User Manual

*m*INT Series IO Modules

MINT Ethernet IO

Customer Support: support@masibus.com Toll Free Number (India Only): 1 – 800 – ADD – CARE (233 – 2273)

MINT CP

MINT AO-8

MINT AI-8U

MINT DO-16

MINT DI-16

Features

Portable
Modbus Connectivity
Single Setup and Easy Handling
Upto 15 Clients on Modnet Network
Low - cost Modules for PLC – DAS Systems
Isolated Modules Available for Special Applications
LEDs for Fault Status, communication and Power Supply
Modules used with third party software via Modnet Slave Protocol
Standard software for Module Configuration, Debug and Trouble - shooting IO modules available in Universal analog inputs, analog outputs, Digital inputs, Digital Outputs, combinational Modules.

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Advanced Automation - Sure Solutions

Contents

1. INTRODUCTION

1.1 About the User Manual and Design Guide

This user manual describes the detail specifications functions, hardware, installation, commissioning and operation of the mint-IO product family from Masibus Automation and Instrumentation Pvt. Ltd. Masibus provides 5 types of mint - I/O modules for various applications so far. Following table is the I/O modules support list we provided for user's choice.

MODEL	MODEL TYPE
I/O MODULES	
MINT-DI-16	16 DIGITAL INPUT MODULE INCLUDING COUNTERS
MINT-DO-16	16 DIGITAL OUTPUT MODULE
MINT-AI-08	8 UNIVERSAL ANALOG INPUT MODULE
MINT-AOI-08	8 ANALOG OUTPUT 0 - 20mA / 4 - 20mA
MINT-AOV-08	8 ANALOG OUTPUT 0 - 10V / 2 - 10V

1.2 An Overview of mINT IO series:

MINT IO modules are innovative which provides a simple low cost solution for distributed I/O requirements. The IO system consists of stand-alone Digital and Analog - Input/output modules which are connected together on a Ethernet network.

The modules communicate using the MODBUS TCP/IP protocol. ARM processor is used in the modules to provide high speed data processing and fast communications turnaround times. IP address is configurable by using webpage and configuration utility software.

All IO modules plug directly onto an industry standard DIN rail. All modules have a minimum isolation of 1500VAC RMS between the field and logic.

The modules have been equipped with status LED's which are used to indicate the status of Inputs or outputs.

This visual indication assists with fault finding and diagnostics.

1.3 Product Ordering Code:

The mint- IO has a nameplate affixed to the one side of the enclosure. Check the model and suffix codes inscribed on the nameplate to confirm that the product received is that which was ordered.

MINT I/O											
Model	**I/O Type**		**AI Channel Type**		**DO Type**		**AO Type**		**Communication**		
MINT	**XX**		**X**		**X**		**X**			**Port 1**	**Port 2**
	AI-8	8 channel Analog Input	N	None	N	None	N	None	SS	RS485	RS485
	DI-16	16 channel Digital Input	0	Non Isolated	0	Sink Type	I	Current o/p	SE	RS485	Ethernet
	AO-8	8 channel Analog Output			1	Source Type	V	Voltage o/p	SP	RS485	Profibus
	DO-16	16 channel Digital Output									

MINT – Analog Input / Output – Master/Slave (RS485)		
Model	**AO Type**	
MINT AI/AO-MS	**X**	
	I	Current o/p
	V	Voltage o/p

MINT – Digital Input / Output – Master/Slave (RS485)		
Model	**DO Type**	
MINT DI/DO-MS	**X**	
	0	Sink Type
	1	Source Type

MINT CP	
Model	**MINT CP**

1.4 List Of Accessories:

The product CD for the mint Plus software contains:

- Mint plus Configuration Tool setup
- User Manual

1.5 SAFETY PRECAUTIONS

The product and the instruction manual describe important information to prevent possible damage to the property and to use the product safely. Understand the following description (signs and symbols), read the text and observe Descriptions.

 **Warning**	This indicates a damage of product if not avoided.

1.5.1 General Note

The user manual, the accompanying texts and the documentation are written for the use of the products by qualified personnel. When using the products, all safety instructions and all valid legal regulations have to be followed. Technical knowledge is presumed. The user has to assure that all legal regulations are followed.

1.5.2 Personnel Qualification

The mint IOs and Gateways must only be installed configured and removed by qualified personnel. Professional qualification in the following specific areas of electrical engineering is required:

- Security and protection of health at work
- Mounting and attaching of electrical equipment
- Measurement and analysis of electrical functions and systems
- Evaluation of the security of electrical equipment

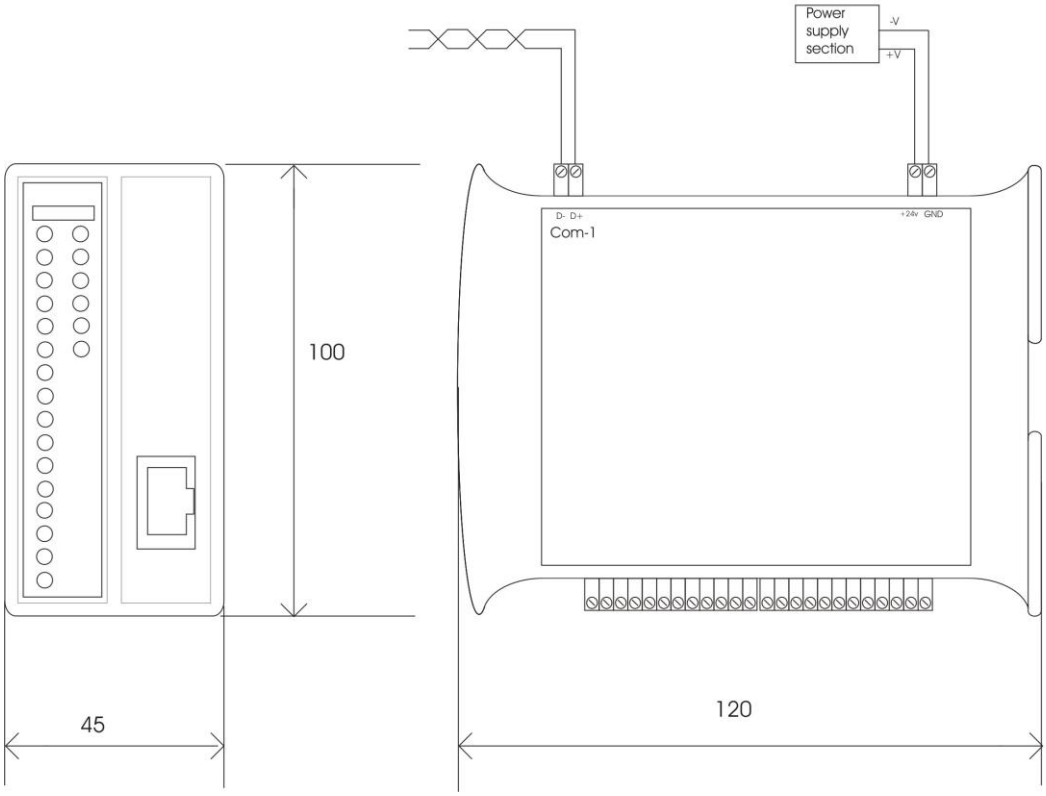
Important: Prior to installation and use of your device you must read and understand all instructions in this manual in order to avoid any damage.

2. IO GENERAL INFORMATION:

2.1 Physical Dimensions:

The mINT Ethernet I/O enclosure is shown below. The module clips directly onto an industry standard DIN rail. Field wiring is on bottom side of the module via a separate plug in connector. The module power and RS485 communications wiring is on a separate plug in connector on the upper side of the housing.

DIMENSIONS IN mm



Warning: Failure to follow improper installation practice of RS485 wiring and power supply wiring may cause failure of IO modules, specifically communication failures.

2.2 Ethernet base mINT-IO introduction

mINT-IO Ethernet-based data acquisition and control modules provide I/O, data acquisitions, and networking to build a cost effective, distributed monitoring and control solution for a wide variety of applications. Through standard Ethernet networking, mINT-IO retrieves I/O values from sensors, and can publish them as a real-time I/O values to networking nodes via LAN. With Ethernet enabled technology, mINT-IO series modules build up a cost-effective DA&C system for Building Automation, Environmental Monitoring, Facility Management and Manufacturing applications..

2.2.1 Ethernet-enabled DA&C I/O Modules

mINT IO is based on popular Ethernet networking standards used in most business environments. Users can easily add mINT I/O modules to existing Ethernet networks, or use mINT-IO modules in new Ethernet-enabled eManufacturing networks. mINT IO modules feature a 10/100 Mbps Ethernet chip and support industrial popular Modbus/TCP protocols over TCP/IP for data connection. mINT IO also supports UDP protocol over Ethernet networking. With UDP/IP, mINT-IO modules can send its IP address to client. Through Ethernet networking, HMI/SCADA systems, and controllers, users can access or gather real-time data from mINT IO Ethernet enabled DA&C modules. This data can then be integrated with business systems to compile valuable business information.

2.2.2 Intelligent I/O Modules

Upgraded from traditional I/O modules, the mINT IO series have prebuilt intelligent mathematic functions to empower system capacity. The Digital Input modules provide 32-bit Counter functions; the Digital Output modules provide pulse output, the Analog Input/Output modules provide the highly accurate data ;

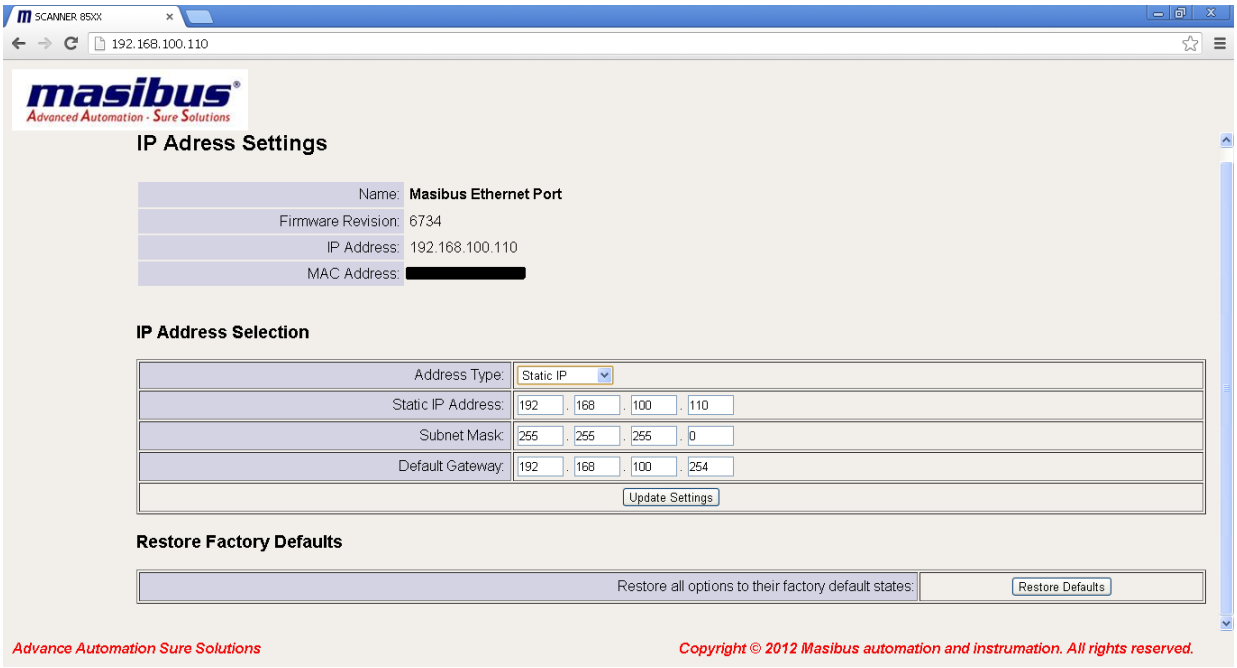
2.2.3 Industrial Standard Modbus/TCP Protocol

mINT-IO modules support the popular industrial standard, Modbus/ TCP protocol, to connect with Ethernet Controller or HMI/SCADA software built with Modbus/TCP driver.

2.2.4 Customized Web Page

The Ethernet enabled mINT IO has built in web pages. These are used for checking the configuration and dynamic data, and for changing configuration. To view this web page, standard web browser is needed.

To view this default web page, start browser and type “192.168.100.110” in to address lone of the browser window. The main page will now be displayed in browser window.



If no webpage is displayed, go back to testing the network connection to the mINT IO by using the ping command. If the mINT IO replies to the ping messages, check the setup of the web browser. If it is directly connected to the same network as the PC," Direct connection to the network" or "by pass proxy server for local addresses" should be selected in the web browser configuration menu. If the IO is connected to the PC through a firewall, a proxy server should be selected in the configuration menu. Contact the local network administrator for information about the network configuration.

This page allows you to change the IP address of the mINT IO, Default Gateway, and Subnet Mask, manually as well as DHCP/auto.

IP Address: The new IP address can be entered into the web page as shown above. After this has been done, you must click the Submit button to send the values to the MINT IO. The screen will now be updated and if successful will continue to display the new IP address. If the IP address has been entered incorrectly and the power has not been switched off, it is possible to re-enter the correct IP address. If the power has been switched off and back on again, the Ethernet enabled MINT IO will not communicate until you enter the new IP address into the address line of the browser window.

Default Gateway IP Address: A default gateway is a node (a router) on a computer network that serves as an access point to another network. In enterprises, however, the gateway is the computer that routes the traffic from a PC to the outside network that is serving the Web pages. It is only necessary to configure the default gateway IP address if the PC that is accessing the Ethernet enabled MINT IO is on a different network.

Subnet Mask: In computer networks, a subnet work or subnet is a range of logical addresses within the address space that is assigned to an organization. The subnet mask is used to inform the MINT IO that it must send its replies to the gateway if the

IP address of the PC is on a different network. When the subnet mask is set to “0.0.0.0” then it is effectively disabled and the default gateway is not used. A typical subnet mask would be “255.255.255.0”.

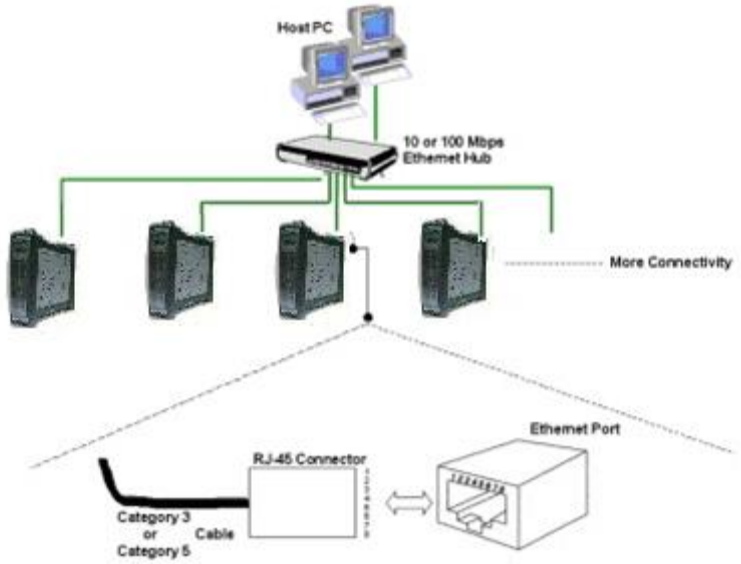
Restore factory defaults option is will restore all the IP, gateway and subnet mask to their default value.

2.2.5 Configuration

Ethernet enabled Mint-io module configuration is done by mint-plus configuration software by using RS485 port com-1. Refer to the section in the mint-plus configuration software guide. The configuration of the IP Address is done using the web browser or IP address configuration software.

2.2.6 Selecting a Link Terminal & Cable

Use the RJ-45 connector to connect the Ethernet port of the mINT-IO to the Hub. The cable for connection should be Category 3 (for 10Mbps data rate) or Category 5 (for 100Mbps data rate) UTP/STP cable, which is compliant with EIA/TIA 586 specifications. Maximum length between the Hub and any mINT IO modules is up to 100 meters (appr. 300 ft).



Ethernet RJ-45 Port Pin Assignment		
Pin Number	**Signal**	**Function**
1	RD+	Receive (+)
2	RD-	Receive (-)
3	TD+	Transmit (+)
4	Not used	-
5	not used	-
6	td-	Transmit (-)
7	not used	-
8	not used	-

4. MINT MODNET IO MODULES:

4.1 mINT – 16DI – Digital Inputs with counters:

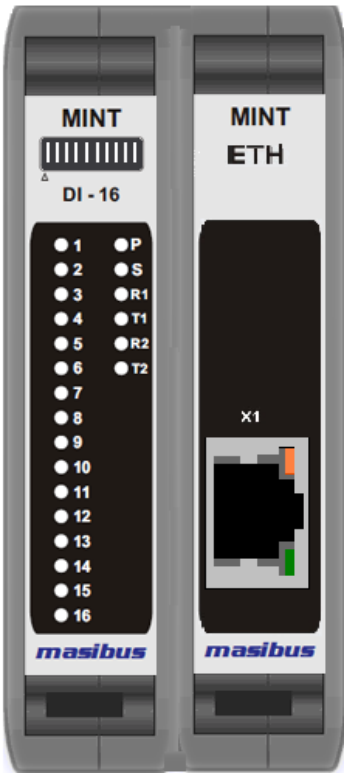
4.1.1 Description:

The IO-16DI module is a 16 channel digital input module. The inputs are isolated from the logic by bi-directional Opto-couplers. The common is connected internally to either the (-) volts or (+) volts. The inputs have internal counters associated with them. These counters are 32 bit Counters allowing a count value from 0 to 4294967295. The count value can be cleared by writing a zero to the associated registers or preset to any other value using the same method.

4.1.2 Technical Specifications:

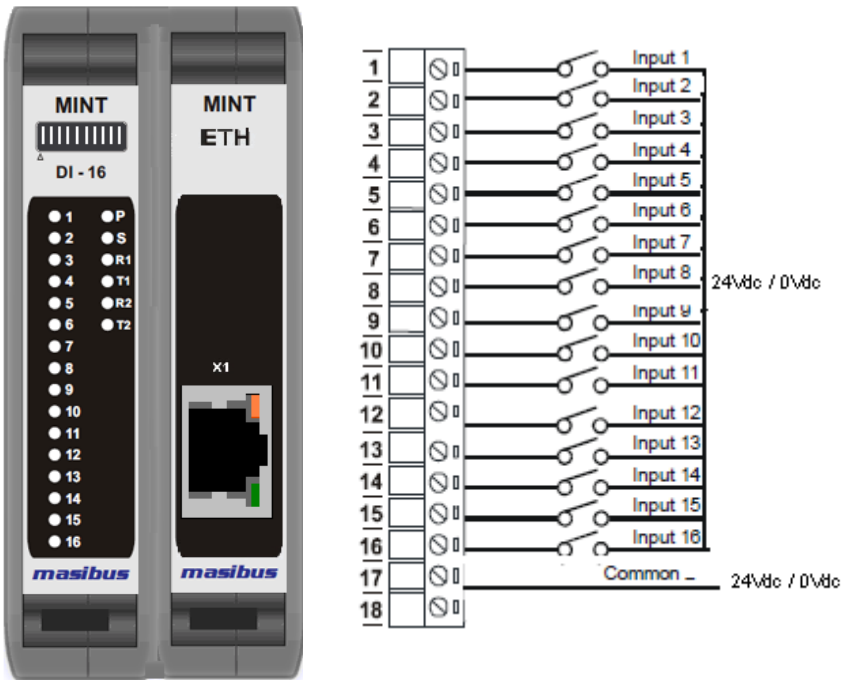
Voltage Requirements:	
Logic Supply voltage	18 - 32Vdc
Logic Supply Current	130mA max @24V
Power Consumption	< 4W
Input Specifications:	
Input Points	16
Maximum Input Voltage	36 Vdc
Input Current	11mA @ 24Vdc
Turn ON Voltage	15-24Vdc
Turn OFF Voltage	0-8Vdc
Minimum Input Pulse Width	500 uSeconds
Frequency Counter	1 Khz Max
Counter Resolution	32bit
Filter time (ms)	0 - 65535 mSeconds
Debounce Time (ms)	0 - 65535 mSeconds
Chatter Filter Time	0 - 65535 mSeconds
Chatter Filter Counts	0 - 250 Counts
Isolation	1500Vrms – Field To Logic
Isolation	1500Vrms – Logic To RS485
Isolation	1500Vrms – RS485 To Field
Isolation	1000Vrms – Supply to RJ45
Environmental Specifications:	
Operating Temperature	0˚ C to 55˚ C
Storage Temperature	-10˚C to 70˚ C
Humidity (Non-condensing)	30 to 95% RH
Communication Specifications:	
Network interface	Ethernet 10/100BaseTx (auto-detecting)
Connector	RJ45 connection (auto-crossover)
Communication Protocol	TCP/IP, ARP, UDP,DHCP, Modbus TCP/IP, HTTP
Configuration & Diagnostic Port	RS-485 port (Modbus RTU Slave)

4.1.3 Status Indicators

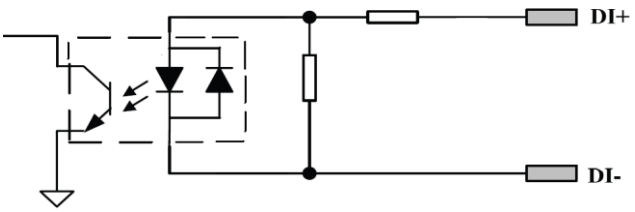


- Power: "ON" When Logic Supply is "ON"
- Module Status: "ON" When CPU is Running
- RS 485 RX1- RX2: Flashes when Modbus queries are receiving
- RS 485 TX1- TX2: Flashes when transmitting Modbus response
- Input Status: "ON" when Input is "ON"
  "OFF" when Input is "OFF"

4.1.4 Wiring Diagram for mINT – 16DI – Digital Inputs:



Equivalent Circuit Diagram:



4.1.5 Input Processing – Filtration

4.1.5.1 Latch High:

If the channel is in the OFF state and then the ON signal is received, the ON state will be latched. This state continues until it is forced OFF by user

4.1.5.2 Latch Low:

If the channel is in the ON state and then the OFF signal is received, the OFF state will be latched. This state continues until it is forced OFF by user.

4.1.5.3 Counter Registers:

The counter registers display two 16 bit registers. The first register is the High Register and the second register is the Low Register. To get the actual 42 bit count value the registers must be combined as follows:

Counter High Value = Register 40001.
Counter Low Value = Register 40002.
Counter Value = (Counter High Value X 65535) + Counter Low Value.

4.1.5.4 Counter Capture:

To capture a counter a BIT value must be written to the corresponding channel number in the Counter Capture Register 40065.

For example: Writing 1 to BIT1 of Register 40065 results in Counter 1 value being captured to Counter Capture 1. Writing 1 to BIT2 of Register 40065 results in Counter 2 value being captured to Counter Capture 2. Writing 1 to BIT3 of Register 40065 results in Counter 3 value being captured to Counter Capture 3. etc.

4.1.5.5 Capture Counter Registers:

Capture counter registers display counter values which are stored in non volatile memory.

4.1.5.6 Counter Zero:

Initial value of counter during power ON condition is controlled by counter zero registers. To ensure that a counter initial value is zero, a 1 must be written to the corresponding bit position in the Capture Zero Register 40070 otherwise initial value of counter is value of capture counter registers which is stored in non volatile memory.

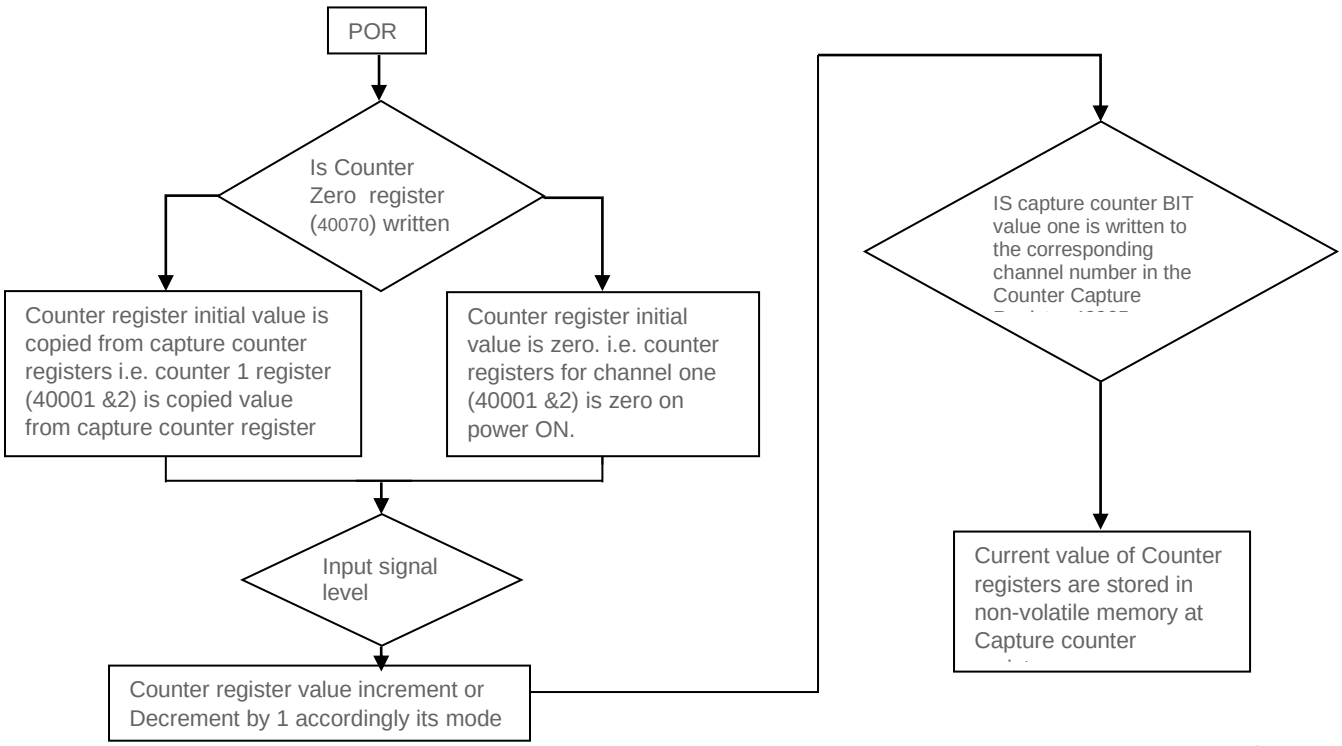
For example: Writing 1 to BIT1 of Register 40070 results in Counter 1 starts counting from zero value on power ON module.

Writing 1 to BIT2 of Register 40070 results in Counter 2 starts counting from zero value on power ON module, etc.

Writing 0 to respective BIT position means particular counter starting from captured value.

The value in the Capture Zero Register 40070 is permanently stored in Memory and only has to be configured once.

Flow chart of Counter function:

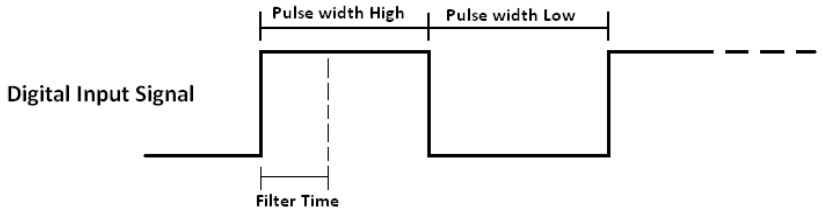


4.1.5.7 Filter Time (ms):

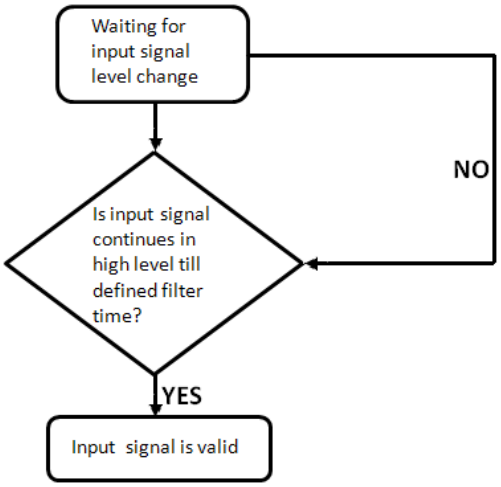
The Filter Time is the length of time that a newly changed input to some channel should last for before it is accepted as a valid input.

It is used to eliminate input noise. If the filter time is zero then there is no filter on this channel. Maximum writable frequency is 65535 mSec.

The factory default value is “0ms”.

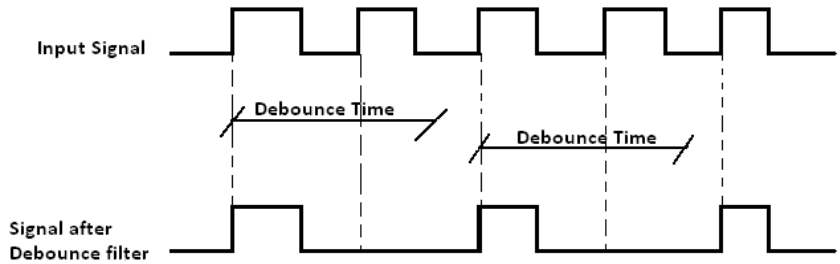


Flowchart:



4.1.5.8 Debounce Time (ms):

Debouncing can be applied for all input functions and prevents the processing of fast input state changes, like those caused by contact bouncing. Signal changes are ignored according to the filter type and time applied. This filter time values range from 0 ...65535 milliseconds; a 0 value deactivates Debounce filtering. The selection of Debounce filter time write registers 40067.



4.1.5.9 Chatter Mode Count:

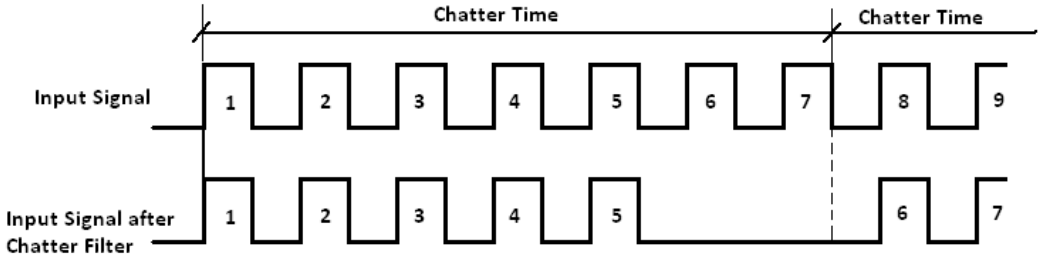
Only applies to event & counter inputs. It limits the number of registered events to a configurable count during a configurable time. The goal is to prevent multiple event registrations for the same input, e.g. a disturbance interfering with a slow changing

input (perhaps the comparator hysteretic was chosen to be too small). The chatter counter is configurable for individual inputs, chatter time for each input pair. Chatter filtering for individual inputs can still be disabled by 0 chatter count values.

Chatter time: The time period within which the chatter counter limit is effective. Value Range from 1 ... 65535 milliseconds.

Chatter count: The maximum number of registered events allowed passing within the chatter time period. Values range from 1 ... 250, a 0 value deactivates chatter filtering.

Example: If chatter time is configured and chatter counts are 5 counts.



Note: *Warning Chattering is a mighty processing tool which may cause Undesirable side effects. Its application to counter inputs is especially questionable*.

4.1.6 Modbus TCP/IP Addresses

sr no	PARAMETER	absolute modnet address read/write	Type of access	Values Applicable	Description
1	DI latch – High bit 1 to 16	41026	R/W	0000 to FFFF	Channels 1 to 16 DI latch coils.
2	Di latch bit 17 to 32	41027	R/W	0000 to FFFF	Channels 1 to 16 DI latch coils.
3	digital input status bit 1 to 16	40001/NA	read	NA	Digital Inputs status. 1-16.
4	swap long counter channel 1 to 16	40002 to 40033 40038/NA	read read read	0 to 4294967295	Channels 1 to 16 counter. Unsigned 32-bit integers (swap long). Counter with range 0 to 4294967295

20	counter capture for channel write	NA/41028	R/W	0000 - FFFF	BIT1=1 to Capture Counter for CH.1, BIT2=1 to Capture Counter for CH.2, etc
26	counter capture value channel 1 to 16	40045/NA	read	0 to 4294967295	Capture Counter Registers, Channels 1 to 16 counter holding registers. Unsigned 32-bit integers (swap long).
		40046/NA	read		
		40034 to 40065 /NA	read		

4.2 mINT – 16DO – Digital Outputs:

4.2.1 Description:

This module has 16 open collector (NPN (Sink) & PNP (Source)) digital outputs. The outputs may be used to drive Lamps or external relays when more drive capability is required. The outputs are isolated from the logic and they share a common negative terminal. We can configure this module with mINT Plus configuration software or any Modbus Master device.

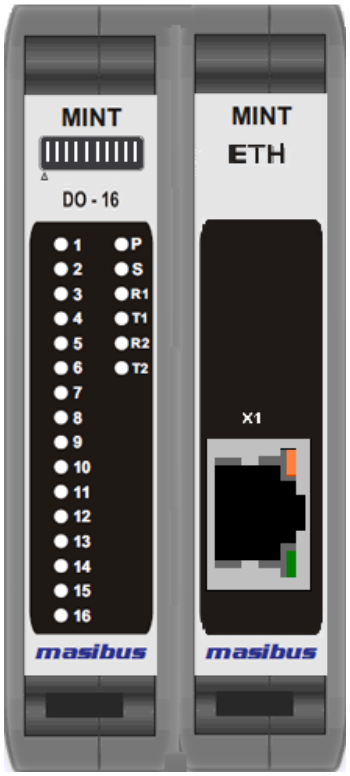
This module has four output configuration modes:

- Normal Output Mode:
- Single Pulse Output Mode:
- Continuous Pulse Output Mode:

4.2.2 Technical Specifications:

Voltage Requirements:	
Logic Supply voltage	18 - 32Vdc
Logic Supply Current	200mA max @ 24V
Power Consumption	<5W
Field Supply voltage	24 Vdc ± 10%
Field Supply Current	<1 A, Note: The user should limit the output current of the module to less than 1A, so the power dissipation for the field is less than 24W.
Output Specifications:	
Output Points	16 (Sink or Source)(Factory Selectable)
Pre-Define Value	ON, OFF
Output type	Discrete output, Single Pulse, Continuous pulse
Pulse Width (High + Low)	User Configurable(10msec to 5dec)
Maximum Current	100mA per Output (total current for output No.1 to 8 <500mA) (total current for output No.9 to 16 <500mA)
Vce ON	1.1V max
Isolation	1500Vrms – Field To Logic
Isolation	1500Vrms – Field To RS485
Isolation	1500Vrms – RS485 To Logic
Isolation	1000Vrms – Supply to RJ45
Environmental Specifications:	
Operating Temperature	0˚ C to 55˚ C
Storage Temperature	-10˚C to 70˚ C
Humidity (Non-condensing)	30 to 95% RH
Communication Specifications:	
Network interface	Ethernet 10/100BaseTx (auto-detecting)
Connector	RJ45 connection (auto-crossover)
Communication Protocol	TCP/IP, ARP, UDP,DHCP, Modbus TCP/IP, HTTP
Configuration & Diagnostic Port	RS-485 port (Modbus RTU Slave)

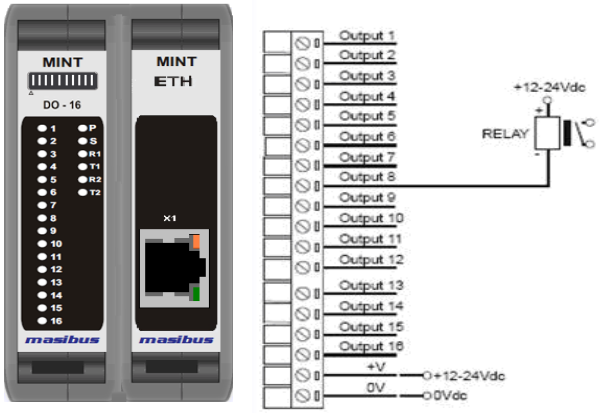
4.2.3 Status Indicators



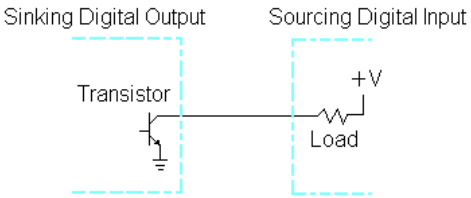
- Power: "ON" When Logic Supply is "ON"
- Module Status: "ON" When CPU is Running
- RS 485 RX1- RX2: Flashes when Modbus queries are receiving
- RS 485 TX1- TX2: Flashes when transmitting Modbus response
- Output Status: "ON" when Output is "ON"
  "OFF" when Output is "OFF"

4.2.4 Wiring Diagram:

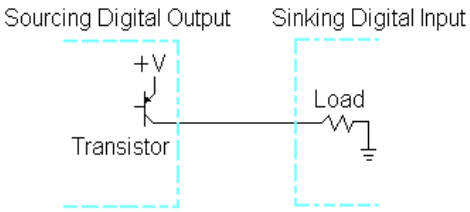
The following diagram shows how the digital outputs are connected to the coil of a relay. (Typical Output Diagram)



Equivalent Circuit Diagram: Sink Output (0V)



Equivalent Circuit Diagram: Source Output (+24V)



4.2.5 Configurable Parameters

Using mINT PLUS the following attributes can be configured to suit the required operation of this Module.

4.2.5.1 Predefine Value:

This parameter is the value set to each channel on power-up of the module, e.g. “1” or “0”. This Value is user defined and can be configured for each channel. This parameter can have the following

Values: **0, 1**

The factory default is “0” for this parameter.

4.2.5.2 Type of Channel:

This parameter enables the user to configure the channel output type. The user configurable options are:

Discrete Output:

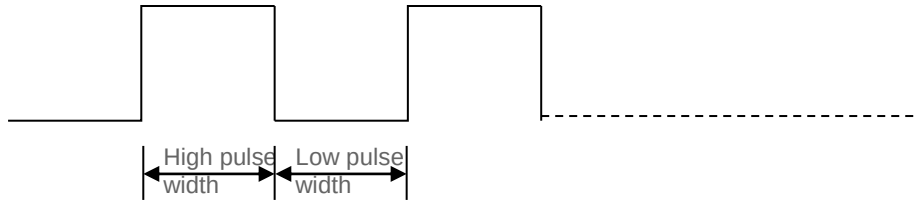
The channel output will remain constant as the controller requires.

Single Pulse:

When working in single pulse mode, “1” means starting a high level period which is defined in the Pulse Width parameter. When a high level period time expires the Output will stay low. “0” means canceling the last starting action. Before starting the next Single pulse a canceling “0” is required.

Continuous Pulse:

When working in continuous pulse mode, ‘1’ means starting a continuous pulse train, the High and low level lengths of which are defined in Parameters. ‘0’ means canceling the last Starting action. The factory default is “Discrete Output” for this parameter.



4.2.5.3 Pulse Width of Channel

This parameter is used to define the pulse width in conjunction with the “Type of channel” parameter. When the Single Pulse or the Continuous Pulse option is set, the high width and low width are configured separately. The unit is 10ms. 1 - 500 the factory default is “500” for this parameter. The user configurable parameters are: **1–500.**

Example: If pulse width register value is written 1 count than Digital Output signal’s pulse width is 10ms accordingly 1 x 10ms. If pulse width count is written 2, then output signal pulse width is 20ms.

4.2.6 Modnet Address for configuration:

Sr No	Parameters	Modnet Address Read/Write	Type of Access	Values Applicable	Description
1	Output 1 to16 Read & Write	40001/41026	r/w	0000-FFFF	Channel 1 – 16 DO Coils 1 = Set to ON 0 = Reset to OFF

mINT – 08AI – Analog Inputs

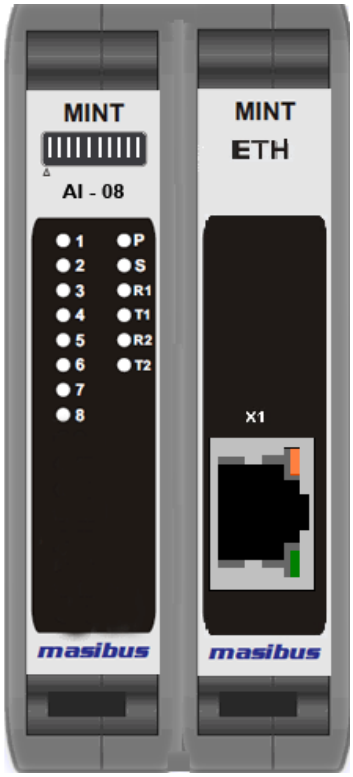
4.3.1 Description:

This module is supplied with Thermocouple, RTD, Voltage and current Inputs. All 8 channels are supplied with user selectable universal Inputs. We can configure this module with mINT Plus configuration software or any Modbus Master device. All user Zero values and Span values of connected sensors are configurable through the mINT Plus Software.

4.3.2 Technical Specifications:

Voltage Requirements:	
Logic Supply voltage	18 - 32Vdc
Logic Supply Current	150mA max @24V
Power Consumption	<4W
Field components	50 ohms connected externally for Current inputs
Input Specifications:	
Input Points	08
Input Types	Thermocouple -> E ,J ,K ,T ,B ,R ,S ,N
	RTD -> Pt100, Cu-53, NI-120
	Current -> 0-20mA , 4-20mA
	Resistor Input -> 0 Ohms to 2k Ohms
	Voltage -> -10V to +10V, -100mVto+100mV, -50mVto+50mV, -250mVto+250mV
Isolation	1500Vrms – Field To Logic
Isolation	1500Vrms – Field To RS485
Isolation	1500Vrms – RS485 To Logic
Isolation	1000Vrms – Supply to RJ45
Resolution	16 Bit ADC
CMRR/NMRR	CMRR>120dB NMRR>60dB at 50Hz
Accuracy	0.1% of FS
Temperature Drift	≤ 0.01% of span/°C
CJC Error	±2°C (0 to 55°C)
Input Impedance	V>1 MΩ, mA<100Ω, mV/TC>1 MΩ
Sensor Burn-out Current	0.5uA
RTD Excitation Current	250uA
Scan Rate	T/C & Voltage/Current: 50mSec/Channels RTD: 100mSec/Channels
Environmental Specifications:	
Operating Temperature	0˚ C to 55˚ C
Storage Temperature	-10˚C to 70˚ C
Humidity (Non-condensing)	30 to 95% RH
Communication Specifications:	
Network interface	Ethernet 10/100BaseTx (auto-detecting)
Connector	RJ45 connection (auto-crossover)
Communication Protocol	TCP/IP, ARP, UDP,DHCP, Modbus TCP/IP, HTTP
Configuration & Diagnostic Port	RS-485 port (Modbus RTU Slave)

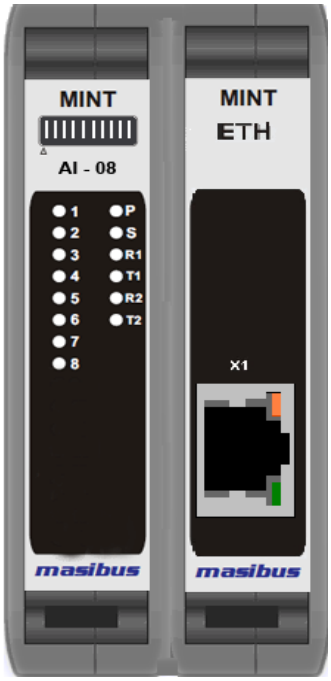
4.3.3 Status Indicators

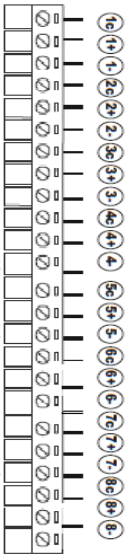


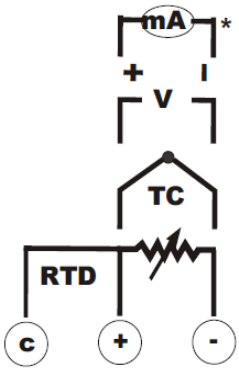
- Power: "ON" When Logic Supply is "ON"
- Module Status: "ON" When CPU is Running
- RS 485 RX1- RX2: Flashes when Modbus queries are receiving
- RS 485 TX1- TX2: Flashes when transmitting Modbus response
- Input Status: "ON" when Input is "ON"
  "OFF" when Input is "OFF"

4.3.4 Wiring Diagram:

The following diagram shows how the Analog Inputs are connected to the Input Terminals.







*** 50 ohms Connected Outside**

4.3.5 Modnet Address for configuration:

*** Calibration is used for factory purpose, these parameters are not recommended to use on field.**

Type Description	Resolution	Accuracy	Type Description	Resolution	Accuracy
E - Type TC	0.1°C	+/- 0.5°C	Pt-100 3W	0.1°C	+/- 0.3°C
J - Type TC	0.1°C	+/- 0.5°C	CU-53	0.1°C	+/- 0.3°C
K - Type TC	0.1°C	+/- 0.5°C	NI 120	0.1°C	+/- 0.3°C
T - Type TC	0.1°C	+/- 0.5°C	resistance	1 Ω	+/- 0.01%
B - Type TC	1°C	+/- 1°C			
R - Type TC	1°C	+/- 1°C	Current	1uA	+/- 0.05%
S - Type TC	1°C	+/- 1°C	Voltage +/-1V	0.1mV	+/- 0.01 %
N - Type TC	1°C	+/- 1°C	Voltage +/-10V	1mV	+/- 0.01 %

Note:

[1] Abnormal Conditions of Process Value

Abnormal Value	Description
32764	Channel Skip
32765	UNDER Value
32766	OVER Value
32767	Channel OPEN Indication

[2] Input Type Descriptions

Value	Type Description	Modbus Ranges	Input Range
0	Channel OFF (Skip)	NA	NA
1	E - Type TC	-2000 to 10000	-200°C to 1000°C
2	J - Type TC	-2000 to 12000	-200°C to 1200°C
3	K - Type TC	-2000 to 13500	-200°C to 1350°C
4	T - Type TC	-2000 to 4000	-200°C to 400°C
5	B - Type TC	4500 to 18000	450°C to 1800°C
6	R - Type TC	0 to 17500	0°C to 1750°C
7	S - Type TC	0 to 17500	0°C to 1750°C
8	N - Type TC	-2000 to 13000	-200°C to 1300°C
9	Pt-1003W	-2000 to 8500	-200°C to 850°C
10	CU-53	-2100 to 2100	-210°C to 210°C
11	NI 120	-800 to 2100	-80°C to 210°C
12	Current	-2000 to +20000	0.000 to 20.000mA
13	Current	-2000 to +20000	4.000 to 20.000mA
14	resistance	0 to 2000	0Ω to 2000Ω
15	Voltage	-2000 to +20000	-10mV to +50mV
16	Voltage	-2000 to +20000	0 to +100mV
17	Voltage	-2000 to +20000	0 to +250mV
18	Voltage	-2000 to +20000	0 to +1V
19	Voltage	-2000 to +20000	0 to +10 V

SRno	Analog Parameters	Modnet Address Read/Write	Type Of Access	Values Applicable	Discription
1	PV CH.1	40001/NA	read only	NA	Channel 1 – 8 Inputs – Read Only
2	PV CH.2	40002/NA	read only	NA	
3	PV CH.3	40003/NA	read only	NA	
4	PV CH.4	40004/NA	read only	NA	
5	PV CH.5	40005/NA	read Only	NA	
6	PV CH.6	40006/NA	read only	NA	
7	PV CH.7	40007/NA	read only	NA	
8	PV CH.8	40008/NA	read only	NA	
9	AMB	40009/NA	read only	NA	Ambient Temperature read only
10	PV FLT CH.1	40010/NA 40011/NA	read only	NA	Channel 1 – 8 Inputs – Read Only swap float formate
11	PV FLT CH.2	40012/NA 40013/NA	read only	NA	
12	PV FLT CH.3	40014/NA 40015/NA	read only	NA	
13	PV FLT CH.4	40016/NA 40017/NA	read only	NA	
14	PV FLT CH.5	40018/NA 40019/NA	read only	NA	
15	PV FLT CH.6	40020/NA 40021/NA	read only	NA	
16	PV FLT CH.7	40022/NA 40023/NA	read only	NA	
17	PV FLT CH.8	40024/NA 40025/NA	read only	NA	
18	amb float	40026/NA 40027/NA	read only	NA	Ambient Temperature Read Only float format
19	input type ch.1	NA/41026	R/W	0-19	Channel 1 – 8 *Input Types
20	input type ch.2	NA /41027	R/W	0-19	
21	input type ch.3	NA /41028	R/W	0-19	
22	input type ch.4	NA /41029	R/W	0-19	
23	input type ch.5	NA /41030	R/W	0-19	
24	input type ch.6	NA /41031	R/W	0-19	
25	input type ch.7	NA /41032	R/W	0-19	
26	input type ch.8	NA /41033	R/W	0-19	

4.4 mINT – 08AO – Analog Output

4.4.1 Description:

This module is supplied with 0/4mA – 20mA or 0/2-10Vdc analog output. All 8 channels are supplied with Fixed type of analog Outputs either current or voltage.

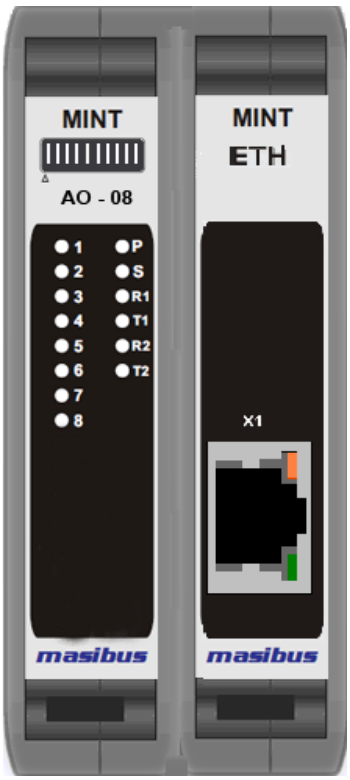
We can configure this module with mINT Plus configuration software or any Modbus Master device.

All user Zero values and Span values of connected load are configurable through the mINT Plus Software.

4.4.2 Technical Specifications:

Voltage Requirements:	
Logic Supply voltage	18 – 32Vdc
Logic Supply Current	100mA max @24V
Power Consumption	<3W
Field Supply voltage	24 VDC
Field Supply Current	250mA max
Output Specifications:	
Output Points	08
Output Types – Factory Set	Current -> 0-20mA / 4-20mA
	Voltage -> 0-10Vdc/2-10Vdc
Isolation	1500Vrms – Field To Logic
Isolation	1500Vrms – Field To RS485
Isolation	1500Vrms – RS485 To Logic
Isolation	1000Vrms – Supply to RJ45
Resolution	16 Bit DAC
Accuracy	0.05% of span
Scan Rate	< 200mSec
Temperature Drift	≤ 0.01% of span
Load (Compliance)	For Current :750 Ω max.@ 24V DC For Voltage : 2000 Ω min.
Environmental Specifications:	
Operating Temperature	0˚ C to 55˚ C
Storage Temperature	-10˚C to 70˚ C
Humidity (Non-condensing)	30 to 95% RH
Communication Specifications:	
Network interface	Ethernet 10/100BaseTx (auto-detecting)
Connector	RJ45 connection (auto-crossover)
Communication Protocol	TCP/IP, ARP, UDP,DHCP, Modbus TCP/IP, HTTP
Configuration & Diagnostic Port	RS-485 port (Modbus RTU Slave)

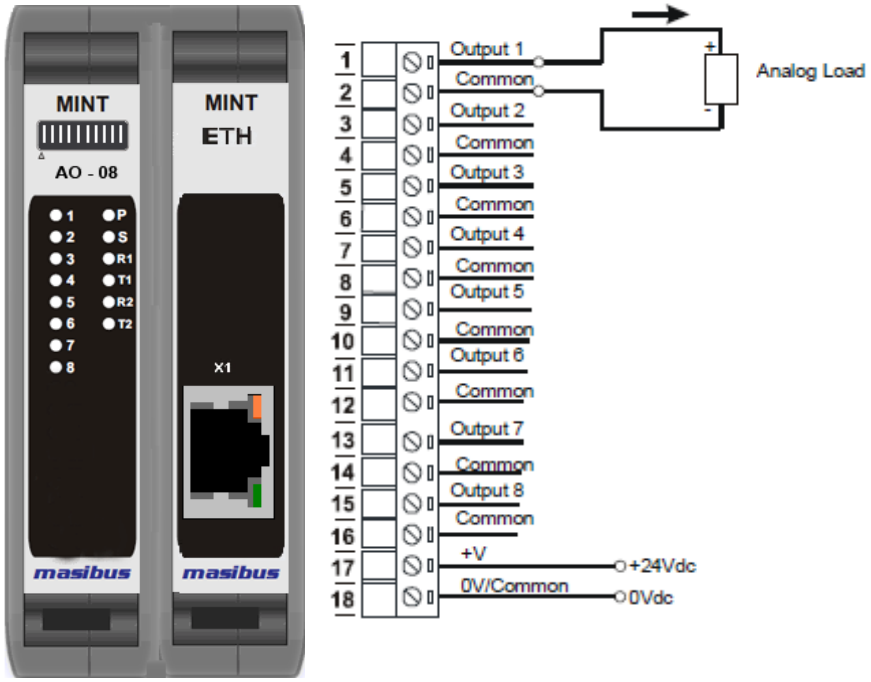
4.4.3 Status Indicators



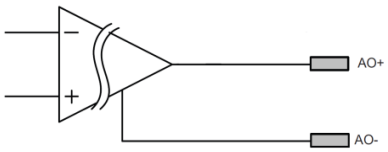
- Power: “ON” When Logic Supply is “ON”
- Module Status: “ON” When CPU is Running
- RS 485 RX1- RX2: Flashes when Modbus queries are receiving
- RS 485 TX1- TX2: Flashes when transmitting Modbus response
- Output Status: “ON” when Output is “ON”
  “OFF” when Output is “OFF”

4.4.4 Wiring Diagram:

The following diagram shows how the Analog Outputs are connected to the Output Terminals.



Equivalent Circuit Diagram:



4.4.5 Modnet Address for configuration:

*** Calibration is used for factory purpose, these parameters are not recommended to use on field.**

Type Description	Accuracy	Resolution
0/4mA – 20mA	+/- 0.05%	16 BIT
0/2VDC – 10VDC	+/- 0.05%	16 BIT

Note:Table-1

[1] Output Type Descriptions

Value	Type Description	Modbus Ranges	Input Range
0	Channel OFF (Skip)	NA	NA
1	0-20 mA	0 to 20000	0.000mA to 20.000mA
2	4-20 mA	4000 to 20000	4.000mA to 20.000mA
3	0-10 VDC	0 to 10000	0.0V to 10.0V
4	2-10 VDC	2000 to 10000	2.0V to 10.0V

Sr No	Parameter	Absolute Modnet Address Read/Write	Type	Values Applicable	Description
26	Channel 1 – Output	40001/41026	R/W	depends upon table [1]	Channel 1 – 8 Output Write As per Table no-1 ‘s Output type ranges
27	Channel 2 - Output	40002/41027	R/W	depends upon table [1]	
28	Channel 3 - Output	40003/41028	R/W	depends upon table [1]	
29	Channel 4 - Output	40004/41029	R/W	depends upon table [1]	
30	Channel 5 - Output	40005/41030	R/W	depends upon table [1]	
31	Channel 6 - Output	40006/41031	R/W	depends upon table [1]	
32	Channel 7 - Output	40007/41032	R/W	depends upon table [1]	
33	Channel 8 - Output	40008/41033	R/W	depends upon table [1]	
34	Channel 1 - Output Type	41034	W	depends upon table [1]	Channel 1 – 8 Output Types As per Table no-1
35	Channel 2 - Output Type	41035	W	depends upon table [1]	
36	Channel 3 - Output Type	41036	W	depends upon table [1]	
37	Channel 4 - Output Type	41037	W	depends upon table [1]	

38	Channel 5 - Output Type	41038	W	depends upon table [1]	
39	Channel 6 - Output Type	41039	W	depends upon table [1]	
40	Channel 7 - Output Type	41040	W	depends upon table [1]	
41	Channel 8 - Output Type	41041	W	depends upon table [1]	

5. MINT- PLUS CONFIGURATION SOFTWARE

Mint-PLUS is PC software used for configuration and Calibration of the IO module, Read IO status directly in PC, Force Outputs to test the module and used as tool for module diagnostic purpose.

For more information about MINT-PLUS configuration software prefer MINT-PLUS CONFIGURATION TOOL USER GUIDE (REF NO: m25Aom/201).

6. APPLICATION

- Remote data acquisition
- Process monitoring
- Industrial process control
- Supervisory control
- Security systems
- Laboratory automation
- Building automation
- Product Test/Simulation in Production

The MINT I/O can also be used by end users, package vendors as well as system integrators who want to upgrade their existing systems or optimize their automation offerings.

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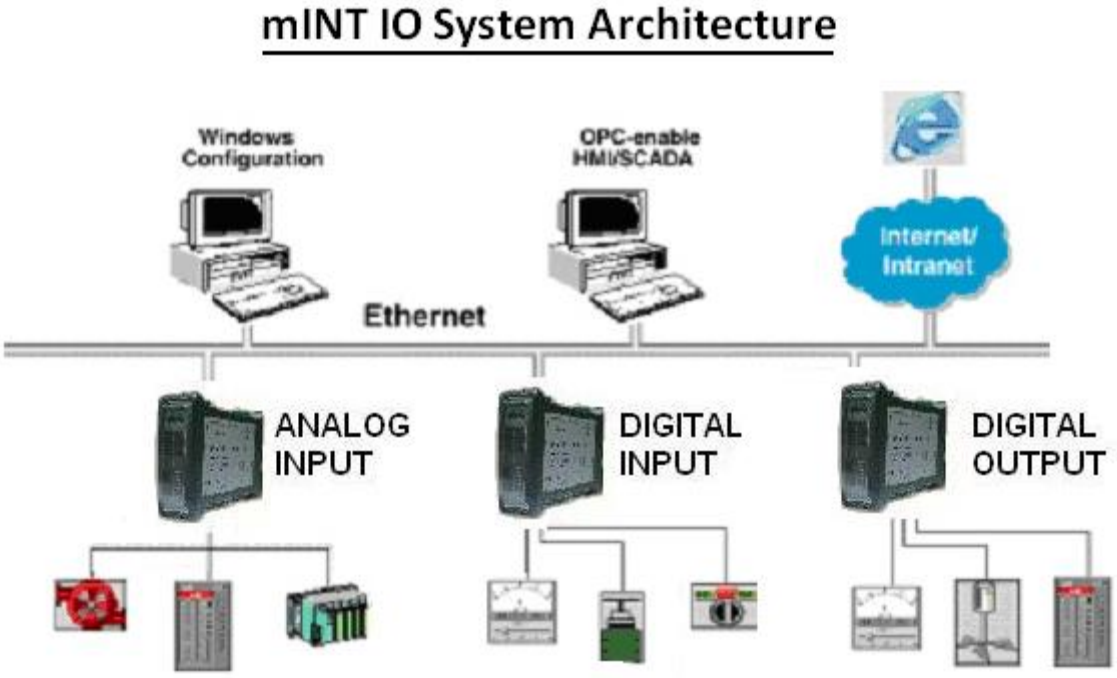
6.1 Application Configurations:

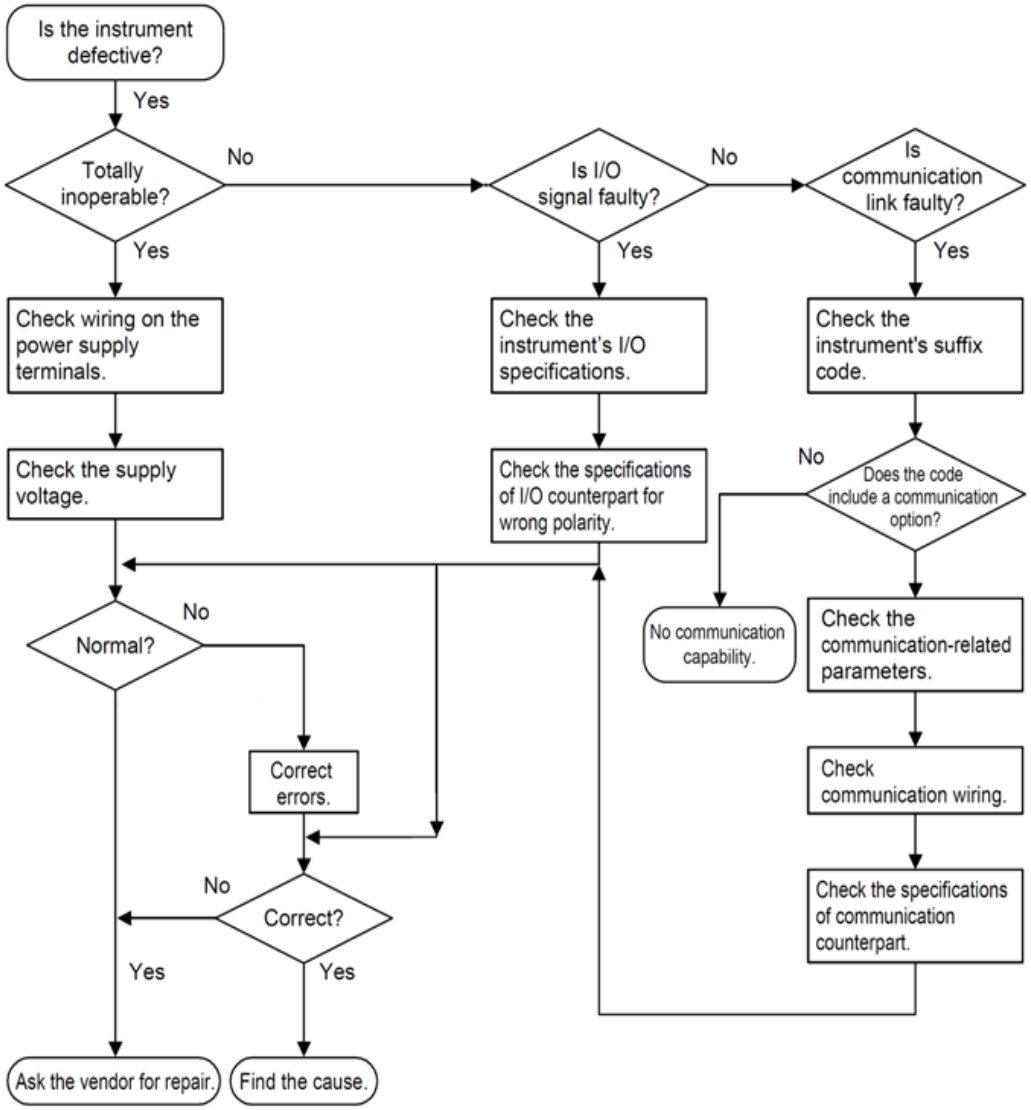
There are a number of different configurations in which the IO modules may be used in a System. Some are listed as follows

6.1.2 Data Acquisition:

Another use of the MINT IO Modules is for Data Acquisition where a **PC** (Personal Computer) Disconnected to the Network. Many SCADA software packages support the MODBUS TCP/IP client Protocol and can hence retrieve data from Input Modules or send data to Output Modules.



8. TROUBLE SHOOTING



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