proop-I/O Module
User Manual

Preface

Proop-I/O Module is used with the Proop device. It can also be used as a data path for any brand. This document will be helpful the user to install and connect Proop-I/O Module.

- Before begin the installation of this product, please read the instruction manual.
- The contents of the document may have been updated. You can access the most updated version at www.emkoelektronik.com.tr

⚠	This symbol is used for safety warnings. User must pay attention to these warnings.

# Environmental Conditions

| Operating Temperature	:	0-50C
Maximum Humidity	:	0-90 %RH (None Condensing)
Weight	:	238gr
Dimension	:	160 x 90 x 35 mm

Features

Proop-I/O Module are divided into several types according to inputs-outputs. The types are as follows.

Product Type		A	B	C	D	E	F
Proop-I/O.P	.	2	. 2	. 1	. 3	.	.
Module Supply							
24 Vdc/Vac (Isolation)		2					
Communication							
RS-485 (Isolation)			2				
Digital Inputs							
8x Dijital				1			
Digital Outputs							
8x 1A Transistor (+V)					3		
Analog Inputs							
5x Pt-100 (-200...650°C)						1	
5x 0/4..20mAdc						2	
5x 0...10Vdc						3	
5x 0...50mV						4	
Analog Outputs							
2x 0/4...20mAdc							1
2x 0...10Vdc							2

Dimensions
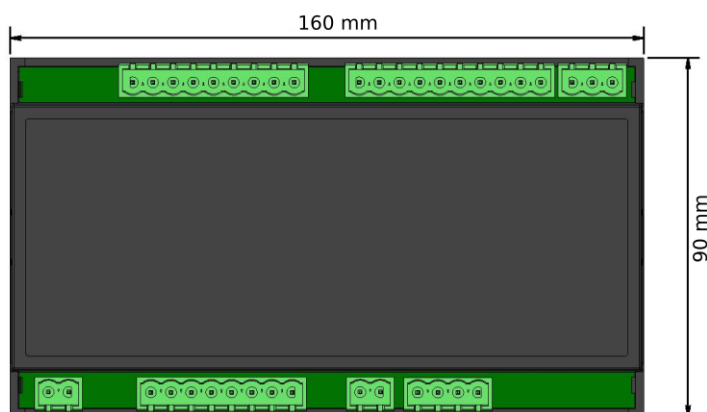
Mounting of Module on Proop Device
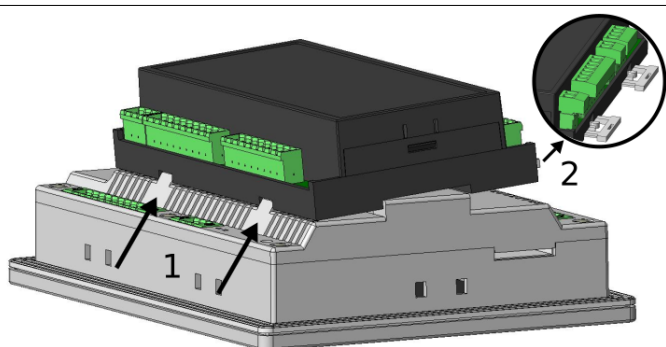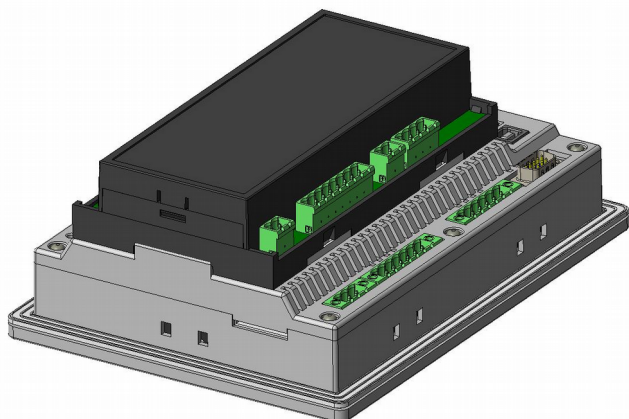
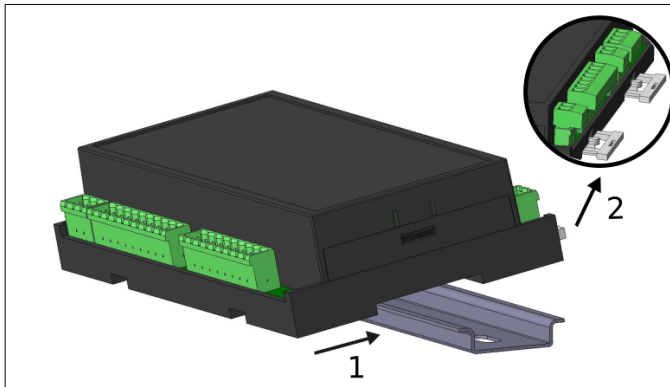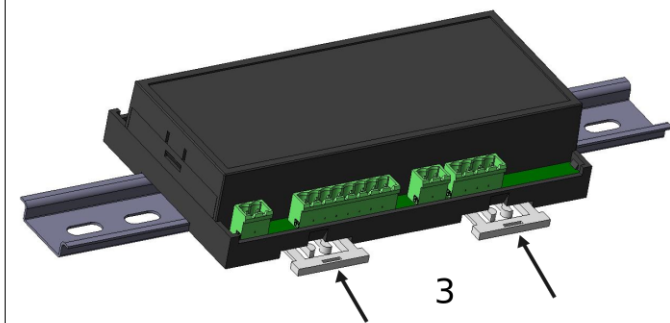|	
	1- Insert the Proop I/O Module to the holes of Proop device as in the picture. **2-** Check the locking parts are plugged in the Proop-I/O Module device and turned on out.
	3- Press the Proop-I / O Module device firmly in the specified direction. **4-** Insert the locking parts by dragging them in the specified direction.
	5- The inserted image of module device should look like the one on the left.
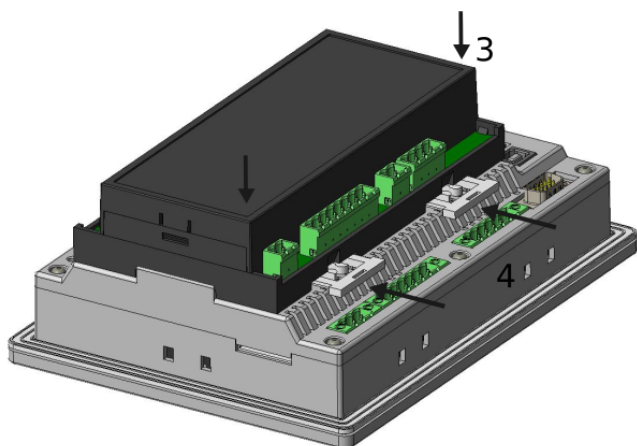
Mounting of Module on DIN-Ray
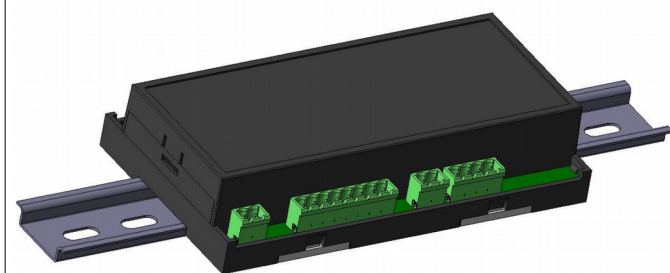
	1-Drag the Proop-I/O Module device onto the DIN-ray as shown. **2-** Check the locking parts are plugged in the Proop-I/O Module device and turned on out.
	3- Insert the locking parts by dragging them in the specified direction.
	4- The inserted image of module device should look like the one on the left.

Installation

> ⚠️ Before beginning installation of this product, please read the instruction manual and warnings below carefully.

A visual inspection of this product for possible damage occured during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.

Do not use the unit in combustible or explosive gaseous atmospheres.
Do not expose the unit to direct sun rays or any other heat source.
Do not place the unit in the neighbourhood of magnetic equipment such as transformers, motors or devices which generate interference (welding machines, etc.)
To reduce the effect of electrical noise on device, Low voltage line (especially sensor input cable) wiring must be separated from high current and voltage line.

During the equipment is putted in hole on the metal panel while mechanical installation some metal burrs can cause injury on hands, you must be careful.
Montage of the product on a system must be done with it's own fixing clamps.
Do not do the montage of the device with inappropriate fixing clamps. Be sure that device will not fall while doing the montage.

If possible, use shielded cable and shield must be connected to ground only one side.

Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented
The digital outputs and supply connections is designed to be isolated from each other.

Before commissioning the device, parameters must be set in accordance with desired use.
Incomplete or incorrect configuration can cause dangerous stiuations
The unit is normally supplied without a power switch or a fuse. Use power switch and fuse as required.
Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.

If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and the electrical connection of the device from the system
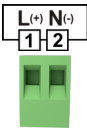Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

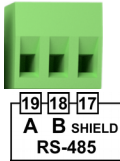Please contact us in case of an unexpected situation.
It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Connections
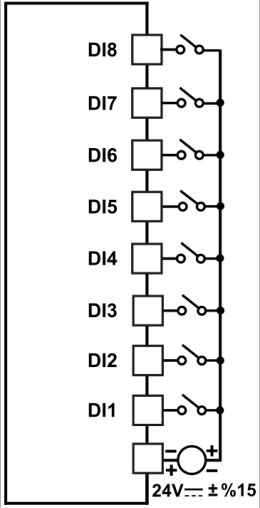
Supply

	Terminal
L (+) N (-) 1 2	+
	-
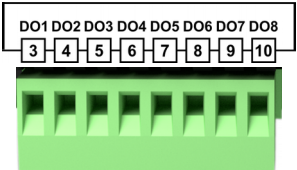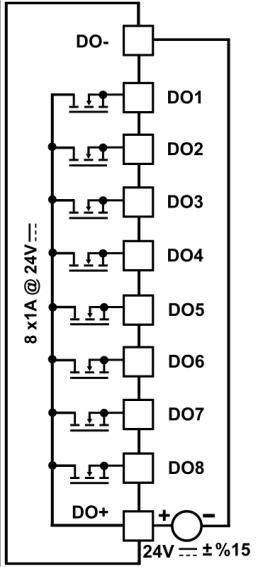
Communication Link with HMI Device

	Terminal
19 18 17 A B SHIELD RS-485	A
	B
	GND

Digital Inputs

Terminal	Comment	Connection Sheme
DI8	Digital Inputs	
DI7		
DI6		
DI5		
DI4		
DI3		
DI2		
DI1		
+/-	NPN / PNP Selection of Digital Inputs	

38 37 36 35 34 33 32 31 30
+/− DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1

DI8 DI7 DI6 DI5 DI4 DI3 DI2 DI1
24V⎓ ± %15
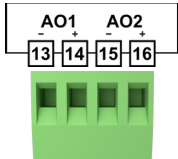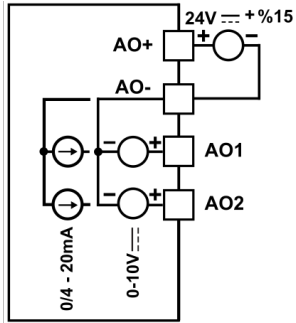
Digital Outputs

Terminal	Comment	Connection Sheme
DO1	Digital Outputs	
DO2		
DO3		
DO4		
DO5		
DO6		
DO7		
DO8		

DO1 DO2 DO3 DO4 DO5 DO6 DO7 DO8
3 4 5 6 7 8 9 10

DO- DO1 DO2 DO3 DO4 DO5 DO6 DO7 DO8 DO+
8 x1A @ 24V⎓
24V⎓ ± %15

Analog Inputs

Terminal	Comment	Connection Sheme
AI5-	Analog Input5	
AI5+		
AI4-	Analog Input4	
AI4+		
AI3-	Analog Input3	
AI3+		
AI2-	Analog Input2	
AI2+		
AI1-	Analog Input1	
AI1+		

Analog Outputs

Terminal	Comment	Connection Sheme
AO+	Analog Output Supply	
AO-		
AO1	Analog Outputs	
AO2		

Technical Features

Power Supply

Power Supply	:	24VDC
Permissible Range	:	20.4 - 27.6 VDC
Power Consumption	:	3W

Digital Inputs

Digital Inputs	:	8 Input	
Nominal Input Voltage	:	24 VDC	
Input Voltage	:	**For Logic 0**	**For Logic 1**
		< 5 VDC	>10 VDC
Input Current	:	6mA max.	
Input Impedance	:	5.9 kΩ	
Response Time	:	'0' to '1' 50ms	
Galvanic Isolation	:	500 VAC for 1 minute	

Digital Outputs

Digital Outputs		8 Output
Outputs Current	:	1 A max. (Total current 8 A max.)
Galvanic Isolation	:	500 VAC for 1 minute
Short Circuit Protection	:	Yes

Analog Inputs

Analog Inputs	:	5 Input			
Input Impedance	:	**PT-100**	**0/4-20mA**	**0-10V**	**0-50mV**
		-200°C-650°C	100Ω	>6.6kΩ	>10MΩ
Galvanic Isolation	:	No			
Resolution	:	14 Bits			
Accuracy	:	±0,25%			
Sampling Time	:	250 ms			
Status Indication	:	Yes			

Analog Outputs

Analog Output	:	2 Output	
		0/4-20mA	**0-10V**
Galvanic Isolation	:	No	
Resolution	:	12 Bits	
Accuracy	:	%1 of full scale	

Internal Address Definitions

Communication Settings:

Parameters	Address	Options	Default
ID	40001	1–255	1
BAUDRATE	40002	0- 1200 / 1- 2400 / 2- 4000 / 3- 9600 / 4- 19200 / 5- 38400 / 6- 57600 /7- 115200	6
STOP BIT	40003	0- 1Bit / 1- 2Bit	0
PARITY	40004	0- None / 1- Even / 2- Odd	0

Device addresses:

Memory	Format	Arange	Address	Type
Digital Input	DIn	n: 0 – 7	10001 – 10008	Read
Digital Output	DOn	n: 0 – 7	1 – 8	Read-Write
Analog Input	AIn	n: 0 – 7	30004 – 30008	Read
Analog Output	AOn	n: 0 – 1	40010 – 40011	Read-Write
Version*	$(aaaaabbbcccccccc)_{bit}$	n: 0	30001	Read

*Note:The a bits in this address are major, b bits are minor version number, c bits indicate device type.

The conversion of the values read from the module according to the analog input type is described in the following table:

Analog Input	The Value Range	Conversion Factor	Example of value shown in PROOP
PT-100 -200° – 650°	-2000 – 6500	$x10^{-1}$	Example-1: The read value as 100 is converted to 10°C.
			Example-2: The read value as 203 is converted to 20,3°C.
0 – 10V	0 – 20000	$0,5x10^{-3}$	Example-1: The read value as 2500 is converted to 1,25V.
0 – 50mV	0 – 20000	$2,5x10^{-3}$	Example-1: The read value as 3000 is converted to 7,25mV.
0/4 – 20mA	0 – 20000	$0,1x10^{-3}$	Example-1: The read value as 3500 is converted to 7mA.
			Example-2: The read value as 1000 is converted to 1mA.

The conversion of the values write at the module according to the analog output type is described in the following table:

Analog Output	The Value Range	Conversion Rate	Example of Value Written in Modules
0 – 10V	0 – 10000	$x10^3$	Example-1: The value to be written as 1.25V is converted to 1250.
0/4 – 20mA	0 – 20000	$x10^3$	Example-1: The value to be written as 1,25mA is converted to 1250.

HSC(High Speed Counter) Settings
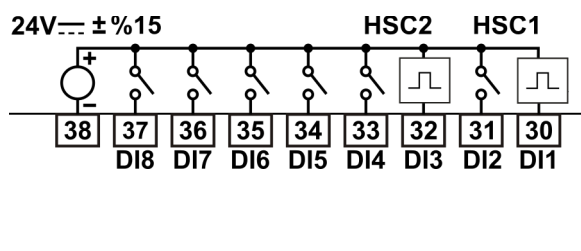
Single Phase Counter Connection

High-speed counters count high speed events that cannot be controlled at PROOP-IO scan rates. The maximum counting frequency of a high-speed counter is 10kHz for Encoder inputs and 15kHz for counter inputs.

There are five basic types of counters: single-phase counter with internal direction control, single-phase counter with external direction control, two-phase counter with 2 clock inputs, A/B phase quadrature counter and frequency measurement type. Note that every mode is not supported by every counter. You can use each type except the frequency measurement type: without reset or start inputs, with reset and without start, or with both start and reset inputs.

- When you activate the reset input, it clears the current value and holds it clear until you deactivate reset.

- When you activate the start input, it allows the counter to count. While start is deactivated, the current value of the counter is held constant and clocking events are ignored.

- If reset is activated while start is inactive, the reset is ignored and the current value is not changed. If the start input becomes active while the reset input is active, the current value is cleared.

HSC Modbus Addresses:

Parameters	Address	Default
HSC1 Configuration ve Mode Select*	40012	0
HSC2 Configuration ve Mode Select*	40013	0
HSC1 New Current Value (Least Significant 16 byte)	40014	0
HSC1 New Current Value (Most Significant 16 byte)	40015	0
HSC2 New Current Value (Least Significant 16 byte)	40016	0
HSC2 New Current Value (Most Significant 16 byte)	40017	0
HSC1 Current Value (Least Significant 16 byte)	30010	0
HSC1 Current Value (Most Significant 16 byte)	30011	0
HSC2 Current Value (Least Significant 16 byte)	30012	0
HSC2 Current Value (Most Significant 16 byte)	30013	0

* Note: This parameter;

      - Least Significant byte is the Mode parameter.

      - Most Significant byte is the Configuration parameter.

HSC Configuration Description:

HSC1	HSC2	Description
40012.8_{bit}	40013.8_{bit}	**Active level control bit for Reset:** 0 = Reset is active low 1 = Reset is active high
40012.9_{bit}	40013.9_{bit}	**Active level control bit for Start:** 0 = Start is active low 1 = Start is active high
40012.10_{bit}	40013.10_{bit}	**Counting direction control bit:** 0 = Count down 1 = Count up
40012.11_{bit}	40013.11_{bit}	**Write the new current value to the HSC:** 0 = No update 1 = Update current value
40012.12_{bit}	40013.12_{bit}	**Enable the HSC:** 0 = Disable the HSC 1 = Enable the HSC
40012.13_{bit}	40013.13_{bit}	Reserve
40012.14_{bit}	40013.14_{bit}	Reserve
40012.15_{bit}	40013.15_{bit}	Reserve

HSC Modes:

Mode	Description		DI1	DI2	DI5	DI6
	HSC1		DI1	DI2	DI5	DI6
	HSC2		DI3	DI4	DI7	DI8
0	Single Phase Counter with Internal Direction		Clock			
1			Clock		Reset	
2			Clock		Reset	Start
3	Single Phase Counter with External Direction		Clock	Direction		
4			Clock	Direction	Reset	
5			Clock	Direction	Reset	Start
6	Two Phase Counter with 2 Clock Input		Clock Up	Clock Down		
7			Clock Up	Clock Down	Reset	
8			Clock Up	Clock Down	Reset	Start
9	A/B Phase Encoder Counter		Clock A	Clock B		
10			Clock A	Clock B	Reset	
11			Clock A	Clock B	Reset	Start
12*	Frequency Measurement (with 100 msn sampling time)		Frequency Input			
13*	Frequency Measurement (with 500 msn sampling time)		Frequency Input			
14	Period Measurement (with 10 usn sampling time)		Period Input			

* Note: The 12th and 13th mode options are not active and cannot be used.

Installing Communication Settings by Default
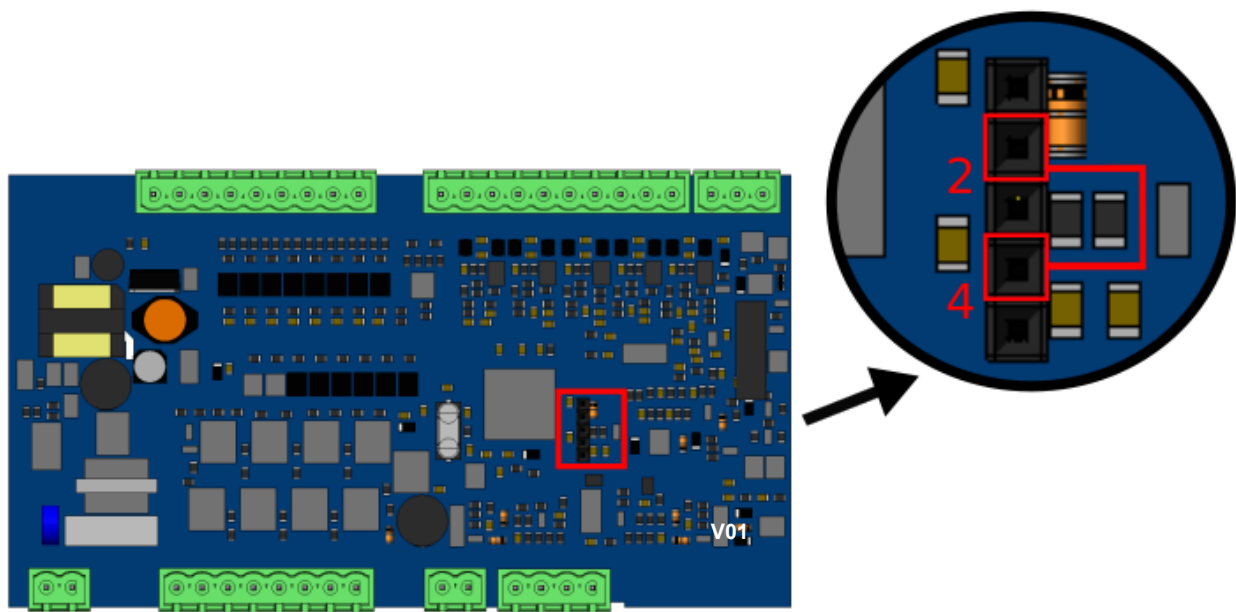
1- Cut out energy to the I/O Module device.
2- Lift the device cover.
3- Make a short circuit the pin 2 and 4 on the socket as above picture.
4- Energy the device and wait at the least 2 seconds.
5- Cancel the short circuit. After 2 seconds the communication settings will return default values.
6- Close the device cover.

Warranty

This warranty is provided for a period of two years. This warranty is in force if duty and responsibilities which are determined in warranty document and instruction manual performs by the customer completely.

Maintenance

Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device.

Other Informations

Manufacturer Information: Emko Elektronik Sanayi ve Ticaret A.Ş.   Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:616369 BURSA   Phone : (224) 261 1900   Fax : (224) 261 1912
Repair and maintenance service information: Emko Elektronik Sanayi ve Ticaret A.Ş.   Demirtaş Organize Sanayi Bölgesi Karanfil Sk. No:616369 BURSA   Phone : (224) 261 1900   Fax : (224) 261 1912