Current Value Digital Input 5
			↓ <b>DI6</b>	Current Value Digital Input 6
		↓	<b>Counters</b>	
			↓ <b>CNT1</b>	Current Value Counter 1
			↓ <b>CNT2</b>	Current Value Counter 2
↓	<b>Battery</b>	→	<b>RTU Battery</b>	% LE – BP Battery Pack Status
		↓	<b>Modem Battery</b>	% HP1 - BP Battery Pack Status
		↓	<b>Archive Modem Batt</b>	
			→ <b>Actual State</b>	Actual Calls Number
			↓ <b>Previous States</b>	Previous Calls Number (9 elements)
		↓	<b>Print Archive</b>	Print archive over the serial Line
↓	<b>Modem</b>	→	<b>Call Centre</b>	Force a call to the configured remote management centre
		↓	<b>Id Modem</b>	Id Modem associated with RTU
			→ <b>Conf Modem Centre</b>	ID Configuration
		↓	<b>Start GSM Data</b>	Force starting the modem in GSM data mode
		↓	<b>GSM Signal</b>	View GSM Signal intensity
		↓	<b>Modem Local Echo</b>	Redirect modem data to local IR port (for testing purp.)
		↓	<b>Last connection</b>	Last Connection Date
↓	<b>State</b>	→	<b>Diagnostic</b>	See Table 2
			→ <b>Diagnostic tel</b>	Diagnosis of calls for each single number called
			→ <b>Event 1, 2...</b>	Events Buffer
		↓	<b>Buffer Events</b>	Reset Events Buffer
		↓	<b>Reset Events</b>	Print Events over the Local Serial Port
		↓	<b>Print Events</b>	
		↓	<b>Connection</b>	Indicates if the RTU is connected to TPOWER
		↓	<b>TPOWER</b>	
↓	<b>Sistema</b>	→	<b>S/N Device</b>	Serial Number RTU
		↓	<b>S/N Press. 1</b>	Serial Number transducer 1
		↓	<b>S/N Press. 2</b>	Serial Number transducer 2
		↓	<b>S/N Press. 3</b>	Serial Number transducer 3
↓	<b>Service</b>	→	<b>Silencing</b>	Turn off the modem and cancel alarms
		↓	<b>Type</b>	Configure the peripheral type
		↓	<b>Total Reset</b>	Delete RTU configuration and reset
		↓	<b>Exclusion</b>	Activate or Deactivate Maintenance Mode
		↓	<b>Modem ON</b>	Activate or Deactivate Modem always ON mode
↓	<b>SW VER</b>			View Firmware and Hardware revisions

**Table 1: Operating Menu**

## 5.1 Diagnostic

The diagnostic information shown in the string on the display reports the status of each diagnostic bit in hexadecimal format: each bit, when set equal to 1, indicates a specific anomaly.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
0				0				0				0				0				0-F				0				0-F			
VISUALIZZAZIONE A DISPLAY																															

FUNCTION	n.bit
UNTESTED	32
RESERVED – HARDWARE ERROR (XRAM)– TRY RESET PROCEDURE	31
RESERVED – HARDWARE ERROR (FLASH WRITE)– TRY RESET PROCEDURE	30
RESERVED – HARDWARE ERROR (FLASH ERROR)– TRY RESET PROCEDURE	29
LOW BATTERY	24
ADC ERROR	23
ANALOG CHANNEL NOT CALIBRATED	22
COUNTING FREQUENCY OUT OF THE LIMIT	21

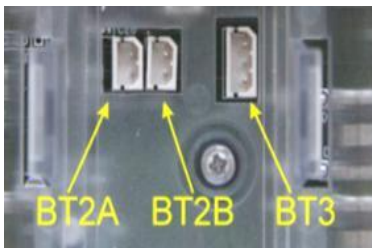
Table 2: Diagnostic

### 5.1.1 Calls Diagnostic

Within the Batteries menu it is possible to obtain some information relating to the number of calls made by the equipment.

- Browsing the menu **Battery**, press the key ↓ until reaching the sub menu **Archive Batt. GSM**.
- Press the key → to access the list of calls made by the machine. Each item in the list corresponds to the instant in which the GSM modem battery was replaced.
- Press another time the key → to view current calls, divided into 2 categories:
  - **Total calls made by the RTU**
  - **Failed calls from the RTU**

## 5.2 Factory reset



It is possible to restore the RTU to its original factory conditions.

1. Disconnect the LE – BP battery pack;
2. Wait for 5 seconds;
3. holding down the keys ↓ ↑ reconnect the battery pack;
4. Wait for the message **RESET HW** to appear on the display;
5. Wait for the RTU to restart.

Figure 4: Clamp battery



**ATTENTION:** carrying out the reset procedure involves resetting the parameters of the entire set configuration. The internal calibration will be maintained, it will be necessary to reset the gain parameters of the transducer.

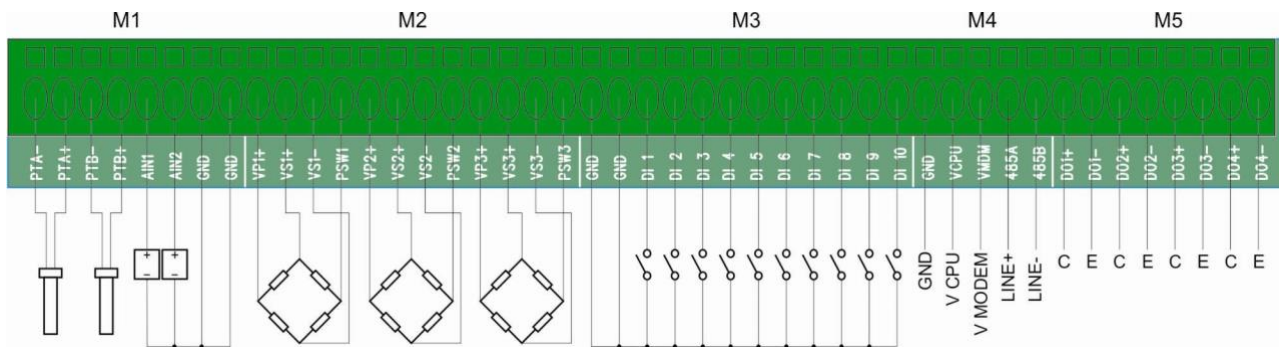
## 6 Installation

**⚠** It is **NOT** sufficient for a device to be intrinsically safe for it to be connected to associated equipment. It is necessary that a qualified technician or a body in charge proceed with the verification of the system and issue of suitable certification proving the compatibility between the electrical safety parameters possessed by both devices.

The essential safety requirements against the risk of explosion in classified areas are established by the European Directives 2014/34 / EU of 26 February 2014 (for equipment) and 1999/92 / EC of 16 December 1999 (for plants). The criteria for the classification of areas with risk of explosion are given by the EN60079-10 standard. The technical requirements of electrical systems in classified areas are given by the EN60079-14 standard.

### 6.1 M-LOG PLUS clamps

- ⚠** The replacement of the pressure or temperature transducer is not allowed.
- ⚠** Opening the lid removes the metric seals.
- ⚠** Refer to chapter 8 for the characteristic parameters of intrinsically safe circuits.



**Figure 5 Clamps MLog**

Auxiliary inputs AIN1, AIN2 accept analog signals from galvanically isolated instruments. Refer to Chapter 8 for safety parameters for electrical coordination.

The digital inputs from number 1 to number 8 provide for the application of a voltage-free signal, inputs DI9 and DI10 can also accept a voltage signal.

The RS485 expansion line can be used for connection to a galvanically isolated equipment. The digital outputs provide four open collector channels. The devices to which the connection is made must be galvanically isolated.

CLAMP.	DEN.	FUNCTION
M1	PTA-	PT1000 A Transducer negative
	PTA+	PT1000 A Transducer positive
	PTB-	PT1000 B Transducer negative
	PTB+	PT1000 B Transducer positive
	AIN1	Analog Input 1
	AIN2	Analog Input 2
	GND	Ground
M2	GND	Ground
	VP1+	Piezoresistive Pressure Sensor 1 – input power – positive
	VS1+	Piezoresistive Pressure Sensor 1 – output signal – positive
	VS1-	Piezoresistive Pressure Sensor 1 – output signal – negative
	PSW1	Piezoresistive Pressure Sensor 1 – input power – negative
	VP2+	Piezoresistive Pressure Sensor 2 – input power – positive
	VS2+	Piezoresistive Pressure Sensor 2 – output signal – positive
	VS2-	Piezoresistive Pressure Sensor 2 – output signal – negative
	PSW2	Piezoresistive Pressure Sensor 2 – input power – negative
	VP3+	Piezoresistive Pressure Sensor 3 – input power – positive
	VS3+	Piezoresistive Pressure Sensor 3 – output signal – positive
	VS3-	Piezoresistive Pressure Sensor 3 – output signal – negative

	PSW3	Piezoresistive Pressure Sensor 3 – input power – negative
M3	GND	Ground
	GND	Ground
	DI1	Digital Input 1
	DI2	Digital Input 2
	DI3	Digital Input 3
	DI4	Digital Input 4
	DI5	Digital Input 5
	DI6	Digital Input 6
	DI7	Digital Input 7
	DI8	Digital Input 8
	DI9	Digital Input 9
DI10	Digital Input 10	
M4	GND	Ground
	V CPU	CPU Power Supply
	V MDM	GSM Modem Power Supply
	485 +	RS485 LINE+
	485 -	RS485 LINE-
M3	DO1+	Digital Output 1 - positive
	DO1-	Digital Output 1 – negative
	DO2+	Digital Output 2 - positive
	DO2-	Digital Output 2 - negative
	DO3+	Digital Output 3 - positive
	DO3-	Digital Output 3 - negative
	DO4+	Digital Output 4 - positive
	DO4-	Digital Output 4 - negative

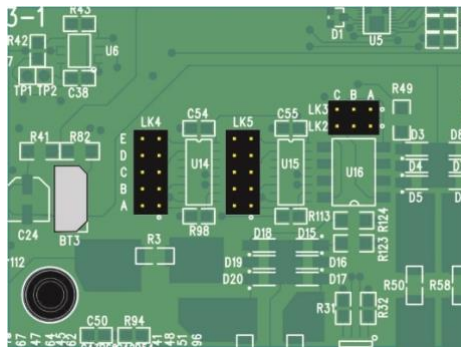
**Table 3: Description of the available clamps**

## 6.2 Prescaler

Clamps DI9 and DI10 (M3-11, M3-12) have two independent prescalers that can be enabled via selector LK3 and LK2 respectively.

In this mode the frequency of the input pulses is divided by a configurable factor from 8 to 4096, this allows to extend the range of input pulse frequencies up to 12KHz.

The prescalers are configured by the LK4 and LK5 selectors; the available options are shown in Tables 4 and 5.



**Figure 6: Selectors for enabling and configuring the prescalers for digital inputs DI9 and DI10**

LK3	LK5	Prescaler	Frequency Max
A-B	-	-	3 Hz
B-C	A	1	3 Hz
	B	8	24 Hz
	C	64	192 Hz
	D	512	1.5 KHz
	E	4096	5 KHz

**Table 4 - DI9 Configuration**

LK2	LK4	Prescaler	Frequency Max
A-B	-	-	3 Hz
B-C	A	1	3 Hz
	B	8	24 Hz
	C	64	192 Hz
	D	512	1.5 KHz
	E	4096	5 KHz

**Table 5 - DI10 Configuration**

## 6.3 M-Power clamps

### 6.3.1 Main board

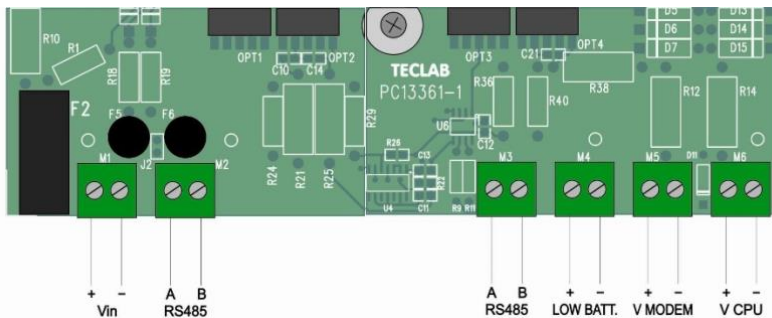
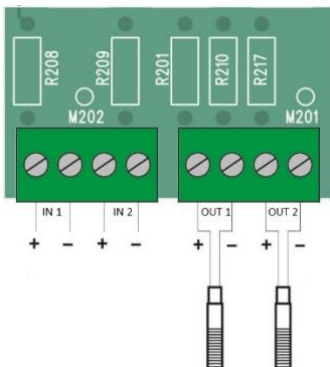


Figure 7: Clamps M-Power

CLAMP.	DEN.	FUNCTION
M1	Vin+	Power Supply Input - Positive
	Vin-	Power Supply Input - Negative
M2	RS485 A	RS485 EXPANSION LINE+
	RS485 B	RS485 EXPANSION LINE-
M3	RS485 A	RS485 LINE+
	RS485 B	RS485 LINE-
M4	LOW BATT +	Low battery Digital Output – Positive
	LOW BATT -	Low battery Digital Output - Negative
M5	V MODEM+	Modem Power Supply Output - Positive
	V MODEM-	Modem Power Supply Output - Negative
M6	V CPU+	CPU Power Supply Output - Positive
	V CPU-	CPU Power Supply Output - Negative

Table 6: M-Power clamps

### 6.3.2 Namur inputs expansion

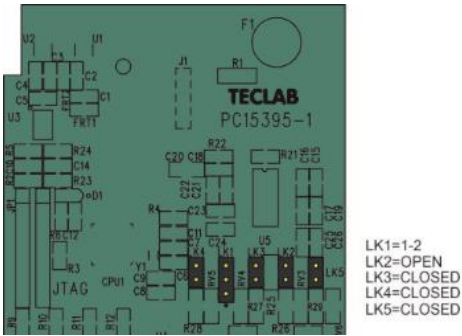


CLAMP.	DEN.	FUNCTION
M201	OUT1+	Transducer connection NAMUR 1 - positive
	OUT1-	Transducer connection NAMUR 1 - negative
	OUT2+	Transducer connection NAMUR 2 - positive
	OUT2-	Transducer connection NAMUR 2 - negative
M202	IN1+	Repetition NAMUR 1 – positive
	IN1-	Repetition NAMUR 1 – negative
	IN2+	Repetition NAMUR 2 – positive
	IN2-	Repetition NAMUR 3 - negative

Figure 10:3 NAMUR inputs expansion

Figure 8: Namur Expansion

### 6.3.3 I/O Expansion



LINK	POS.	FUNCTION
LK1	1 - 2	AIN3 +-5V FS o 4-20mA (LK3)
	2 - 3	AIN3 0 +- 20V FS
	Open	AIN3 Open
LK2	Open	AIN0 Voltage
	Closed	AIN0 Current
LK3	Open	AIN3 Voltage
	Closed	AIN3 Current
LK4	Open	AIN2 Voltage
	Closed	AIN2 Current
LK5	Open	AIN1 Voltage
	Closed	AIN1 Current

Figure 9: Expansion I/O

Table 7: I/O Link configuration

#### DIN RAIL INPUTS

CLAMP	DEN	FUNCTION
M1A	GND	Ground
	DI1	Digital input 1
	DI2	Digital input 2
	DI3	Digital input 3
	DI4	Digital input 4
M1B	GND	Ground
	AIN1	Analog input 1
	AIN2	Analog input 2
	AIN3	Analog input 3
	AIN4	Analog input 4
	DO1+	Digital output 1 – positive
	DO1-	Digital output 1 – negative
DO2+	Digital output 2 – positive	
DO2-	Digital output 2 – negative	

**Table 8: DIN RAIL inputs**

#### IP 67 inputs

CLAMP.	DEN	FUNCTION
M1	GND	Ground
	DI1	Digital input 1
	DI2	Digital input 2
	DI3	Digital input 3
	DI4	Digital input 4
	GND	Ground
	GND	Ground
	AIN1	Analog input 1
	AIN2	Analog input 2
	AIN3	Analog input 3
AIN4	Analog input 4	
DO1+	Digital output 1 – positive	
DO1-	Digital output 1 – negative	
DO2+	Digital output 2 – positive	
DO2-	Digital output 2 – negative	

**Table 9: IP 67 inputs**

## 7 Communication with the operations centre

**M-LOG PLUS** can be configured for different types of communication towards the remote control and remote management center. All the modes listed below are available both in the battery version and in the remote powered version (solar panel or mains voltage). The autonomy in the absence of external power depends on the specific communication technique configured.

- A. Periodic spontaneous communication with alarm and immediate return
- B. Always active waiting for a call
- C. Always on in continuous connection (RTU real-time mode)
- D. Window access waiting for a call
- E. Window lit in continuous connection during the ignition period

### 7.1 Vectors

**M-LOG PLUS** has two internal connectors for housing communication modules (Modems). The replacement or installation of the communication modules can be done after installation and does not require the replacement of additional elements to the module itself.

Currently supported modules:

- A. 2G Module
- B. LoRaWan

### 7.2 Protocols

- A. Modbus
- B. IEC60870-5-104
- C. LoRaWan



## 8 Identification

M-LOG PLUS is identified by a front plate on which are reported:

- CE Marking
- ATEX Certificate number
- Version (A, B, T)
- Protection mode identification string
- Serial number
- Year of production

## 9 Maintenance

There are no scheduled maintenance operations.



**ATTENTION: DANGER OF ELECTROSTATIC DISCHARGE**

In order to prevent the accumulation of electrostatic charges on the equipment, appropriate procedures must be adopted during installation, maintenance and use.

## 10 Checking

All verification and / or maintenance operations must be carried out according to the criteria of the European standard EN60079-17.

## 11 Technical specifications

MECHANICAL	MIN	TIP	MAX
Casing Dimensions (L X H X P)	210x150x80 mm		
Pressure Sensors Dimensions (L X H X P)	62 X 28 X 28 mm		
Pressure Sensors Dimensions – headroom (L)	50 mm		
IP Protection	66 / 67		
ENVIRONMENT	MIN	TIP	MAX
Operating temperature	-25°C		+60°C
Mechanical/Electromagnetic Class	M2/E2		
ELECTRICAL	MIN	TIP	MAX
Battery Life – PACK HP1-BP <sup>•</sup>		5 years	
Battery Life – PACK LE – BP <sup>•</sup>		5 years	
LOCAL OPTICAL INTERFACE	EN62056-21 (ZVEI)		
UART Configuration	9600,8,n,1		
REMOTE COMMUNICATION			
Communication technologies	GSM/GPRS 2G, LoRAWAN		
Protocols	Modbus, IEC60870-5-104, LoRaWAN		
Connection Type	Scheduled Call; Configuration; Download Archive and Current Data, Clock Set.		
Firmware update protection	Local or Remote. CRC32 Protection		
ANALOG INPUTS	MIN	TIP	MAX
Channels		7	
Type	Piezoresistive (n.3) Voltage / Current (n.2 0÷5V, 4/20mA configurable) / PT1000 (n.2)		
ADC Resolution		16 bits	
DIGITAL INPUTS - COUNTERS	MIN	TIP	MAX
Channels			10
Flow Rate Inputs			2
Frequency	0		200 Hz
Output Voltage <sup>♦</sup>		3 V	3 V
Current			3 mA
Type	Relay Contact		
DIGITAL OUTPUTS	MIN	TIP	MAX
Channels			4
Voltage			15V
Insulation		1500 Vac	
Type	Open collector npn		

<sup>•</sup> Riferita alle condizioni operative standard: 1 connessione dati al giorno; 1 chiamata di allarme al mese

<sup>♦</sup> Internally generated. Do not connect external voltage generator.

## 11.1 I/O characteristic parameters

<b>Digital Inputs 1-8</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value (Ver. A)	6 V	6,5mA	10mW	6 V	N.A.	N.A.	10µF	47µH	Nota 1	5µH
Value (Ver. B)	6 V	6,5mA	10mW	6 V	N.A.	N.A.	10µF	47µH	Nota 1	2,5µH
Value (Ver. T)	6 V	6,5mA	10mW	6 V	N.A.	N.A.	10µF	47µH	Nota 1	50nH
<b>Digital Inputs 9-10</b>										
Value (Ver. A)	6 V	6,5mA	10mW	15 V	N.A.	N.A.	10µF	47µH	Nota 1	5µH
Value (Ver. B)	6 V	6,5mA	10mW	15 V	N.A.	N.A.	10µF	47µH	Nota 1	2,5µH
Value (Ver. T)	6 V	6,5mA	10mW	15 V	N.A.	N.A.	10µF	47µH	Nota 1	50nH
<b>Digital Outputs</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value (Ver. A)	6 V	6,5mA	10mW	15V	N.A.	N.A.	10µF	47µH	Nota 1	5µH
Value (Ver. B)	6 V	6,5mA	10mW	15V	N.A.	N.A.	10µF	47µH	Nota 1	2,5µH
Value (Ver. T)	6 V	6,5mA	10mW	15V	N.A.	N.A.	10µF	47µH	Nota 1	50nH
<b>Inputs for Analog pressure sensor (1)</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value	6 V	222mA	333mW	N.A.	N.A.	N.A.	10µF	47µH	N.A.	N.A.
<b>Auxiliary Analog inputs 0-5V</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value (Ver. A)	6 V	1mA	6mW	6 V	N.A.	N.A.	10µF	47µH	450µF	5µH
Value (Ver. B)	6 V	1mA	6mW	6 V	N.A.	N.A.	10µF	47µH	85µF	2,5µH
Value (Ver. T)	6 V	1mA	6mW	6 V	N.A.	N.A.	10µF	47µH	450µF	50nH
<b>Input for Temperature sensor</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value	6 V	26mA	39mW	N.A.	N.A.	N.A.	10µF	47µH	N.A.	N.A.
<b>RS485 Serial Expansion Line</b>										
<b>Parameter</b>	<b>Uo</b>	<b>Io</b>	<b>Po</b>	<b>Ui</b>	<b>Ii</b>	<b>Pi</b>	<b>Co</b>	<b>Lo</b>	<b>Ci</b>	<b>Li</b>
Value (Ver. A)	6 V	6,5mA	10mW	6V	N.A.	N.A.	180 µF	200µH	450µF	5µH
Value (Ver. B)	6 V	6,5mA	10mW	6V	N.A.	N.A.	500 µF	200µH	85µF	2,5µH
Value (Ver. T)	6 V	6,5mA	10mW	6V	N.A.	N.A.	180 µF	200µH	450µF	50nH

(1) The following transducer models can be connected to these channels:

STS TD GAS, STS TM EX  
 GEMS 563966, GEMS 564280  
 TECLAB GSE-03, TECLAB TL01, TECLAB GSE/03/1  
 FAST GSE-03, FAST TL01, FAST GSE/03/1

Or any ATEX certified transducer with characteristic parameters compatible with the values shown in the table.


**Note1:**

The capacity  $C_i$  that M-LOG PLUS presents externally is a function of the applied voltage  $U_i$ : the considerations that led to these values are described in the technical note filed with the Notified Body that issued the type certificate.

The following two tables show the  $C_i$  values as a function of the applied voltage:

Voltage V	Version A and T $C_i$ ( $\mu\text{F}$ )
8,7	450
9	225
10	45
11	27
12	16,2
13	10,2
14	7,66
15	6,3

**Table 11.1-15**

Voltage V	Version B $C_i$ ( $\mu\text{F}$ )
6	85
7	25,8
8	8,5
9	3,4
10	1,86
11	1,18
12	0,77
13	0,53
14	0,4
15	0,31

**Table 11.1-16**

## 11.2 Power supply lines characteristic parameters

### 11.2.1 External battery – A version

If you decide to power the modem section of M-LOG PLUS version A with an external battery pack, the following characteristic parameters must be taken into consideration:


Parameter	$U_o$	$I_o$	$P_o$	$U_i$	$I_i$	$P_i$	$C_o$	$L_o$	$C_i$	$L_i$
Value	NA	NA	NA	5,9V	3,9A	5,76W	NA	NA	880 $\mu\text{F}$	5 $\mu\text{H}$

**Table 11.3-1**

### 11.2.2 External power source – B version

M-LOG PLUS Version B can be powered from an external source via the SE12354 interface card (optional) mounted in the slot that normally houses the GSM / GPRS modem.

The board allows power supply from an external source and at the same time makes an additional RS422 serial line available.

 For interfacing, associated equipment is required to ensure galvanic isolation between the power supply, the M-LOG PLUS communication circuits and the external correspondents.

Characteristic parameters of the power supply line:

Parameter	$U_o$	$I_o$	$P_o$	$U_i$	$I_i$	$P_i$	$C_o$	$L_o$	$C_i$	$L_i$
Value	NA	NA	NA	6V	650mA	N.A.	NA	NA	165 $\mu\text{F}$	2,5 $\mu\text{H}$

**Table 11.3-2**

Characteristic parameters of RS422 communication lines:

Parameter	Uo	Io	Po	Ui	Ii	Pi	Co	Lo	Ci	Li
Value	NA	NA	NA	6V	N.A.	N.A.	NA	NA	85 $\mu$ F	2,5 $\mu$ H

**Table 11.11.2-1**



The values of the capacitance Ci of the inductance Li presented by M-LOG PLUS version B refer to the equipment only, without connections to external transducers or to other equipment.

The actual capacitance and inductance values must take into account the capacitance and inductance values of the peripherals connected to the M-LOG PLUS terminals.

The 5-pole terminal on the SE 12354 board must be interpreted according to the following table:

Clamp	Function
1	Vin
2	GND
3	TX+
4	TX-
5	RX+
6	RX-

**Table 11.11.2-4**

### 11.2.3 External power supply using M-POWER -T version

M-LOG PLUS version T can be powered by the M-Power remote power supply.



In this version the modem must be exclusively of the SE13358 type and cannot be replaced in any way by another type of modem, also the radio module CANNOT be installed.

Characteristic parameters of the CPU power supply line:

Parameter	Uo	Io	Po	Ui	Ii	Pi	Co	Lo	Ci	Li
Value	NA	NA	NA	5,9V	0,6A	N.A	NA	NA	880 $\mu$ F	50nH

**Table 11.3-2**

Characteristic parameters of the MODEM power supply line:

Parameter	Uo	Io	Po	Ui	Ii	Pi	Co	Lo	Ci	Li
Value	NA	NA	NA	5,9V	3,9A	5,76W	NA	NA	880 $\mu$ F	50nH

**Table 11.11.2-6**



M-LOG PLUS version T can be equipped with a BU-BP battery capable of supporting the power supply of the CPU in the event of a main power supply failure. It is not allowed to use the BU-BP buffer battery in versions A and B. Use only the battery model indicated.

## 12 Disposal



Exhausted batteries contain substances that are hazardous to the environment and are subject to mandatory separate collection. **CER 160605.**



The equipment must be disposed of in accordance with current regulations. **CER 160216**

