

# **USER'S MANUAL for TP1070 series HMI - Operator panel**



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ME7032\_09  
06/22



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## **1. Introduction**

To grant a fast setup of the device please follow carefully the information in this manual.

### **1.1. Staff skill**

Products described in this manual are devoted to PLC programmers or automation experts only. MECT S.r.l. declines any responsibility about malfunctioning or damage caused by incorrect use of MECT devices, due to noncompliance to this manual information. MECT S.r.l has an help desk.

### **1.2. Simbols**



#### **Danger**

Follow this advice to avoid people injury.



#### **Warning**

Follow this advice to protect the device.



#### **Caution**

Follow this advice to have a more effective performance.



#### **ESD ( Electrostatic discharge)**

Danger: possibly damage due to Electrostatic discharge.



#### **Note**

Step to follow for a correct installation.



#### **Additional information**

### **1.3. Terms**

PLC:	TP1070
Terminals:	MPNC006; MPNC020; MPNC030; MPNC035
System:	PLC (TP1070) with terminals

#### 1.4. Security

**Attention**

Switch off devices before connecting them.

**ESD** (Electrostatic discharge)

Modules have electronic components that can be damaged by electrostatic discharge. Be sure to be connected to ground when handle the devices.

The instrument has no power switch and no internal fuse, but it powers on immediately after connecting a correct power supply input (check the power supply value on the instrument label). Keep the power supply line as short as possible and keep it separate from other power lines.

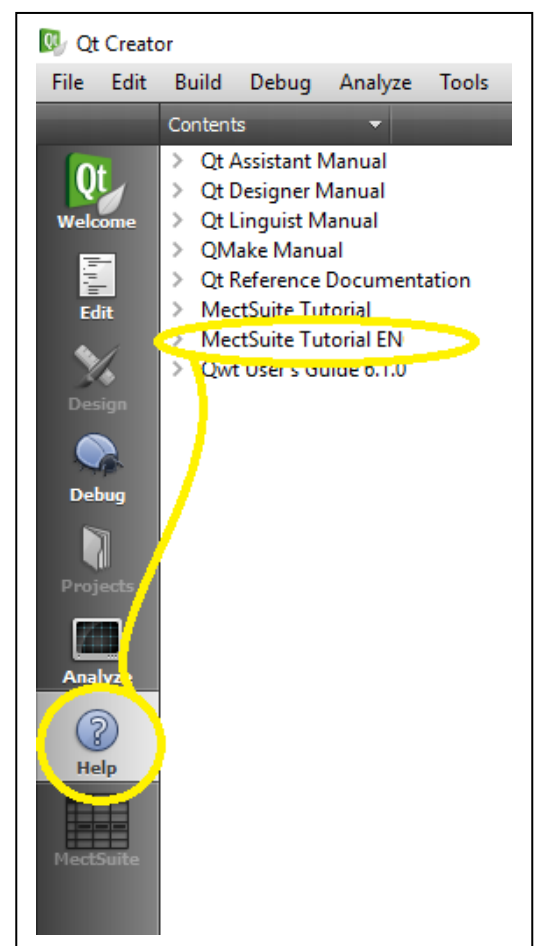
For security reasons it is necessary to have a 2 section power switch with a fuse near the instrument and easily replaceable.

Avoid the presence of other power actuators in the same control panel, high humidity, excessive heat and corrosive gas.

Instruments must have a power supply from security transformers or SELV transformers.

#### 1.5. REFERENCE MANUAL

The **Quick Start** (downloadable from the web site) and **MectSuite Tutorial** are the reference manuals for MectSuite to develop HMI and PLC applications.



## 2. System description

TP1070 is a device composed by a PLC and a HMI with touch-screen monitor 7" width and 800 x 480 pixel resolution with 262.000 colors.

The TP1070 operator panel allows supervision of devices connected to the Modbus TCP and Modbus RTU network. The networks are managed at the same time by the TP1070, and data from one network can be sent to another, thus creating a bridge between the two networks.

On the TP1070 operator panel there is also a USB host port. The USB allows the use of a key for software update and data historicization.

On the TP1070 there are up to 1 kByte of retentive variables stored on flash memory.

The device can be applied in horizontal or in vertical design with the option "V" (see following pictures).



Figure 1: Front view TP1070 (horizontal version)

Figure 2: Front view TP1070 (vertical version)

**2.1. Specification**

The TP1070 operator panel is based on a multiprocessor system. PLC and HMI are based on a 454MHz ARM9.

Table 1

<b>Hardware characteristics</b>	
Processor	ARM926JE 454MHz
RAM	128MB
FLASH	128MB
Non volatile variables	On FLASH memory
Real Time Clock	Yes with rechargeable battery
Screen 7"	TFT 800 x 480 pixel 262k colors
Touch screen	Resistive 4 wires
Ethernet	10Mbit/s - 100Mbit/s self recognition
USB	Host 2.0
CANOpen	1 channel
	Max Bit rate: 1Mbit/sec
	Cycle time: 10msec
Serial output	RS485 full duplex (hardware configuration)
<b>Software characteristics</b>	
OS	LINUX 2.35
PLC	IEC61131-3
Graphics	Based onQT library
CAN Bus	CanOpen 2.0
ModBus	Modbus RTU master
Storage memory massa	Possibility of history storage
<b>Field bus main features</b>	
RTU Modbus	Master 2 or 4 wies
TCP Modbus	Server

**Electromagnetic compatibility**

The electromagnetic compatibility tests have been carried out at accredited laboratories, according to EN 61326-1, EN 61131-2 and EN 61000-6-2standards.

3. Hardware Installation

In the following figures see the TP1070 operator panel dimensions.

3.1. Mechanical dimensions

Side view

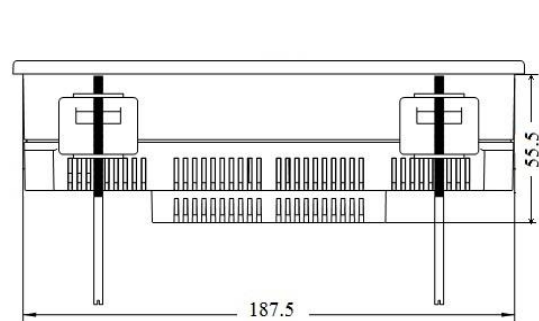


Figure 3

Rear view

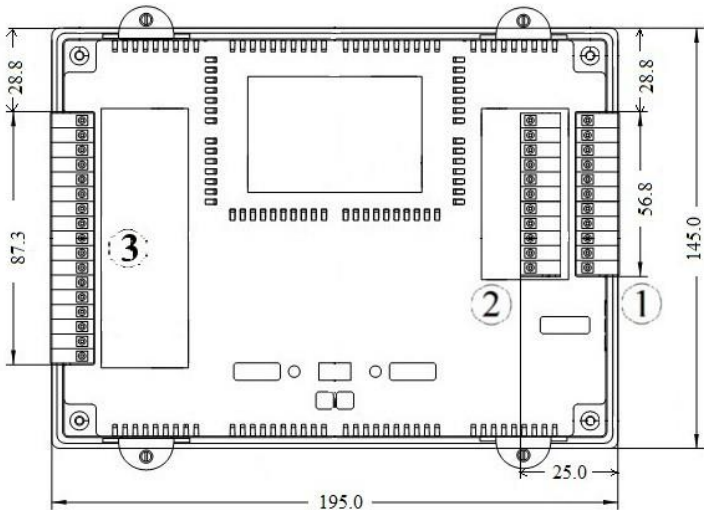


Figure 4

Side view

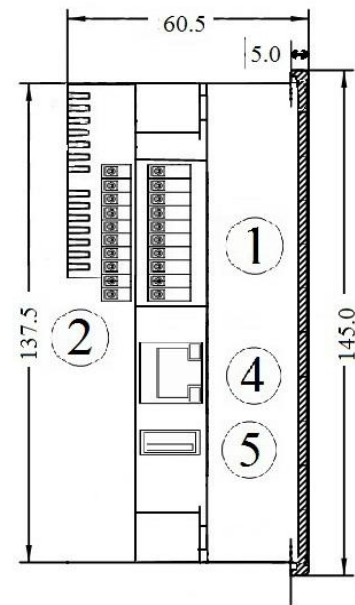


Figure 5



## Technical specification

Table 2

<b>Mechanical</b>	
Material	Polycarbonate, Polyamide 6.6
Dimensions W x L x H	195 mm x 145 mm x 60.5 mm
Mounting plate	138mm x 188mm
Installation	Panel installation
<b>Environmental conditions</b>	
Operative temperature	0 °C ... 55 °C
Storage Temperature	-20 °C ... +85 °C
Relative Humidity	5 % a 95 % no condensation
<b>Electric isolation</b>	
Air clearance	According to IEC 60664-1
Pollution According to IEC 61131-2	2
<b>Protection</b>	
Rear protection	IP 20
Front protection	IP65

**Attention**

Install the device in a panel with no more than 55 °C.

### 3.2. Panel mount

#### 3.2.1. Distance

System must be installed with a space for heat dissipation and cabling. Avoid cabling superimposing to avoid EMC problems.

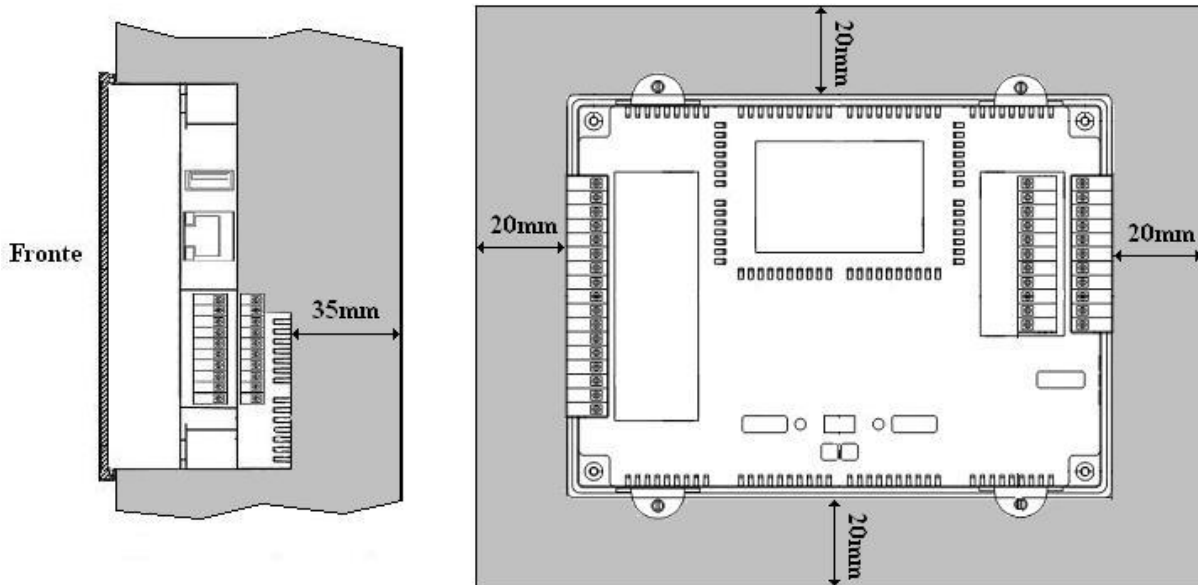


Figure 6A: Horizontal mounting

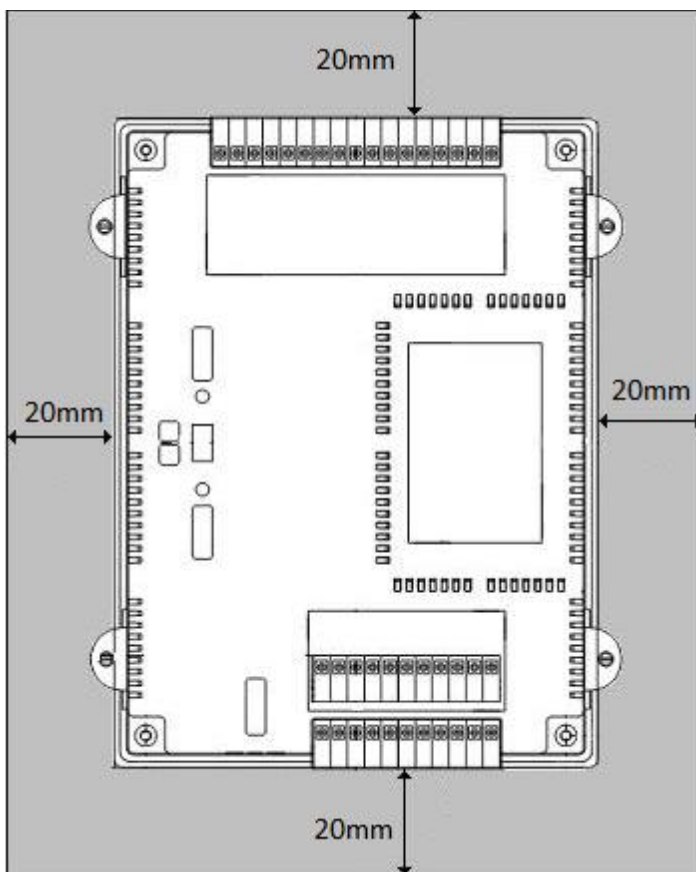


Figure 6B: Vertical mounting

4. TP1070 wiring

4.1. Connections

In the following figure see the wiring diagram with the available I/O.

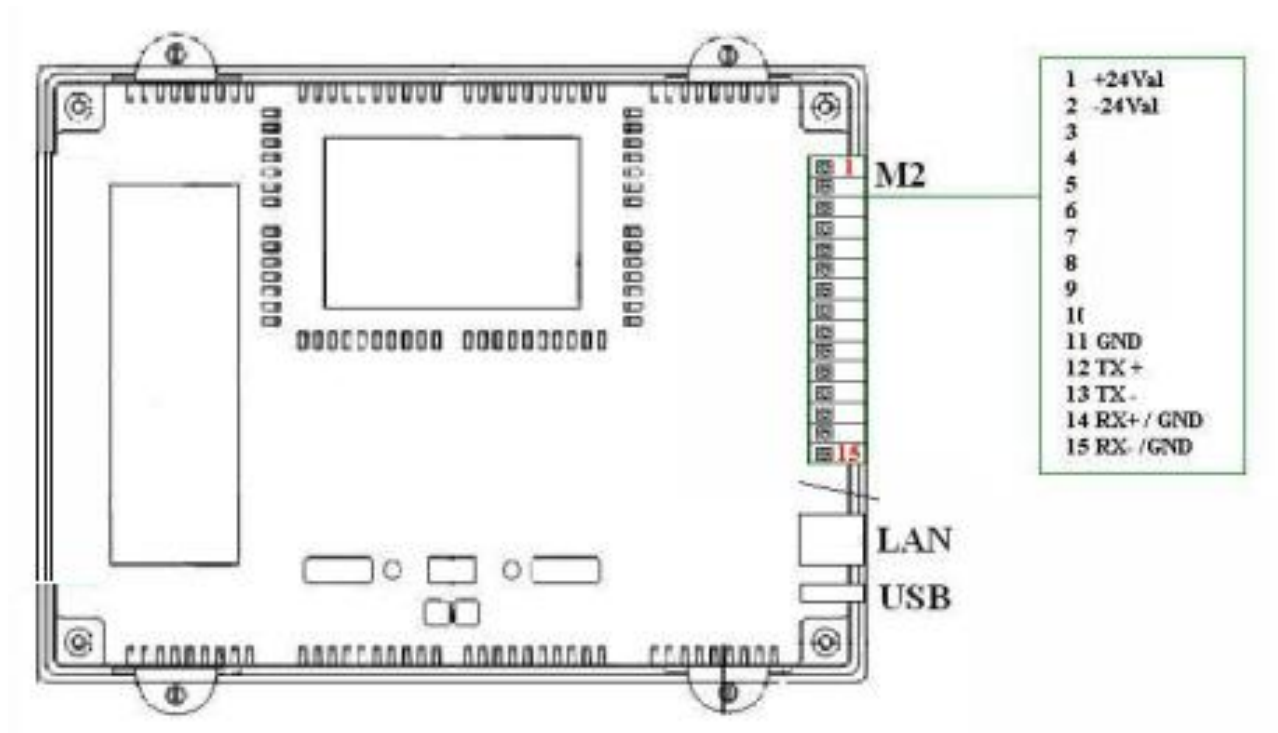


Figure 7

Table 3

TP1070	
Power Supply	12÷36Vdc Vdc 400mA
USB A	2.0
Ethernet	Bit rate: 100Mbit/sec
Serial ouputs	RS485 full duplex (hardware configuration)

## 4.2. Power supply

### 4.2.1. System power supply

TPAC1070 operator panel has a 12÷36Vdc according to the scheme in the figure. System is protected against reverse power supply.

### 4.2.2. Fuse

System has no internal fuse , so is suggested the use of an external 1A fuse for the panel power supply.

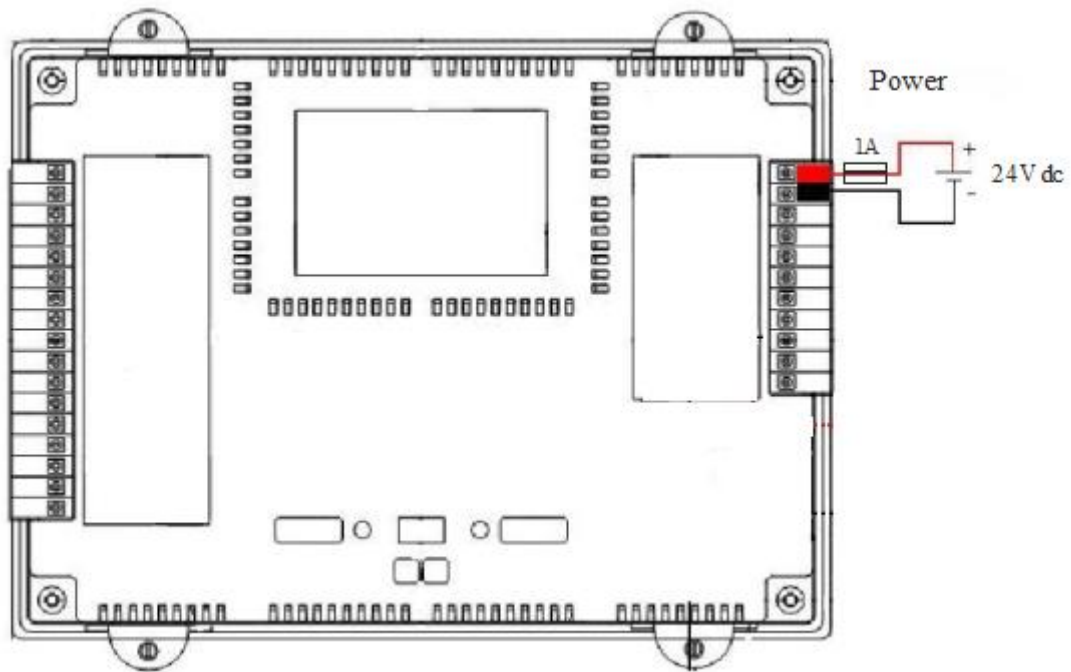


Figure 8



### Attention

A wrong value for the power supply can cause a damage to the device

### 4.3. ModBus wiring (on all models)

ModBus on TP1070 operator panel is a 4 wire RS485 serial line, on the M2 terminal (RTU3) board on pins:

Table 4

Pin	Segnale	Description
11	GND	
12	TX +	Line + Tx
13	TX -	Line - Tx
14	RX +	Line + Rx
15	RX -	Line - Rx

Example of a wiring of a system composed by:

- MPNC006
- MPNC020
- MPNC030
- TP1070

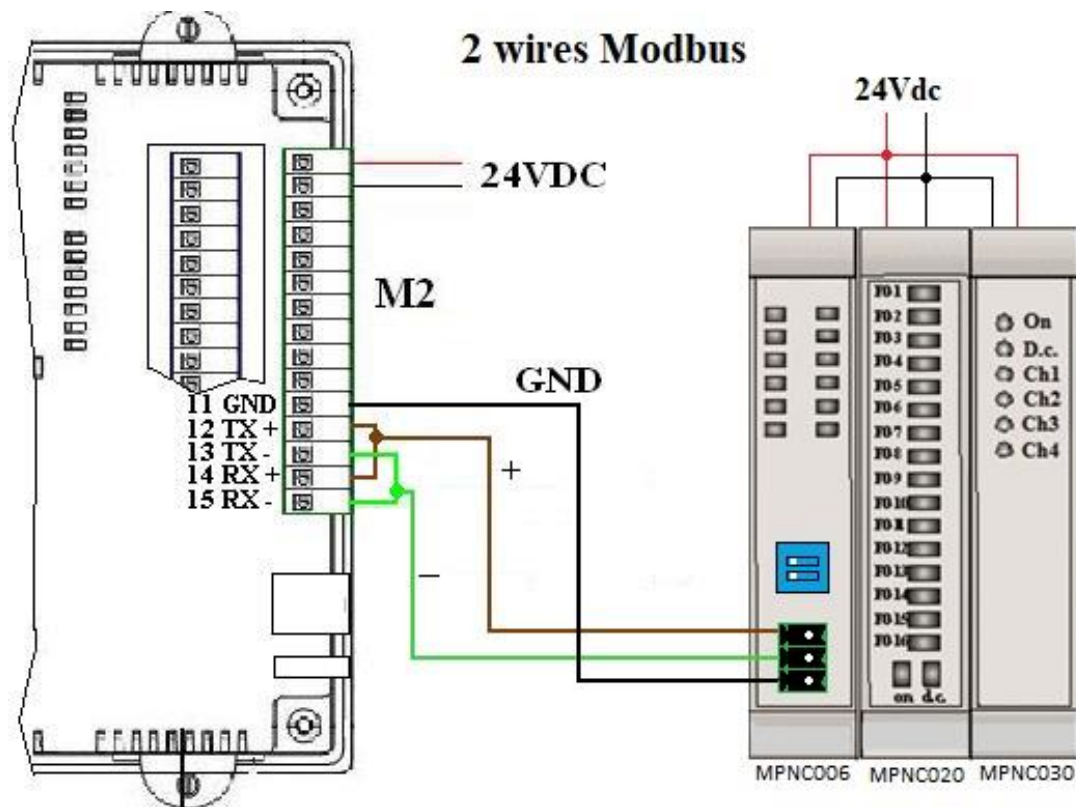


Figure 9

#### 4.4. CanOpen (TP10070\_01\_B model)

Can interface on TP1070\_01\_B operator panel is on M3 terminal board on pins.

Table 1

Pin	Signal
1	CAN H
2	CAN L
3	GNDiso

Example of a wiring of a system composed by:

- MPNC010
- MPNC020
- MPNC030
- TP1070

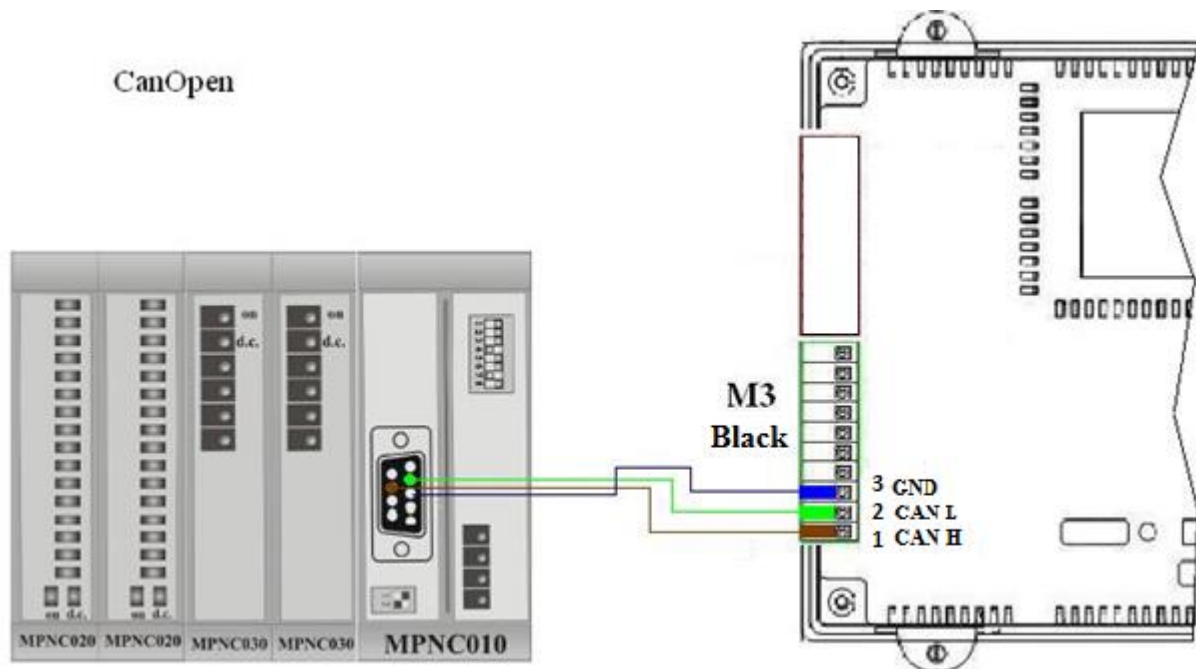


Figure 15

#### Cable type

Cable between TP1070\_01\_B and CANopen slave must be a shielded twisted pair, and to avoid external disturbances the shield must be connected to both 0V of the communicating systems. The cable length is a function of the baud rate as follows.

Table 2

Baud rate	Bus lenght
1 Mbit/s	10 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
50 kbit/s	1000 m

### Terminal resistance

Inside the TP1070\_01\_B operator panel there is a resistance of  $120\Omega$  to terminate properly the bus on the master side.

To configure the CAN communication see the **CAN Builder** tutorial.

### 4.5. ModBus wiring (TP1070\_01\_C model)

ModBus on TP1070\_01\_C operator panel is a 4 wire RS485 serial line, on the M3 terminal (**RTU0**) board on pins.

Table 6

Pin	Signal
1	D+
2	D-
3	GNDiso

## 5. Peripherals

### 5.1. USB

TPAC1070 has an USB 2.0 host for:

- software update.
- data storage: datalogger.
- Connect USB peripherals as printers, mouse, etc.

**Specific connection of external peripherals are implemented on request.**

### 5.2. *Ethernet*

TP1070 operator panel has a 10/100Mbit/s ethernet port with autoconfiguration, with direct or inverse connection cable.

TP1070 operator panel, by ethernet, can be controlled by a personal computer, it is possible to control the I/O of TP1070 by means of a program on a PC.

## 6. HMI

To set the TP1070 operator panel is necessary to develop a software in QT Creator based on QT libraries, custom-tailored on MECT operator panel.

A specific tutorial is furnished with the device.

The QT Creator suite software is available in Windows environment.

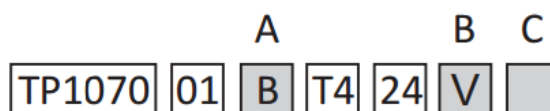
### 6.1. *System variables*

The system can use 5472 interchange variables between HMI and automation (at maximum) which include:

internal variables, interchange variables on Modbus network, retentive variables.

The variables are defined by a tool furnished from Mect.

## 7. How to order



### **A** - Interface

**A** = LAN, USB, RS485  
**B** = LAN, USB, RS485, CAN  
**C** = LAN, USB, 2 for RS485

### **B** - Orientation

**Blank** = Horizontal  
**V** = Vertical

### **C** - Options

Upon customer's request