



# proop

Professional Operator Panel

## User Manual

PROOP series HMI panels are a product with powerful features that enable you to perform your applications quickly. EMKO Proop series offers a wide selection for your projects with HMI panels starting from 4.3 " to 10.1 " and offering different communication and input-output options. 4.3 thousand -5 "and 7" HMI panels 260 thousand and 10.1 HMI panels come with a 16 million color TFT display.

This gives you rich colors and unmatched resolution on your touch screen. With the powerful Arm Cortex A series processor, your processing speeds will be much shorter. Proop HMI panels support communication through multiple serial ports simultaneously, so you can connect to multiple controllers and increase your processing power. You can connect to external networks with the Ethernet port or access the HMI panel from an external network again. With built-in input ports, you can perform simple plc applications without using an external plc. With simple, useful, powerful and user-friendly editor software, you can develop new designs and create world-class programs.

This Document will assist the user in PROOP installation and connection.

- For your safety, read the document before using the product.
- For information about PROOP builder software and installation, please refer to PROOP Builder User Manual.
- The contents of the document may have been changed and updated. You can find the current version at [www.emkoelektronik.com.tr](http://www.emkoelektronik.com.tr)



Security warnings are marked with the symbol on the side. warnings ! needs to be considered by the user.

## GENERAL FEATURES

- Over 100 vector-based ready elements.
- Vector-based user-defined image (SVG) support.
- Image support in BMP, GIF, JPG, JPEG, PNG, PBM, PGM, PPM, TIFF, XBM, XPM format.
- Improved visual drawing infrastructure; antialiasing, alphablending support.
- TrueType (TTF), PostScript Type1 (PFA / PFB), Bitmap Distribution Format (BDF), CID-keyed Type1, Compact Font Format (CFF), OpenType fonts, SFNT-based bitmap fonts, Portable Compiled Format (PCF), Microsoft Supports Windows Font File Format (Windows FNT), Portable Font Resource (PFR), Type 42 (limited support) fonts.
- Remote access and control thanks to the built-in VNC protocol.
- Project upload or download in a short time with high speed data transfer via USB 2.0 port.
- Support of time, date and number formats sensitive to regional settings.
- Internal Analog / Digital Input-Output port support.
- Offline simulation mode.
- RS232, RS422, RS485, Ethernet physical interfaces.
- MODBUS ASCII, RTU, TCP communication protocols.
- Siemens S7-300 / S7-400 / S7-1200 / S7-1500 PLC protocol support.
- BACNET MS / TP, BACNET IP
- MQTT support
- OMRON HOSTLINK / FINS communication protocol
- DELTA DVP series PLC communication protocol

# PROOP MODELS

MODEL		4,3" TFT	5" TFT	7" TFT	10" TFT	RS-232	1x RS-485	2x USB	Ethernet-1	Ethernet-2	Wi-Fi	4 x Digital Input	5 x Digital Input	4 x Digital Input	2 x Analogue Input	2 x Analogue Input
ECO	Proop.black-4.eco	X				1X	X	X								
	Proop.black-5.eco		X			1X	X	X								
	Proop.black-7.eco			X		1X	X	X								
LITE	Proop-7L			X		2X	X	X								
	Proop-7L.wi			X		2X	X	X			X					
	Proop-7L.E			X		2X	X	X	X							
	Proop-7L.Ewi			X		2X	X	X	X		X					
	Proop-10L				X	2X	X	X								
	Proop-10L.wi				X	2X	X	X			X					
	Proop-10L.E				X	2X	X	X	X							
	Proop-10L.Ewi				X	2X	X	X	X		X					
CONTROL	Proop-7C			X		2X	X	X				X		X		
	Proop-7C.wi			X		2X	X	X			X	X		X		
	Proop-7C.E			X		2X	X	X	X			X		X		
	Proop-7C.E2			X		2X	X	X	X	X		X		X		
	Proop-7C.Ewi			X		2X	X	X	X		X	X		X		
	Proop-7C.E2wi			X		2X	X	X	X	X	X	X		X		
	Proop-10C				X	2X	X	X					X	X		
	Proop-10C.wi				X	2X	X	X			X		X	X		
	Proop-10C.E				X	2X	X	X	X				X	X		
	Proop-10C.Ewi				X	2X	X	X	X		X		X	X		
PROCESS	Proop-10P.0.D5.D4.AC.AC				X	2X	X	X					X	X	X	X
	Proop-10P.wi.D5.D4.AC.AC				X	2X	X	X			X		X	X	X	X
	Proop-10P.E.D5.D4.AC.AC				X	2X	X	X	X				X	X	X	X
	Proop-10P.Ewi.D5.D4.AC.AC				X	2X	X	X	X		X		X	X	X	X
	Proop-10P.E2.D5.D4.AC.AC				X	2X	X	X	X	X			X	X	X	X
	Proop-10P.E2wi.D5.D4.AC.AC				X	2X	X	X	X	X	X		X	X	X	X

# TECHNICAL SPECIFICATIONS

Product	4,3"	5"	7"	10,1"
Screen Type	4,3" TFT LCD	5" TFT LCD	7" TFT LCD	10,1" TFT LCD
Display Colors	260K	260K	260K	16M
Resolution	480x272	800x480	800x480	1024x600
Touch Method	Resistive Analogue	Resistive Analogue	Resistive Analogue	Resistive Analogue
LCD Lighting	LED	LED	LED	LED
Brightness (Cd / m2)	530	330	300	270
Backlight Life (Hour)	25°C 50000 Hour	25°C 50000 Hour	25°C 50000 Hour	25°C 50000 Hour
MCU	ARM Cortex-A-Series	ARM Cortex-A-Series	ARM Cortex-A-Series	ARM Cortex-A-Series
Flash drive	8GB eMMC	8GB eMMC	8GB eMMC	8GB eMMC
RAM	512 MB DDR3 SDRAM	512 MB DDR3 SDRAM	512 MB DDR3 SDRAM	512 MB DDR3 SDRAM
Buzzer	X	X	>=85dB	>=85dB
USB-Slave	1 x USB 2.0	1 x USB 2.0	1 x USB 2.0	1 x USB 2.0
USB-Host	1 x USB 2.0	1 x USB 2.0	1 x USB 2.0	1 x USB 2.0
RS-232	Max. Speed 230400 Baudrate	Max. Speed 230400 Baudrate	Max. Speed 230400 Baudrate	Max. Speed 230400 Baudrate
RS-422 / RS-485	Max. Speed 57600 Baudrate	Max. Speed 57600 Baudrate	Max. Speed 57600 Baudrate	Max. Speed 57600 Baudrate
Ethernet	X	X	10/100 Mbit/s	10/100 Mbit/s
Wi-Fi-Standard	X	X	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n
Wi-Fi-Frequency	X	X	2.4 Ghz	2.4 Ghz
Wi-Fi max. Communication Speed	X	X	Max. 72 Mbit/s	Max. 72 Mbit/s
Wi-Fi-Security Protocols	X	X	WEP, WPA und WPA2	WEP, WPA und WPA2
Digital Inputs	X	X	Optical Isolation 50mSn	Optical Isolation 50mSn
Digital Outputs	X	X	Optical Isolation 50mSn	Optical Isolation 50mSn
Analogue I / O Resolution	X	X	X	14 Bit
Analogue I / O Sampling Time	X	X	X	50 Msn
Real Time Clock	Settled	Settled	Settled	Settled
IP-Cod	Ip65 at front Ip20 at rear	Ip65 at front Ip20 at rear	Ip65 at front Ip20 at rear	Ip65 at front Ip20 at rear
Operating Voltage	18...30Vdc	18...30Vdc	18...30Vdc	18...30Vdc
Power Consumption	5W	5W	6W	8W
RTS-Battery	Cr2032 Lithium, 3V	Cr2032 Lithium, 3V	Cr2032 Lithium, 3V	Cr2032 Lithium, 3V
RTC-Battery Life	5 Year	5 Year	5 Year	5 Year
Operating Temperature	0...50°C	0...50°C	0...50°C	0...50°C
Storage Temperature	-20...60°C	-20...60°C	-20...60°C	-20...60°C
Working Humidity	0...90% RH	0...90% RH	0...90% RH	0...90% RH
Weight	350gr	350gr	700gr	1300gr

## Certifications:

- \* EN 61000-6-2 (EMC immunity)
- \* EN 61000-6-4 (Radiated emissions)
- \* EN 61010-1 (Safety standards)



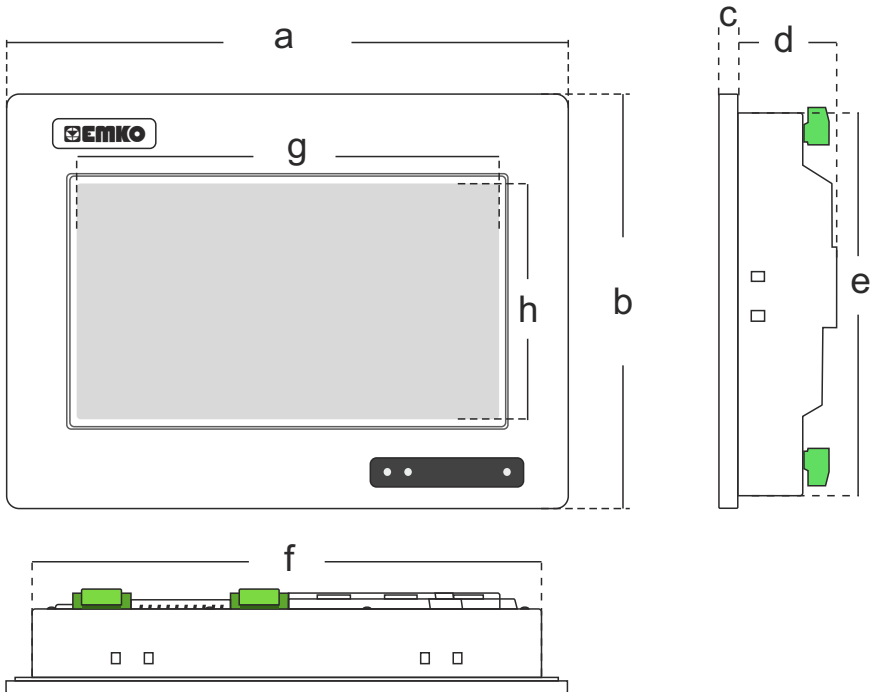
# SYSTEM REQUIREMENTS

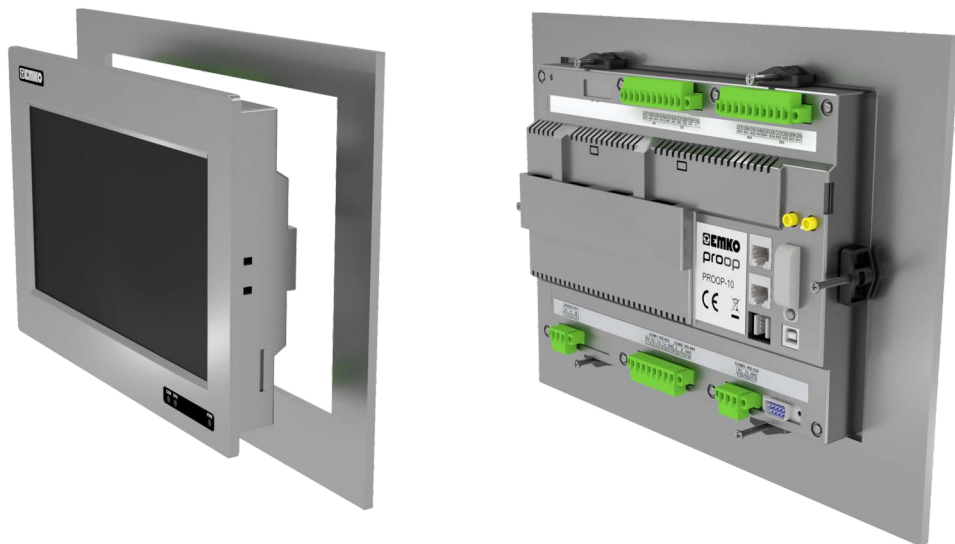
Minimum system requirements for installing Proop Builder software:

- 1GHz or faster processor
- 1GB RAM
- 2GB of Memory (at least 500 MB of free memory)
- RJ45 Ethernet network cable
- USB Port Input
- Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10 any of the operating systems.

# DIMENSIONS

	a (mm)	b (mm)	c (mm)	d (mm)	e (mm)	f (mm)	g (mm)	h (mm)
Proop 4.3	153	105	5	43	92	136	96	54
Proop 5	153	105	5	43	92	136	109	62
Proop 7	206	152	8	40	136	190	155	86
Proop 10.1	278	200	8	42	180	258	223	125





1. Prepare the section of panel where the device will be mounted in the dimensions given.
2. The sealing gaskets on the front panel of the device are installed. be sure.
3. Insert the device into the section on the panel.
4. Install mounting brackets into their slots.
5. Secure the device to the panel by tightening the device's apparatus screws.
6. Excessive force can damage the panel
7. Screws of the cables attached to the terminals must be tightened.
7. Air to prevent the device from overheating and cooling



Do not cover the sections that provide circulation and make sure there is enough space for air circulation.

## SETUP



Before starting the installation of the device, read the following warnings carefully.

Before carrying out the installation of the device, it must be checked against damage that may occur during transportation. Installation and commissioning must be done by mechanical and electrical technicians. This responsibility belongs to the buyer.

Never use the device in environments where flammable and explosive gases are present.

Avoid exposing the device to direct sunlight or any type of heat source. Transformer, motor etc. near the device. such as magnetic objects or interference generating devices (such as welding machines, etc.).

In order to reduce the effect of electrical noise on the device, the low voltage line (especially the sensor input cable) cables should be separated from the high current and voltage line.

Necessary precautions must be taken for all parts that may create a hazard on the mechanical parts of the device. These measures are necessary for the safety of the personnel who will assemble.

The device must be mounted on the system with its own fixing parts. Do not assemble the device with unsuitable fixing parts. Mount the device with the fixing parts to ensure that the device will not fall.

If possible, use shielded cable. The screen should be grounded to one side only. In order to prevent electrical shocks and similar accidents, the device and the system where the installation is made should not be energized before all connections of the device are completed.

Digital outputs and supply connections are designed by isolating each other. Before commissioning the device, the parameters must be adjusted according to the desired use.

Incomplete or incorrect configuration can cause dangerous gaps.



There is no switch on the device to turn off the fuse and device energy. A switch and fuse that will turn off the energy at the supply input of the device must be added to the system by the user.

It is necessary to check the supply voltage range of the device and apply the appropriate supply voltage. This control operation will prevent damage to the device, system and possible accidents by applying the wrong supply voltage.

After the device is energized, check that the power led lights on the device screen. If there is a danger arising from any error or malfunction on the device, turn off the system's energy and disconnect all electrical connections of the device from the system.

Do not make changes or attempt to repair the device. Interventions on the device can cause malfunctions, damage to the device and the system, electrical shocks, and fire.

In case of an unexpected situation, please contact us.  
In the event that the device is used outside of the uses and purposes specified in this user manual, all responsibility belongs to the user.

PROOP Builder software should be used to program the device.  
You can download the current version of Proop Builder editor software free of charge at <https://www.emkoelektronik.com.tr>

## PANEL VIEW

EMKO offers 2 different color options in Proop HMI panels, black and gray. Proop 4.3 "and 5" economic models are only black color options and other models can choose 2 different colors.

Black and Gray color views are as in Figure 1 and Figure2.

Proop Black



Figure1 :PROOPBLACK front view

Proop Grey



Figure2 :PROOP front view

1	COM	It is a communication indicator.
2	CPU	Shows the current status of the CPU.
3	PWR	It is an indicator of energy.

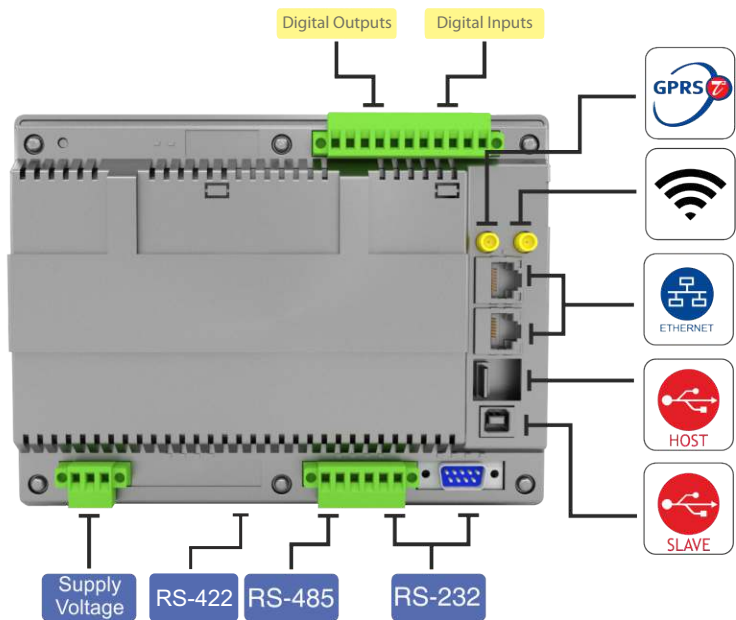


Figure2 :PROOP 7" Back view

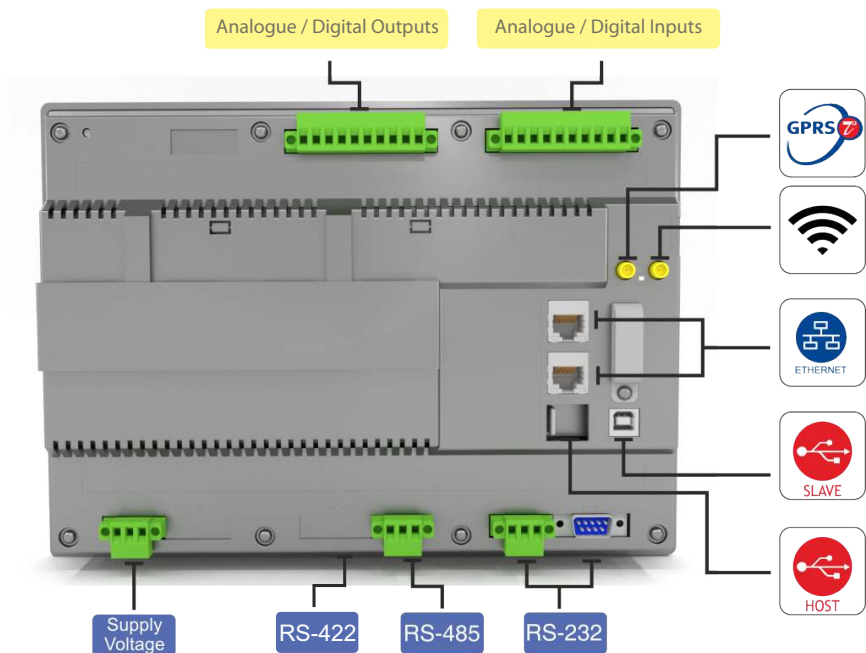


Figure3 :PROOP 10.1" Back view

## SYSTEM SETTINGS

Device system settings can only be made on the panel.

In order to open the device system settings window, a button object should be added to the form page and the button type property of this button should be set as HMI settings.

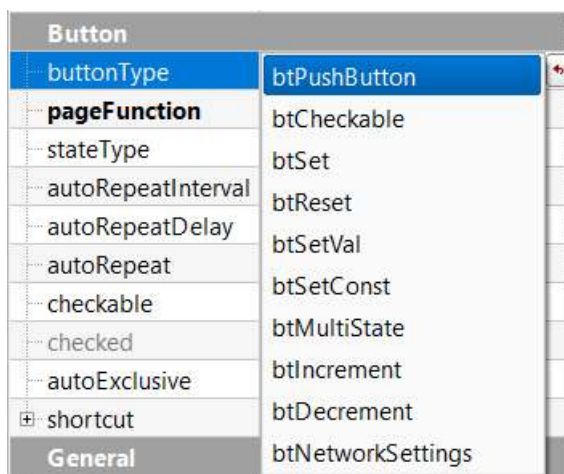


Figure4 :Button Type Setting

In the HMI Network settings section, Ethernet communication settings can be made for devices with Ethernet ports.

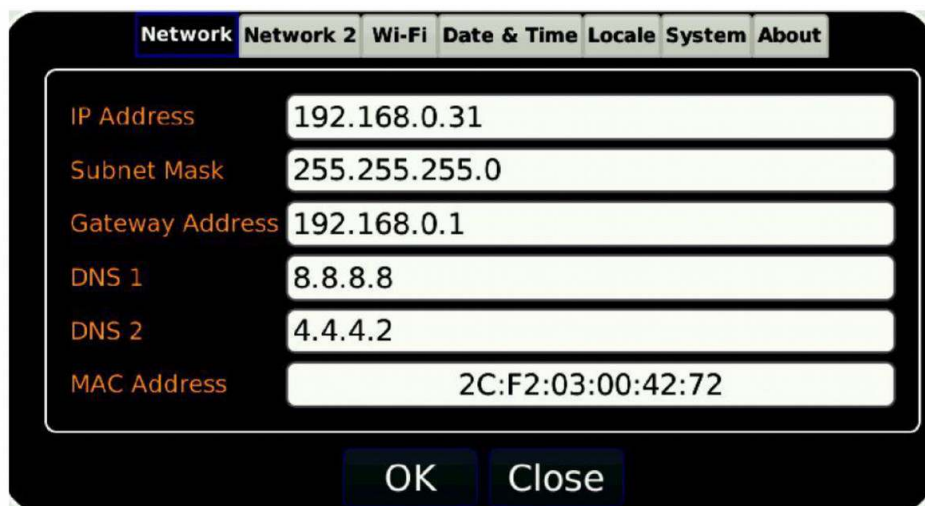


Figure5 :HMI Network Settings Window

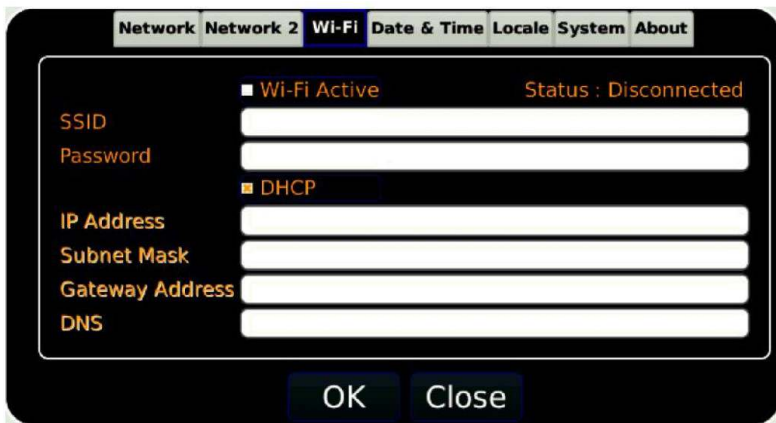


Figure6 :HMI Wi-Fi Settings Window

- Wi-Fi connection settings are made on the Wi-Fi tab.
- The name of the network to be connected to the SSID part and the password of the network is written in the password part.
- The DHCP icon is removed to get fixed IP from the network and the necessary settings can be made
- Related fields become active for.



Figure7 :HMI Time-Date Settings Window

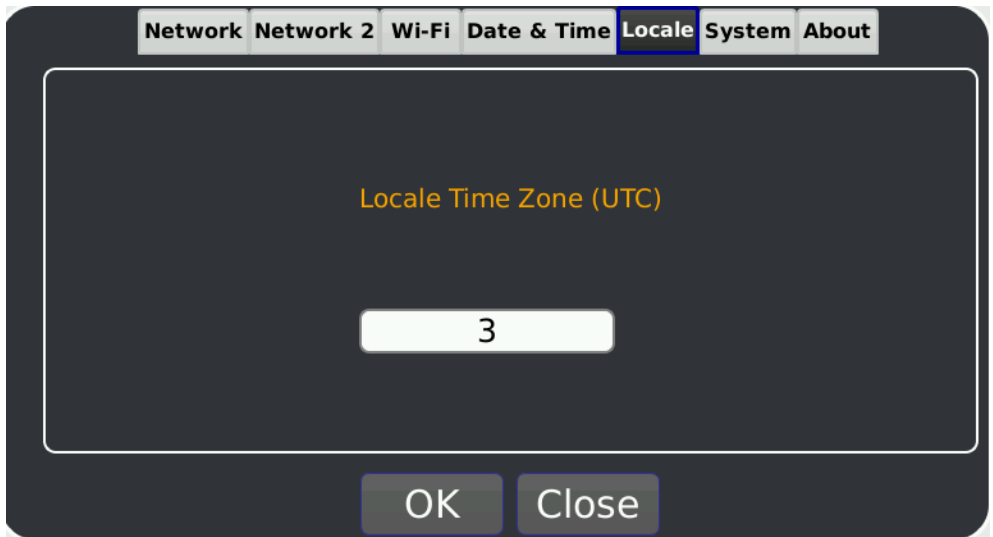
- From the HMI Date and Time settings tab, the time and date settings of the HMI panel can be made.
- The device has a CR2032 battery that prevents the erasure of time and date information. In this way, even if the power is cut off, the time and date information is not deleted.
- Battery life is 5 years.



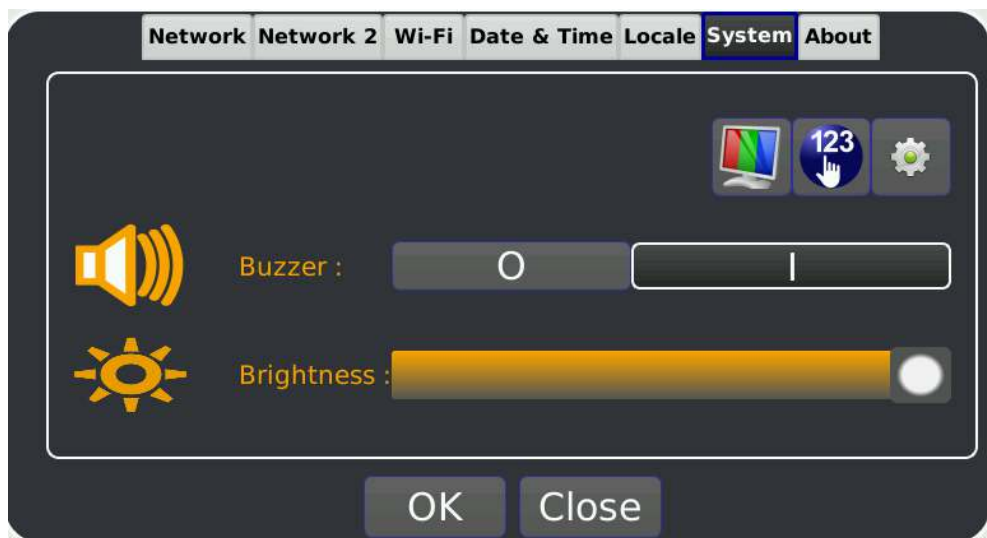
Figure8 :10" HMI Battery bed

- In 10 "panels, the battery can be replaced by opening the cover in Figure 8.
- Battery in other models

The back cover must be opened for replacement.





- Local time zone can be defined from Locale tab.
- When programming, local time zone can be read from \$ S12 address or this The local time zone can be changed by writing to the address.

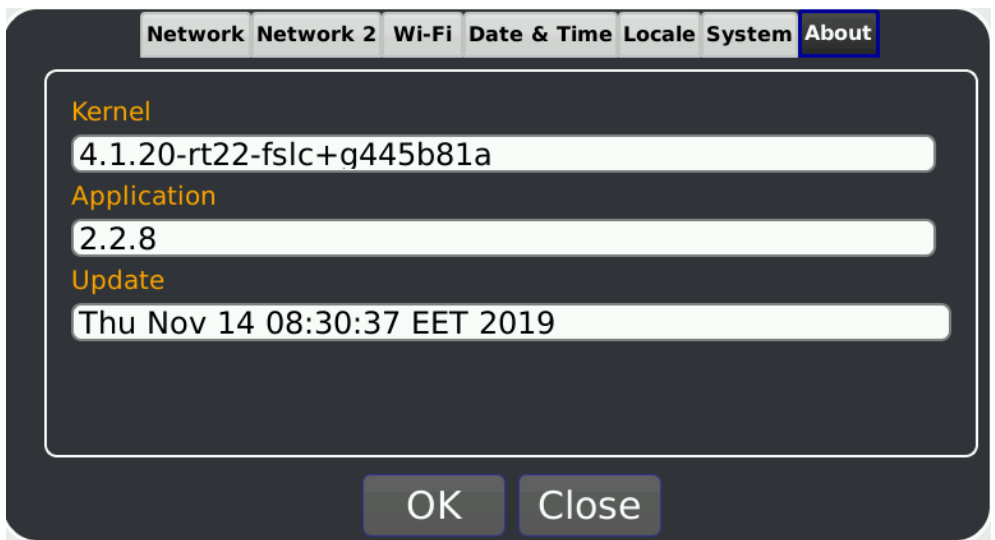


*Figure9 :HMI Lighting-Buzzer Settings Window*

- Display brightness and buzzer on-off setting from HMI system settings
- In order to open and close the buzzer during the program, assignment to \$ S0 must be made. When \$ S0 is 1, the buzzer will be open and 0 will be closed.
- \$ S1 address is used to change the screen brightness. \$ S1 address is between 0-7. 0 means brightness completely closed and 7 means completely open.

 Color test screen  
with button

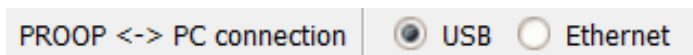
 Touch test with button screens can  
be switched.



- The firmware and update information can be accessed from the About tab. There is firmware version information installed on the device in the application section.

## PROJECT LOADING

- We can upload the program we made in the editor software to the HMI panel with PC or USB memory.
- Installation via PC can be done over Ethernet for devices with USB or Ethernet ports.



Project installation selection is made through the Proop PC connection section by following the "Project / Project Settings" path in the editor software.

- When the connection type is selected as Ethernet, the IP number of our device should be written in the Target IP address section of the project settings.





## To install cable over PC;

### USB Cable

1. Connect the HMI panel from the USB device port to the PC via cable.
2. In the editor software, PROOP <-> PC Connection USB Select.
3. When the program you made from the editor software is open in a 'To Tools / HMI Device  
Install " or press F5.

### Ethernet Cable

4. Connect the HMI panel to the Ethernet network.
5. PROOP <-> PC Connection from the project settings section in the editor software  
Choose as Ethernet.
6. Type the IP address of the panel in the Destination IP Address section.
7. When the program you made from the editor software is open in a 'To Tools / HMI Device  
Install " or press F5.

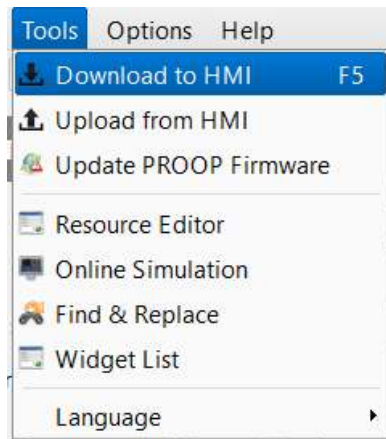



Figure 10: Installing Programs to the HMI Panel

8. Installation process at the bottom of the editor software  It can be viewed by clicking the icon.

## To install programs with USB Memory:

1. Create a folder named "emko" or "proop" in the main directory in the USB memory.
2. Copy the project file (\*.emkp) you prepared with the editor software into this folder.
3. Copy the image library file with the extension "\*" .rcc" that you used in your project to this folder where you created it.
4. Connect the USB memory to the USB host socket on the back of the HMI device.
5. When USB memory is inserted, de-energize the HMI device and re-power it. The device will start installing the program from the USB memory. You can follow the installation process on the screen.

```
Update <tar> started, please wait...
emko/runtime/libEmkoHmi.so.1.0.0
emko/runtime/hmi_protocols/libinternal.so
usr/lib/fonts/arial.ttf
Update successful!!!
```

*Figure11 :Program Install Screen*

## FIRMWARE UPDATE

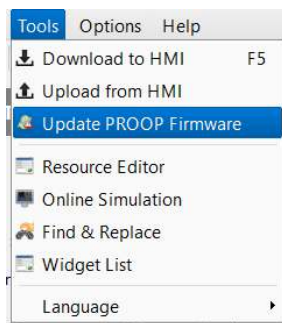
•Firmware updates containing specific features with HMI panel editor software is published regularly. Current editor software, firmware updates and Information documents can be found at [www.emkoelektronik.com.tr](http://www.emkoelektronik.com.tr)

Firmware update can be done in two ways.

**For firmware update via PC;**1.Wire the HMI panel from the USB device input to the PC with cable.

2. Click Update Tools / PROOP Firmware from the editor software.

3. The latest firmware update with the extension "\*" .bin" you downloaded from the site in the window that appears. Select the file.



\*\*\*When the update is installed on the device, the device will turn on again and all the program in it will be deleted.

**•Firm For firmware update via USB memory;**

1. Copy the firmware file you downloaded to the main directory of the USB stick.

2.Plug the USB device into the closed device and energize the device.

3.The device will start installing the update while booting.

4.Installation process can be followed on the device screen.

```
Please wait: booting...
Kernel      : 4.1.20-rt22-fslc+g445b81a
Application  : #1.0
Update      : Fri Mar 31 15:07:20 EEST 2017
Update (sh) started, please wait...
Update successful!!!
```

Figure12 :Firmware Update Screen



The editor software you use and the device firmware version It must be the same. Otherwise, your program will not work properly.

## FACTORY SETTINGS

When the device is turned on, pressing the reset button shown in picture13 for 5 seconds, the device, updates and software are deleted and returned to the factory settings. Countdown and deletion of the settings can be followed on the screen.

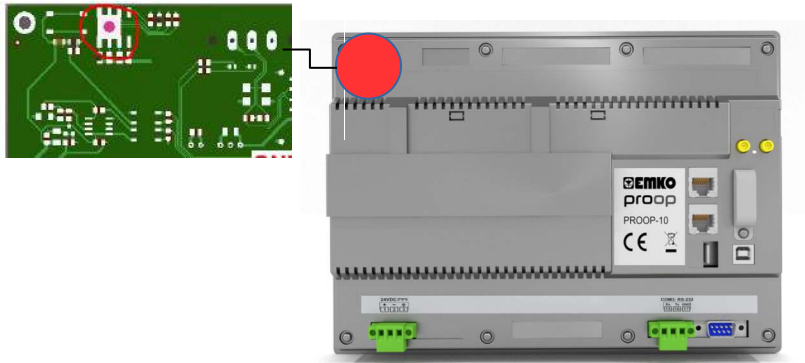


Figure13 :Reset Button

## INTERNAL MEMORY ADDRESS DEFINITIONS

Memory Type	Format	December
Volatile Memory	\$n	n: 0-65535
Non-Volatile Memory	\$Mn	n: 0-65535
Volatile Memory Bit	\$n.k	n: 0-65535 k: 0-15
Non-Volatile Memory Bit	\$Mn.k	n: 0-65535 k: 0-15
Internal Settings	\$Sn	n: 0-65535

**Note\*:**The non-volatile memory of the device is independent of the device supply. It is not affected by power cuts and battery removal. When firmware update is done on the PC, the permanent memory is deleted.

## HMI SETTING ADDRESSES

Address	Data Range	Explanation
\$S0	0-1	Buzzer Control (On-Off)
\$S1	0-7	Screen brightness
\$S2	*****	Change Page
\$S3	*****	Change Language
\$S4	*****	Barcode Value Last Read
\$S5	*****	MQTT Status
\$S12	0-23	Local Time Zone

## SUPPORTED COMMUNICATION PROTOCOLS

Supported communication protocols are listed in the table below.

MODBUS	Modbus-RTU
MODBUS	Modbus-ASCII
MODBUS	Modbus TCP/IP
MODBUS	Modbus-ASCII(Slave)
MODBUS	Modbus-RTU(Slave)
MODBUS	Modbus TCP/IP(Slave)

SIEMENS	S7-300(ISO TCP)
SIEMENS	S7-400(ISO TCP)
SIEMENS	S7-1200(ISO TCP)
SIEMENS	S7-1500(ISO TCP)

BACNET	MS/TP
BACNET	IP
OMRON	Host Link
OMRON	FINS
DELTA	DVP Series PLC

## MODBUS ADDRESS DEFINITIONS

The following addresses are used for remote access to the internal addresses and inputs of the panel.


General			
Internal Memory Space	Modbus Address Range		Modbus Functions
	Start	Finish	
Volatile Memory	40001	42000	3,6,16
Non-Volatile Memory	42001	44000	3,6,16
Volatile Memory Bit	44001	44002	3,6,16
Non-Volatile Memory Bit	45001	45500	3,6,16

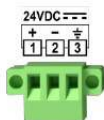
Extended			
Internal Memory Space	Modbus Address Range		Modbus Functions
	Start	Finish	
Volatile Memory	410001	420000	3,6,16
Non-Volatile Memory	420001	430000	3,6,16
Analog Outputs	435001	435500	3,6,16
Internal Settings	450001	455000	3,6,16

Internal Memory Space	Modbus Address Range		Modbus Functions
	Start	Finish	
Analog Inputs	30001	30002	4
Digital Outputs	00001	00004	1,5,15
Digital Inputs	10001	10004/10005*	2

**Note\*:** Analog inputs and outputs are only available on Proop 10P and Proop 10P.E models.

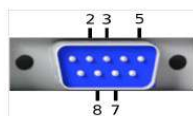
## Device Supply Input(For PROOP 4.3,5,7 and 10 )

Terminal	
+	
-	
	



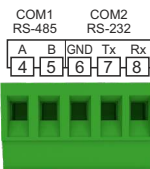
## COM4 (For PROOP 7 and 10)

Terminal	
2- Rx	
3- Tx	
5- GND	
7- RTS	
8- CTS	



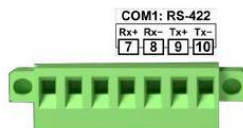
## COM2- COM3 (For PROOP 4.3, and 5)

Terminal	
A	
B	
GND	
Tx	
Rx	



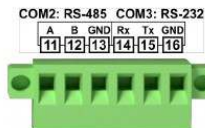
## COM1 (For PROOP 7 )

Terminal	
Rx+	
Rx-	
Tx+	
Tx-	



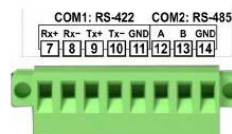
## COM2- COM3 (For PROOP 7 )

Terminal	
A	
B	
GND	
Rx	
Tx	
GND	



## COM1 – COM2 (For PROOP 10)

Terminal	
Rx+	
Rx-	
Tx+	
Tx-	
GND	
A	
B	
GND	


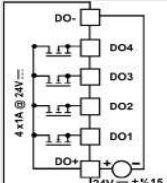
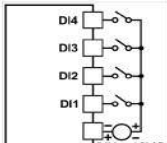


## COM3 (For PROOP 10)

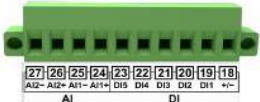
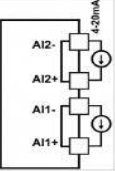
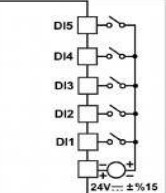
Terminal	
Rx	
Tx	
GND	



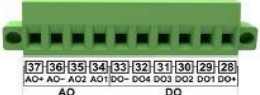
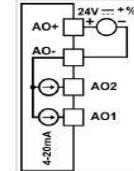
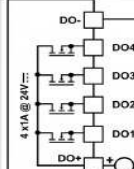
## Digital Inputs/Outputs (For PROOP 7)

 <table border="1" data-bbox="135 325 403 365"><tr><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td></tr><tr><td>DO-</td><td>DO4</td><td>DO3</td><td>DO2</td><td>DO1</td><td>DO+</td><td>DI4</td><td>DI3</td><td>DI2</td><td>DI1</td></tr><tr><td colspan="4">DO</td><td colspan="6">DI</td></tr></table>	27	26	25	24	23	22	21	20	19	18	17	DO-	DO4	DO3	DO2	DO1	DO+	DI4	DI3	DI2	DI1	DO				DI						Terminal	Explanation	Wiring Diagram
	27	26	25	24	23	22	21	20	19	18	17																							
	DO-	DO4	DO3	DO2	DO1	DO+	DI4	DI3	DI2	DI1																								
	DO				DI																													
	DO-	Digital Output Supply -																																
	DO4	Digital Outputs																																
	DO3																																	
	DO2																																	
	DO1																																	
	DO+	Digital Output Supply +																																
	DI4	Digital Inputs																																
	DI3																																	
DI2																																		
DI1																																		
+/-	Digital Inputs NPN/PNP Selection																																	

## Analogue/Digital Inputs (For PROOP 10)

	Terminal	Explanation	Wiring Diagram
	A2-	Analogue Input 2	
	A2+		
	A1+	Analogue Input 1	
	A1-		
	DI5	Digital Inputs	
	DI4		
	DI3		
	DI2		
	DI1		
	+/-	Digital Inputs NPN/PNP Selection	

## Analog/Dijital Çıkışlar (PROOP 10 için)

	Terminal	Explanation	Bağlantı Şeması
	AO+	Digital Output Supply +	
	AO-	Digital Output Supply -	
	AO2	Digital Outputs	
	AO1		
	AO1		
	DO-	Digital Output Supply -	
	DO4	Digital Outputs	
	DO3		
	DO2		
	DO1		
	DO+	Digital Output Supply +	

## WARRANTY

It is guaranteed for two years against material and workmanship defects. If the duties and responsibilities of the customer written in the user manual are fulfilled, they remain in effect.

## MAINTENANCE

The device must be repaired by trained people. To access the internal parts of the device, first de-energize the device.

Do not clean the device with solutions containing hydrocarbons (such as Petroleum, Trichlorethylene).

Cleaning the device with these solutions can reduce the mechanical reliability of the device.

## OTHER INFORMATIONS

### **Manufacturer Company Information:**

Emko Elektronik Sanayi ve Ticaret A.Ş.

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