

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

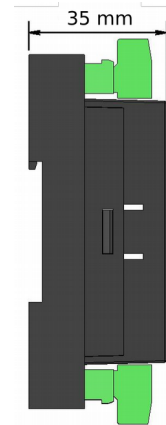
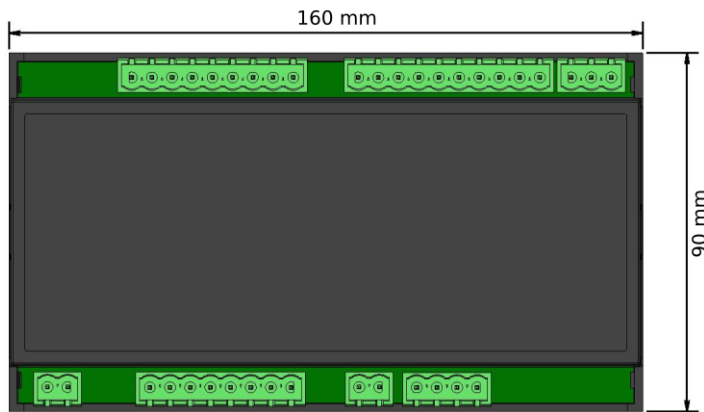
Operating Temperature	:	0-50C
Maximum Humidity	:	0-90 %RH (None Condensing)
Weight	:	238gr
Dimension	:	160 x 90 x 35 mm

Features

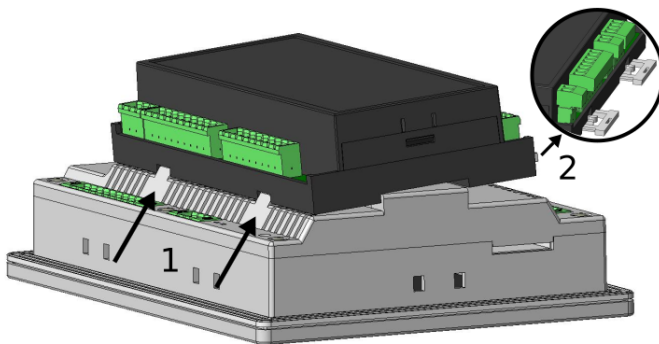
Proop-I/O Module are divided into several types according to inputs-outputs. The types are as follows.

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

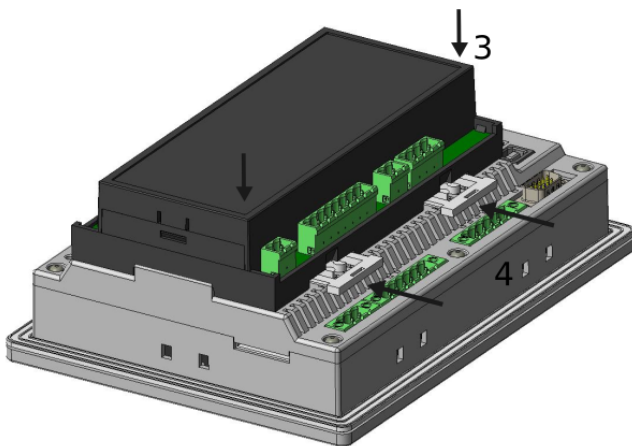


Mounting of Module on Proop Device



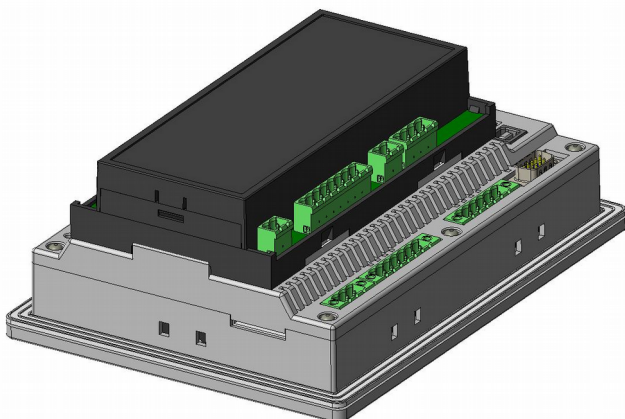
1- Insert the Proop I/O Module to the holes of Proop device as in the picture.

2- Check the locking parts are plugged in the Proop-I/O Module device and turned on out.



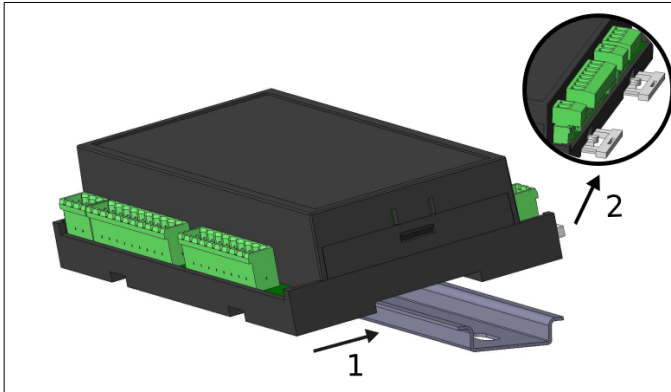
3- Press the Proop-I / O Module device firmly in the specified direction.

4- Insert the locking parts by dragging them in the specified direction.



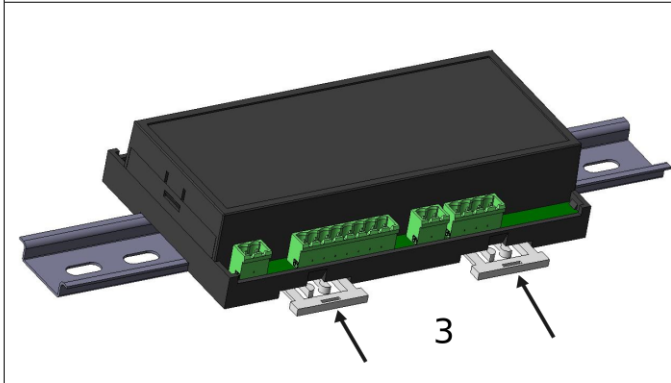
5- The inserted image of module device should look like the one on the left.

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 occurred 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

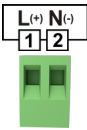
Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.

Please contact us in case of an unexpected situation.

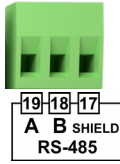
It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

Connections


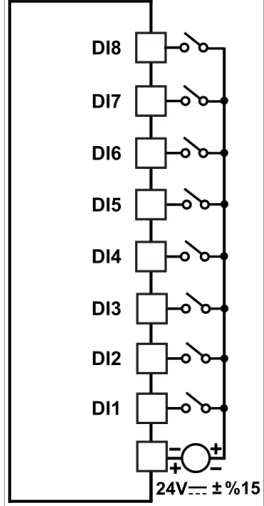
Supply

	Terminal
	+
	-

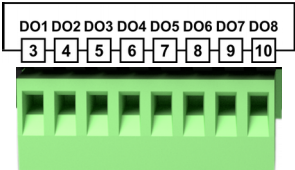
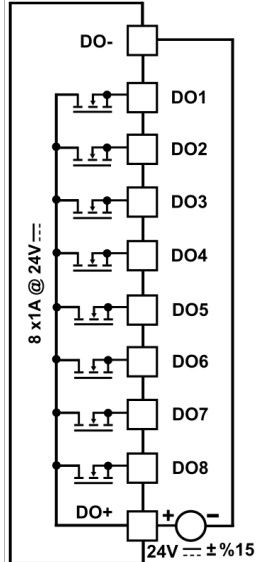
Communication Link with HMI Device

	Terminal
	A
	B
	GND

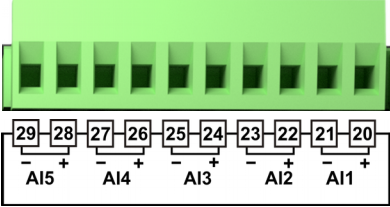
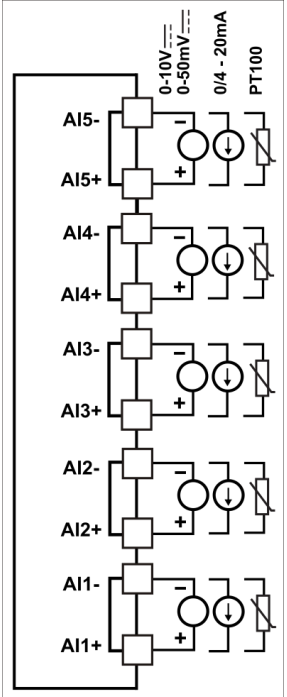
Digital Inputs

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

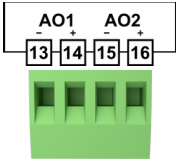
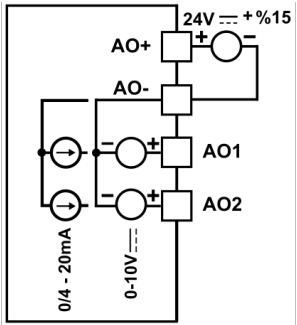
Digital Outputs

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

Analog Inputs

	Terminal	Comment	Connection Scheme	
	AI5-	Analog Input5		
	AI5+			AI4-
	AI4+	AI3-		Analog Input3
	AI3+	AI2-		
	AI2+	AI1-		Analog Input1
	AI1+			

Analog Outputs

	Terminal	Comment	Connection Scheme	
	AO+	Analog Output Supply		
	AO-			AO1
	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*	(aaaaabbbcccccc) _{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.

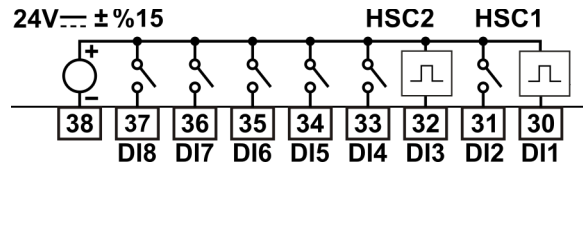
The conversion of the values read from the module according to the analog input type is described in the following table:

Analog Input	The Value Range	Conversion Factor	Example of value shown in PROOP
PT-100 -200° – 650°	-2000 – 6500	$\times 10^{-1}$	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	$0,5 \times 10^{-3}$	Example-1: The read value as 2500 is converted to 1,25V.
0 – 50mV	0 – 20000	$2,5 \times 10^{-3}$	Example-1: The read value as 3000 is converted to 7,25mV.
0/4 – 20mA	0 – 20000	$0,1 \times 10^{-3}$	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	$\times 10^3$	Example-1: The value to be written as 1.25V is converted to 1250.
0/4 – 20mA	0 – 20000	$\times 10^3$	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:

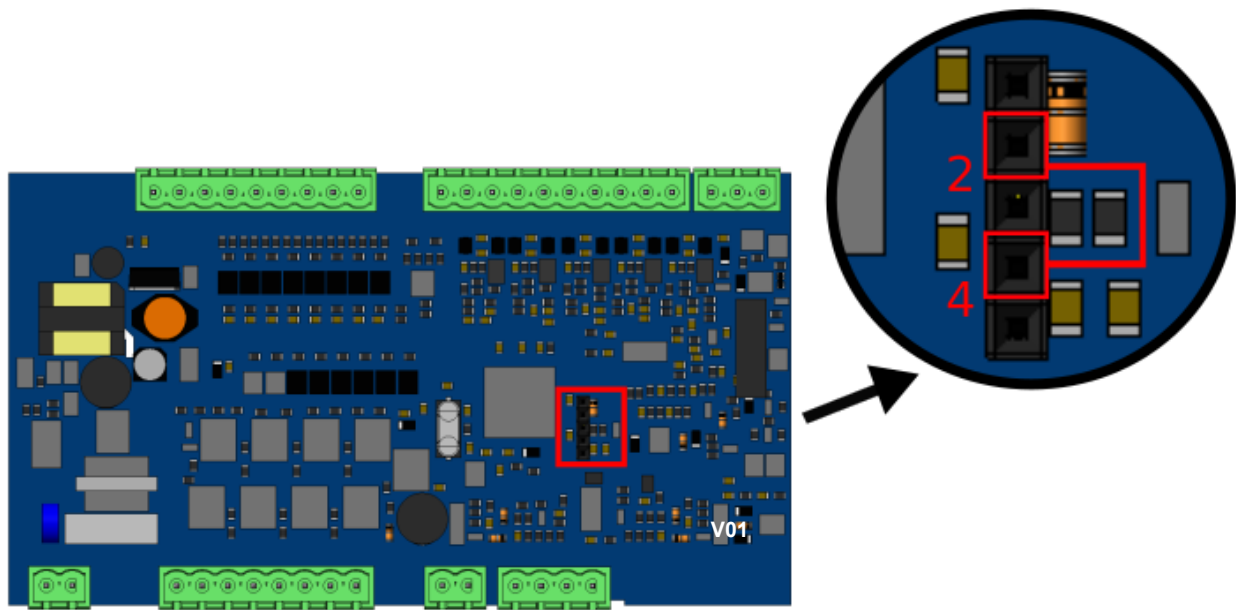
HSC1	HSC2	Description
40012.8 _{bit}	40013.8 _{bit}	Active level control bit for Reset: 0 = Reset is active low 1 = Reset is active high
40012.9 _{bit}	40013.9 _{bit}	Active level control bit for Start: 0 = Start is active low 1 = Start is active high
40012.10 _{bit}	40013.10 _{bit}	Counting direction 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	Inputs			
		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

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Repair and maintenance service information:

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