

DISTRIBUTED MODBUS TCP I/O MODULES USER MANUAL



UMEIO01A March, 2022 Document Approval No: UM0EIO1A

Revision History

Version	Document Approval No	Description	Date
UMEIO01A	UM0EIO1A	 Initial release 	March, 2022

Warning Symbol

This document contains notices that you should observe to ensure your safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning triangle and are marked as follows.

The danger symbol indicates that death or severe personal injury may result if proper precautions are not taken. Do not proceed beyond a warning symbol until the indicated conditions are fully understood and met.

Preface

Original equipment manufacturer reserves the right to change information available in this document without notice. The manufacturer is not liable for any damages incurred to equipment / personal during installation or use of equipment as explained in this document. User must acquire sufficient knowledge & skills before using equipment in the application and follow all the local standards & regulations to meet safety requirements.

Copyright

The documentation and the software included with this product are copyrighted 2022 by Brainchild Electronic Co. Ltd. All rights are reserved. Brainchild Electronic Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice.

No part of this manual may be reproduced/copied/translated or transmitted in any form or by any means without the prior written permission of Brainchild Electronic Co., Ltd. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

Contact Information

Head Office & Factory

Brainchild Electronic Co. Ltd. 209 Chongyang Road, Nangang Dist., Taipei 11573, Taiwan Tel: +886-2-2786-1299 Fax: +886-2-2786-1395 Website: <u>www.brainchildtw.com</u>; Email:<u>sales@brainchild.com.tw</u>; <u>service@brainchild.com.tw</u>

China Sales Office

Brainchild Electronic (Kunshan) Co. Ltd. Room 405, Building #6, Huamin Gentlefolk Garden No. 13, Qianjin Central Road, Kunshan City, Jiangsu 215300, China Tel: +86-512-5511-6133 Fax: +86-512-5511-6113

Website: <u>www.brainchild.com.cn</u>; Email: <u>sales@brainchild.com.cn</u>; <u>service@brainchild.com.cn</u>

TABLE OF CONTENTS

1 An Overview of The Modbus TCP I/O System	8
1.1 Introduction	8
1.2 Application Configurations	8
1.2.1 I/O Expansion	8
1.2.2 Data Acquisition	8
1.3 Modbus TCP IO Module Selection Guide	9
2 Modbus TCP IO Modules General Information	10
2.1 Physical Dimensions	10
2.2 Grounding / Shielding	10
3 Configuration	11
3.1 Hardware Connections	11
3.2 Front panel LED's	11
3.3 Connecting to a PC which is not connected to a network	12
3.4 Connecting to a PC which is connected to a network	14
3.5 Testing the connection	14
3.6 Viewing web pages	15
3 7 Resetting the module to factory default	15
3.8 Troubleshooting Guide	16
3 9 Modhus Register Types	16
3 10 Modbus Functions	10
4 Modbus TCP IO Modules	17
110-16 Notatics minimized inputs with Counters	10
1 1 Description	10
1.1.7 Description	10
1 1 3 Status Indicators	10
1 1 1 Wiring	10
4.1.4 Willing	13
4.1.5 Configuration	2 I
4.1.0 Viewilly web pages	2J 24
4.1.7 IO-TODI-E -Moubus Mapping (Moude Type - 140)	24 20
4.2 10-1000-E-10 Charmer Digital Outputs	20
4.2.1 Description	20
4.2.2 Technical Specification of 10-10D0-E	29
4.2.5 Status Inducators	29
4.2.4 Willing	29
4.2.5 Configuration	30
4.2.0 Viewing web pages	32
4.2.7 IO-16DO-E = Modbus Mapping (Module Type = 131)	
4.3 IU-4RU-E – 4 Unannel Relay Outputs	
4.3.1 Description	
4.3.3 Status Indicators	
4.3.4 Wiring	35
4.3.5 Configuration	
4.3.6 Viewing web pages	38
4.3.7 IO-4RO-E – Modbus Mapping (Module Type = 142)	
4.4 IO-8DIO-E – 8 Channel Digital Inputs/Outputs with Counters	40
4.4.1 Description	40
4.4.2 Technical Specification of IO-8DIO-E	41
4.4.3 Status Indicators	41

4.4.4 Wiring	42
4.4.5 Setting the jumpers for NPN inputs	43
4.4.6 Setting the jumpers for PNP inputs	
4.4.7 Configuration	
4.4.8 Viewing web pages	
4.4.9 IO-8DIO-E Modbus Mapping (Module Type = 132)	
4.5 IO-8AIIS-E – 8 Channel Isolated Analog Current Inputs	
4.5.1 Description	
4.5.2 Technical Specification of IO-8AIIS-F	51
4 5 3 Status Indicators	51
4 5 4 Wiring	52
4 5 5 Configuration	53
4.5.6 Viewing web pages	54
4 5 7 IO-8AIIS-F Modbus Mapping (Module Type = 137)	55
4 6 IO-8AIVS-F – 8 Channel Isolated Analog Voltage Inputs	58
4 6 1 Description	58
4 6 2 Technical Specification of IO-8AIVS-F	59
4 6 3 Status Indicators	59
4.6.4 Wiring	60
4 6 5 Configuration	61
4.6.6 Viewing web pages	62
$4.6.7 \Omega_{-8} $ VS-F Modbus Manning (Module Type = 138)	
4.7 IO-8TCS-F = 8 Channel Isolated Thermocouple Inputs	
4.7 1 Description	66
172 Technical Specification of IO-8TCS-F	
173 Status Indicators	
4.7.4 Wiring	
475 Configuration	69
A 7 6 Viewing web pages	03
4.7.0 Viewing web pages	70
1.8 IO-6RTD-F = 6 Channel RTD Inputs	
4.8.1 Description	
4.8.2 Technical Specification of IΩ ₋ 6RTD ₋ F	
4.8.3 Status Indicators	
4.0.0 Status Indicators	
1 8 5 Configuration	
1.8.6 Viewing web pages	
4.0.0 Viewing web pages	
$1.9 \Omega_{8} \Omega_{1} = 8 Channel Analog Outputs Current$	
1.0 1 Description	
4.9.1 Description	70
4.9.3 Status Indicators	
A 9 A Wiring	80
1 0 5 Configuration	
4.9.5 Configuration	
$4.9.7 \Omega_{-80} = Modely Manning (Module Type = 140)$	
$4.10 \Omega_{84} _{F} = 8 Channel Analog Output Voltage$	۵۵ ۵ <i>۸</i>
1 10 1 Description	۰۰۰۰۰۰۹ ۵ <i>۸</i>
4 10.2 Technical Specification of $I\Omega_8\Delta\Omega V_{-}F$	04 פק
4 10.3 Status Indicators	טט פג
4 10 4 Wiring	
т. т. v. т. v и и и и у	

4.10.5 Configuration	87
4.10.6 Viewing web pages	88
4.10.7 IO-8AOV-E Modbus Mapping (Module Type = 141)	
5 PC Software	90
5.1 IO Studio	90
5.1.1 IO Studio Software Installation	90
5.1.2 Start and Exit	94
5.1.3 Uninstallation of Software	94
5.1.4 IO Studio	94
5.2 Data Acquisition Studio Software	96
5.2.1 Data Acquisition Studio Software Installation	97
5.2.2 Start and Exit	99
5.2.3 Real-Time Viewer	99
5.2.4 Dynamic Data Exchange (DDE)	127
5.2.5 Historical Viewer	130
6 Specifications	139
6.1 Environmental	139
6.2 EMC Installation Instructions	139
6.3 EMC Test Results	139
6.4 CE Conformity Certificate	140
6.5 ROHS Certificate	141
6.6 REACH Certificate	142

TABLE OF FIGURES

1-1 IO MODULES FOR PLC EXPANSION	8
1-2 IO MODULES WITH DAQ SOFTWARE	9
2-1 DIMENSION	10
3-1 FRONT LED INDICATION	11
3-2 ETHERNET LED INDICATION	11
3-3 PC TO IO MODULE DIRECT CONNECTION	12
3-4 PC NETWORK CONFIGURATION	12
3-5 PC IP ADDRESS CONFIGURATION	13
3-6 PC IP ADDRESS CONFIGURATION	13
3-7 PC TO IO MODULE NETWORK CONNECTION	14
3-8 WEB SERVER	15
3-9 RESET SWITCH	15
4-1 IO-16DI-E	18
4-2 IO-16DI-E STATUS INDICATORS	19
4-3 IO-16DI-E WIRING -POTENTIAL FREE SWITCH	20
4-4 IO-16DI-E WIRING -NPN / PNP TRANSISTOR	20
4-5 IO-16DI-E POWER WIRING	21
4-6 IO-16DI-E WEB PAGE CONFIGURATION	21
4-7 IO-16DI-E WEB PAGE COUNTER CONFIGURATION	22
4-8 IO-16DI-E WEB PAGE VIEW IO STATUS	23
4-9 IO-16DI-E WEB PAGE VIEW COUNTER STATUS	23
4-10 IO-16DO-E	28
4-11 IO-16DO-E STATUS INDICATORS	29
4-12 IO-16DO-E OUTPUT WIRING	30
4-13 IO-16DO-E POWER WIRING	30
4-14 IO-16DO-E WEB PAGE CONFIGURATION	31
4-15 IO-16DO-E WEB PAGE VIEW- DO STATUS	32

4-16	IO-4RO-E	.34
4-17	IO-4RO-E STATUS INDICATORS	.35
4-18	IO-4RO-E OUTPUT WIRING	.36
4-19	IO-4RO-E POWER WIRING	.36
4-20	IO-4RO-E WEB PAGE CONFIGURATION	.37
4-21	IO-4RO-E WEB PAGE VIEW- RO STATUS	.38
4-22	IO-8DIO-E	.40
4-23	IO-8DIO-F STATUS INDICATORS	42
4-24	IO-8DIO-F INPUT / OUTPUT WIRING	42
4-25	IO-8DIO-F POWER WIRING	43
4-26	IO-8DIO-E JUMPER FOR NPN INPLITS	43
4-27	IO-8DIO-E JUMPER FOR PNP INPLITS	44
4-28	IO-8DIO-E WEB PAGE CONFIGURATION	45
1_20	10-8DIO-E WEB PAGE COUNTER CONFIGURATION	.40
4-20	10-8DIO-E WEB PAGE VIEW J/O STATUS	.40 .46
4-30	IO-8DIO-E WEB PAGE VIEW -00 STATUS	.40
4-01	IO BALLE E	.41 50
4-52		.00
4-00		.01 50
4-04		.0Z
4-30	10-0AIIS-E POWER WIRING	.52
4-30	10-8AIIS-E WEB PAGE CONFIGURATION	.53
4-3/	10-8AIIS-E WEB PAGE VIEW- INPUT STATUS	.54
4-38	IO-8AIIS-E WEB PAGE VIEW- INPUT TYPE	.55
4-39		.58
4-40	IO-8AIVS-E STATUS INDICATORS	.59
4-41	IO-8AIVS-E INPUT WIRING	.60
4-42	IO-8AIVS-E POWER WIRING	.60
4-43	IO-8AIVS-E WEB PAGE CONFIGURATION	.61
4-44	IO-8AIVS-E WEB PAGE VIEW- INPUT STATUS	.62
4-45	IO-8AIVS-E WEB PAGE VIEW- INPUT TYPE	.63
4-46	IO-8TCS-E	.66
4-47	IO-8TCS-E STATUS INDICATORS	.67
4-48	IO-8TCS-E INPUT WIRING	.68
4-49	IO-8TCS-E POWER WIRING	.68
4-50	IO-8TCS-E WEB PAGE CONFIGURATION	.69
4-51	IO-8TCS-E WEB PAGE VIEW- INPUT STATUS	.70
4-52	IO-8TCS-E WEB PAGE VIEW- INPUT TYPE	.71
4-53	IO-6RTD-E	.72
4-54	IO-6RTD-E STATUS INDICATORS	.73
4-55	IO-6RTD-E INPUT WIRING	.74
4-56	IO-6RTD-E POWER WIRING	.74
4-57	IO-6RTD-E WEB PAGE CONFIGURATION	.75
4-58	IO-6RTD-E WEB PAGE VIEW- INPUT STATUS	.76
4-59	IO-8AOI-E	.78
4-60	IO-8AOI-E STATUS INDICATORS	.79
4-61	IO-8AOI-E OUTPUT WIRING	.80
4-62	IO-8AOI-E POWER WIRING	.80
4-63	IO-AOI-E WEB PAGE CONFIGURATION	.81
4-64	IO-8AOI-E WEB PAGE VIEW- OUTPUT STATUS	.82
4-65	IO-8AOV-E	.84
4-66	IO-8AOV-E STATUS INDICATORS	.85

4-67 IO-8AOV-E OUTPUT WIRING	
4-68 IO-8AOV-E POWER WIRING	
4-69 IO-AOV-E WEB PAGE CONFIGURATION	
4-70 IO-8AOV-E WEB PAGE VIEW- OUTPUT STATUS	
6-1 CE CERTIFICATE	140
6-2 ROHS CERTIFICATE	141
6-3 REACH CERTIFICATE	142

TABLE OF TABLES

1-1 IO MODULE SELECTION GUIDE	9
3-1TROUBLESHOOTING GUIDE	.16
3-2 MODBUS REGISTER TYPES	.16
4-1 IO-16DI-E SPECIFICATIONS	.19
4-2 IO-16DI-E MODBUS MAPPING	26
4-3 IO-16DI-E DIGITAL INPUT REGISTER	26
4-4 IO-16DO-E SPECIFICATIONS	.29
4-5 IO-16DO-E MODBUS MAPPING	.33
4-6 IO-16DO-E DIGITAL OUTPUT REGISTER	.33
4-7 IO-4RO-E SPECIFICATIONS	.35
4-8 IO-4RO-E MODBUS MAPPING	.38
4-9 IO-4RO-E DIGITAL OUTPUT REGISTER	.39
4-10 IO-8DIO-E SPECIFICATIONS	.41
4-11 IO-8DIO-E MODBUS MAPPING	.48
4-12 IO-8DIO-E DIGITAL INPUT REGISTER	.49
4-13 IO-8DIO-E DIGITAL OUTPUT REGISTER	.49
4-14 IO-8AIIS-E SPECIFICATIONS	.51
4-15 IO-8AIIS-E MODBUS MAPPING	.55
4-16 IO-8AIIS-E ANALOG INPUT REGISTER	.55
4-17 IO-8AIIS-E ANALOG INPUT STATUS	.56
4-18 IO-8AIIS-E ANALOG INPUT ALARM STATUS	.57
4-19 IO-8AIVS-E SPECIFICATIONS	.59
4-20 IO-8AIVS-E MODBUS MAPPING	.63
4-21 IO-8AIVS-E ANALOG INPUT REGISTER	.63
4-22 IO-8AIVS-E ANALOG INPUT STATUS	.64
4-23 IO-8AIVS-E ANALOG INPUT ALARM STATUS	.65
4-24 IO-8TCS-E SPECIFICATIONS	.67
4-25 IO-8TCS-E MODBUS MAPPING	.71
4-26 IO-6RTD-E SPECIFICATIONS	.73
4-27 IO-6RTD-E MODBUS MAPPING	.77
4-28 IO-6RTD-E ANALOG INPUT STATUS	.77
4-29 IO-8AOI-E SPECIFICATIONS	.79
4-30 IO-8AOI-E MODBUS MAPPING	.83
4-31 IO-8AOV-E SPECIFICATIONS	.85
4-32 IO-8AOV-E MODBUS MAPPING	.89
5-1 IO STUDIO SYSTEM REQUIREMENTS	.90
6-1 EMC TEST RESULTS	139

1 An Overview of The Modbus TCP I/O System

1.1 Introduction

Modbus TCP I/O system is an innovative modular I/O system which provides a simple solution for distributed I/O requirements. The Modbus TCP IO system consists of stand-alone Digital and Analog Input and Output modules which are connected together on an ETHERNET 10/100Base-T network using the Modbus TCP protocol.

The Modbus TCP modules also have built in web servers. This enables configuration and diagnostic data to be accessed via a standard web browser.

All Modbus TCP modules plug directly onto an industry standard DIN rail. All modules have isolation between the field and logic.

1.2 Application Configurations

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

1.2.1 I/O Expansion

There are a number of devices such as **PLC**'s (Programmable Logic Controllers) which have a Modbus TCP Communications facility available. When configured as a Modbus Master, and attached to the Ethernet network, Modbus TCP Modules may be used as remote I/O reducing cabling costs and increasing the I/O capability of the PLC.



1-1 IO Modules for PLC Expansion

1.2.2 Data Acquisition.

Modbus TCP Modules are used for Data Acquisition where a **PC** (Personal Computer) is connected to the Network. Data Acquisition Studio (DAQ) software and many SCADA software packages support the Modbus TCP Master Protocol and can hence retrieve data from Input Modules or send data to Output Modules.



1-2 IO Modules with DAQ software

1.3 Modbus TCP IO Module Selection Guide

MODEL	MODULE TYPE
IO-16DI-E	16 Channel Digital Input Module with Counters
IO-16DO-E	16 Channel Digital Output (Sink or NPN Transistor) Module
IO-8DIO-E	8 Channel Digital Input / 8 Channel Digital Output (Sink or NPN Transistor) Module
IO-4RO-E	4 Channel Relay Output Module
IO-8AIIS-E	8 Channel Isolated Current Input Module
IO-8AIVS-E	8 Channel Isolated Voltage Input Module
IO-8AOI-E	8 Channel Current Output Module
IO-8AOV-E	8 Channel Voltage Output Module
IO-8TCS-E	8 Channel Isolated Thermocouple Input Module
IO-6RTD-E	6 Channel RTD Input Module

1-1 IO Module Selection Guide

2 Modbus TCP IO Modules General Information

2.1 Physical Dimensions

The Modbus TCP IO module enclosure is shown below. The module clips directly onto an industry standard DIN rail. Field wiring is on the front of the module via a separate plug-in connector. The module power wiring is on a separate plug-in connector on the underside of the housing and the Ethernet communications plugs into a RJ45 connector on the top of the housing.

Allow at least 25mm on front, below and above the module to accommodate the wiring. Ensure that enough space is kept above and below the module for good ventilation.



2-1 Dimension

2.2 Grounding / Shielding

In most cases, Modbus TCP IO modules will be installed in an enclosure along with other devices which generate electromagnetic radiation. Examples of these devices are relays and contactors, transformers, motor controllers etc. This electromagnetic radiation can induce electrical noise into both power and signal lines, as well as direct radiation into the module causing negative effects on the system. Appropriate grounding, shielding and other protective steps should be taken at the installation stage to prevent these effects. These protective steps include control cabinet grounding, module grounding, cable shield grounding, protective elements for electromagnetic switching devices, correct wiring as well as consideration of cable types and their cross sections.

3 Configuration

3.1 Hardware Connections

The Modbus TCP IO Module must be clipped onto a DIN rail. Power must be applied to terminal 1 (0V) and terminal 2 (+24VDC). The power LED will illuminate and flash when power is applied.

Next the Ethernet connection is required, either through a network or directly to a PC. The Ethernet interface uses a standard RJ45 connector.

3.2 Front panel LED's.

The LEDs on the front panel of the Modbus TCP IO Module are used to indicate the operation of the module.



3-2 Ethernet LED Indication

3.3 Connecting to a PC which is not connected to a network

If the PC is equipped with an Ethernet port but not connected to a network, a local network address should be used for communication between the Modbus TCP IO Module and the PC. The Modbus TCP IO Module is shipped with a default IP address **192.168.0.112**. This address is in the address area reserved for local networks not connected to the Internet. For direct connection between the PC and the Modbus TCP IO Module, a crossover Ethernet cable is required.



3-3 PC to IO Module Direct Connection

To setup your PC to connect directly to the Modbus TCP IO Module, an IP address in the same range as the Modbus TCP IO Module must be assigned to the PC. In Windows environments, this should be done as follows:

- Connect the PC and the Modbus TCP IO Module together using a crossover cable
- Open the Windows Control Panel
- Select Network
- Select Ethernet -> the PC's Ethernet adaptor as shown below



3-4 PC Network Configuration

- Right click on the Ethernet and choose the properties. A TCP/IP Properties box similar to the one below should appear
- Choose the TCP/IPv4 option to configure the PC IP address.
- Insert the IP address 192.168.0.110 and the corresponding subnet mask as shown
- Save your settings by pressing OK in both TCP/IP properties and Network properties
- Reboot your PC

nanise	Diagnose this	connection Rename this conr	nection »		
Networking Sharing Connect using:		CF 3 e GbE Family Controller	Wi-Fi Not connected Intel(R) Dual Band Wi	reless-AC 72	
Realtek PCIe GbE Family Controller This connection uses the following items: Client for Microsoft Networks Gle and Printer Sharing for Microsoft Net QoS Packet Scheduler Internet Protocol Version 4 (TCP/IPv4) Microsoft Network Adapter Multiplexor f Microsoft NetDP Protocol Driver Internet Protocol Version 6 (TCP/IPv6)	Configure				
Install Uninstall Description Transmission Control Protocol/Internet Protoco wide area network protocol that provides com across diverse interconnected networks.	> Properties I. The default munication				

3-5 PC IP Address Configuration

	Internet Protocol Version 4 (TCP/IPv4	l) Properties	×
	General		
	You can get IP settings assigned auto this capability. Otherwise, you need t for the appropriate IP settings.	omatically if your network supports to ask your network administrator	
	Obtain an IP address automatica	ally	
	• Use the following IP address:		
•	IP address:	192.168.0.110	
•	Subnet mask:	255.255.255.0	
	Default gateway:	192.168.0.1	
۵	Obtain DNS server address auto	omatically	
	Use the following DNS server ad	dresses:	
	Preferred DNS server:	8.8.8.8	
	Alternative DNS server:		
	Validate settings upon exit	Advanced	
ł		OK Cancel	

3-6 PC IP Address Configuration

3.4 Connecting to a PC which is connected to a network

If there is an Ethernet network available, the Modbus TCP IO Module can be connected to any Ethernet connection or hub belonging to the network. If the PC is connected to a network, there is a strong possibility that the default IP address of the Modbus TCP IO Module is outside the range of the network (the address doesn't belong to the IP subset of the network). If the Ethernet network is connected to the Internet, this is certain. In this case a new IP address for the Modbus TCP IO Module is required. Contact the local network administrator to be assigned a free IP address for the Modbus TCP Module. The new IP address is programmed into the Modbus TCP Module using a Web browser software such as Internet explorer. In this case the Modbus TCP IO Module must first be connected directly to a PC as described above.



3-7 PC to IO Module Network Connection

In the remaining of this chapter, the IP address 192.168.0.112 is used as an example. Exchange this IP address with the IP address you have set up in all the occurrences.

3.5 Testing the connection

To test the connection between the PC and the Modbus TCP IO Module, a simple program called *ping* can be used. *Ping* sends a number of messages to the specified IP address and displays the response. The ping program can be run from the command line or from a DOS window on the PC, as follows:

- Open the Windows Start Menu
- Click Run
- In the Open box, type: "ping 192.168.0.112"

If the network connection is OK, the program will respond with: "Reply from 192.168.0.112" and information about the response time.

If there is a problem with the network setup the program will respond: "**Destination host unreachable**". There may be two solutions to this problem:

- If the PC is connected in a network, change the IP address to an address accessible from the local network.
- If the Modbus TCP IO Module is connected directly to the PC (or through a hub), change the PC's IP address to one in the same address range as the Modbus TCP Module.

If there is a problem with the Modbus TCP IO Module the program will respond:

"Request timed out", this means that the Modbus TCP IO Module cannot respond to messages. Check the power connection. Check that the Link LED is illuminated when the cable is plugged into the RJ45 connector.

3.6 Viewing web pages

The Modbus TCP IO Modules have built in web pages. These are used for checking the configuration and dynamic data, and for altering the configuration. To view these Web pages, a Web browser such as Internet Explorer or Netscape is needed.

To view the default Web page in the Modbus TCP IO Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page of the Modbus TCP IO Module will now be displayed in the browser window.



3-8 Web Server

If no Web page is displayed, go back to testing the network connection to the Modbus TCP IO Module by using the ping command. If the Modbus TCP IO Module replies to the ping messages, check the setup of the Web browser. If the Modbus TCP IO Module is directly connected to the same network as the PC, "direct connection to the network" or "bypass proxy server for local addresses" should be selected in the Web browser configuration menu. If the Modbus TCP IO Module 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.

3.7 Resetting the module to factory default

In the event that the programmed IP address of the module is lost, it is possible to reset the module to the factory IP address.

The following parameters are reset:

- IP address
- Default gateway address
- Subnet mask



Reset switch at rear of module.

3-9 Reset Switch

The Module can be reset to the factory default by performing the following procedure:

- 1. Switch off power to the module.
- 2. Remove the module from the DIN rail.
- 3. Press in the reset switch at the rear of the module using a small screw driver.
- 4. Switch on the power whilst the switch is on.
- 5. Wait 5 seconds.
- 6. Remove the screw driver and switch off the power.
- 7. Replace the module.

3.8 Troubleshooting Guide

No	Checkpoint		Solution
1	Is the LINK LED on and is the ACTIVITY	No	No network connection is detected. The Ethernet cable is either not plugged in or wrong type of cable is used. For connection to a network with a hub or switch, a normal network cable can be used. For direct connection to a PC network card, a twisted cable must be used.
	short pulses?	Yes	A network connection is detected, the Modbus TCP Module is connected to the network.
2	Does the Modbus TCP IO Module respond to	No	Either the PC or the Modbus TCP Module is setup with wrong IP address. To change the IP address of the Modbus TCP Module back to the default address, open the Modbus TCP Module housing and remove the jumper labeled SIP2. Apply power to the Modbus TCP Module for a short while. Now replace the jumper and close the enclosure. To change the IP address of a PC, use the Windows "control panel -> network - > TCP/IP properties" and setup an IP address close to the Modbus TCP Module address. The Modbus TCP Module is shipped with a default IP address of 192.168.0.112, the PC can be setup with an IP address of 198.168.0.110
	PING requests?	Yes	The PC and Modbus TCP Module are setup with a correct IP address and they are able to communicate with each other.
3	Can the default Web page be accessed in a	No	This is normally caused by the setup of the Web browser. In the "options" or "preferences" menu, check that the Web browser is configured for direct network connection or local area network and NOT using a proxy server.
	Web browser?	Yes	No problems.

3-1Troubleshooting Guide

3.9 Modbus Register Types

There are 4 types of variables which can be accessed from the module. Each module has one or more of these data variables.

Туре	Starting Address	Variable Type	Access
1	00001	Digital Outputs	R/W
2	10001	Digital Inputs	Read Only
3	30001	Input Registers (Analog)	Read Only
4	40001	Output Registers (Analog)	R/W

3-2 Modbus Register Types

<u>Note</u>: The Modbus message length must be limited to 100 consecutive read or write registers. If more registers are required then a new poll group must be added for the next xxx registers.

3.10 Modbus Functions

The Modbus TCP IO modules will respond to the following Modbus functions:

- Function 1 Read I/O status (Digital Inputs and Outputs)
- Function 2 Read I/O status (Digital Inputs and Outputs)
- Function 3 Read Register (Analog Inputs and Outputs)
- Function 4 Read Register (Analog Inputs and Outputs)
- Function 5 Write Single Digital Output (Digital Outputs)
- Function 6 Write Single Register (Analog Outputs)
- Function 15 Write Multiple Digital Outputs (Digital Outputs)
- Function 16 Write Multiple Registers (Analog Outputs)

4 Modbus TCP IO Modules

4.1 IO-16DI-E – 16 Channel Digital Inputs with Counters

4.1.1 Description

The IO-16DI-E module is a 16-channel digital input module. The inputs are isolated from the logic by bi-directional opto-couplers. The inputs are divided into 2 isolated groups of 8 inputs each. This allows for many configurations in which the input module may be used. One such configuration could be where one group is connected as common positive and the second group connected as common negative.



4-1 IO-16DI-E

The counters operate in three modes:

- In mode 0: All the counters are disabled.
- In mode 1: The 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.
- In mode 2: The inputs are connected as up/down counters. Input 1 will increment counter 1 whilst input 2 decrements counter1. In the same way, inputs 3&4 operate counter 2, inputs 5&6 operate counter 3 and inputs 7&8 operate counter 4, etc.

When the input filter is configured for > 10ms (Input Filter > 1), the 16 counters are saved in non-volatile memory and the count value will be saved when power fails.

The format of the registers allows the status of the inputs to be read as either single bits or all at once as a single register on the Modbus network.

Each IO-16DI-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-16DI-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital input status parameters is <u>http://192.168.0.112/index.htm</u> and the address for viewing the counters is <u>http://192.168.0.112/counters.htm</u>.

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u> and the web page for configuring the counters is <u>http://192.168.0.112/countcfg.htm</u>.

Power Supply	Logic Supply Voltage	12 -24 Vdc							
	Logic Supply Current	75mA @ 12V / 39mA @ 24V							
Digital Inputs	Input Points	16							
	Input Voltage Range	12 - 24 Vdc							
	Input Current per input	5mA @ 12Vdc / 11mA @ 24Vdc							
	Isolation	1500Vrms between field and logic							
Counters (Filter disabled)	Inputs	1 to 16							
	Resolution	32 Bits							
	Frequency	1KHz (max)							
	Pulse Width	500us (min)							
Counters (Filter > 1)	Inputs	1 to 16							
	Resolution	32 Bits							
	Frequency	25Hz (max)							
	Pulse Width	20ms (min)							
Ethernet	10/100Mbits/s	Twisted pair.							
Temperature	Operating Temperature.	-40°C to + 80°C							
	Storage Temperature	-40°C to + 85°C							
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit							
	Inputs	18 Way screw connector on front							
	Ethernet	RJ45 on top side of unit.							

4.1.2 Technical Specification of IO-16DI-E

4-1 IO-16DI-E Specifications

Note: Inputs 1 to 16 are used as both digital inputs and counter inputs.

4.1.3 Status Indicators

Power:	Flashes to indicate the CPU is running.
RS485 Rx:	Flashes to indicate the unit has received a valid Modbus message.
RS485 Tx:	Flashes to indicate the unit has sent a Modbus message.
Input Status:	"OFF" when the input is off.
•	"ON" when the input is on.



4-2 IO-16DI-E Status Indicators

4.1.4 Wiring

The following diagram shows how the digital inputs are connected to potential free switches. The common can be connected to positive or negative as indicated.



4-3 IO-16DI-E Wiring -Potential Free Switch

The following diagram shows how the digital inputs are connected a NPN transistor or a PNP transistor.



4-4 IO-16DI-E Wiring -NPN / PNP Transistor

The following diagram shows the wiring for the power.



4-5 IO-16DI-E Power Wiring

4.1.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Input Names for identification/maintenance purposes.

🔲 📔 IO-16DI-E 16 Digital Inpu	ut Modu 🗙 🕒 IP Address - IO-16DI-E	× +				- 0 ×							
\leftarrow \rightarrow C a A	Not secure 192.168.0.112/ip.htm		సం 🔍	ವೆ 🔿 🗞 😈	e e ø	3 🖆 🔂 🖷							
🖺 Jntu 4-1 Informatio 💿 🚺	HDFC Bank: Person 🔹 Le TGV - YouTu	oe 🔇 CiteSeerX — Synthe 🗋) என் சமையல 🌔 🗅	பெட்டகம்: சமை 쀁 டு	₽@ங்கப்பட்டி	> 🛛 🛅 Other favourites							
		Brai	nChil	d		^							
		IC	-16DI-E										
16DI - DIGITAL INPUT MODULE													
Ethernet Configuration Parameters													
Module IP	192 168 0 112]											
Default Gateway IP	192 168 0 1]											
Subnet Mask	0 0 0												
Socket Time Out	90		X 1 second										
			Submit										
Warning: The IP address entered. If you forget the IP add	will not be updated until the power dress, refer to the user manual to re	on the module has been swit set the module back to the de	ched off and on again. After fault IP value.	clicking on the Submit b	utton check that the co	rrect IP address has been							
Module Name	-16DI-E Submit												
Input 1 Name	UT_1 Submit												
Input 2 Name	UT_2 Submit					•							

4-6 IO-16DI-E Web Page Configuration

- **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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.

- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Input Names:** These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input by name or number.

The Web page address "**192.168.0.112/countcfg.htm**" is entered into the address line of the browser window to access the counter configuration page. This page allows you to enter a Counter Description Name for identification/maintenance purposes.



4-7 IO-16DI-E Web Page Counter Configuration

- Counter Mode: Enter 0, 1 or 2 to submit the required mode.
- **Input Filter:** The input filter is used to prevent false inputs and counting due to electrical noise or contact bounce.

4.1.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

🗈 🕒 IO-16DI-E 16 Digital Input Modul 🗙 🕒 IP Address - IO-16	DI-E × [Counter Configuration - 16DI	$\times +$									_	0	\times
← → C ᢙ ▲ Not secure 192.168.0.112/inc	lex.htm		ි 💁	â () 🔗	U	G	C	ø	3	£'≡	Ē	۲	
🎦 Jntu 4-1 Informatio 💶 🚺 HDFC Bank: Person 🕒 Le TGV - Y	ouTube 🔇 CiteSee	rX — Synthe р என் சமைய	» [ʰ [ʰ	பெட்டகம்	். சமை	<u>በ</u> መወ	ரங்கப்ப	பட்டி			>	🛅 🤇	Other fav	ourites
	Bi	rainC	hi	d										Î
		IO-16DI-E												
	16	DI - DIGITAL INPUT	MODUL	E										
		HOME PAGE												
		Module Name: IO-1	6DI-E											
[INPUT NUMBER	INPUT NAME		STATE										- 11
	INPUT 1:	INPUT_1			OFF									
	INPUT 2:	INPUT_2			OFF									
	INPUT 3:	INPUT_3			OFF									
	INPUT 4:	INPUT_4			OFF									
	INPUT 5:	INPUT_5			OFF									
	NPUT 6:	INPUT_6			OFF									
	INPUT 7:	INPUT_7			OFF									
	INPUT 8:	INPUT_8			OFF									
	NPUT 9:	INPUT_9			OFF									
	NPUT 10:	INPUT_10			OFF									
	NPUT 11:	INPUT_11			OFF									
	INPUT 12:	INPUT_12			OFF									-

4-8 IO-16DI-E Web Page View IO Status

- Input Number: This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **State:** This is the current state of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

To view the Counter Web page in the Modbus TCP Module, start the Web browser and type "**192.168.0.112/counter.htm**" into the address line of the browser window.



4-9 IO-16DI-E Web Page View Counter Status

- **Counter:** This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **Count:** This is the current count on the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Counter Configuration:** This is the mode as described at the beginning of this section.

		apping (m	ouule Type	, 140)	
Modbus	Register Name	Low	High	Access	Description
Address		Limit	Limit		
10001	Digital Input 1	0	1	R	Status of Digital Inputs.
10002	Digital Input 2	0	1	R	"
10003	Digital Input 3	0	1	R	
10004	Digital Input 4	0	1	R	"
10005	Digital Input 5	0	1	R	II.
10006	Digital Input 6	0	1	R	H
10007	Digital Input 7	0	1	R	II
10008	Digital Input 8	0	1	R	H
10009	Digital Input 9	0	1	R	11
10010	Digital Input 10	0	1	R	11
10011	Digital Input 11	0	1	R	"
10012	Digital Input 12	0	1	R	"
10013	Digital Input 13	0	1	R	11
10014	Digital Input 14	0	1	R	"
10015	Digital Input 15	0	1	R	11
10016	Digital Input 16	0	1	R	"
30001	S/W Version /	N/A	N/A	R	High Byte = Software Version
	Module Type				Low Byte = 148
30002	Digital Inputs	N/A	N/A	R	Digital Inputs in 16 bits. 16 - 1.
40003	Counter 1 MSB	0	65535	R/W	Counter MSB and LSB
					combine to give a 32 bit
40004	Counter 1 LSB	0	65535	R/W	Counter with range 0 to
					4294967295.
40005	Counter 2 MSB	0	65535	R/W	n
40006	Counter 2 LSB	0	65535	R/W	H
40007	Counter 3 MSB	0	65535	R/W	n
40008	Counter 3 LSB	0	65535	R/W	11
40009	Counter 4 LSB	0	65535	R/W	II
40010	Counter 4 LSB	0	65535	R/W	H
40011	Counter 5 MSB	0	65535	R/W	II
40012	Counter 5 LSB	0	65535	R/W	11
40013	Counter 6 MSB	0	65535	R/W	"
40014	Counter 6 LSB	0	65535	R/W	"
40015	Counter 7 MSB	0	65535	R/W	11
40016	Counter 7 LSB	0	65535	R/W	"
40017	Counter 8 MSB	0	65535	R/W	"
40018	Counter 8 LSB	0	65535	R/W	11
40019	Counter 9 MSB	0	65535	R/W	п
40020	Counter 9 LSB	0	65535	R/W	н

4.1.7 IO-16DI-E -Modbus Mapping (Module Type = 148)

Modbus	Register Name	Low	High	Access	Description
Address		Limit	Limit		
40021	Counter 10MSB	0	65535	R/W	
40022	Counter 10LSB	0	65535	R/W	"
40023	Counter 11MSB	0	65535	R/W	Counter MSB and LSB combine to give a 32 bit
40024	Counter 11LSB	0	65535	R/W	Counter with range 0 to 4294967295.
40025	Counter 12MSB	0	65535	R/W	П
40026	Counter 12LSB	0	65535	R/W	н
40027	Counter 13MSB	0	65535	R/W	н
40028	Counter 13LSB	0	65535	R/W	11
40029	Counter 14MSB	0	65535	R/W	11
40030	Counter 14LSB	0	65535	R/W	"
40031	Counter 15MSB	0	65535	R/W	11
40032	Counter 15LSB	0	65535	R/W	"
40033	Counter 16MSB	0	65535	R/W	"
40034	Counter 16LSB	0	65535	R/W	"
40035	Counter Capture	0	65535	R/W	Bit1 = 1 to Capture Counter1, Bit2 = 1 to Capture Counter2, etc.
40036	CCounter 1 MSB	0	65535	R/W	Capture Counter Registers. MSB and LSB
40037	CCounter 1 LSB	0	65535	R/W	combine to give a 32-bit Value.
40038	CCounter 2 MSB	0	65535	R/W	Counter with range 0 to 4294967295.
40039	CCounter 2 LSB	0	65535	R/W	
40040	CCounter 3 MSB	0	65535	R/W	11
40041	CCounter 3 LSB	0	65535	R/W	II
40042	CCounter 4 LSB	0	65535	R/W	II.
40043	CCounter 4 LSB	0	65535	R/W	11
40044	CCounter 5 MSB	0	65535	R/W	11
40045	CCounter 5 LSB	0	65535	R/W	II
40046	CCounter 6 MSB	0	65535	R/W	IT
40047	CCounter 6 LSB	0	65535	R/W	11
40048	CCounter 7 MSB	0	65535	R/W	"
40049	CCounter 7 LSB	0	65535	R/W	
40050	CCounter 8 MSB	0	65535	R/W	"
40051	CCounter 8 LSB	0	65535	R/W	
40052	CCounter 9 MSB	0	65535	R/W	"
40053	CCounter 9 LSB	0	65535	R/W	
40054	CCounter 10MSB	0	65535	R/W	"
40055	CCounter 10LSB	0	65535	R/W	"
40056	CCounter 11MSB	0	65535	R/W	"
40057	CCounter 11LSB	0	65535	R/W	
40058	CCounter 12MSB	0	65535	R/W	
40059	CCounter 12LSB	0	65535	R/W	"
40060	CCounter 13MSB	0	65535	R/W	"
40061	CCounter 13LSB	0	65535	R/W	

Modbus Address	Register Name	Low Limit	High Limit	Access	Description
40062	CCounter 14MSB	0	65535	R/W	n
40063	CCounter 14LSB	0	65535	R/W	n
40064	CCounter 15MSB	0	65535	R/W	n
40065	CCounter 15LSB	0	65535	R/W	н
40066	CCounter 16MSB	0	65535	R/W	11
40067	CCounter 16LSB	0	65535	R/W	н
40101	Counter Mode	0	2	R/W	0=Disable, 1=Up Counting, 2=Up/Down Count
40102	Input Filter	0	65535	R/W	0 = Disable, >0 = Enable. (x10ms)
40103	Capture Zero	0	65535	R/W	0 = Disabled, bit1 = auto zero counter 1.

4-2 IO-16DI-E Modbus Mapping

4.1.7.1 Digital Input Register

The digital inputs can be read in a single register as follows:																
MSB	IO-16DI-E DIGITAL INPUTS													SB		Address
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	30002
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Digital Input Number

4-3 IO-16DI-E Digital Input Register

4.1.7.2 Counter Registers

The counters are stored as two 16-bit registers. The first register is the High Register (MSB) and the second register is the Low Register (LSB). To get the actual 32-bit count value the registers must be combined as follows:

Counter High Value (MSB) = Register 40003.

Counter Low Value (LSB) = Register 40004.

Counter Value = (Counter High Value X 65536) + Counter Low Value.

4.1.7.3 Counter Capture.

To capture a counter a 1 must be written to the corresponding bit position in the Counter Capture Register 40035. For example:

- 1. Writing 1 to Register 40035 results in Counter 1 value being captured to Counter Capture 1.
- 2. Writing 2 to Register 40035 results in Counter 2 value being captured to Counter Capture 2.
- 3. Writing 3 to Register 40035 results in Counter 1 value being captured to Counter Capture 1 and Counter 2 value being captured to Counter Capture 2.

Once the module has Captured the counters, the Counter Capture Register 40035 is cleared to zero. It is possible to read this register to get confirmation that the capture is complete before reading the captured counter values.

4.1.7.4 Counter Auto Zero.

The counter being captured can be auto zeroed. The purpose of this function is to let the module zero the counter so that no counts get lost due to delays from communication latency, etc.

To ensure that a counter is auto zeroed, a 1 must be written to the corresponding bit position in the Capture Zero Register 40103. For example:

Writing 1 to Register 40103 results in Counter 1 value being zeroed when the Counter Capture bit is 1.

The value in the Capture Zero Register 40103 is permanently stored in memory and only has to be configured once.

4.2 IO-16DO-E-16 Channel Digital Outputs

4.2.1 Description

This module has 16 open collector (NPN) 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.



4-10 IO-16DO-E

The outputs are written to by the Modbus master device such as a PC or PLC. Each output can be individually switched on or off, or all outputs can be set up at the same time by writing a single number to the output register which represents the status of all outputs.

An output watchdog timer can be configured to switch off all the outputs if there have been no communications with the module for up to 255 seconds. A value of 0 seconds will disable this timer and the outputs will remain in the last programmed state.

Each IO-16DO-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-16DO-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital output status parameters is <u>http://192.168.0.112/index.htm</u>

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>

4.2.2 Technical Specification of IO-16DO-E

Power Supply	Logic Supply Voltage	12 -24 Vdc							
	Logic Supply Current	75mA @ 12V / 39mA @ 24V							
	Field Supply Voltage	12 -24 Vdc							
	Field Supply Current	6mA @ 12V / 6mA @ 24V							
Digital Outputs	Output Points	16							
	Maximum Voltage	36 Vdc							
	Maximum Current	100 mA per output							
	Vceon	1.1V Max.							
	Isolation	1500Vrms between field and logic							
Ethernet	10/100Mbits/s	Twisted pair.							
Temperature	Operating Temperature.	-40°C to + 80°C							
	Storage Temperature	-40°C to + 85°C							
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit							
	Inputs	18 Way screw connector on front							
	Ethernet	RJ45 on top side of unit.							

4-4 IO-16DO-E Specifications

4.2.3 Status Indicators

- **Power:** Flashes to indicate the CPU is running.
- **RS485 Rx:** Flashes to indicate the unit has received a valid Modbus message.
- **RS485 Tx:** Flashes to indicate the unit has sent a Modbus message.
- **Output Status:** "OFF" when the output is off.
 - "ON" when the output is on.



4-11 IO-16DO-E Status Indicators

4.2.4 Wiring

The following diagram shows how the digital outputs are connected to the coil of a relay. The coil is connected to positive and switched to negative.



4-12 IO-16DO-E Output Wiring

The following diagram shows the wiring for the power.





4.2.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Output Names for identification/maintenance purposes.

🔲 🕒 IO-16DI-E 16 Digital Inp	ut Modul 🗙	🗅 ca	punters - 10	6DI	× 🗅 IP Addre	ss - IO-16DO-E	×	Cou	unter Cor	nfiguration - 16	DI X	(+					-	0	\times
\leftarrow \rightarrow C a \checkmark	Not sec	ure 19	2.168.0.11	12/ip.htm			τõ	o _x	63	0 %	U	G	G	ø	3	€≦	Ē		
🗅 Jntu 4-1 Informatio 😐 🚺	HDFC Ban	k: Person	🖸 Le T	IGV - YouTube	e 🔇 CiteSeerX — Synthe	🗋 என் சமை	ഡல	00	ດມມ່ມ	_கம்: சமை	6	ு முங்கப்	ப்பட்டி			>	0	ther favo	ourites
					Bra	in C 10-16D0-E	h	1	d										
		Ethern	net Con	figuration	16DO - DK	SITAL OUTP	UTN	IODU											
Module IP	192	168	0	112					-										
Default Gateway IP	192	168	0	1															
Subnet Mask	0	0	0	0															
Socket Time Out	90					X 1 secon	d												
Warning: The IP address entered. If you forget the IP ad	will not b dress, refe	e update er to the	:d until th user mar	he power or nual to reset	n the module has bee tt the module back to a	Submit n switched off and the default IP valu	d on ag ue.	ain. Afte	er clicki	ing on the Si	ubmit b	outton c	heck th	at the d	correct IF	' addre	ess has	been	
Module IP		0	0	0	0														
Slave Poll Rate		0	1 X	10 milli	iseconds (0 = c	liasbled)													

4-14 IO-16DO-E Web Page Configuration

- **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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.

- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Output Names:** These fields allow you to enter an output description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular output by name or number.

4.2.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

D IO-16DO-E 16 Digital Output M 🗙 D Counters - 16DI	× [P Address - IO-16DO-E	× [ງ Counte	r Configu	iration - 16D	×	+					-	0	\times
← → C ⋒ ▲ Not secure 192.168.0.112/in	ndex.htm		τõ	≥ _₹ (6		U	C	0	ø	3	5∕≡	Ē		
🖒 Jntu 4-1 Informatio 😐 🚺 HDFC Bank: Person 🕒 Le TGV -	YouTube 🔇 CiteSee	erX — Synthe 🌓 என் சபை	பைல 🎦) 🗅 ම	பட்டகப்	் சமை	ტ დდ	றங்கப்ப	பட்டி			>	🛅 0	ther favo	urites
	Bi	rain C	h	1											Â
		IO-16DO-	E												
	160	O - DIGITAL OUTP	ит мо	DULE											
		HOME PAG	θE												
Module Name: IO-16DO-E															
	OUTPUT NUMBER	OUTPUT NAME		S	TATE										- 11
	OUTPUT 1:	OUTPUT_1				OFF									
	OUTPUT 2:	OUTPUT_2				OFF									
	OUTPUT 3:	OUTPUT_3				OFF									
	OUTPUT 4:	OUTPUT_4				OFF									
	OUTPUT 5:	OUTPUT_5				OFF									
	OUTPUT 6:	OUTPUT_6				OFF									
	OUTPUT 7:	OUTPUT_7				OFF									
	OUTPUT 8:	OUTPUT_8				OFF									
	OUTPUT 9:	OUTPUT_9				OFF									
	OUTPUT 10:	OUTPUT_10				OFF									
	OUTPUT 11:	OUTPUT_11				OFF									
	OUTPUT 12:	OUTPUT_12				OFF									.

4-15 IO-16DO-E Web Page View- DO Status

- **Output Number:** This refers to the actual output number on the terminals of the module.
- **Output Name:** This is the name that was entered in the configuration page to best describe the outputs.
- **State:** This is the current state of the outputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Output Watchdog Timer:** This displays the watchdog time for the outputs.

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
00001	Digital Output 1	0	1	R/W	Status of Digital Outputs.
00002	Digital Output 2	0	1	R/W	"
00003	Digital Output 3	0	1	R/W	"
00004	Digital Output 4	0	1	R/W	"
00005	Digital Output 5	0	1	R/W	II
00006	Digital Output 6	0	1	R/W	11
00007	Digital Output 7	0	1	R/W	"
00008	Digital Output 8	0	1	R/W	"
00009	Digital Output 9	0	1	R/W	"
00010	Digital Output 10	0	1	R/W	"
00011	Digital Output 11	0	1	R/W	"
00012	Digital Output 12	0	1	R/W	"
00013	Digital Output 13	0	1	R/W	"
00014	Digital Output 14	0	1	R/W	"
00015	Digital Output 15	0	1	R/W	"
00016	Digital Output 16	0	1	R/W	"
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 131
40002	Digital Outputs	N/A	N/A	R/W	Digital Outputs in bits. 16(MSB) – 1(LSB).
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.

4.2.7 IO-16DO-E – Modbus Mapping (Module Type = 131)

4-5 IO-16DO-E Modbus Mapping

4.2.7.1 Digital Output Register.

The digital outputs can be read/written in a single register as follows:

MSB		IO-16DO-E DIGITAL OUTPUTS							LSB							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	ADDRESS
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	40002
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Digital Output

4-6 IO-16DO-E Digital Output Register

4.2.7.2 Output Watchdog Timer.

The watchdog timer is used to switch off all of the outputs in the event of a communications failure. When set to zero (register 40101) the watchdog timer is disabled.

4.3 IO-4RO-E – 4 Channel Relay Outputs

4.3.1 Description

The IO-4RO-E module has 4 normally open/ normally closed relay outputs. These modules may be used when a higher drive capability is required, or when isolation between outputs is required.



4-16 IO-4RO-E

The outputs are written to by the Modbus master device such as a PC or PLC. Each output can be individually switched on or off, or all outputs can be set up at the same time by writing a single number to the output register which represents the status of all outputs.

An output watchdog timer can be configured to switch off all the outputs if there have been no communications with the module for up to 255 seconds. A value of 0 seconds will disable this timer and the outputs will remain in the last programmed state.

Each IO-4RO-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-4RO-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital output status parameters is <u>http://192.168.0.112/index.htm</u>

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>

4.3.2 Technical Specification of IO-4RO-E

Power Supply	Logic Supply Voltage	24 Vdc					
	Logic Supply Current	75 mA					
Relay Outputs	Output Points	4					
	Maximum Current	1A @ 220VAC / 2A @ 24VDC					
	Isolation	4000Vrms between field and logic					
		1000Vrms between outputs					
Ethernet	10/100Mbits/s	Twisted pair.					
Temperature	Operating Temperature.	-40°C to + 80°C					
	Storage Temperature	-40°C to + 85°C					
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit					
	Inputs	18 Way screw connector on front					
	Ethernet	RJ45 on top side of unit.					

4-7 IO-4RO-E Specifications

4.3.3 Status Indicators

- **Power:** Flashes to indicate the CPU is running.
- **RS485 Rx:** Flashes to indicate the unit has received a valid Modbus message.
- **RS485 Tx:** Flashes to indicate the unit has sent a Modbus message.
- Output Status: "OFF" when the output is off

"ON" when the output is on.



4-17 IO-4RO-E Status Indicators

4.3.4 Wiring

The following diagram shows how the relay outputs are connected to the coil of a relay. The coil is connected to positive and switched to negative.



4-18 IO-4RO-E Output Wiring

The following diagram shows the wiring for the power.



4-19 IO-4RO-E Power Wiring

4.3.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Output Names for identification/maintenance purposes.
IO-4RO-E 4 Relay Output	Module X	D IP	Address -	IO-4RO-E	× +													-	0	×
$\leftarrow \rightarrow$ C A	Not secu	ure 192	2.168.0.1	12/ip.htm				бĩ	6 7	ຣີລ	0	% T	7 ©	C	ø	3	£'≡ (È.		
🕒 Jntu 4-1 Informatio 🔹 🚺	HDFC Bank	c Person	🖸 le	TGV - YouTube	e 🔇 CiteSeerX — Synth	e 🗅 e	ான் சமை	யல	00	Guću	கம்: சபை	🗅	முறங்க	ப்பட்டி			>	🛅 Otł	er favou	ites
					Bra 4ro - re		ARO-E UTPU	њ		d										Î
		Ethern	net Con	figuration	n Parameters															
Module IP	192	168	0	112]															
Default Gateway IP	192	168	0	1]															
Subnet Mask	0	0	0	0																
Socket Time Out	90					X 1 seco	ond													
Warning: The IP address v entered. If you forget the IP add	vill not bo ress, refe	e update er to the i	d until tl user mai	he power o nual to rese	n the module has bee at the module back to	Si sn switche the defau	ubmit ed off and ult IP valu	d on aga ue.	in. Afte	r clicki	ng on the	Submit	button	check th	at the c	orrect IP	addres	s has b	een	
Module IP		0	0	0	0															
Slave Poll Rate	(0	X	10 mill	liseconds (0 =	diasble	ed)													-

4-20 IO-4RO-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Output Names:** These fields allow you to enter an output description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular output by name or number.

4.3.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

🗈 IO-4RO-E 4 Relay Output Moduli 🗙 🕒 IP Address - IO-4RO	р-е × +												-	0	\times
← → C ⋒ ▲ Not secure 192.168.0.112/ind	ex.htm			τõ	🖎 🗘	0 🗠	U	G	C	ø	3	۲⊆	Ē		
🕒 Jntu 4-1 Informatio 🔹 🚺 HDFC Bank: Person 🔹 Le TGV - Yo	ouTube 🔇 CiteSeer	X — Synthe	என் சமை	யல 🗅	டு பெட்	.டகம்: சமை	- C u	ரைங்கப்	பட்டி			>	🛅 c)ther favo	ourites
	Br	air	10	h	ilc										^
		10-	-4RO-E												
	4R	O - RELAY (Ουτρυ	т мор	ULE										
		HON	/IE PAG	iΕ											
		Module Na	ame: IC	0-4RO-E											
	OUTPUT NUMBER	OUTPU	T NAME		STA	TE									- 1
	DUTPUT 1:	OUTPUT_1				OFF									- 1
<u>c</u>	DUTPUT 2:	OUTPUT_2				OFF									- 1
<u>e</u>	OUTPUT 3:	OUTPUT_3				OFF									- 1
C	OUTPUT 4:	OUTPUT_4				OFF									
	OUI	PUT WATCHD	OG TIME	R 0 SECO	ONDS										
-															
	10	D-4RO-E Confi	guration	Paramete	ers										
s	oftware Version	1													
	IAC Address	70b3	d552	773b											
		192	168	0											*

4-21 IO-4RO-E Web Page View- RO Status

- **Output Number:** This refers to the actual output number on the terminals of the module.
- **Output Name:** This is the name that was entered in the configuration page to best describe the outputs.
- **State:** This is the current state of the outputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Output Watchdog Timer:** This displays the watchdog time for the outputs.

4.3.7 IO-4RO-E – Modbus Mapping (Module Type = 142)

-		- PP J	1	J 1 ² -	1
Modbus	Register Name	Low	High	Access	Comments
Address		Limit	Limit		
00001	Relay Output 1	0	1	R/W	Status of Digital Outputs.
00002	Relay Output 2	0	1	R/W	11
00003	Relay Output 3	0	1	R/W	II
00004	Relay Output 4	0	1	R/W	II
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 142
40002	Digital Outputs	N/A	N/A	R/W	Digital Outputs in bits. xxxx xxxx xxxx 4,3,2,1 bit4(MSB) – bit1(LSB).
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.

4-8	10-4R	Э-E	Modbus	Mapping
-----	-------	-----	--------	---------

4.3.7.1 Relay Output Register.

The relay outputs can be read/written in a single register as follows:

MSB		IO-4RO-E DIGITAL OUTPUTS LSB														
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Address
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	40002
-	-	-	-	-	-	-	-	-	-	-	-	4	3	2	1	

Relay Output

4-9 IO-4RO-E Digital Output Register

4.3.7.2 Output Watchdog Timer.

The watchdog timer is used to switch off all of the outputs in the event of a communications failure. When set to zero (register 40101) the watchdog timer is disabled.

4.4 IO-8DIO-E – 8 Channel Digital Inputs/Outputs with Counters

4.4.1 Description

The IO-8DIO-E module is an 8-channel digital input and 8 channel digital output module. The inputs are isolated from the logic by bi-directional opto-couplers. The common is connected internally to either the -volts or +volts field power supply terminals using a jumper link which is situated inside the housing.



4-22 IO-8DIO-E

The counters operate in three modes.

- ✤ In mode 0 all the counters are disabled.
- In mode 1 the first eight inputs (1-8) 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.
- In mode 2 the inputs are connected as up/down counters. Input 1 will increment counter 1 whilst input 2 decrements counter1. In the same way, inputs 3&4 operate counter 2, inputs 5&6 operate counter 3 and inputs 7&8 operate counter 4.

Note: The count values are not battery backed-up and will be lost if power is turned off.

The format of the registers allows the status of the inputs to be read as either single bits or all at once as a single register on the Modbus network.

The 8 digital outputs are open collector (NPN). 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.

When used as a slave module, the outputs are written to by the Modbus master device such as a PC or PLC. Each output can be individually switched on or off, or all outputs can be set up at the same time by writing a single number to the output register which represents the status of all outputs.

Each IO-8DIO-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8DIO-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP

address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital input status parameters is <u>http://192.168.0.112/index.htm</u> and the address for viewing the counters is <u>http://192.168.0.112/counters.htm</u>.

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u> and the web page for configuring the counters is <u>http://192.168.0.112/countcfg.htm</u>.

4.4.2 Technical Specification of IO-8DIO-E

Power Supply	Logic Supply Voltage	12 -24 Vdc					
	Logic Supply Current	75mA @ 12V / 39mA @ 24V					
	Field Supply Voltage	12 -24 Vdc					
	Field Supply Current	6mA @ 12V / 6mA @ 24V					
Digital Inputs	Input Points	8					
	Input Voltage Range	12 -24 Vdc					
	Input Current per input	5mA@12Vdc / 11mA @24Vdc					
	Isolation	1500Vrms between field and logic					
Digital Outputs	Output Points	8					
	Maximum Voltage	36 Vdc					
	Maximum Current	100 mA per output					
	Vceon	1.1V Max.					
	Isolation	1500Vrms between field and logic					
Counters	Inputs	1 to 8					
	Resolution	32 Bits					
	Frequency	1KHz (max)					
	Pulse Width	500us (min)					
Ethernet	10/100Mbits/s	Twisted pair.					
Temperature	Operating Temperature.	-40°C to + 80°C					
	Storage Temperature	-40°C to + 85°C					
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit					
	Inputs	18 Way screw connector on front					
	Ethernet	RJ45 on top side of unit.					

4-10 IO-8DIO-E Specifications

Note: Inputs 1 to 8 are used as both digital inputs and counter inputs.

4.4.3 Status Indicators

Power:	Flashes to indicate the CPU is running.
RS485 Rx:	Flashes to indicate the unit has received a valid Modbus message.

- **RS485 Tx:** Flashes to indicate the unit has sent a Modbus message.
- Input Status: "OFF" when the input is off

"ON" when the input is on.

Output Status: "OFF" when the output is off

"ON" when the output is on.



4-23 IO-8DIO-E Status Indicators

4.4.4 Wiring

The following diagram shows how the digital inputs and outputs are connected.



4-24 IO-8DIO-E Input / Output Wiring

The following diagram shows the wiring for the power.



4-25 IO-8DIO-E Power Wiring

4.4.5 Setting the jumpers for NPN inputs.

The Digital inputs can be configured as NPN inputs. This means that the inputs can be operated by switching to 0V. Change the link **P4** to the NPN position.



4-26 IO-8DIO-E Jumper for NPN Inputs

4.4.6 Setting the jumpers for PNP inputs.

The Digital inputs can be configured as PNP inputs. This means that the inputs can be operated by switching to +12V to +24V. Change the link **P4** to the PNP position.



4-27 IO-8DIO-E Jumper for PNP Inputs

4.4.7 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Input Names for identification/maintenance purposes.

🔲 🖹 IO-8DIO-E 8 Digital Input/Outpu 🗙 🗎 Counters - 8DIO	X 🕒 IP Address - IO-8DIO-E X 🕒 Cou	nter Configuration - SDIO 🗙 + — 🔿 🗙
← → C ᢙ ▲ Not secure 192.168.0.112/ip.htm	íð 🔤	않 🚺 🐵 😇 😌 🐵 ଓ 순 🖷 🌒 …
💾 Jntu 4-1 Informatio 🔹 🚺 HDFC Bank: Person 🔹 Le TGV - YouTube	🔇 CiteSeerX — Synthe 🌓 என் சமையல 🖺 🕒	பெட்டகம்: சமை 🎦 முருங்கப்பட்டி > 🎦 Other favourites
	BrainCh il	d
	IO-8DIO-E	
	8DIO - DIGITAL INPUT/OUTPUT MO	DULE
	Ethernet Configuration Parameters	
Ethernet Configuration	Parameters	
Module IP 192 168 0 112		
Default Gateway IP 192 168 0 1		
Subnet Mask 0 0 0 0		
Socket Time Out 90	X 1 second	
	Submit	
Warning: The IP address will not be updated until the power or entered. If you forget the IP address, refer to the user manual to rese	n the module has been switched off and on again. Afte t the module back to the default IP value.	r clicking on the Submit button check that the correct IP address has been



- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.

- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- Input/Output Names: These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input/output by name or number.

The Web page address "**192.168.0.112/countcfg.htm**" is entered into the address line of the browser window to access the counter configuration page. This page allows you to enter a Counter Description Name for identification/maintenance purposes.



4-29 IO-8DIO-E Web Page Counter Configuration

- **Counter Mode:** Enter 0, 1 or 2 to submit the required mode.
- **Input Filter:** The input filter is used to prevent false inputs and counting due to electrical noise or contact bounce.

4.4.8 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.



4-30 IO-8DIO-E Web Page View -I/O Status

- Input Number: This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **State:** This is the current state of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Counter filter:** When this value is zero (0) then the inputs are sampled at 0.5ms and there is not filtering. This is used for high-speed counting. When the value is greater than 0 then the inputs are debounced to prevent faults counting from relay contacts.
- **Output Watchdog:** This is the time that the outputs will keep their active state after communications has stopped. If the value is zero (0) then the outputs will not time out and the last state will remain as long as power is applied to the module.

To view the Counter Web page in the Modbus TCP Module, start the Web browser and type **"192.168.0.112/counter.htm"** into the address line of the browser window.

IO-8DIO-E & Digital Input/Outpu × Counters - 8DIO	× D IP Address - IO-8DIO-E	×	sdio × +	- 0 ×
← → C බ ▲ Not secure 192.168.0.112/counter.htm		රු 🔩 ඩී 🕐 🖉	े 😇 🕝 🙆	3 6 🖷 🛢 …
🕒 Jntu 4-1 Informatio 🔹 🚺 HDFC Bank: Person 🔹 Le TGV - YouTube (🖇 CiteSeerX — Synthe 🎦 என் சன	மயல 🗅 🕒 பெட்டகம்: சமை	🕒 முறங்கப்பட்டி	> 🛛 🛅 Other favourites
	BrainC	hild		Î
	IO-8DIO-	E		
8				
	DIO - DIGITAL INFOTO			
	COUNTER	s		
INPUT N	UMBER INPUT NAME	COUNT		
INPUT 1:	INPUT_1	0		
INPUT 2:	INPUT_2	0		
INPUT 3:	INPUT_3	0		
INPUT 4:	INPUT_4	0		
INPUT 5:	INPUI_5	0		
INPUT 6: INDUT 7:	INPUI_6	0		
INPUT 8	INPUT 8			
	Counter Mode : 0 Input	Filter : 0 x10ms		
	RETURN TO HOM	E PAGE		
	<u>ALTORATO HOM</u>	<u>L'IIIN</u>		

4-31 IO-8DIO-E Web Page View -Counter Status

- **Counter:** This refers to the actual input number on the terminals of the module.
- **Input Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **Count:** This is the current count on the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.
- **Counter Configuration:** This is the mode as described at the beginning of this section.

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
10001	Digital Input 1	0	1	R	Status of Digital Inputs.
10002	Digital Input 2	0	1	R	n
10003	Digital Input 3	0	1	R	п
10004	Digital Input 4	0	1	R	п
10005	Digital Input 5	0	1	R	n
10006	Digital Input 6	0	1	R	n

4.4.9 IO-8DIO-E Modbus Mapping (Module Type = 132)

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
10007	Digital Input 7	0	1	R	"
10008	Digital Input 8	0	1	R	"
00017	Digital Output 1	0	1	R/W	Status of Digital Outputs.
00018	Digital Output 2	0	1	R/W	"
00019	Digital Output 3	0	1	R/W	11
00020	Digital Output 4	0	1	R/W	11
00021	Digital Output 5	0	1	R/W	"
00022	Digital Output 6	0	1	R/W	"
00023	Digital Output 7	0	1	R/W	11
00024	Digital Output 8	0	1	R/W	"
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 132
30002	Digital Inputs	N/A	N/A	R	Digital Inputs in lower 8 bits. 8 - 1.
40003	Digital Outputs	N/A	N/A	R/W	Digital Outputs in lower 8 bits. 8 - 1.
40004	Counter 1 MSB	0	65535	R/W	Counter MSB and LSB combine to give a 32 bit
40005	Counter 1 LSB	0	65535	R/W	Counter with range 0 to 4294967295.
40006	Counter 2 MSB	0	65535	R/W	"
40007	Counter 2 LSB	0	65535	R/W	11
40008	Counter 3 MSB	0	65535	R/W	II.
40009	Counter 3 LSB	0	65535	R/W	П
40010	Counter 4 LSB	0	65535	R/W	П
40011	Counter 4 LSB	0	65535	R/W	П
40012	Counter 5 MSB	0	65535	R/W	П
40013	Counter 5 LSB	0	65535	R/W	П
40014	Counter 6 MSB	0	65535	R/W	П
40015	Counter 6 LSB	0	65535	R/W	Ш
40016	Counter 7 MSB	0	65535	R/W	П
40017	Counter 7 LSB	0	65535	R/W	Ш
40018	Counter 8 MSB	0	65535	R/W	п
40019	Counter 8 LSB	0	65535	R/W	"
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.
40105	Counter Mode	0	2	R/W	0=Disable, 1=Up Counting, 2=Up/Down Count
40106	Input Filter	0	65535	R/W	0 = Disable, >0 = Enable. (x10ms)

4-11 IO-8DIO-E Modbus Mapping

4.4.9.1 Digital Input Register.

The digital inputs can be read in a single register as follows:

MSB	IO-8DIO-E DIGITAL INPUTS											L	SB			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	ADDRESS
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	30002
Δ	0	0	0	0	0	0	Δ	Q	7	6	5	Λ	2	2	1	

Digital Input Number 4-12 IO-8DIO-E Digital Input Register

4.4.9.2 Digital Output Register.

The digital outputs can be read/written in a single register as follows:

MSB	, i i i i i i i i i i i i i i i i i i i	IO-8DIO-E DIGITAL OUTPUTS												LSB					
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	ADDRESS			
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	40003			
0	0	0	0	0	0	0	0	8	7	6	5	4	3	2	1				

Digital Output Number 4-13 IO-8DIO-E Digital Output Register

4.4.9.3 Counter Registers.

The counters are stored as two 16-bit registers. The first register is the High Register (MSB) and the second register is the Low Register (LSB). To get the actual 32-bit count value the registers must be combined as follows:

Counter High Value (MSB) = Register 40003.

Counter Low Value (LSB) = Register 40004.

Counter Value = (Counter High Value X 65535) + Counter Low Value.

4.4.9.4 Output Watchdog Timer.

The watchdog timer is used to switch off all of the outputs in the event of a communications failure. When set to zero (register 40101) the watchdog timer is disabled.

4.5 IO-8AIIS-E – 8 Channel Isolated Analog Current Inputs

4.5.1 Description

The IO-8AIIS-E module is an 8-channel isolated current input module. The module uses differential inputs to reduce effects of electrical noise and mains pickup. The current inputs are isolated from the logic and from each other.



4-32 IO-8AIIS-E

The current input can be represented in a number of formats according to the type which is setup by writing a value to the Type register. The value is obtained from the table below.

The standard setting for the IO-8AIIS-E module is 0 - 20mA input current which represents an output value of 0 - 4095 (12 bits) in the corresponding Modbus register. 4 mA would give a reading of 819 \pm 1LSB.

The module can also be configured for a 0 - 20.000 mA input range or +/- 20.000 mA input. The module also supports 14 bit and 16-bit ranges.

Each IO-8AIIS-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8AIIS-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the input parameters is <u>http://192.168.0.112/index.htm</u> and the address for viewing the configuration data is <u>http://192.168.0.112/tconfig.htm</u>.

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>.

Power Supply	Logic Supp	ly Voltage	12 -24 Vdc
	Logic Supply	y Current	105mA @ 12V / 54mA @ 24V
Current Inputs	Input Points		8
	Input Currer	nt	0(4) - 20 mA
	Input Type	Range	Resolution
	1	0 – 4095	12 bits
	2	0–20.000mA	1uA
	3	+/-20.000mA	1uA
	4	0 - 16383	14 bits
	5	0 - 65535	16 bits
	Drift		100ppm/°C
	Isolation		1500Vrms between field and logic
			350Vpeak between each input
Ethernet	10/100Mbits	s/s	Twisted pair.
Temperature	Operating T	emperature.	-40°C to + 80°C
	Storage Ter	mperature	-40°C to + 85°C
Connectors	Logic Powe	r and Comms.	4 Pin Connector on underside of unit
	Inputs		18 Way screw connector on front
	Ethernet		RJ45 on top side of unit.

4.5.2 Technical Specification of IO-8AIIS-E

4-14 IO-8AIIS-E Specifications

4.5.3 Status Indicators

- Power:Flashes to indicate the CPU is running.Ethernet Rx:Flashes to indicate the unit has received a valid Modbus message.Ethernet Tx:Flashes to indicate the unit has sent a Modbus message.
- **Input Status:** "ON" when the input is zero.

"OFF" when the input is greater than zero and less than 20mA.

"Flashing" when the input is over range, greater or equal to 20mA.



4-33 IO-8AIIS-E Status Indicators

4.5.4 Wiring

The following diagram shows how the analog inputs are connected to a 0(4)-20mA source. All of the common terminals are isolated from each other.



4-34 IO-8AIIS-E Input Wiring

The following diagram shows the wiring for the power.



4-35 IO-8AIIS-E Power Wiring

4.5.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address, default gateway and subnet mask of the Modbus TCP Module, select the Input type, and to enter a Module Description Name and Input Names for identification/maintenance purposes.

Image: Description of the second	Counter Configuration - 8010	< +	– € (⊕ (> [⊂] 0+
C A Not secure 192.168.0.112/ip.htm S Intu 4-1 Informatio Default Gateway IP 192 188 192 188 1	MODULE	🖲 🕒 🧐 🤤 நூற்கப்பட்டி	≡ @⊕ (> <mark>₾</mark> он
Intu 4-1 Informatio HDFC Bank: Person Le TGV - YouTube CiteSeerX — Synthe Intu 4-1 Informatio	MODULE	மருங்கப்பட்டி	> 🛅 Ot
BreinChine IO-8AIIS-E BAIIS - ISOLATED CURRENT INPUT Ethernet Configuration Parameters Module IP 192 PETAUL Configuration Parameters	MODULE		
SAIIS - ISOLATED CURRENT INPU' Ethernet Configuration Parameters Module IP 192 168 0 112 112 Default Gateway IP 192 168 0 1	MODULE		
Module IP 192 168 0 112 Default Gateway IP 192 168 0 1			
Default Gateway IP 192 168 0 1			
jubnet Mask 0 0 0 0			
Socket Time Out 90 X 1 second			
nput Type 4 TYPE: 0-16383 (14	it)		

4-36 IO-8AIIS-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. If the IP address has been entered incorrectIy 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.

- **Input Type:** The type for the module can be configured by entering the corresponding number from the list in the specifications.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Input Names:** These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input by name or number.

4.5.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

IO-8AIIS-E - ISOLATED CURRENT X Counters - 8DIO X P Addr	ss - IO-8AIIS-E 🗙 🗎 Count	ter Configuration - 8D	10 × +			- 0 ×
← → C ⋒ A Not secure 192.168.0.112/index.htm	Ý0 🔤	£ 🕐 🗠	U (C)	© 🥬	3 ≤	· 😩 ···
🕒 Jntu 4-1 Informatio 💿 🚺 HDFC Bank: Person 💿 Le TGV - YouTube 🔇 CiteSeerX — Synth	் டு என் சமையல டு டு (பெட்டகம்: சமை	ப்கன்றை பீ	ட்டி	>	Cther favourites
Bra	in Chil	d				Î
	IO-8AIIS-E					
SAIIS - ISOLATI	D CORRENT INPUT MC	DOLE				
	HOME PAGE					
Moc	ule Name: IO-8AIIS-E					
CHANNEL NUMBER	CHANNEL NAME	VALUE				
CHANNEL 1:	INPUT_1	0				
CHANNEL 2:	INPUT_2	0				
CHANNEL 3:	INPUT_3	0				
CHANNEL 4:	INPUT_4	0				
CHANNEL 5:	INPUT_5	0				
CHANNEL 6:	INPUT_6	0				
CHANNEL 7:	INPUT_7	0				
CHANNEL 8:	INPUT_8	0				
INP	JT TYPE: 0-16383 (14 bit)					
2	nfiguration Parameters					

4-37 IO-8AIIS-E Web Page View- Input Status

- **Channel Number:** This refers to the actual input number on the terminals of the module.
- **Channel Name:** This is the name that was entered in the configuration page to best describe the inputs.
- Value: This is the current value of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

To view the Configuration Web page in the Modbus TCP Module, start the Web browser and type "**192.168.0.112/tconfig.htm**" into the address line of the browser window.



4-38 IO-8AIIS-E Web Page View- Input Type

• Input Type: This is the format that the module has been configured to operate with.

Modbus	Register Name	Low	High	Access	Description
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 137
30002	Analog Input 1	0	65535	R	Analog Input lower 16 Bits
30003	Analog Input 2	0	65535	R	п
30004	Analog Input 3	0	65535	R	II
30005	Analog Input 4	0	65535	R	n
30006	Analog Input 5	0	65535	R	II
30007	Analog Input 6	0	65535	R	n
30008	Analog Input 7	0	65535	R	II
30009	Analog Input 8	0	65535	R	n
30010	Input Status	0	65535	R	bit2 = 0(open circuit or < 2), bit2 = 1(over range) bit1 = 0(OK), bit1 = 1(error)
30011	Input Alarm Status	0	255	R	bit1 = 0(OK), bit1 = 1(input < 2mA)
40101	Input Type	1	5	R/W	See specification table.

4.5.7 IO-8AIIS-E Modbus Mapping (Module Type = 137)

4-15 IO-8AIIS-E Modbus Mapping

4.5.7.1 Analog Input Registers.

The analog inputs are read as a yy bit value in the registers as follows: (yy = 12, 14 or 16 bit)

MSB	IO-8AIIS-E ANALOG INPUTS LSB															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	ADDRESS
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	300XX
Х	Х	Х	Х	х	х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
Analog Input: 12 Bit Value (0 - 4095)									—							

4-16 IO-8AIIS-E Analog Input Register

4.5.7.2 Analog Input Status.

There are two status bits associated with each analog input. These bits are used to indicate if the input is zero or open circuit, in the working range 0-20mA, or over range. If the

input is open circuit or over range, then the error bit will be set. When the error bit is set, the range bit is zero if the input is open circuit and set if the input is over range, i.e.:

Bit 1- Error	Bit 2-Range	Condition	Status LED
0	don't care	Input working OK.	(LED OFF)
1	0	Input Open circuit or zero.	(LED ON)
1	1	Input Over range.	LÉD
FLASH)			,

The analog input status can be read in a single register as follows:



4-17 IO-8AIIS-E Analog Input Status

4.5.7.3 Analog Input Alarm Status.

There is one alarm status bit associated with each analog input. The alarm bits are used to indicate if the 4-20mA current loop is broken and the bit will be set if the loop current is less than 2mA.

The analog input alarm status can be read in a single register as follows:

MSB	MSB IO-8AIIS-E ANALOG INPUT ALARM STATUS														3	ADDRESS
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	30011
IP8 Ala	arm -															 ▶ IP1 Alarm ▶ IP2 Alarm
IP6 Ala	ırm 🗲												L			→ IP3 Alarm
IP5 Ala	irm 🖣															IP4 Alarm

4-18 IO-8AIIS-E Analog Input Alarm Status

4.6 IO-8AIVS-E – 8 Channel Isolated Analog Voltage Inputs

4.6.1 Description

The IO-8AIVS-E module is an 8-channel isolated voltage input module. The module uses differential inputs to reduce effects of electrical noise and mains pickup. The voltage inputs are isolated from the logic and from each other.



4-39 IO-8AIVS-E

The voltage input can be represented in a number of formats according to the type which is setup by writing a value to the Type register. The value is obtained from the table below.

The standard setting for the IO-8AIVS-E module is 0 – 10V input voltage which represents an output value of 0 - 4095 (12 bits) in the corresponding Modbus register. 2V would give a reading of 819 \pm 1LSB.

The module can also be configured for a 0 - 10.000V input range or +/- 10.000V input. The module also supports 14 bit and 16-bit ranges.

Each IO-8AIVS-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8AIVS-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the input parameters is <u>http://192.168.0.112/index.htm</u> and the address for viewing the configuration data is <u>http://192.168.0.112/tconfig.htm</u>.

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>.

4.6.2 Technical Specification of IO-8AIVS-E

Power Supply	Logic Supp	ly Voltage	12 -24 Vdc
	Logic Supply	y Current	105mA @ 12V / 54mA @ 24V
Voltage Inputs	Input Points		8
	Input Voltag	е	0(2) - 10 Vdc
	Input Type	Range	Resolution
	1	0 – 4095	12 bits
	2	0 – 10.000 V	1mV
	3	+/- 10.000 V	1mV
	4	0 – 1.0000 V	0.1mV
	5	+/- 1.0000 V	0.1mV
	6	0 - 16383	14 bits
	7	0 - 65535	16 bits
	Drift		100ppm/°C
	Isolation		1500Vrms between field and logic
			350Vpeak between each input
Ethernet	10/100Mbits	s/s	Twisted pair.
Temperature	Operating T	emperature.	-40°C to + 80°C
	Storage Ter	nperature	-40°C to + 85°C
Connectors	Logic Powe	r and Comms.	4 Pin Connector on underside of unit
	Inputs		18 Way screw connector on front
	Ethernet		RJ45 on top side of unit.

4-19 IO-8AIVS-E Specifications

4.6.3 Status Indicators

- **Power:** Flashes to indicate the CPU is running.
- Ethernet Rx: Flashes to indicate the unit has received a valid Modbus message.
- **Ethernet Tx:** Flashes to indicate the unit has sent a Modbus message.
- Input Status: "
 - "ON" when the input is zero. "OFF" when the input is greater than zero and less than 10V.

"Flashing" when the input is over range, greater or equal to 10V.



4-40 IO-8AIVS-E Status Indicators

4.6.4 Wiring

The following diagram shows how the analog inputs are connected to a 0(2)-10Vdc source. All of the common terminals are isolated from each other.



4-41 IO-8AIVS-E Input Wiring

The following diagram shows the wiring for the power.



4-42 IO-8AIVS-E Power Wiring

4.6.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address, default gateway and subnet mask of the Modbus TCP Module, select the Input type, and to enter a Module Description Name and Input Names for identification/maintenance purposes.

D IO-8AIVS-E ISOLA	TED VOLTAGE	×		Address -	IO-8AIVS-E	×	+														-	0	\times
$\leftarrow \rightarrow$ C @	A Not	secure	192	.168.0.11	12/ip.htm					Ę	ō 🖸	63	0	~	U	C	C	ø	3	₹≦	Ē		
🗅 Jntu 4-1 Informatio 🔹	HDFC	Bank: Pe	rson	🖸 Le T	GV - YouTub	e 🔇 Cit	eSeerX — Syr	nthe	ு என் ச	ைமையல.	D	பு பெட்	டகம்: சன	ഫ	ല് ശര	ங்கப்ப	LQ			>	0 🗂	ther favou	urites
Medule IP	193	1	68	10	112	1						_											*
Default Gateway IP	192	1	68		1																		
Subnet Mask	0	0		10	0	1																	
Socket Time Out	90			1.					X 1 se	econd													
Input Type	3								TYPE	: +/- 10.0	00V												
Warning: The IP ad entered. If you forget the	dress will n IP address,	ot be u refer te	pdated o the u	l until th ser mar	ne power o nual to res	on the mo et the mo	dule has b dule back t	een swi to the d	Submit tched of efault IP	f and on value.	again. A	fter click	king on th	ie Sub	mit butt	on chee	:k that	the co	orrect IF	'addre	ess has	been	l
Module Name	IO-8AIVS-	E		S	Submit																		
Input 1 Name	INPUT_1			S	ubmit																		
Input 2 Name	INPUT_2			S	ubmit																		
Input 3 Name	INPUT_3			S	ubmit																		
Input 4 Name	INPUT_4			S	ubmit																		
Input 5 Name	INPUT_5			S	ubmit																		1
Input 6 Name	INPUT_6			S	ubmit																		

4-43 IO-8AIVS-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.

- **Input Type:** The type for the module can be configured by entering the corresponding number from the list in the specifications.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Input Names:** These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input by name or number.

4.6.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

D IO-8AIVS-E ISOLATED VOLTAGE X D IP Address - IO-8AIVS-E	$\times +$						– ø ×
← → C ⋒ ▲ Not secure 192.168.0.112/index.h	ntm	τô	🔩 🗘 🕐 «	9 0 0	e 🔊	(3 {≐	rie 😩 …
🕒 Jntu 4-1 Informatio 🔹 🚺 HDFC Bank: Person 💿 Le TGV - YouTu	ube 🔇 CiteSeerX — Synthe	. 🎦 என் சமையல) 🖒 பெட்டகம்: சமை.	🗅 முறங்கப்	ப்பட்டி	>	Cther favourites
	Brai	in Ch	ild				•
		IO-8AIVS-E					
	SAIVS - ISULATE	D VOLIAGE INPO	TWODULE				
		HOME PAGE					
	Modul	e Name: IO-8AIVS-E					
	CHANNEL NUMBER	CHANNEL NAME	VALUE				
CHA	NNEL 1:	INPUT_1	0				
CHA	NNEL 2:	INPUT_2	-2				
CHA	NNEL 3:	INPUT_3	0				
CHA	NNEL 4:	INPUT_4	0				
CHA	NNEL 5:	INPUT_5	0				
CHA	NNEL 6:	INPUT_6	0				
CHA	NNEL 7:	INPUT_7	0				
CHA	NNEL 8:	INPUT_8	0				
	INP <u>Con</u>	UT TYPE: +/- 10.000V figuration Parameters					

4-44 IO-8AIVS-E Web Page View- Input Status

- **Channel Number:** This refers to the actual input number on the terminals of the module.
- **Channel Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **Value:** This is the current value of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

To view the Configuration Web page in the Modbus TCP Module, start the Web browser and type "**192.168.0.112/tconfig.htm**" into the address line of the browser window.



4-45 IO-8AIVS-E Web Page View- Input Type

• Input Type: This is the format that the module has been configured to operate with.

Modbus Address	Register Name	Low Limit	High Limit	Access	Description
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 138
30002	Analog Input 1	0	65535	R	Analog Input lower 16 Bits
30003	Analog Input 2	0	65535	R	п
30004	Analog Input 3	0	65535	R	п
30005	Analog Input 4	0	65535	R	II
30006	Analog Input 5	0	65535	R	п
30007	Analog Input 6	0	65535	R	п
30008	Analog Input 7	0	65535	R	II
30009	Analog Input 8	0	65535	R	n
30010	Input Status	0	65535	R	bit2 = 0(open circuit or < 2), bit2 = 1(over range) bit1 = 0(OK), bit1 = 1(error)
30011	Input Alarm Status	0	255	R	bit1 = 0(OK), bit1 = 1(input < 1V)
40101	Input Type	1	7	R/W	See specification table.

4.6.7 IO-8AIVS-E Modbus Mapping (Module Type = 138)

4-20 IO-8AIVS-E Modbus Mapping

4.6.7.1 Analog Input Registers.

The analog inputs are read as a yy bit value in the registers as follows: (yy = 12, 14 or 16 bit)

MSB	,				IO-8	AIVS-	E ANA	ALOG	INPU	TS				LS	B	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	ADDRESS
32768	16384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1	300XX
Х	Х	Х	х	Х	х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	
			^			it Value	(0 40	05)								

Analog Input: 12 Bit Value (0 - 4095)

4-21 IO-8AIVS-E Analog Input Register

4.6.7.2 Analog Input Status.

There are two status bits associated with each analog input. These bits are used to indicate if the input is zero or open circuit, in the working range 0-10V, or over range. If the

input is open circuit or over range, then the error bit will be set. When the error bit is set, the range bit is zero if the input is open circuit and set if the input is over range, i.e.:

Bit 1- Error	Bit 2-Range	Condition	Status LED
0	don't care	Input working OK.	(LED OFF)
1	0	Input Open circuit or zero.	(LED ON)
1	1	Input Over range.	(LED FLASH)

The analog input status can be read in a single register as follows:



4-22 IO-8AIVS-E Analog Input Status

4.6.7.3 Analog Input Alarm Status.

There is one alarm status bit associated with each analog input. The alarm bits are used to indicate if the 2-10V voltage input is broken and the bit will be set if the input voltage is less than 1V.

The analog input alarm status can be read in a single register as follows:

MSB	ISB IO-8AIVS-E ANALOG INPUT ALARM STATUS													3	ADDRESS	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
32768	16384	8192	4096	2048	1024	512	256	128	64	32	32 16		4	2	1	30011
IP8 Ala	arm -	<u> </u>		<u> </u>												► IP1 Alarm IP2 Alarm
IP6 Ala	irm 🗲															IP3 Alarm
IP5 Ala	irm 🖛											L				► IP4 Alarm

4-23 IO-8AIVS-E Analog Input Alarm Status

4.7 IO-8TCS-E – 8 Channel Isolated Thermocouple Inputs

4.7.1 Description

The IO-8TCS-E module is an 8 isolated thermocouple input module. The module uses differential inputs to reduce effects of electrical noise and mains pickup. The thermocouple inputs are isolated from the logic and from each other.



4-46 IO-8TCS-E

The thermocouple voltage is read by the module circuitry, linearized and converted to °C. No ranging is required as the module covers the full temperature range of the thermocouple. The value that is read from the Modbus register is the actual temperature in °C to 0.1°C resolution. i.e.: a value of 3451 corresponds to a temperature of 345.1°C.

The thermocouple type is setup by writing a value to the TC Type register. The value is obtained from the table below. For example, to select type K thermocouples, the value "2" must be written to the TC Type register. All 8 thermocouple inputs adopt the same TC type.

A value of -32767 is used to indicate downscale burnout.

The module has built in Cold Junction Compensation. Use must be made of the correct thermocouple extension wire to avoid reading errors.

The thermocouple module can also be configured for a 0 - 50mV input range. The TC Type register must be set to 9 for this option. The value in the register which is read back over the network is 0 - 50,000.

Each IO-8TCS-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8TCS-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the Thermocouple input parameters is <u>http://192.168.0.112/index.htm</u> and the address for viewing the configuration data is <u>http://192.168.0.112/tconfig.htm</u>.

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>.

Power Supply	Logic Supply V	oltage	12 -24 Vdc					
	Logic Supply Cu	rrent	105mA @ 12V / 54mA @ 24V					
TC Inputs	Input Points		8					
	Resolution		0.1°C					
	Drift		100ppm/°C Typ					
	Isolation		1500Vrms between field and	logic				
			350Vpeak between each TC	input				
ТС Туре	Number	Туре	Range	Accuracy				
	1	J	-150 to 760 °C	0.2°C				
	2	K	-200 to 1370 °C	0.3°C				
	3	Е	-200 to 1000 °C	0.1°C				
	4	Т	-200 to 400 °C	0.3°C				
	5 N		0 to 1300 °C	0.3°C				
	6 B		400 to 1820 °C	0.5°C				
	7 S		-50 to 1767 °C	0.6°C				
	8	R	-50 to 1767 °C	0.7°C				
	9	mV	0 to 50mV	0.1%				
	10	С	0 to 2315.5 °C	0.7°C				
	11	D	0 to 2315.5 °C	0.7°C				
	12	G	0 to 2315.5 °C	0.9°C				
	13	m V	+/- 100mV	0.1%				
Cold Junction	CJC Error		±0.5°C Typ. After 30 Minutes warm up time.					
Ethernet	10/100Mbits/s		Twisted pair.					
Temperature	Operating Temp	erature.	-40°C to + 80°C					
	Storage Temper	ature	-40°C to + 85°C					
Connectors	Logic Power and	l Comms.	4 Pin Connector on underside of unit					
	Inputs		18 Way screw connector on front					
	Ethernet		RJ45 on top side of unit.					

4.7.2 Technical Specification of IO-8TCS-E

4-24 IO-8TCS-E Specifications

4.7.3 Status Indicators

Power: Flashes to indicate the CPU is running.

Ethernet Rx: Flashes to indicate the unit has received a valid Modbus message.

Ethernet Tx: Flashes to indicate the unit has sent a Modbus message.

Input Status: "ON" when the thermocouple is open circuit.

"OFF" when the thermocouple is connected.



4-47 IO-8TCS-E Status Indicators

4.7.4 Wiring

The following diagram shows how the inputs are connected to a thermocouple.



4-48 IO-8TCS-E Input Wiring

The following diagram shows the wiring for the power.



4-49 IO-8TCS-E Power Wiring

4.7.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module, select the TC type, and to enter a Module Description Name and Input Names for identification/maintenance purposes.

DIO-8TCS-E TCP IS		🗅 ca	onfigurat	ion	× 🗅 IP A	ddress - IO-8TCS-E	× +								-	0	\times
< → C ⋒	A Not secu	re 19	2.168.0.	112/ip.htm			ĩo 💁	63	0 @	U	0	© i	9 3	۲≦	Ē		
🕒 Jntu 4-1 Informatio 🔹	HDFC Bank	: Person	🖸 Le	TGV - YouTu	be 🔇 CiteSeerX — S	nthe 🗅 என் சஎ	மையல 🎦 🗋) பெட்	_கம்: சமை	- C	நங்கப்ப	ட்டி		>	1 💼 1	Other fav	ourites
					Brc 8TCS - ISOLA	IO-8TCS	-E DCOUPLE N		JLE								
		Etherr	net Co	nfiguratio	on Parameters												
Module IP	192	168	0	112													
Default Gateway IP	192	168	0	1													
Subnet Mask	0	0	0	0													
Socket Time Out	90					X 1 se	ond										
TC Type Number	2					TC TYP	E: K										
Warning: The IP ad entered. If you forget the Module Name	dress will not be IP address, refe IO-8TCS-E	e update r to the	d until user m	the power anual to re Submit	on the module has set the module back	Submit Submit been switched off to the default IP v	and on again. Aft alue.	er click	ing on the S	ubmit bu	tton che	ck that t	the correc	t IP addi	ress ha	s been	
Input 1 Name	INPUT 1			Submit													

4-50 IO-8TCS-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.
- **TC Type:** The thermocouple type for the module can be configured by entering the corresponding number from the list in the specifications.

- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Input Names:** These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input by name or number.

4.7.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.



4-51 IO-8TCS-E Web Page View- Input Status

- **Channel Number:** This refers to the actual input number on the terminals of the module.
- **Channel Name:** This is the name that was entered in the configuration page to best describe the inputs.
- **Value:** This is the current temperature of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

To view the Configuration Web page in the Modbus TCP Module, start the Web browser and type "**192.168.0.112/tconfig.htm**" into the address line of the browser window.

🗖 🕴 🖸 10-8TCS-E TCP ISOL	ATED THERM 🗙 🎦 Configuration	× P Address - IO-8TCS-	e × +					- 0 >	<
$\leftarrow \rightarrow$ C a	A Not secure 192.168.0.112/tconfig.htm	n	సం 📭	å 🕐 🗠	U (C)	© 🔊	(3 ζ≌	· 😩 …	
🗅 Jntu 4-1 Informatio 🔹	HDFC Bank: Person 🖸 Le TGV - YouTube	🔇 CiteSeerX — Synthe 🗋 जन	ர்சமையல 🗅 🗅 ே	பெட்டகம்: சமை	🗅 முருங்கப்ப	ட்டி	>	📋 Other favourite	25
BrainChild									
		IO-8	TCS-E						
	8	8TCS - ISOLATED THE	RMOCOUPLE MO	ODULE					
		CONFIGUR	ATION PAGE						
		CJC TEMPRATURE	24.8						
		INPUT TYPE	к						
		CJC OFFSET	100						
		RETURN TO	HOME PAGE						

4-52 IO-8TCS-E Web Page View- Input Type

- **CJC Temperature:** This is the temperature of the terminals inside the module.
- **Input Type:** This is the type of thermocouple the module has been configured to operate with.
- **TC OFFSET:** This is a correction factor

4.7.7 IO-8TCS-E Modbus Mapping (Module Type = 136)

Modbus Address	Register Name	Low Limit	High Limit	Access	Description				
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 136				
30002	TC Input 1	-XXX.X	уууу.у	R	Thermocouple Inputs. See table for range.				
30003	TC Input 2	-XXX.X	уууу.у	R	Resolution in 0.1°C.				
30004	TC Input 3	-XXX.X	уууу.у	R	n				
30005	TC Input 4	-XXX.X	уууу.у	R	n				
30006	TC Input 5	-XXX.X	уууу.у	R	n				
30007	TC Input 6	-XXX.X	уууу.у	R	n				
30008	TC Input 7	-XXX.X	уууу.у	R	n				
30009	TC Input 8	-XXX.X	уууу.у	R	n				
30010	CJC Temp.	-XXX.X	уууу.у	R	CJC Temperature in 0.1°C resolution.				
30011	Input Status	0	65535	R	bit1 = 0(OK), bit1 = 1(error or open circuit)				
40101	ТС Туре	1	13	R/W	See TC Tables.				
40102	Line Frequency	50	60	R/W	Line Frequency				
40103	CJC Offset	1	199	R/W	100 = zero offset (0.0) Up to and including SW V2.0				
40104	Units Type	1	2	R/W	1=°C, 2=°F				
40105	CJC Offset 1	1	199	R/W	100 = zero offset (0.0) SW V3.0 onwards				
40106	CJC Offset 2	1	199	R/W	100 = zero offset (0.0)				
40107	CJC Offset 3	1	199	R/W	100 = zero offset (0.0)				
40108	CJC Offset 4	1	199	R/W	100 = zero offset (0.0)				
40109	CJC Offset 5	1	199	R/W	100 = zero offset (0.0)				
40110	CJC Offset 6	1	199	R/W	100 = zero offset (0.0)				
40111	CJC Offset 7	1	199	R/W	100 = zero offset(0.0)				
40112	CJC Offset 8	1	199	R/W	100 = zero offset (0.0)				

4-25 IO-8TCS-E Modbus Mapping

4.8 IO-6RTD-E – 6 Channel RTD Inputs

4.8.1 Description

The IO-6RTD-E module is a 6 RTD input module. The module can accommodate either 2 or 3 wire RTD sensors. The RTD inputs are isolated from the logic.



4-53 IO-6RTD-E

The RTD resistance is read by the module circuitry, linearized and converted to °C. No ranging is required as the module covers the full range of the RTD. The value that is read from the Modbus register is the actual temperature in °C to 0.1°C resolution. i.e.: a value of 3451 corresponds to a temperature of 345.1°C.

The RTD type is setup by writing a value to the RTD Type register. The value is obtained from the table below. For example, to select a PT100 RTD, the value "1" must be written to the RTD Type register. All 6 RTD inputs adopt the same RTD type.

A value of -32767 is used to indicate downscale burnout.

Note: As there is no inter-channel isolation, isolated RTD's must be used in order to prevent ground loops and reading errors.

Each IO-6RTD-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-6RTD-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the RTD input parameters is <u>http://192.168.0.112/index.htm</u>

The web page address for configuring the module is http://192.168.0.112/ip.htm .
4.8.2 Technical Specification of IO-6RTD-E

Power	Logi	c Supply	Voltage		12 -24 Vdc			
Supply	Logic	c Supply (Current		115mA @ 12V	/ 58mA @ 24V		
RTD Inputs	Input	Points			6			
	RTD	Configura	ation		2 or 3 Wire			
	Resc	olution			0.1°C			
	Drift				100ppm/°C Typ.			
	Line	resistanc	e effect		< 0.1°C balanc	ed		
	Max.	line resis	stance		100ohms			
	Isola	tion			1500Vrms betw	een field and logic		
RTD Type	Num	ber	Туре		Range	Accuracy		
	1		PT100		-200 to 850°C	0.3°CIEC		
						751:1983		
	2		Ni120		-80 to 320°C	0.3°C		
	3		PT1000		-200 to 850°C	0.3°C		
	4		Ni1000-DIN		-200 to 850°C	0.3°C		
	5		Ni1000-Landys	&Gyr	-200 to 850°C	0.3°C		
	6		Ohms		10 - 400			
					ohms			
	7		Ohms		100-			
					4000ohms			
Ethernet		10/100N	/lbits/s	Twisted p	pair.			
Temperature		Operatii	ng	-40°C to	+ 80°C			
		Temper	ature.					
		Storage	Temperature	-40°C to	+ 85°C			
Connectors L		Logic P	ower and	4 Pin Co	nnector on under	side of unit		
		Comms						
		Inputs		18 Way screw connector on front				
		Etherne	t	RJ45 on top side of unit.				

4-26 IO-6RTD-E Specifications

4.8.3 Status Indicators

Power: Flashes to indicate the CPU is running.

Ethernet Rx: Flashes to indicate the unit has received a valid Modbus message.

Ethernet Tx: Flashes to indicate the unit has sent a Modbus message.

Input Status: "ON" when the RTD is open circuit.

"OFF" when the RTD is connected.



4-54 IO-6RTD-E Status Indicators

4.8.4 Wiring

The following diagram shows how the inputs are connected to a 2 and 3 wire RTD.



4-55 IO-6RTD-E Input Wiring

The following diagram shows the wiring for the power.



4-56 IO-6RTD-E Power Wiring

4.8.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows the user to change the IP address of the Modbus TCP Module, select the RTD type, and to enter a Module Description Name and Input Names for identification/maintenance purposes.

🔲 📔 10-6RTD-E - RTD MODUL	- ×	🕒 Con	figuration		× 🗋 IO-6RTD-E	- RTD MODULE	× +										-	o ×
\leftarrow \rightarrow C a A	Not secure	192.	168.0.112	/ip.htm			τõ	0	ê () ര	U	G	0	ø	3	ເ∕≡	à (
🕒 Jntu 4-1 Informatio 🔹 🚺	HDFC Bank: P	erson	🖸 Le TG	V - YouTube	🗴 CiteSeerX — Synthe	🗋 என் சமைய	ல 🗅	ပြီးရ	பட்டகம்	: சமை	ტ დი	நங்கப்	பட்டி			>	📋 Othe	er favourites
BrainChild																		
						IO-6RTD-E												
					6RTD	- RTD MOI	DULE											
Ethernet Configuration Parameters																		
	I	Etherne	et Confi	guration	Parameters													
Module IP	192 1	168	0	112														
Default Gateway IP	192 1	168	0	1														
Subnet Mask	0 (0	0	0														
Socket Time Out	90)				X 1 second												
						Submit												
Warning: The IP address will not be updated until the power on the module has been switched off and on again. After clicking on the Submit button check that the correct IP address has been entered. If you forget the IP address, refer to the user manual to reset the module back to the default IP value.																		
Module Name	RTD-E		S	ubmit														
Input 1 Name	IT_1		Su	bmit														

4-57 IO-6RTD-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. If the IP address has been entered incorrectIy 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.

- **RTD Type:** The RTD type for the module can be configured by entering the corresponding number from the list in the specifications.
- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Input Names:** These fields allow you to enter an input description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular input by name or number.

4.8.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "192.168.0.112" into the address line of the browser window. The main page will now be displayed in the browser window.

IO-6RTD-E - RTD MC	DDULE X	Configuration	× 🖺 10-6RTD-	-E - RTD MODULE	$\times +$								-	٥	×
$\leftarrow \rightarrow$ C \bigcirc	A Not secur	e 192.168.0.112/index.	itm		ර 🔍	63	0 🕫	U	C	C	ø	3 1 2	≡ (⊕		
🕒 Jntu 4-1 Informatio 🔹	HDFC Bank:	Person 🕒 Le TGV - YouT	be 🔇 CiteSeerX — Synthe	🗋 என் சமைய	ഖ 🗅 🗋) பெட்ட	.கம்: சமை	ტ დი	நங்கப்ப	ட்டி			> 🛅	Other fav	/ourites
	BrainChild														
				IO-6RTD-E											
6RTD - RTD MODULE															
	HOME PAGE														
Module Name: IO-6RTD-E															
			CHANNEL NUMBER	CHANNEL NAT	VIE	VALU	E								- 1
		CH/	NNEL 1:	INPUT_1			3276.8 °C								- 1
		CH/	NNEL 2:	INPUT_2		-	3276.8 °C								- 1
		CHA	NNEL 3:	INPUT_3		-	3276.8 °C								
		CH/	NNEL 4:	INPUT_4			3276.8 °C								
		CH/	NNEL 5:	INPUT_5		-	3276.8 °C								
		CHA	NNEL 6:	INPUT_6		-	3276.8 °C								
				INPUT TYPE: PT100	I										
			IO-6RTD-E	E Configuration P	arameters										

4-58 IO-6RTD-E Web Page View- Input Status

- **Channel Number:** This refers to the actual input number on the terminals of the module.
- **Channel Name:** This is the name that was entered in the configuration page to best describe the inputs.
- Value: This is the current temperature of the inputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

Modbus Address	Register Name	Low Limit	High Limit	Access	Description
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 139
30002	RTD Input 1	-XXX.X	уууу.у	R	RTD Inputs. See table for range.
30003	RTD Input 2	-XXX.X	уууу.у	R	Resolution in 0.1°C.
30004	RTD Input 3	-XXX.X	уууу.у	R	"
30005	RTD Input 4	-XXX.X	уууу.у	R	и
30006	RTD Input 5	-XXX.X	уууу.у	R	н
30007	RTD Input 6	-XXX.X	уууу.у	R	н
30008	Input Status	0	65535	R	bit1 = 0(OK) bit1 = 1(error or open circuit)
40101	RTD Type	1	7	R/W	See RTD Tables.
40102	Line Frequency	50	60	R/W	Line Frequency
40103	Units Type	1	2	R/W	1=°C, 2=°F

4.8.7 IO-6RTD-E Modbus Mapping (Module Type = 139)

4-27 IO-6RTD-E Modbus Mapping

4.8.7.1 RTD Input Status.

There is one status bits associated with each RTD input. These bits are used to indicate if the input is open circuit or over range. If the input is open circuit or over range, then the error bit will be set.

Bit 1- Error	Bit 2-Not Used	Condition	Status LED
0	0	Input working OK.	(LED OFF)
1	0	Open circuit / Over range.	(LED ON)

The analog input status can be read in a single register as follows: The analog input status can be read in a single register as follows:



4.9 IO-8AOI-E – 8 Channel Analog Outputs Current

4.9.1 Description

The IO-8AOI-E Module is an 8-channel current output module. Each channel can be set to output a current in the range 0 - 20mA. The outputs are isolated from the logic and share a common negative terminal.

The resolution is 12 bits, so writing a value to the Modbus register for each output of 0 - 4095 would give an output current of 0 - 20mA. A value of 819 \pm 1LSB will give a current output of 4mA.



4-59 IO-8AOI-E

Each IO-8AOI-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8AOI-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the analog output status parameters is <u>http://192.168.0.112/index.htm</u>

The web page address for configuring the module is http://192.168.0.112/ip.htm

4.9.2 Technical Specification of IO-8AOI-E

Power Supply	Logic Supply Voltage	12 -24 Vdc				
	Logic Supply Current	67mA @ 12V / 35mA @ 24V				
	Field Supply Voltage	24 Vdc				
	Field Supply Current	175mA				
Current Output	Output Points	8				
	Output Current	0(4) - 20 mA				
	Resolution	12 bits				
	Drift	100ppm/°C				
	Accuracy	0.05% of span				
	Compliance	1000 ohms max. @ 24Vdc 500 ohms max. @ 12Vdc				
Isolation	Between field and logic	1500Vrms between field and logic				
Ethernet	10/100Mbits/s	Twisted pair.				
Temperature	Operating Temperature.	-40°C to + 80°C				
	Storage Temperature	-40°C to + 85°C				
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit				
	Inputs	18 Way screw connector on front				
	Ethernet	RJ45 on top side of unit.				

4-29 IO-8AOI-E Specifications

4.9.3 Status Indicators

Power:	Flashes to indicate the CPU is running.
RS485 Rx:	Flashes to indicate the unit has received a valid Modbus message.
RS485 Tx:	Flashes to indicate the unit has sent a Modbus message.
Output Ctatura	"ON" when the extruct is zero

Output Status: "ON" when the output is zero.

"OFF" when the output is between zero and full scale.

"Flashing" when the output is at full scale.



4-60 IO-8AOI-E Status Indicators

4.9.4 Wiring

The following diagram shows how the analog outputs are connected to a load.



4-61 IO-8AOI-E Output Wiring

The following diagram shows the wiring for the power.



4-62 IO-8AOI-E Power Wiring

4.9.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows you to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Output Names for identification/maintenance purposes.

D IO-8AOI-E ANALOG	DUTPUT MC 🗙 🌓 IP Address - IO-8AOI-E	× +			- 0 ×			
$\leftarrow \rightarrow$ C a	A Not secure 192.168.0.112/ip.htm		ි 💐 සී	🕐 🐵 😇 🌀				
🗅 Jntu 4-1 Informatio 🔹	HDFC Bank: Person 💿 Le TGV - YouTube	🔇 CiteSeerX — Synthe) என் சமையல 🕒 🕒 பெப	டகம்: சமை 🗋 முருங்கப்	الديم > 🗂 Other favourites			
		Brai	nChild		Â			
		ю	-8AOI-E					
8A0I - ANALOG OUTPUT MODULE - CURRENT								
	Ethernet Configuration	Parameters						
Module IP	192 168 0 112							
Default Gateway IP	192 168 0 1							
Subnet Mask	0 0 0							
Socket Time Out	90		X 1 second					
		I	Submit					
Warning: The IP addre entered. If you forget the IP	ess will not be updated until the power o address, refer to the user manual to rese	n the module has been swite t the module back to the de	ched off and on again. After clic fault IP value.	king on the Submit button ch	eck that the correct IP address has been			
Module IP	0 0 0	0						
Slave Poll Rate	Slave Poll Rate 0 X 10 milliseconds (0 = diasbled)							
	•							

4-63 IO-AOI-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.

- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Output Names:** These fields allow you to enter an output description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular output by name or number.

4.9.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type "**192.168.0.112/index.htm**" into the address line of the browser window. The main page will now be displayed in the browser window.

D IO-8A0I-E ANALOG OUTPUT MC × D IP Address - IO-8	401-e × +						-	o ×
← → C ⋒ ▲ Not secure 192.168.0.112/in	ndex.htm	£∂ I	🕯 🗘 🖉 🧟	. u 🕞	G 🔊	(3 ∠≞	œ (
🖺 Jntu 4-1 Informatio 😐 🚺 HDFC Bank: Person 😐 Le TGV -	YouTube 🔇 CiteSeerX — Synthe.	. 🗅 என்சமையல 🗅	💾 பெட்டகம்: சமை	. 🗋 முறங்கப்	பட்டி	:	🛛 📋 Othe	er favourites
BrainChild								
		IO-8AOI-E						
	8AOI - ANALOG OUTPUT MODULE - CURRENT							
HOME PAGE								
Module Name: IO-BAOI-E								
	CHANNEL NUMBER	CHANNEL NAME	VALUE					
	CHANNEL 1:	OUTPUT_1	0					
	CHANNEL 2:	OUTPUT_2	0					
	CHANNEL 3:	OUTPUT_3	0					
	CHANNEL 4:	OUTPUT_4	0					
	CHANNEL 5:	OUTPUT_5	0					
	CHANNEL 6:	OUTPUT_6	0					
	CHANNEL 7:	OUTPUT_7	0					
	CHANNEL 8:	OUTPUT_8	0					
	IO-8AOI-E	Configuration Paramete	ers					*

4-64 IO-8AOI-E Web Page View- Output Status

- **Output Number:** This refers to the actual output number on the terminals of the module.
- **Output Name:** This is the name that was entered in the configuration page to best describe the outputs.
- **Value:** This is the current value of the outputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

4.9.7 IO-8AOI-E Modi	bus Mapping (Mo	odule Type = 140)
----------------------	-----------------	-------------------

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 140
40002	Current Output 1	0	4095	R/W	Current Outputs. 0 - 4095 = $0(4) - 20mA$.
40003	Current Output 2	0	4095	R/W	II
40004	Current Output 3	0	4095	R/W	H
40005	Current Output 4	0	4095	R/W	II
40006	Current Output 5	0	4095	R/W	"
40007	Current Output 6	0	4095	R/W	II
40008	Current Output 7	0	4095	R/W	II
40009	Current Output 8	0	4095	R/W	II
40010	Output Status	0	65535	R	bit2 = 0(0), bit2 = 1(4095) bit1 = 0(OK), bit1 = 1(error)
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 -255 = enabled.

4-30 IO-8AOI-E Modbus Mapping

4.10 IO-8AOV-E – 8 Channel Analog Output Voltage

4.10.1 Description

The IO-8AOV-E Module is an 8-channel voltage output module. Each channel can be set to output a voltage in the range 0 - 10V. The outputs are isolated from the logic and share a common negative terminal.



4-65 IO-8AOV-E

The resolution is 12 bits, so writing a value to the Modbus register for each output of 0 - 4095 would give an output current of 0 - 10V. A value of 819 \pm 1LSB will give a current output of 2V.

Each IO-8AOV-E Module has a unique Ethernet IP address which must be programmed into the PC or PLC. The IP address in the IO-8AOV-E Module is configured via the Web Server. Any standard Web browser such as Internet Explorer can be used to access the web pages where configuration is carried out. The modules are factory programmed with a default IP address of 192.168.0.112. This address must be changed before the module is added to an existing network.

The web page address for viewing the digital output status parameters is http://192.168.0.112/index.htm

The web page address for configuring the module is <u>http://192.168.0.112/ip.htm</u>

4.10.2 Technical Specification of IO-8AOV-E

Power Supply	Logic Supply Voltage	12 -24 Vdc				
	Logic Supply Current	67mA @ 12V / 35mA @ 24V				
	Field Supply Voltage	24 Vdc				
	Field Supply Current	85 mA max.				
Voltage Output	Output Points	8				
	Output Voltage	0(2) - 10 V				
	Resolution	12 bits				
	Drift	100ppm/°C				
	Accuracy	0.05% of span				
	Compliance	2000 ohms min. load				
Isolation	Between field and logic	1500Vrms between field and logic				
Ethernet	10/100Mbits/s	Twisted pair.				
Temperature	Operating Temperature.	-40°C to + 80°C				
	Storage Temperature	-40°C to + 85°C				
Connectors	Logic Power and Comms.	4 Pin Connector on underside of unit				
	Inputs	18 Way screw connector on front				
	Ethernet	RJ45 on top side of unit.				

4-31 IO-8AOV-E Specifications

4.10.3 Status Indicators

Power: Flashes to indicate the CPU is running.

Ethernet Rx: Flashes to indicate the unit has received a valid Modbus message.

Ethernet Tx: Flashes to indicate the unit has sent a Modbus message.

Output Status: "ON" when the output is zero.

"OFF" when the output is between zero and full scale. "Flashing" when the output is at full scale.



4-66 IO-8AOV-E Status Indicators

4.10.4 Wiring

The following diagram shows how the analog outputs are connected to a load.



4-67 IO-8AOV-E Output Wiring

The following diagram shows the wiring for the power.



4-68 IO-8AOV-E Power Wiring

4.10.5 Configuration

The Web page address "**192.168.0.112/ip.htm**" is entered into the address line of the browser window to access the configuration page. This page allows you to change the IP address of the Modbus TCP Module and to enter a Module Description Name and Output Names for identification/maintenance purposes.

🗖 🗋 IO-8AOV-E - VOLTA	SE OUTPUT 🗙 🕒 IP Address - IO-8AOV-E	× +					- 0 ×
$\leftrightarrow \rightarrow$ C \otimes	A Not secure 192.168.0.112/ip.htm		6	å 🕐 🐵	.	● 3 4	· 😩 ···
🕒 Jntu 4-1 Informatio 🗈	HDFC Bank: Person 🕒 Le TGV - YouTube	🔇 CiteSeerX — Synthe	டு என் சமையல டு டு ே	பட்டகம்: சமை [) முருங்கப்பட்டி…	>	Cther favourites
		Brai	nChile				•
	8/	II AOV - ANALOG O	D-8AOV-E UTPUT MODULE - VC	OLTAGE			
	Ethernet Configuration	Parameters					
Module IP	192 168 0 112						
Default Gateway IP	192 168 0 1						
Subnet Mask	0 0 0 0						
Socket Time Out	90		X 1 second				
Warning: The IP addr entered. If you forget the IP	ess will not be updated until the power or address, refer to the user manual to rese	n the module has been sw t the module back to the	Submit vitched off and on again. After o default IP value.	licking on the Subm	it button check that	the correct IP addre	ass has been
Module IP	0 0	0					
Slave Poll Rate	• X 10 mill	iseconds (0 = dia	sbled)				-

4-69 IO-AOV-E Web Page Configuration

- 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 Module. The screen will now be updated and if successful will continue to display the new IP address. The new IP address will only be effective after the Module power has been switched off and on again. This feature allows you to check that the correct IP address has been entered before being activated. 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 Module 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 Module is on a different network.
- Subnet Mask: In computer networks, a subnetwork 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 Module 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".
- **Socket Timeout:** If a socket connection is broken, say due to a network fault, it must timeout to free it up so that it can be used again. This timer is triggered by activity on the module, so if there is no communications activity for longer than the timeout period, the socket will close.

- **Module Compatibility:** When the value is zero "0", the Modbus registers are configured in the format for a Modbus TCP module. When the value is set to one "1", the Modbus registers are reconfigured to match the format of the Modbus TCP modules. This is useful if a new Modbus TCP module is being used to replace an old Modbus TCP module in an existing system.
- **Module Name:** This field allows you to enter a module description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the Modbus TCP Module in the system by name or number.
- **Output Names:** These fields allow you to enter an output description name into the Modbus TCP Module. This is an identifier for diagnostic/maintenance purposes and is chosen to best describe the particular output by name or number.

4.10.6 Viewing web pages

To view the default Web page in the Modbus TCP Module, start the Web browser and type **"192.168.0.112/index.htm"** into the address line of the browser window. The main page will now be displayed in the browser window.

IO-8AOV-E - VOLTAGE OUTPUT X IP Address - IO-	BAOV-E × +						-	0 ×
← → C ⋒ ▲ Not secure 192.168.0.112/	index.htm	20 Q	i 🗘 🕐 🙈	u 😮	C 🔊	3 ☆	Ē	
🕒 Jntu 4-1 Informatio 💿 🔁 HDFC Bank: Person 💿 Le TGV	- YouTube 🔇 CiteSeerX — Synthe	டு என் சமையல டு	🗅 பெட்டகம்: சமை	🗅 முறங்கப்ப	ட்டி)	• 🛅 Otł	ner favourites
	Bra	inChi	d					Î
		IO-8AOV-E						- 1
	840V - ANALOG		VOITAGE					- 1
	CACT ANALOG		TO LINGE					- 1
		HOME PAGE						- 1
	Modu	le Name: IO-8AOV-E						- 1
	CHANNEL NUMBER	CHANNEL NAME	VALUE					
	CHANNEL 1:	OUTPUT_1	0					
	CHANNEL 2:	OUTPUT_2	0					
	CHANNEL 3:	OUTPUT_3	0					
	CHANNEL 4:	OUTPUT_4	0					
	CHANNEL 5:	OUTPUT_5	0					
	CHANNEL 6:	OUTPUT_6	0					
	CHANNEL 7:	OUTPUT_7	0					
	CHANNEL 8:	OUTPUT_8	0					
	IO-8AOV-	E Configuration Paramete	rs					

4-70 IO-8AOV-E Web Page View- Output Status

- **Output Number:** This refers to the actual output number on the terminals of the module.
- **Output Name:** This is the name that was entered in the configuration page to best describe the outputs.
- **Value:** This is the current value of the outputs. To get an updated reading it is necessary to refresh the browser window to upload the web page again.

1.10.7 IO-8AOV-E Modbus	s Mapping	(Module Type = 141))
-------------------------	-----------	---------------------	---

Modbus Address	Register Name	Low Limit	High Limit	Access	Comments
30001	S/W Version / Module Type	N/A	N/A	R	High Byte = Software Version Low Byte = 141
40002	Voltage Output 1	0	4095	R/W	Voltage Outputs. 0 - 4095 = 0 - 10V.
40003	Voltage Output 2	0	4095	R/W	n
40004	Voltage Output 3	0	4095	R/W	n
40005	Voltage Output 4	0	4095	R/W	n
40006	Voltage Output 5	0	4095	R/W	"
40007	Voltage Output 6	0	4095	R/W	"
40008	Voltage Output 7	0	4095	R/W	"
40009	Voltage Output 8	0	4095	R/W	"
40010	Output Status	0	65535	R	bit2 = 0(0), bit2 = 1(4095) bit1 = 0(OK), bit1 = 1(error)
40101	Watchdog Timer	0	255	R/W	Timer in seconds. 0 = disabled. 1 - 255 = enabled.

4-32 IO-8AOV-E Modbus Mapping

5 PC Software

The PC Software can be used for configuration of the IO Module, real-time monitoring and logging of data, viewing and analyzing of historical data There are 2 software available for these functions as listed below.

- 1. IO Studio- For Configuration & Real-time Monitoring
- 2. Data Acquisition Studio- Real -time monitoring and logging, Historical data analysis (Real Time Viewer + Historical Viewer)

5.1 IO Studio

This is a free software provided for configuring the IO module and monitoring the realtime data from the IO module.

5.1.1 IO Studio Software Installation

The IO Studio installation will install the software on the PC.

Item	Minimum Requirements
System	IBM PC compatible computer with Intel Pentium IV or above
Operating System	Windows XP or above
Memory	1 GB
Hard Disk	50 GB Free Space on the hard disk
Communication Ports	RS232 or RS485 or Ethernet Port
Ethernet Port no	502 to be opened

5.1.1.1 System Requirements

5-1 IO Studio System Requirements

5.1.1.2 Software Installation

IO Studio software can be installed by following the below procedure.

- 1. Download the IO Studio software form the manufacturer's website.
- 2. Install the software by running the setup file from the IO Studio folder.

e Home	Share	View			
→ • ↑	> Th	is PC → Data (D:) → BC_Products →	O Modules > IOStudioN2.8 > IO	OStudioN2.8	
		Name	Date modified	Туре	Size
Quick access		IOStudio	16-04-2014 17:11	Application	724 KB
Desktop	*	H IOStudio	26-08-2004 22:52	lcon	1 KB
🖊 Downloads	*	🔊 IOStudio	04-03-2022 13:26	Configuration sett	1 KB
Documents	*	IOStudio	09-10-2014 15:19	JPG File	2 KB
Pictures	*	📳 IOStudio	16-04-2014 17:11	Windows Installer	327 KB
Brainchild - La	bels	🔂 setup	16-04-2014 17:11	Application	375 KB

3. Follow the on-screen instructions to install the software.

🛃 IOStudio		_	
Welcome to the IOStudi	o Setup Wiza	ard	
The installer will guide you through the st	eps required to install	IOStudio on your d	computer.
	staatad bu aasuriahti		
Unauthorized duplication or distribution of or criminal penalties, and will be prosecut	f this program, or any ted to the maximum e	aw and internation portion of it, may re xtent possible unde	ar treattes. esult in severe civil er the law.
	Cancel	< Back	Next >
IOStudio		_	
Select Installation Folde	ər		
The installer will install IOStudio to the fo	llowing folder.		
To install in this folder, click "Next". To i	install to a different fo	der, enter it below	or click "Browse".
<u>F</u> older:			
<u>F</u> older: C:\Program Files (x86)\IOStudio\			Browse
Eolder: C:\Program Files (x86)\lOStudio\			Browse Disk Cost
Eolder: C:\Program Files (x86)\IOStudio\ Install IOStudio for yourself, or for anyo	one who uses this co	mputer:	Browse Disk Cost
Eolder: C:\Program Files (x86)\IOStudio\ Install IOStudio for yourself, or for anyo Everyone	one who uses this co	mputer:	Browse Disk Cost
Eolder: C:\Program Files (x86)\IOStudio\ Install IOStudio for yourself, or for anyo Everyone Just me	one who uses this co	mputer:	Browse Disk Cost



4. Once the installation is completed the user can see the below confirmation message.



5. After the installation is completed successfully, the shortcut for IO Studio software will be created on the desktop.



6. The structure of IO Studio on the start menu as below.



5.1.2 Start and Exit



The IO Studio program can be started by using the shortcut on the desktop or selecting the program IO Studio from the Start menu. The program can be started directly from the IO Studio application on the IO Studio folder without installation.

🛛 🚽 🚽 🖓 🚽 🖓 🚽	dioN2.	8			
File Home S	Share	View			
← → • ↑ <mark> </mark>	> Thi	s PC > Data (D:) > BC_Products	> IO Modules > IOStudioN2.8 > IO	StudioN2.8	
10.1		Name	Date modified	Туре	Size
Quick access		👖 IOStudio	16-04-2014 17:11	Application	724 KB
Desktop	×	H IOStudio	26-08-2004 22:52	lcon	1 KB
🕂 Downloads	A	IOStudio	04-03-2022 13:26	Configuration sett	1 KB
Documents	A	IOStudio	09-10-2014 15:19	JPG File	2 KB
Pictures	*	🛃 IOStudio	16-04-2014 17:11	Windows Installer	327 KB
📙 Brainchild - La	bels	🐻 setup	16-04-2014 17:11	Application	375 KB

The program can be exit by simply closing the program X symbol on the top right corner of the screen.

5.1.3 Uninstallation of Software

The software can be uninstalled by selecting the uninstall option on the control panel Add or Remove Programs.

5.1.4 IO Studio

Once the IO studio software is started, the below screen will appear.

🗗 IOStudio					
File About					
	Module ID	þ	Stop	Comms	

5.1.4.1 IO Studio -Tool Bar

The IO Studio software has the bellow tools on the tool bar.

- ✤ File
- ✤ About

5.1.4.1.1 File

Below are the sub menu options available in File Menu

🖞 IOStudio

File	About			
	Setup Comms			
_	Exit	Module ID	1 Start	Comms
	-IOT16DIB	lule Type: 148		

1. Setup comms: Set up the communication parameters for the IO module to communicate with the PC.

Setup Comms P	ort
Comm Port	TCP/IP
Poll Rate	5 X 10ms
IP Address	192 168 0 112
	Select

2. Exit: Exit or Close the program

5.1.4.1.2 About

Provides information about the software version and the necessary information.

About IOStudio
IOStudio
IOStudio configuration and test software. V2.8
For more information contact:
Chara -
Close

5.1.4.2 IO Module Connection

To connect the IO module with the IO studio software for the configuration follow the below procedure.

- Connect the IO module with the PC via Ethernet
- Ensure the PC and the IO module communication is successful using the Ping command for the IP address of the IO module. The default IP address is 192.168.0.112

Command Prompt
Microsoft Windows [Version 10.0.19042.1526] (c) Microsoft Corporation. All rights reserved.
C:\Users\Thillai>ping 192.168.0.112
Pinging 192.168.0.112 with 32 bytes of data:
Reply from 192.168.0.112: bytes=32 time=1ms TTL=64
Ping statistics for 192.168.0.112:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\Users\Thillai>

 Open the IO Studio Software and configure the IP address of the IO module the setup communication configuration.

uit	Setup Commu	nication configuration.
	-Setup Comms P	ort
	Comm Port	TCP/IP 💌
	Poll Rate	5 X 10ms
	IP Address	192 168 0 112
		,
		Select
ĺ		

 Once the communication is successful the software can read the parameters from the IO module. The user can modify the configuration parameters as per their requirement.

File About

	I	Module ID 1	Stop		Comms
Mod	ule Type: 148				
Softwar	e Version: 1				
Modbus	Value	Label			
Address	;				
10	001	Digital Input 1	▲	Description of Modbus Register	
10	002	Digital Input 2			
10	003 0	Digital Input 3			
10	004 0	Digital Input 4			
10	005 0	Digital Input 5			
10	006	Digital Input 6			
10	007	Digital Input 7			
10	008	Digital Input 8			
10	009	Digital Input 9			
10	010 0	Digital Input10			
10	011 0	Digital Input11			
10	012 0	Digital Input12			
10	013	Digital Input13			
10	014 0	Digital Input14			
10)15 0	Digital Input15			
10	016	Digital Input16			
30	001 404	Type/SW Version		Move Mouse pointer over Value	
30	002 0	Input Status		tor Description	
400	003 0	Counter 1			
40	005 0	Counter 2			

5.2 Data Acquisition Studio Software

The Data Acquisition Studio software (DAQ) consists of Real-time Viewer, Configuration Viewer and Historical Viewer.

5.2.1 Data Acquisition Studio Software Installation

The Data Acquisition Studio installation will install Real-time Viewer, Historical Viewer and Configuration Viewer on the PC.

5.2.1.1 System Requirements

ltem	Minimum Requirements	
System	IBM PC compatible computer with Intel Pentium IV or above	
Operating System	Windows XP or above	
Memory	1 GB	
Hard Disk	50 GB Free Space on the hard disk	
Communication Ports	RS232 or RS485 or Ethernet Port	
Others	USB Port or SD Card Slot	
License	USB License Key	

5.2.1.2 Software Installation

The Data Acquisition Studio software can be installed by following the below procedure.

- 1. Download the Data Acquisition Studio software form the manufacturer's website.
- 2. Install latest dot Net software from Microsoft website
- 3. Install the software by double-clicking the setupwizard.exe from Data Acquisition Studio folder.

	ta Acquisition Studio					4 Q	Search Da., P
	*	Name	Date modified	Type	Sot		
Chiefe access		Dr. Cat Entern	21.11.2018.08.18	Dis Builder			
Desktop		Data According Toute Catego	21112-2010-0018	File Folder			
Sowekaads	1	Line Acquisition School Server	21-12-2018-09119	File folder			
Documents		Microsoft Dot Net	21-12-2018 09-18	File folder			
Pictures		OFM Tool	21-12-2018 09:18	File folder			
This PC		Autorun	18-01-2010 09:17	Setup Information	TICE		
Historical		Beckground	16-05-2010 06:04	BMP File	5,976 (48)		
Returne		Setup	07-04-3009 13:46	UMP File	4 108		
andr		SetupReleareNote	15-15-2018 13:14	Test Document	2.68		
REA P		A Setup Wicord	05-06-2017.06/58	Application	7,494 (49		
Thillai		5 SetupWoard	27-11-2017 11:27	Configuration sett	3.68		

4. Select the language for installation and



5. Select the software components to be installed and select install



6. Follow on-screen instructions to select the installation path and press next to continue the installation.

🚯 (hale Compatible Martin Solar)		U
Choose Destination Location Solid: Note: electronic actual of initial Res		1
No.	The broadstor Ward off rend Oats Acquiring Stude is the Moving Note: To work to the Sole, dot: Terri". To rend is a different Sole, dot. "Server" and select another fiddes.	
	Destruction Faller Crit	
	c Back Back 5 Cancel	

7. Follow onscreen instructions to complete the installation. Once the installation is completed the system will show the installation complete message.



8. After installation is successful, the shortcut for Real-time Viewer and Historical viewer software will be created on the desktop



5.2.1.3 Uninstallation of Software

The software can be uninstalled by selecting the uninstall option on the control panel Add or Remove Programs.

5.2.2 Start and Exit

The Real-time Viewer program can be started by using the shortcut Historical your or the desktop or selecting the program Real-time viewer from the start menu.

The program can be exit by simply closing the program X symbol on the top right corner of the screen.

5.2.3 Real-Time Viewer

When running the program first time the initial screen displays like below.

The first test states and the set

5.2.3.1 Real-Time Viewer – Tool Bar

The real-time viewer has the following toolbars.



✓ Dew



- 🗸 斗 Save As
- ✓ / Display Page Choice
- ✓ [™]Configuration Data'
- ✓ Measured Data
- ✓ IIII Channel Digital
- ✓ Status
- 🗸 🔎 Auto Page Mode
- ✓ Show Event/Alarm List
- ✓ I Digital Mode Display
- 🗸 🛄 Bar Graph
- ✓ Kend Mode

- ✓ IO Module Configuration (only for IO Modules)
- ✓ Controller Configuration (only for Controllers)
- ✓ Recorder (PR) Recorder Configuration (only for recorders)
- ✓ I Manually Operate Jobs
- Reset Counters of IO Module (only for IO modules)
- Mute Alarms

5.2.3.2 Real Time Viewer – Menu Bar

The menu bar consists of 6 menus. They are listed as below.

- 1. File(F)
- 2. View(V)
- 3. Page(P)
- 4. Window(W)
- 5. Language(L)
- 6. Help(H)

🞲 Display real-time measured value from: C:\Data Acquisition Studio\RealTime\Project187.daq	
File(F) View(V) Page(P) Window(W) Language(L) Help(H)	
🕒 🚵 🖄 🕼 🏚 🗰 🔛 🛗 🏥 🔛 📄 🔛 🧱 🔛 🏦 [JO Card 🔄 🖉 🦉 Recorder(PR) 🕤 😁 😒	- 4

5.2.3.2.1 File (F)

The File menu consists of the below sub-menu.

File(F)	View(V)	Page(P)	Wind
📄 Nev 🌛 Ope	/ :n		1
🕞 Save	e As se		
Rec	ent		•
ff Crea	ate DDE lin	k in <mark>E</mark> xcel	
O Exit			

- **1. New:** Create a new project.
- 2. Open: Open an existing project.
- 3. Save As: Save the project with a new name.
- 4. Close: Close the current project
- 5. Recent: Open recently opened projects.
- 6. Create DDE link in Excel: Create Dynamic Data Exchange in Excel for real-time values.
- 7. Exit: Exit the program.

5.2.3.2.2 View (V)

The View menu consists of the below sub-menu.



- **1. Configuration Data:** Opens the configuration data of the project.
- 2. Measured Data: Opens the historical data of the project via Historical Viewer.

5.2.3.2.3 Page (P)

The Page menu consists of the available display pages to select. The user can select the display page to be viewed from the shown list.



5.2.3.2.4 Window (W)

The Window menu consists of different display modes to select. The user can select the display mode to be viewed from the shown list.

🛞 Display real-time measured value from: C:\Data Acquisit

File(F)	View(V)	Page(P)	Window(W)	Language(L)
Eve	nt/Alarm	🗐 🍪 🗖 List	世 Trend 間 Bar 図 Digital	
Ack	Type		Event	
1	Login	Error	🗄 Arrange a	a
3		larm larm	All chann Status	el digital

- 1. Trend: Shows the display page in trend mode.
- **2.** Bar: Shows the display page in bar graph mode.
- 3. Digital: Shows the display page in digital display mode.
- 4. Event: Shows the Event/ Alarm List display.
- 5. Arrange All: Shows the display page with Trend, Bar Graph, Digital Display and Event/Alarm List.
- 6. All Channel Digital: Shows all the configured channels in the digital mode as an overview.
- 7. Status: Shows the status of counters and Totalizers.

5.2.3.2.5 Language (L)

The display language of the software can be changed by selecting any one of the available languages from the sub-menu.



5.2.3.2.6 Help (H)

The help menu provides information about the software and the necessary information.

🛞 Display real-time measured value from: C:\Data Acquisition Studio\RealTime\Project187.daq

File(F) View(V) Page(P)	Window(W) Language(L)	Help(H)	
🗅 👌 😫 🗃 🎕 🗖		RealTime Viewer help F About	
Event/Alarm List		w riscut	_

- 1. Real-time Viewer: Open the software help file.
- **2. About:** Provides the information about the software like version and other related information.

5.2.3.3 Real-time Configuration Viewer-Tool Bar

The real time configuration has the following tools on the tool bar.



- 🗸 日 Save
- ✓ 💾 Backup the configuration
- ✓ ✓ ✓ Delete the project
- ✓ ^{CD} Option
- 🗸 ဲ Print

- ✓ 😰 Bank
- ✓ ▲ Channel Configuration
- ✓ 🚿 Tools
- ✓ Comment
- ✓ Setup Controller (only for Controllers)
- ✓ I Setup all Display pages in Digital Mode Overview display.
- ✓ I Fast Backward
- Backward
- Forward
- ✓ [➡]Fast Forward
- ✓ Project Auto configure
- ✓ ____Close and return to main program.

5.2.3.3.1 Option

The Options menu of real-time configuration have the following options.

- 1. Share
- 2. Email
- 3. Communication
- 4. Format
- 5. Display
- 6. Print auto-output
- 7. User Manage
- 8. The display of AI serial for IO Modules (only for IO Modules)
- 9. Auto start project

1. Share

The share menu will allow the user to configure for share or not to share the data with others.

The disp	lay of AI serial	for IC modul	s A	uto start project
Format	Display	Print au	o-output	User Manage
Shar	e	Email	0	mmunication
-				
4	• 1. Do not sh	are		

Share/do not share options are available for user selection. If the share option is selected, then historical data available on the computer can be shared from other computers. On selection of this share data, the shared folder will be created and the following message will be shown



For example, the recorder is connected to the PC with a real-time viewer and wish to analyze historical data at a different computer. While opening the project in the second Computer, directly link to the project file available under **C:\Data Acquisition Studio** through network configuration. This will minimize the data transfer between Modbus slaves and the computers and make it more efficient by using available resources through the network Configurations.

2. Email

The Email menu will allow the user to configure the email server to send an email on an event or alarm. The default Port number 25 is used to send email from the SMTP server. If the network administrator configured a different port in LAN for accessing internet/email, then the user has to modify the port number accordingly.

To send an email for any event, the procedure is as follows.

- Set SMTP server details as below. Please contact system or network administrator for the server details if the computer is connected in LAN.
- ✤ Host, Port, User name,
- From: Sender email address
- To: Receiver email address (Max.10 email addresses can be selected)
- In case, email is successful, it delivers as follows

Type: HI Alarm Source: Tag1 Active Time: 05/08/09, 13:31:04 Value: 50 Comment: Level high

The display of AI ser	rial for IO modules	Auto start project
Share Share	Email	Communication
Email: Enabl	9	TP Login Frable *
Please fill in the bla	nks so the email fund	tion can be activated.
SMTP Server		
Host:	smtp.gmail.com	
Port:	465	
User:	PR30 DAG	
	,	
Login	Concertain and the	
Accounts	juser locompany.com	
Password:	1	
Email Address		
Sender:	ThilaDAQ	
Receiver:	sales@brainchild.co	m.tw +
1.0	service Obrainchild.	com.tw
		10.70

If Email is failed to deliver, then it prompts the following error message. In this case, it requires to check all the email settings



3. Communication

The communication menu will allow the user to configure the communication parameters for the project.

The display of . format 0	AI serial for IO module isplay Print aut	es Auto start project
Share	Email	Communication
Samp	ling Rate: 15	▼ /Project
	TmeDut: 1 Sec	▼ /Node
	Interval: SmSac	- Ainda

Sampling rate: It is used to set data display time for Real-Time Viewer. User can select

One from the following for real-time monitoring.

1 S		-
1 S		
2 S		
5 S		
10 S		
30 S		
60 S		
120 S		

Time out: This is time set for generating time out errors related to real-time viewer Communication.

For example, if IO module and PC with data acquisition software are located at different places connected through Ethernet across different gateways, and then the user can adjust sampling rate and time out settings to avoid errors in communication. When the real-time viewer is running, please observe the following taskbar at the bottom side of the screen.

Page1	Sampling Rate: 1 Sec	Scan time: 4 ms

Here, scan time should always be less than the sampling rate. Otherwise, communication errors will occur. If PC and Modbus slave devices are connected by a long-distance network, then there might be chances that scan time gets increased. So, check this and set sampling-rate more than scan time. Also, the user can set time out settings to generate Communication failure errors. Maximum time out settings possible is 60 sec. For example, scan time is adjusted and time out setting = 30 sec. This means, if scan time is more than the sampling rate for more than 30 sec, then communication errors will be generated.

4. Format

The Format menu will allow the user to configure the date-time format and set the name for the software on the PC.

The displa	y of AI serial for	IO modules	Auto start project
Share	6	mail	Communication
Format	Display	Print auto-outp	out User Manage
His	torical Viewer Re	port title	
1.000	I Init Name	RealTime View	ver
	Generative	. pocurine view	
Da	te/Time Format		
Da	te/Time Format		
Da	te/Time Format Date Form	at: dd-MM-yy	•
Da	te/Time Format Date Form Examp	at: dd-MM-yy	
Da	te/Time Format Date Form Examp	at: dd-MM-yy ke: 01-09-11	•
Da	te/Time Format Date Form Examp Time form	at: dd-MM-yy ke: 01-09-11 at: hh:mm:ss t	•

5. Display

The Display menu will allow the user to configure the display properties for communication error, latest event/alarm list, auto page scrolling and screen display for alarm action.

the	display of AI serial for IO modules Auto start project
form	at Display Print auto-output User Manag
	When communication error trend display
	1. Error Value
	C 2. Clear display value
	C 3. Keep the current situation
	Latest Event/Alarm list
	I. Bottom
	С 2. Тар
	Auto-page
	Action Disable 👻
	Interval 15
	Restore window to maximum when an alarm occurs
	🕫 1. Disable

Auto-page:

The Auto page function is to rotate pages at a set time interval. If this option is enabled and time is set, then, display pages in Real-Time Viewer will be rotated cyclically as per the set time **Action:** Enable, Disable options are available

Interval: This is the time interval and max. 60 sec. is possible

6. Print Auto-output

The Print auto-output menu will allow the user to configure to do the automatic printing of historical data from the PC in the pre-defined interval.

The display of A	I serial for 10 module	s Auto start project
Share	Emai	Communication
Format Di	splay Print aut	o-output User Manag
Historical Data		
Period		
1	Node: Last Minutes	•
1	Min.: 1	•
Int	erval: 1 Sec	•
Report Data		
	2011 C	

7. User Manage

The User Manage menu will allow the user to configure the user security for the project. The user can set the password and auto-logout time.

Disable: The security function will be disabled.

Set Password: Set password only for user security.

User Security Level: The user can set the password and auto-logout time for security.

The s	display of AI serial for IO modules Auto start project ihare Email Communication
Form	at Display Print auto-output User Manage
	Canada Mada
	Security Mode
	1. Disable
	(* 2. Set Password
	C 3. User Security Level
	Password
	Auto-logout
	Louise Barrie
	L000002 Disable

8. The display of AI serial for IO modules

This is applicable only for the IO module. If the IO module is connected with the real-time viewer, then this option will allow the software to check the input status of the IO module and display according to the selection in this tab.

Check the	status of AL		
@ 1.En	able		
C 2. Dis	able		
When inp	ut status is err	or trend displa	'
· 1.0V	alue		
C 2. Err	or Value		
9. Auto start project

This tab will allow the user to configure the last project to be started when the software started.

Format	Display	Print auto-ou	put	User Manage
Share		Email	Comm	nunication
The displa	y of AI serial f	for IO modules	Auto	start project
Stz	ert last time pro	oject when execu	te RealTim	e
Stz	art last time pro 1. Disable	oject when execu	te RealTim	e

5.2.3.3.2 Bank Configuration

There are four banks are available in real-time viewer configuration to configure for the devices to connect with the software. All four banks will utilize different communication ports for communication. Ethernet and serial communication ports can be used for communication.

1. Ethernet Bank Configuration

The Ethernet port can be configured with port no as 502 and protocol as Modbus_TCP

Featline Configure		0 ×
H 14 8 Q & A		
a la la la l	Bankt	
	Protocol: Modbus_TCP *	
	Literal	
	Pert: 502	
	Formet : Standard +	

1. RS232/RS485 Bank Configuration

The serial RS232 or RS485 ports can be configured with Protocol as Modbus_RS232 and other communication parameters such as com port no, Baud Rate, Parity, Data Bits and Stop Bits as per the connection.

Seattere Contigen					1.00
UBS DA ON	8 K Q 8	E ± -	+ + = 21 20		
		Bank	E.		
1 2 3 4 1					
	Protocol:	Modbus	R5232 ·		
	R5232				
	Com Port :	0041	-		
	Soultate	9808	-		
	Parter	pe .	-		
	Deter Dits :				
	200154b (1	-		
			Default		

Note: It is possible to connect more than one device with the software with a different mode of connection. For example, one device can be connected via Ethernet and another device can be connected via RS485 or RS232.

5.2.3.3.3 Channel Configuration

The channels are auto-configured with all the configured tags from the device by the software. The configured tags channels can be viewed by selecting the channel configuration icon icon in the real-time configuration. It will display the configured device and channel information.

	TIAN	A Modely	±10000			
lio.	Node Name	Tag Name	Dank	Lise Convertier	Node/3P	De
	Al Lat	Alt	1	No	192,168.0.187	Re
	Recorder(PR)	AIZ	1	No	192,168.0.187	54
		A23	1	No	192,168.0.187	Re
		A94	1	Bo	192,168.0.187	Re
		AIS	1	140	192,168.0.187	Re
		A16	1	190	192,168.0.187	50
		A17	1	No	192,168.0.187	Fac
		All	1	No	192.168.0.187	Re
		A15	1	No	192.168.0.187	Re
		ADD	1	No	192.168.0.187	For
		All1	1	No	192,168.0.187	Fo:
		AD2	1	No.	192,168.0.187	Re
		A013	1	No	192.168.0.187	Re
		Alt4	1	140	192,168.0.187	Re
		A115	1	190	192,168.0.187	64
		AD8	1	No	192,168.0.187	Re
		A017	1	No	107.168.0.187	Ext
		ADA	1	89	192,168.0.187	Re
		Alts	1	No	152,168.0.187	Re
		A(21)	1	190	192.168.0.187	Ex
		A01	1	No	192.168.0.187	Re
		A122	1	No	192.168.0.187	Re
		A[23	1	140	192.168.0.187	Re
		A124	1	190	192,168.0.187	Re
		Al25	1	No	192,168.0.187	Re
		ADE	1	No	192.168.0.187	Re
		AI27	1	No	192.168.0.187	Re
		A/28	1	No	192,168.0.187	Foo
		A129	1	No	192,168.0.187	No.
		4				

The channel configuration can be modified or deleted by selecting Modify or Delete options. There are additional channels can be added by selecting Add option in the software. The available channels are as below.

- 1. Recorder Channels from Recorder
- 2. Controller Channels from Controller
- 3. IO Module Channel from IO Modules
- 4. Math channels for a math operation

	rotacal: Madbus_TCP	Use Cor	werter Device Nod	is address 🕴		IP oddress:			
1.99	2	2		- 19 C			<u>0</u> 1		
	Trigger: b	ry Time 🔄	1	agSpeed: 15ec/D	n 1	LogMethad	Instant	-	
	Calla Byte Type:	i byte 💌		alue Low: 1 = 3		Value High:	1.43		
				UNE	_	Decimal:	I I	-	
	Former T			1000			a - 1	7.4	
	concernent lo								
Scale		1010		1111 Alternation					
Scale Sca	de Transformation: 🖟	rable 💌		Scale Low: 1290.0		Scale High:	2400.0	-	
Scale Sca vent/Alarm	de Transformation (c	inable 💌	1	Scale Low: -1290.0		Scale High:	2400.0		
Scale Sca vent/Alore Tigae	de Transformations (c SeePoint	inable 🖃	-	Scale Low: [-1280.0	,	Scale High:	(2400.0 Hysteresia	Heiding	Time
Scale Sca Sca Sca Sca Sca Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scale Scal	de Transformations (c GeiPoint 💽 (0.0	inable 💽 Logi Na Action	• No Action	Scale Low: [-1200.0	jio Actor	Scale High:	[2400.0 Hysteresic [0.5	Heiding	Time v
Scale Sca vent/Alariv Type NO NO	ie Transformatien (6 GeiPoint (1.0) (1.0) (1.0)	Inable •	• No Actor	icale Low: 1290.0) No Action No Action	Scale High:	2400.0 Hysteresic [0.0	Holding Duable	Time *
Scale Scale Scale VentUAloriv Type AD AD AD AD AD	de Transformations (2) SeePoint	Inable	v No Actor v No Actor v No Actor v No Actor	Scale Low: 1280.0	No Action No Action No Action	Scale High:	2403.0 Hysteresis [0.5 [0.5]	Heiding Duable Duable Doable	Time *
Scale Scale Scale Scale Type MD MD MD	de Transformations (c SeeBoard) (2.5) (2.5) (2.5)) (2.5)	Inable Logi Ne Action Ne Action Ne Action Ne Action		Scale Low: 1280.0	No Action No Action No Action No Action	Scale High:	9460.0 Hysteresse 0.0 0.0 0.0	Heiding Duable Duable Duable Duable	Ine Y Y

5. Linear Channels for 3rd party Modbus slave devices to connect via Modbus protocol.

	otacali Madbus,J	OP 1	🖓 Use Conv	ertei Device Node address	1		P address		-	
Log			100		21				1	
	Trigger:	by fine		LogSpeed	1 Sec/Dot	1	LogNethod:	Instant	*	
	Cata Byte Types	4 Dyte		Value Lowy	1438	-	Value Highs	1.438	_	
	Gain:	1.0	-	Offset:	0.0	_	Decinal:	1	-	
On Ave										
	Register Type:	Inputites	ster (3iono)	· Data Type:	UDIT16	-	Starting Address:	b		
	CHAR			Income	Deable	-				
				1.000	Score of	100				
Cerversio				2004.0000	-		12.0100000		_	
	Турк:	(cruble		Engineering Low:	-1999.9	_	Engineering High:	14552.6		
				RAW Low:	8		RAM High:	e2235		
njiliarm	0000						2223		10020	
Type	SetPort		Log	Juli	-	In Artes	3082	Hysteress	Hotolog	Twe
		-		- No Artico		tio Artists		8.0	-	
	-	-		+ boarbon	-	Teo Action		la a	-	
10	. 6.0	1		w No Actor		Dia Action		20	-	
	-lho	-		a bio Action	-	tio Action		10 m	-	
10. F	and the second s			- I per recent)		her wrond		P	A	and the

6. Simulate Channels to simulate the input signals by the software

	rotacal: Modbus_T	or is ne	e Converte	riDevice Node address	12	(3)	3P oldress:				
1.40			12								
	Trigger:	by Time	-	LogSpeet	1 Sec/Del	-	LogMethed:	Distant	-		
	Cata Byte Type:	4 Byte	•	Value Laws	1.478	_	Take High	143			
	Gein:	1.0		Offect	0.0	_	Decinei;	1	-		
Tendetor											
2000	Wave Type:	Sine	-	WaveCyde/Sec:	400		Have Amplitude:	1120	-		
		1070 N			a						
	mave Offsets	440	1.1								
	mave Offsets	+40									
Scale	mave Offsets	++0	-	Forda i ano	Dava -	_	Consistent	From to			
Scale Scal	illave Officen In Transformations	H40 Diable	-	Scale Laws	-120.3		Scale High:	[1000.0			
Scale Scal Scal	www.chfsec. e Transformations SciPort	(++0) Dualse	3	Scale Lavo John	-420.3		Scale Highs Job2	[1003.0 Thistorese		Time	
Scale Scal nt/Alam Type H	Illeve Office) in Transformations Self-Vent • [776.0	HO Docke Log (No Action	2	Scale Laven Job 1 Jio Action	-120.0	jia Action	Scale High: 3082	(0.0 1000.0 1000.0	reiding [Deable	Sine •	
Scale Scal nt,Alam Type H	Were Office). In Transformation SetToert 1776.0 104.0	HO Duchie Log (No Action (No Action	-	Scale Lavo Jobil Jilo Action Jilo Action	-120.0	Jio Action Jio Action	Scale High: 3082	(1000.0 Historiss (0.0 (0.0	reiding Double	38 • I •	
Scale Scale nt, Alam Type H L	Weve Office). = Transformation: = Transformation:	HO Docke No Acton No Acton No Acton		Sole Lavo Mol 1 Juo Actori Juo Actori Juo Actori Juo Actori	-420.0	Pio Actor Pio Actor Pio Actor	Scale High: John 2	1000.0 Historists [0.0 [0.0 [0.0	rekting Doctor Doctor Doctor	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Scale Scale Scale NUMerry Type H L	Neve Offset) = Transformations = Transformations = T75.0 = T76.0 = T04.0 = T04.0 = T04.0 = T04.0 = T04.0	H40 Disable Lag (No Action (No Action (No Action	-	Scale Law: Job 1 Jio Action Jio Action Jio Action Jio Action	-420.0	No Action No Action No Action No Action	Scale High: Joh 2	1000.0 Historias [0.0 [0.0 [0.0]	reiding Doeble Doeble Doeble Doeble		

All the channel configurations are similar to recorder channel configuration. Every channel can be configured with 5 different types of events or alarms similar to the recorder and each event can be configured with two jobs.

Device Type: Display channel source

Bank: Display current Bank number

Tag Name: It is to define the name for each channel in a maximum of 9 characters Auto-Update: If you wish to modify Tag name and modify the configuration, deselect it Use Gateway-Device Node address: It is the address of selected device type IP address: Display current gateway IP address

Log Type: Enable/Disable. Select disable while a specific channel is not required at this time. Select enable while a specific channel is required

Log Speed: It is the logging speed (recording speed) of measured data. Select Log Speed column, then choose 1, 2, 5, 10, 15, 20, 30 seconds, 1,2,5,10,15 Minutes, 1 Hour, 2 Hour.

Log Method: The method of logging measured data. Select the column, and then choose the Log method of Instant, Average, Minimum or Maximum data

Instant: logging in the last measured data at the sampling interval Average: logging in averaged measured data at the sampling interval Minimum: logging in minimum measured data at the sampling interval Maximum: logging in maximum measured data at the sampling interval Trigger: Select various types like "by time" or "by change" or disable By Time: Data log based on Log Speed and Log Method

By Change: Depends on Tolerance setting. Log speed and Log Method is disabled if this option is selected and if this option is selected sampling rate is fixed at 1 sec. This option is selected to save memory in PC If data logging is required in set log speed (fixed time interval), select Trigger as by timer. If data logging is required only when there is a change in process value, then select Trigger as by change. This will save memory

Tolerance: This is enabled if "by change" is selected at Trigger Type. For example, if tolerance is set at 0.5, then if the new process value is more than or less than 0.5, then only the new sample will be logged

Data Byte Type: Choose 2 or 4 or 8 byte

Range Low: Range low for the specific channel in the selected device, ex: 4.00 mA **Range High**: Range high for the specific channel in the selected device, Ex: 20.00 mA

Decimal: select one of the options - 0, 1, 2, 3 or 4

Gain: It is a multiplier to correct the sensor error. The correct value = (the process value + offset) x gain

Offset: It is offset value to correct the sensor error

Unit: The engineering unit of input

Sensor: It displays input type automatically as per the type of IO card selected

Scale Low: Defines the low scale with decimal if necessary. For instance, input 0-10

V, the Scale Low can be set up with value 0.00 to be correspondent to low range 0 V.

Scale High: Defines the high scale with decimal if necessary. For instance, input 0-10 V, the Scale High can be set up with value 100.00 to be correspondent to high range 10 V.

5.2.3.3.4 Event

The Event is frequently used for Alarm purpose. The event can also be used for digital output DO, Timer, Totalizer, Counter or Report.

Type: There are various types of H, L, HH, LL, R, r or Error to be selected for job or Alarm purpose.

H: High limit. When the process is over a high limit, the alarm or job is actuated.
L: Low limit. Any the process is lower than the low limit, the alarm or job is actuated
HH: High high limit, to set up another limit higher than the high limit for double warning.
LL: Low low limit, to set up another limit lower than the low limit for double warning.

R: Increasing the rate of change. The job or alarm is actuated when the rate of increasing process value is greater than the specified rate time interval. For example, when the Setpoint is set to 100_1S, if the process is increasing greater than the value 100 in 1 second, then job or alarm will be actuated.

r: Decreasing the rate of change. The job or alarm is actuated when the rate of decreasing process value is greater than the specified rate time interval. For example, when the Setpoint is set to 50_2S if the process is decreasing greater than the value 50 in 2 seconds, then job or alarm is actuated.

Dev+: It is deviation+ event. This event will be triggered by the positive deviation of the process value. The job or alarm is activated when the process value is deviated by the value higher than setpoint from the previous process value.

For example,

Setpoint =10 At 10.00.01 Hrs., Tag1=40 At 10.00.02 Hrs., Tag1 = 51 Then, job or alarm is activated

Dev-: It is deviation- event. This event will be triggered by the negative deviation of the process value. The job or alarm is activated when the process value is deviated by the value lower than setpoint from the previous process value.

For example,

Setpoint =10

At 10.00.01 Hrs., Tag1=40

At 10.00.02 Hrs., Tag1 = 29

Then, job or alarm is activated.

Error: If there is an error in channel input, then alarm or job is actuated

Setpoint: To set up the process value for actuating Job1 and /or Job2

Hysteresis: To avoid job has been activated too often, the option available to set for no reaction in 0.1% to 10% of full span (Low Scale to High Scale).

Job1, Job2: When an event occurs, the task to be performed is called the job. A typical example is to trigger sound buzzer in the event of high temperature. Each pen can accept five events (or alarms) and each event can create two jobs. Various types of jobs can be selected:

5.2.3.3.5 Jobs

The following jobs are available for configuration to be executed on an event **No Action:** Do nothing

Log Alarm (Auto Ack): Record alarm with acknowledgement automatically

Log Alarm: Record alarms

Log Event: Record events

Send Email: Send an email if it is configured on an event

Sound Buzzer: Sound the buzzer on an event

DO Latch On: Set digital output/relay on, and then select Target let say DO 1. The relay is latched when it is activated. Digital Output relays will be shown if the digital output IO module is configured and available in the database

- **DO Latch Off:** Set digital output/relay off, and then select Target say DO 1. The relay is latched when it is activated. Digital Output relays will be shown if the digital output IO module is configured and available in the database
- **DO Process:** Set digital output/relay on for process high or low, and then select Target from DO 1 to DO 6. The relay is not going to be latched when it is activated. Digital Output relays will be shown if the digital output IO module is configured and available in the database

Enable Timer: Start the timer, and then select Target from Timer1 to Timer 100 or all Timers

- **Disable Timer:** Stop the timer, and then select Target from Timer1 to Timer 100 or all Timers
- **Preset Totalz:** Start the totalizer with a preset value, and then select Target from Totalz 1 to Totalz 50. It requires configuring totalizer via tools and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer
- **Reset Totalz:** Reset totalizer into zero, and then select Target from Totalz 1 to Totalz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer
- **Enable Totalz:** Start the totalizer, and then select Target from Totalz 1 to Totalz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer
- **Disable Totalz:** Stop the totalizer, and then select Target from Totalz 1 to Totalz 50. It requires configuring totalizer and enabling it to appear totalizer number in the jobs after selecting Preset Totalizer

Preset Counter: Start the Counter with a preset value, and then select Target from Cont1 to Cont50. It requires configuring Counter via tools to appear counter number after selection of Preset counter in the jobs

Reset Counter: Resets the counter into zero, and then select Target from Cont1 to Cont50.

Inc Counter: Increase the counter, and then select Target from Cont1 to Cont50 **Dec Counter:** Decrease the counter, and then select Target from Cont1 to Cont50 **Log Report:** Make the report for Counter and Totalizer **Reset MinMaxAve:** In Report function, after logging the MinMaxAve data of AI and Math channels for one day for example, then reset historical data in order to log new data for the next day

Log Message: Log customized comments for alarm as messages on an event. A total of 100 messages available for customer customization

Print Historical Data: Prints the historical data as per print auto output configuration. **Print Event List:** Prints the event list as per print auto output configuration.

Print Report List (Min/Max/Ave): Prints the report list as per print auto output configuration.

Print Snapshot: Prints the snapshot of the screen.

Output Historical Data: Output historical data to CSV format as per print auto-output configuration.

Log Report (Instant): Log the report with instant values.

5.2.3.3.6 Display Page Configuration

⁶ The display page configuration will allow the user to configure the display pages as per the requirement. The display pages will be auto-configured along with the auto channel configuration. The user can modify the channel and pages as per their requirement. There are 200 display pages available in Total with 24 pens/page.

Mode: This is for page enable or disable.

Page Marks: This is the name for the specific page. Ex: Section Kiln. Maximum 38 characters are allowed

Speed: This is the real-time trend display resolution. Select one of the options in 1 sec/dot, 2 sec/dot, 5 sec/dot, 10 sec/dot, 15 sec/dot, 20 sec/dot, 30 sec/dot, 1 min/dot, 2 min/dot, 5 min/dot, 10 min/dot, 15 min/dot, 1 hour/dot, 2 hour/dot, 10 min/page, 30 min/page, 1 hr/page, 2 hrs/page, 4 hrs/page, 8 hrs/page, 12hour/page, day/page and week/page. If you wish to see both Real-time and historical combined, then, select say day/page at the display. Then, the Real-time trend in screen will be for the last 24 hours update dynamically

Direction: Selects the trend direction horizontal or vertical.

Background: Defines the background colour of Trend mode in black or white **Pen**: Defines a specific channel as a drawing pen, its colour, width, Display Hi and Display Low.

Channel: Selects a specific analog input AI or Mathematics Math, or selects Disable if a specific channel is not required.

Color: Selects the colour for each pen.

Width: Selects the width of the trend, 1-thin, 2-medium, 3-wide.

Low: Defines the low scale for a pen on the display.

High: Defines the high scale for a pen on the display.

Forward / backward button: It is to navigate to next/earlier 8 sets of pens for display configuration

S Default														
						Page1								
1 2	3	4	5	6	7	8	1	9	10	11	12	13	14	
6	Mode:	Enable		•	Page	Marks:				Speed:	1 Se	c/Dat		
Dire	action:	Horizon	tal.	•	Page1		_	-	Ba	ickground:	Block	t.	•	
Lon			-	-	10. 					and arala-	LATI		-	
ren.	L DADES	1.	1	÷.						ong proje-	larr.			
No,		Chenr	iel .		Color		w	dth		Low		High		
1	Alt		-	-	Blue	*	1		-200.	0	1100	.0	-1	
2	AIZ			-	Green	-	1	*	-270.	0	1370	.0	-	
3	AB			•	Cyan	-	1	*	-270.	0	400.0	D	-	
4	A34		-	-	Red		1		-270.	0	800.0	0		
5	AIS			•	Magenta	-	1	-	0.0		1820	.0		
6	A36			•	Yellow	*	1	*	-50.0	ę – B	1760	.0		
7	AI7			•	Gray	•	1	+	-50.0		1760	.0		
1.1.1.2.2	1.10			-	Deep Blue	*	1	+	-270	0	1300	0	-	

5.2.3.3.7 Tools Configuration

The real-time viewer has Timers, counters, Totalizers as tools for the user to use as per the application requirement.

1. Timers

Maximum 100 timers available for configuration

Type: Countdown, Repeat Countdown, Daily, Weekly or Monthly.

Countdown: Defines the interval of time, e.g., days, hours, minutes and seconds. (Not Real-Time clock)

Repeat Countdown: Repeats the previous countdown.

Daily, Weekly or Monthly: The timer works in the selected interval of Real-Time clock **Action:** Disables or enables the timer.

Job1, Job2: various jobs as described in jobs for each timer.

imer	Counte	×	otenzer		Timer1					
1 :	2 3	4	5	6 7	8	9	10 1	1 12	13	14
	Type: Count	dawn		•	Action:	Disable	1		•	
Time										
	0	•	0	•	0	•	1	•		

2. Counters

Maximum 50 counters are available.

Name: Defines the name of the counter.

Desc: Defines the description for a specific counter on the display. **Unit:** Defines the unit of counter

Preset: Defines the preset value for the counter. The counter starts from a preset value.

Event: Defines the type, setpoint, Job1 or Job2.

Type: Select one of three options: None, Process Hi, Process Low **Setpoint:** Defines the setpoint of process value to trigger the counter. **Job1, Job2:** various jobs as described in jobs for each counter

		9	3 01		: + + ‡ 🕅 🔟	
Т	imer	0	Counter	Totalizer		
				Cou	nter1	
1	2	1	3 4	5 6 7	8 9 10	11 12 13 1
	Nam	e: 0	ont1	Desc:		
	Un	n: [Preset: 0	_	
Eve	nt/Alarn					
No.	Тур	B	SetPoint	Log	Job1	Job2
1	NO	•	100	Log Alarm(AutoAck) •	No Action	No Action
	1		100	Log Alarm/AutoAch)	No Action	No Action

3. Totalizers

Maximum 50 Totalizers are available.

Name: Defines the name of the totalizer.

Desc: Defines the description for a specific totalizer on the display.

Source: Select a specific analog input or Math input to be used for totalizing. **Action:** Disables or enables the totalizer.

Decimal: Defines the decimal point for the totalizer.

Period: Selects second, minute or hour used for the totalizer.

Unit: Defines the unit of totalizing

Preset: Defines the preset value for the totalizer. The totalizer starts from a preset value.

Low Cut: If Source channel has below this setting, then the value is skipped from Totalizing

Event: Defines the type, setpoint, Job1 or Job2.

Type: Select one of three options: None, Process Hi, Process Low

Setpoint: Defines the setpoint of process value to trigger the totalizer.

Job1, Job2: various jobs as described in jobs for each totalizer.

b 1-	ul Time Config	ute			- D X
6		3 01		1 + + 1 R ()	
Ti	mer (Counter	Totelizer		
38	39	40 41	42 43 44	talizer13 45 46 47	48 49 50 <u>•</u> •
	Name:	folz13	Desc	[
	Source:	Conti	Action:	Disable •	Decimal: 1
	Period:	Sec 💌	Unit:		Preset: 0.0
	Low Cut:	0.0			
Eve	nt/Alarm				
140.	Type	SetPoin	t Log	Job1	Job2
1	ND -	100.0	Log Alarm(AutoAck)	No Action	No Action
	NO -	100.0	Lon Alarm(AutoAck)	No Action	No Action

5.2.3.3.8 Comments

There are 100 comments are available to customize the alarm messages. The user can select one comment from this list when to log message or send Email jobs are configured. Each comment can accept a maximum of 50 characters.

4	ceal Time Configure	- U X
ы	🛤 💫 📖 😓 🙆 🔊 📾 🚷 🖩 🚳 🥅 🗦 + + ÷ 🗮 🔯 🔟	
-16	â Modity	
No	Contant	
NO.	Content	
1	Chi Hi Alarm	
2	Message2	
3	Message3	
4	Message4	
5	Message5	
0	Messageo	
1	Message/	
8	Message8	
9	Message9	
10	Message10	
11	Message11	
12	Message12	
13	Message13	
14	Message14	
15	Message15	
10	Message10	
1/	Message17	
18	Message18	
19	Message19	
20	Message20	
21	Message21	
22	Message22	
23	Message23	
24	Message24	
25	Message25	
20	Messagezo	
20	Message27	
28	Message20	
29	messafeta	

5.2.3.3.9 Auto Configuration

The Autoconfiguration will automatically configure the tags from the recorder, IO Module and controllers. This will simplify the project setup procedure. **Device type:** Select IO Card for the addition of IO Module into the network **Bank:** Select bank from 1 to 4 as per bank configuration **IP Address:** IP address of the IO module. After Entering the IP address press '+' to add to the IP List.

- **IP List:** IP List of the IO modules. If any recorder needs to be removed from the list, then select the IP address from the list, then press'- 'to remove the IP from the list.
- **Use Converter:** Device Node Address: If the device is connected to PC via PC-E converter or IO module connected via Ethernet then select this option and enter the node address of the device.

From: Start address of the device in the RS485 network.

To: End address of the device in the RS485 network. This is not applicable for Recorders. Click on "OK" to add all the devices into network configuration

😵 Auto-configuration	- 🗆 X
Device Type: I/O Card	Bank: 1
Protocol: Modbus_TCP	
LogSpeed: 1 Sec/Dot	LogMethod: Instant
- IP address	
Example: 192.168.0.25	< Please key in IP here and then press '+' button to add it to the IP list.
IP List: 192.168.0.112	+ - Please select one IP form IP List and then press '-' button to remove it.
Use Converter	
 Use Converter:Device Node address Set node range 	From: 1
Select Display Tag	
C 1.PV	
© 2.PV and SV © 3.PV, SV and MV	
🗸 ок	X Cancel

Auto-configuration	
-	—
Device Type: I/O Card	Bank: 2
Protocol: Modbus RS232	,
LogSpeed: 1 Sec/Dot	LogMethod: Instant
Node address	
From: 1	To: 5
Use Converter	
- Use Converter Ive Converter:Device Node address	From: 1
⊂ Use Converter ✓ Use Converter:Device Node address ✓ Set node range	From: 1 🚖
Use Converter Use Converter:Device Node address Set node range Select Display Tag	From: 1 ♀ To: 1 ♀
Use Converter Use Converter:Device Node address Set node range Select Display Tag C 1.PV	From: 1 🚖 To: 1 文
Use Converter ✓ Use Converter:Device Node address ✓ Set node range Select Display Tag C 1.PV C 2.PV and SV	From: 1 🚖 To: 1 🜩
Use Converter Use Converter:Device Node address Set node range Select Display Tag C 1.PV C 2.PV and SV G 3.PV, SV and MV	From: 1 🜩
Use Converter ✓ Use Converter:Device Node address ✓ Set node range Select Display Tag C 1.PV C 2.PV and SV G 3.PV, SV and MV	From: 1

5.2.3.4 Create a New Project

To create a new project, follow the below steps.

- 1. Click the icon in or select New from File Menu.
- 2. Set a name for the project

Enter the ne	ew name : Projec	:t227	
Γ	🖌 ОК	X Cancel	

3. The Software requests the user for auto-configuration. Press No to configure the communication Banks.

nformat	ion		
?	There are no tag da configure it ?(Y/N)	ta in the project !! Do	you want to

4. Click Bank icon 🔯 to configure communication bank.

	Ω	RAD	2 🔞 🛄 🗦	+ - ± 🕅 🧰		
₹i Add	-13	Modify	Tibelete			
No. Node Name	71	Tag Name	Bank	Use Converter	Node/IP	 Devis

- 5. There are 4 different banks are available for the user to configure. It will allow the software to read the data from different communication networks like RS232, RS485, and Ethernet.
 - 5.1. If the device is connected to PC via Ethernet port, then configure the bank with Protocol as Modbus_TCP and port no as 502.

RealTime Carrigues	- 🗆 ×
Bank1 3 2 3 4	
Protocol: Modbus_TCP	
Eternet	
Part : 902	
Fornat : Standard	
Default	

5.2. If the device is connected to PC via RS232 or RS485 port then configure the bank with Protocol as Modbus_RS232 and other communication parameters such as com port no, Baud Rate, Parity, Data Bits and Stop Bits as per the connection.

5.3. After configuring the banks close the configuration viewer and restart the program.

ormat	ion	
0	To let the new Bank setting take effect, system	will save them
U	then restart II Continue ?(I/N)	

- 6. Click the icon or select New from File Menu.
- 7. Set a name for the project



8. The Software requests the user for auto-configuration. Press yes to configure the tags of the device automatically by the software.

in officia	tion		
?	There are no configure it	tag data in the project !! Do ?(Y/N)	you want to
			10

- 9. Add the device to the project as per the connection.
 - 9.1. Select IO Card as a device type to read the data from the IO Module.
 - 9.2. Select the Bank as per the connection
 - 9.3. Enter the IP address and press'+'key to add the device to the project. It there are any existing devices in the list and needs to be removed then select the IP address and press'- 'key to remove.

Auto-configuration	—
Device Type: I/O Card	Bank: 1
Protocol: Modbus_TCP	
LogSpeed: 1 Sec/Dot	LogMethod: Instant
_IP address	
Example: 192.168.0.25 192.168.0.112	< Please key in IP here and then press '+' button to add it to the IP list.
IP List:	+ - - - - - - - - - - - - - - - - - - -
Use Converter	-
Set node range	To: 1
Select Display Tag	
Select Display Tag	
Select Display Tag C 1.PV C 2.PV and SV	

- 9.4. Configure the log speed and log method
- 9.5. Press OK to establish the communication and auto-update the tags from the IO Module.

🎲 R	ealTime Configure						- 🗆 X
	🕦 🔀 🔲 🔈	🟦 🔪 🖻 🖏 🗔	🐒 🔳 🗦	+ + ‡			
	才 iAdd	± ¶Delete	🖄 Modify				
No.	Node Name	Communication	Tag Name	Bank	Use Converter	Node/IP	Device Type
	All List		TCS1	1	Yes	1 / 192.168.0.112	I/O Card
1	I/O Card	Enable	TCS2	1	Yes	1 / 192.168.0.112	I/O Card
			TCS3	1	Yes	1 / 192.168.0.112	I/O Card
			TCS4	1	Yes	1 / 192.168.0.112	I/O Card
			TCS5	1	Yes	1 / 192.168.0.112	I/O Card
			TCS6	1	Yes	1 / 192.168.0.112	I/O Card
			TCS7	1	Yes	1 / 192.168.0.112	I/O Card
			TCS8	1	Yes	1 / 192.168.0.112	I/O Card
S		>	<				>

- 9.6. If there is more than one device is added to the project then the tag configuration of all the devices will be listed.
- 10. Close the Real-time configuration viewer to update the tag contents and logging the data from the configured devices to PC. The configuration Viewer can be

closed by pressing the X key on the right side top or 0 key.

🔮 RealTime Configu	re		×
≓i Add	🖹 Modify	± į Delete	

11. Press yes to apply the new settings to the project.



12. If the USB License key is not plugged to the USB port of the PC, then the Software will show the warning message and start the demo mode. The software will stop working after the demo period.



- 13. Press OK to start in demo mode.
- 14. If the USB License key is plugged into the USB Port of the PC, then the software will start reading the data from the devices and log the data to the PC.

Display real-time	measured value from: C:\Data Acqui	isition Studio\RealTime\TCP_IO.daq Help(H)							- d	J X
🗈 👌 📽 🗍 🖬	*== 	🚾 🏭 🏣 🛛 🏦 T/O Card 🔄 🔳 🗍	R Recorder (VR 18)	bi 🐒	*	6 #			A 15:	41:15
Event/Alarm Lis	t		- • ×	Bar-Page1						
Ack Type 1 Login	Source System	Active Time Clear Time 03/04/22 15:39:38	Value/Content	1370.0 . 1213.0 . 1056.0	1370.0 1213.0 1056.0	1370.0 1370 1213.0 1213 1056.0 1050	0.0 1370.0 3.0 1213.0 5.0 1056.0	1370.0 1213.0 1056.0	1370.0 1213.0 1056.0	1370.0 1213.0 1056.0
						899.0 <td>0</td> <td></td> <td></td> <td></td>	0			
< √ Adk	V 1AI Alarm	Normal Event/Cleared	>	TCS1	TCS2	TCS3 TCS4	TCS5	TCS6	TCS7	TCS8
🔢 Digital-Page1			- • ×	🚾 Trend-Page					-	
TCS1	26.9	1652 26.9		1370.0 1213.0 1056.0 899.0			1 Sec/Dot			
TCS3	26.9	1054 26.9	÷c	742.0 585.0 428.0 271.0						
1000	-3276.8	-3276.8	°c	-43.0 -200.0	15:33:00 03/04/22 TCS1	15:34:40 03/04/22 TCS2 TCS3	15:36:20 03/04/22 TCS4 TC	15:38:00 03/04/22	15:39:40 03/04/22 TCS7 TC	58
1057	-3276.8	- 3276.8	°C	₿ ₩ ₩ 📰						
Page1-Page1	Sampling Rate: 1 Se	c Scan Time:	30 ms							

5.2.3.5 Open an Existing Project

To open an existing project the following procedures to be followed.

- 1. Click the icon 🚵 or select Open from File Menu.
- 2. The software will list the projects from the default project path for the user to select.

Look in	RealTime		•	- 🗈 💣 💷 -		
4	Name			Date modified	Type	-
	Project22	7.dag		08-01-2019 14:34	DAGE	
Guick access	gfhghg.da	PQ		04-01-2019 09:22	DAGE	
	Project10	.deg		29-11-2018 11:14	DAQF	
Dealston	SO.deq			22-11-2018 11:48	DAQF	
	Project248	.dag		01-11-2018 16:16	DAQF	
	Tsie.dag			05-09-2018 19:03	DAGE	
Lérates	t2343.daq			27-08-2018 14:41	DAQF	
	ytjytju dag	1		26-07-2018 10-46	DAQE	
-	ewfe.slag			26-07-2018 10:10	DAQF	
This PC	hi.daq			26-07-2018 10:02	DAQF	
1	psb.10R			20-07-2018 13:42	DAQF	
Matural	gadds.dag			30-05-2018 10:12	DAQF	
THOLE WAR	€ 16421.deo			11-05-2018 11:03	DAO F	ŝ
	Rename:	Project227	_	•	Open	
	Files of type:	Project files (* das)		-	Canoel	5

- 3. Select the project and click Open to open the project.
- 4. If the USB License key is not plugged to the USB port of the PC, then the Software will show the warning message and start the demo mode. The software will stop working after the demo period.



- 5. Press OK to start in demo mode.
- 6. If the USB License key is plugged into the USB Port of the PC, then the software will start reading the data from the devices and log the data to the PC.



5.2.3.6 Add a Device to the Existing Device

It is possible to add a device to the existing project and log the data. For adding the device to the existing project follow the procedure as follows.

- 1. Open the project by using the Open project option as explained above.
- 2. Go to Configuration by using Configuration data in the View menu or icon on the Toolbar.

		TIULAN T		поеник юл 🔻		T	
🏶 R	ealTime Configure						$ \Box$ \times
	😫 🔀 🖾 📚	🟦 🔪 🖩 🖏 🖬	* 🛯 📾 🕅	+ + ‡	* 0		
	⊋ `Add	±¶ Delete	🖄 Modify				
No.	Node Name	Communication	Tag Name	Bank	Use Converter	Node/IP	Device Type
	All List		TCS1	1	Yes	1 / 192.168.0.112	I/O Card
1	I/O Card	Enable	TCS2	1	Yes	1 / 192.168.0.112	I/O Card
			TCS3	1	Yes	1 / 192.168.0.112	I/O Card
			TCS4	1	Yes	1 / 192.168.0.112	I/O Card
			TCS5	1	Yes	1 / 192.168.0.112	I/O Card
			TCS6	1	Yes	1 / 192.168.0.112	I/O Card
			TCS7	1	Yes	1 / 192.168.0.112	I/O Card
			TCS8	1	Yes	1 / 192.168.0.112	I/O Card
1							
`		/					>

3. Click Add and configure the device information to add an additional device to the project.

	114	aro cara	LINDIE	111002	-	100	1 / 172.100.0.112	40 Curu	
Add.	A Tag							_	\times
	Device Type	: I/O Card	•	Bank: 1			Tag Name: Auto		
	Protoco	I: Modbus_TCP	Use Conve	rter:Device Node address	1		IP address: 192.168.0.112		
Log	,								
		Trigger: by Time	•	LogSpeed:	1 Sec/Dot	•	LogMethod: Instant		
	Data	Byte Type: 4 Byte	Ŧ						
				🗸 ок	🗶 Ca	ncel			

4. Now the real-time configuration will update the tags with new device information.

🏶 RealTime C	onfigure	% 🖬 🕅	\$ + + \$			- 0
≓ Add	±¶ Delete	Modif	/			
No. Node N	ame Commu	nication Tag Name	e Bank	Use Converter	Node/IP	Device Type
All List		TCS1	1	Yes	1 / 192.168.0.112	I/O Card
1 I/O Ca	d Enable	TCS2	1	Yes	1 / 192.168.0.112	I/O Card
2 I/O Ca	d 2 Enable	TCS3	1	Yes	1 / 192.168.0.112	I/O Card
		TCS4	1	Yes	1 / 192.168.0.112	I/O Card
		TCS5	1	Yes	1 / 192.168.0.112	I/O Card
		TCS6	1	Yes	1 / 192.168.0.112	I/O Card
		TCS7	1	Yes	1 / 192.168.0.112	I/O Card
		TCS8	1	Yes	1 / 192.168.0.112	I/O Card
		TCS1_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS2_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS3_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS4_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS5_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS6_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS7_2	1	Yes	1 / 192.168.0.112	I/O Card
		TCS8_2	1	Yes	1 / 192.168.0.112	I/O Card
		> <				

5. Close the Real-time Configuration Viewer to update the project with the new device.



5.2.4 Dynamic Data Exchange (DDE)

Dynamic Data Exchange (DDE) is a standard inter-application communication protocol built into Microsoft Windows operating systems and supported by many applications that run under Windows. DDE takes data from one application and gives it to another application. It allows Windows programs that support DDE to exchange data between themselves.

Data from DAQ software can be exchanged with Excel on the DDE link. After completion of all network configuration (adding of all Modbus slaves), then open Data acquisition studio software – Real-time viewer. Open the existing project or create a project then go to File Menu in Real-time Viewer then select Create DDE Link in Excel.

Display real-time me File(F) View(V) Page	asured v e(P) Wi	alue from: C:\Dat ndow(W) Langi	a Acquisition Studio\RealT uage(L) Help(H)	ime\Project187.daq						
🗋 New 🌛 Open				I/O Card 🚽 📱						
Save As		urce	Active Time	Clear Time						
Recent	•	tem 2.168.0.187	17-01-19 02:03:54 PM 17-01-19 02:04:19 PM							
Create DDE link in E	cel		17-01-19 02:04:19 PM 17-01-19 02:04:19 PM							
O Exit			17-01-19 02:04:19 PM 17-01-19 02:04:19 PM							

Specify the path and file name as follows. By default, the file name will start with DDE and the project name with underscore. Save the file name in PC at the selected path as above to proceed further.

Save As					8
Save in	n: Desktop		•	• 🖻 💣 🖬 •	
Autock access	(One	Drive			1
Desktop	и 💦	LLAI NAYAGAM			
Lbrates	J This	PC			
This PC		aries			
Network	SUHC SUP	GB free of 29.7 GB			
	File name:	DDE_Project187		•	Save
	Save as type:	Excel file (" cav)		-	Cancel

For example, if Desktop is selected in the path, then excel file should be available in Desktop. If the MS Office is not installed on the PC, then you cannot open the excel file created in the above procedure. Please contact your system administrator to install MS office software in the PC. Now try to open the file from Desktop created for using DDE application with the recorder through Real-time viewer Software.

Microsof	ft Excel				×
٨	This workbook contains links If you trust the links, update t	to one or them to ge	more external sources that t the latest data. Otherwis	t could be unsafe. e, you can keep worl	ting with the data you have.
	Upd	iate	Don't Update	Help	

Click on update to activate DDE between DAQ software and Excel application. If the DDE is successful, then real-time data of the channels should be updated in the excel file as shown in the sample screen.

111 10	HR.	HERE MADE	0.011	IDANG	0.00		vite vite						100,91	ertil-be	9									-	-	iden-1
C Roa	-	2080 8 7 9 -	-[11 - [11 -	-x 1 h-4-	1 1 1 1 1 1 1 1	0. 12.12	() Anno () Marga	leel In Carter	(Consult T(t) = 5	4	- II		Hore	111.300	Bet .	-	itoti rput	inter a	el U e Det	Coloniati Note			∑histan ∰ia+ €Da+	The R Part		
1909101	()	4	foat			144	and they			-						19491						141	1	019		
	1.1	2 1 6	Tanta																							
		14	14							1.4	1 41	44					14								1.0	100
The second	-	1 August							-													-		5		
ALI	¥.	100.0																								
AL	4	1110.1																								
40	÷.	284																								
AM	*	375.3																								
AB	ю.	1354.7																								
440	£.	1224.0																								
AIT	5	1110.0																								
AB	<u>۲</u>	202.5																								
MP	*c	418.9																								
A10	sc	292.7																								
MIL	÷	1913																								
A12	۳	592.6																								
ALL	۴	-19.6																								
ADE	7	345.4																								
ALD	2	1085.7																								
ALSO.	-	112.1																								
AU	2	10DL1																								
ALLS .	7	795.3																								

DDE expression format to get real-time data from the Real-time Viewer software is as follows.

=RealTime_Viewer|TagService!_TagN Where N = 1,2,3.... Application = RealTime_Viewer Topic = Tag Service Tag name = _Tag1 (Please observe underscore before the tag number)

It is possible to exchange data related to AI, DI, DO, Counters and Totalizers between

DAQ software and third-party applications running under Windows operating systems via DDE.

5.2.4.1 Procedure to find the tag number for the tag name to use in DDE applications

- Create a DDE link from Real-time viewer.
- Open Excel file. Three columns appear in the excel file as Name, Unit and Value as shown in the Excel file.
 - > **Name:** This is tag name actually defined in the channel configuration
 - > Unit: This is unit for the tag name defined in the channel configuration
 - Value: This is the specific cell where the process value for the tag will appear in real-time.
- To find the DDE format for any tag in channel configuration, for a specific tag, double click at "Value" column for the corresponding tag defined at Name. For example, For Name= AI1 is at R2C1, double click at cell R2C3 to see DDE format for AI1. Click on Esc button at the keyboard to see process value at the cell from displaying DDE format.

Ø		0 - Cp -	-									
	FILE	HOME	INSERT PAGE LI	TUOWA	FORMULA	S DATA	REVIE	W				
1	Xc	ut	Calibri	- 11	• A* A*	= =	æ, .	1				
P	inte at E	opy =	8 I U -	u · ⊡ · <u>۵</u> · <u>▲</u> · = = =								
	Clipbe	ard		ont	6		Align	me				
c	2	• 1	× - / fe	=Real1	imeViews	er TagServi	cel_Tag1					
	A	B	c	D	E	- F -	G					
1	Name	Unit	Value					Т				
2	AI1	*C	-194.5									
з	AI2	*C	-181.7									
4	AI3	°C	-200.7									
5	Al4	°C	-106.3									
15	AI14	*F	453									
16	AI15	°F	1588.4									
17	AI16	*F	1503.4									
18	AI17	*F	1516.9									
19	AI18	۴F	923.8									
20	AI19	*F	645.6									
21	A120	*F	386									
22	AI21	°C	-60									
23	AI22	*F	-32.8									
24	A123	%	20									
25	AI24	%	30									
	1.100	1.00										

- If any "Error" appears in any cell at excel, possible reasons are no data available at the selected tag. Check the channel configuration and make sure value is available
- If any "NAME" text appears in the excel file, it indicates that particular tag is not configured properly. Tag name may not available at DAQ software.

Note:

If Excel file is not opening from the selected path, then check the following

- ✓ RAM size in the PC is very less. Restart the computer and then create the DDE link once again and open the Excel file.
- ✓ Increase virtual memory in the PC. Please contact the system administrator to check the virtual memory settings at the PC.

My computer-properties-advanced-performance settings –advanced virtual memory.

5.2.4.2 DDE with 3rd party applications

Once the data is available at Excel at a particular cell, then data can be exchanged with the 3rd party applications like PLC, SCADA, and Visual Basic etc. If data is to be exchanged with PLC, then PLC programmer can write Visual basic macro in Excel from the following link

Excel - Tools - macro

For the source code examples, PLC programmer may check the PLC manuals for DDE sample macros. It is also possible to exchange data from recorder to SCADA applications through DDE.

5.2.5 Historical Viewer

The Historical data of the project can be viewed and analyzed by using the Historical Viewer software. The Historical data can be accessed by using the Measured Data option on the view menu on the real time Viewer.

89	Display	y real-time measure	d value from: C:\Data Acqui	sition Studio\RealTime\TCP	_IO.daq								-	0	×
Fi	ile(F) V	/iew(V) Page(P)	Window(W) Language(L)	Help(H)											
	0 63	Configuration da	ta Ctrl+Alt+C	🔣 🏭 😿 🛛 🏦 I/O Ca	rd 🔻 🖪]	Recorder(VR18) 💌	D	2	-				Ω	15:59:	22
	Even	Measured data	Ctrl+Alt+M				ili Bar	-Page1							• ×
	Ack	Туре	Source	Active Time	Clear Time	Value/Content		1370.0	1370.0	 .370.0 -	 1370.0	1370.0	137	·0.0	1370.0
1	1	Login	System	03/04/22 15:46:39			1			1	1	1	1	1	

Once you select the measured data, the historical data of the project can be viewed and analyzed. Disabled items on the historical viewer tool bar are not supported for real time viewer project analysis.



5.2.5.1 Historical Viewer-Tool Bar

The historical viewer has below tools on the tool bar.



✓ [™] Snapshot
✓ ✓ Show Statistics
✓ Manually Export data in PDF
 ✓ Osearch by Specific Time
✓ [™] Search by Specific Period
 Search by Handwrite
✓ 💶 Fast Backward
✓ ✓ Backward
✓ Forward
 ✓ [➡]Fast Forward
✓ 🔍 Zoom In
✓Zoom Out
✓ 🔍 Zoom All
✓ Zoom Size ▼ Zoom Size
✓ Zoom By Time
✓ Zoom By Time and Value
✓ ^{IIII} Select Period (Period A to B)
 ✓ Sy Horizontally
✓ 💆 By Vertically
✓ White Background
✓ ■ Black Background
✓ Khow Trend View
✓ 🦉 Show Circular View
✓ / Next Page
✓ 🐴_Manually import measured data
✓ <u></u> Configuration
✓ Page Configuration
✓ 1 Scale Selection
✓ Batch1-1 ■Batch Selection

✓ Signature List

Logout
 Seek by Taq Name
 Seek by Event/Alarm
 Seek by Event/Alarm
 Seek by Trend Remark
 Seek by Trend Remark
 Seek by Signature
 Seek by Signature
 Trend Scale List
 Trend Scale List
 Batch Comments
 Batch Comments
 Decode method

5.2.5.2 Historical Viewer-Menu Bar

The menu bar consists of 8 menus. They are listed as below.

- 1. File(F)
- 2. Edit(E)
- 3. View(V)
- 4. Display(D)
- 5. Page(P)
- 6. Search(S)
- 7. Language(L)
- 8. Help(H)

Display measured values from histor File(F) Edit(E) View(V) Display(D)	cal data of CAHistorical Viewer/Historical/Project227.dag Page(P) Search(S) Language(L) Help(H)	
🖹 👌 🛱 📚 🛛 🗟 🔳 🚳 🔳	🞯 🗞 函 🕼 🖓 🕸 🖬 🔯 👌 음 옥 💈 + + + 후 옥 옥 옥 12 Hour/Page 💽 团 田 田 🖉	🛛 🖗 🐨
🗟 🌯 👂 📄 🛛 1 Scale	V Batch1-2 V B	

5.2.5.2.1 File (F)

Below are the submenu options available in File Menu.

File(F)	Edit(E)	View(V))
Nev	v	Ctrl+N	
👌 Оре	en	Ctrl+0	a
🖺 Save	e As	Ctrl+S	
為 Prin	t	۲	
Rec	ent	۲	
∱ Log	out		
Exit			
1206	.0-		

- 1. New: Create a new project.
- **2. Open:** Open an existing project.
- 3. Save As: Save the project with a new name.
- **4. Print:** Print the data.
- 5. Recent: Open recently opened projects.
- 6. Logout: Log out the current user.
- 7. Exit: Exit the program.

5.2.5.2.2 Edit (E)

Below are the submenu options available in Edit Menu.



- 1. Manually Import: Manually import the data from the device.
- Automatically Import and Export Option: Automatically import the data from the device and exported to Excel, PDF or Database format
- 3. Manually export data to Excel: Manually export the data to excel
- 4. Manually export data to Database Format: Manually export the data to the database format .csv
- 5. Manually export data to PDF: Manually export the data to PDF
- 6. Clear: Clear the data from the project for a specific time period or all.
- 7. Copy: Copy the screen
- 8. Remark: Add remark to the data
- 9. Snapshot: Print the snapshot of the trend view.
- **10.** Show Statistics: Show the statistical data Min, Max, Ave, P-P, Mean, RMS, Point A, Point B, difference of point A and point B (A-B) of the displayed trend.

11. Signature: Shows the list of signatures on the data.



12. Display Configuration Option: Select the display configuration as automatically or manually.

5.2.5.2.3 View (V)

Below are the submenu options available in the View menu.



This will allow the user to select the different zoom rate for the data, vertical or horizontal direction of the trend and black or white background.

5.2.5.2.4 Display (D)

The below are the submenu options available in Display Menu.

🗋 🚵 👫 📚	Trend View	lt 🔒	🙆 🚺 🖻		=++=
# \land 🖉 🖿	1 Sc Event/Alarm Lis	2		R X	
AI1	Value List				
1370.07					

Display measured values from historical data of C:\Historical Viewer\Historical\Project2271.daq

- 1. Trend View: View the data in trend view mode.
- 2. Event/Alarm List: View the Event and alarm List of the data.
- 3. Report List: View the report list of the data.
- 4. Value List: View the data in Value List mode.

5.2.5.2.5 Page (P)

The below are the submenu options available in Page Menu.

Display measured values from historical data of C:\Historical Viewer\Historical\Project181.daq

File(F) Edit(E) Vi	ew(V) Display(D)	Pag	Je(P) Search(S)	Language(L)	Help(H)
🗅 🚵 🛤 📚	🗮 🔳 🙆 🔳	•	Page1 1	۵ 🖬 🖻	0 🕰 🔍 😫 🗸
# 🏚 🖉 🐚	1 Scale		Page2 2	-	R &
600.0			Page3 3		
			Page4 4		
			Page5 5		
520.0			Page6 6		
-			Page7 7		
1			Page8 8		
-		1			
440.0					

The user can select the display page to be viewed from the shown list.

5.2.5.2.6 Search (S)





- 1. By Time: Search the data at a particular time.
- 2. By Period: Search between two periods. Hold the mouse left key and move to select the period A and Period B.



- 3. By Handwrite: Search the data by handwriting.
- 4. By Tag Name: Search the data by tag name.
- 5. By Event/Alarm: Search the data by Event or Alarm.
- 6. By Remark: Search the data by the remark.

5.2.5.2.7 Language (L)

The display language of the software can be changed by selecting any one of the available languages from the sub-menu.

🗋 🚵 📇 🍃 📃 📾 🗐	Batch1-1	Brazil Portuguese Czech	++= @ @ @	Zoom Size 🔹 🔣	a a a ⊽ w ⊡
600.0		Danish Dutch			۵.
		English			
520.0-	******	German			
		Greek			
		Italian			
+0.0		Japanese			
		Korean			
		Polish			
360.0		Pontuguese			
		SimplifiedChinese			
290.0-		Spanish			
20010		Swedish			
		Thai			
200.0-		TraditionalChinese			
		Turkish			
120.0-					
-					

5.2.5.2.8 Help (H)

The help menu provides information about the software and the necessary information.



- 1. Historical Viewer: Open the software help file.
- 2. About: Provides the information about the software like version and other related information.

6 Specifications

6.1 Environmental

Operating Temperature-10°C to +50°CStorage Temperature-40°C to +85°CHumidityUp to 95% non-condensing.

6.2 EMC Installation Instructions

- 1. Screened twisted pair cable must be used for I/O and communications with the screens grounded at one point as close to the Modbus TCP module as possible.
- 2. The Modbus TCP modules must be installed in an appropriate enclosure inaccessible to the operator during normal use.

6.3 EMC Test Results

dhua TCD EMC Teat Desults

		รนแร										
Test	Standard	Test Value	Modb	us TCP	Produc	t Comp	liance					
Immunity Test EN 61326-1	t Results		16DI	16DO	8DIO	4RO	8AIIS	8AIVS	8TCS	6RTD	8AOI	8AOV
Electrostatic	IEC	8KV Air	А	А	А	А	А	А	А	А	А	А
Discharge	61000-4-2	4KV Contact	A	A	A	A	A	A	A	A	A	A
Radiated Field	IEC 61000-4-3	10V/m	A	A	A	A	A	A	A	A	A	A
Fast Transients	IEC 61000-4-4	Power 2KV	A	A	A	A	В	В	В	В	A	A
		I/O 1KV	А	А	А	А	В	В	В	В	А	А
Surge	IEC 61000-4-5	Power 1KV/2KV	A	A	A	A	A	A	A	A	A	A
RF Conducted	IEC 61000-4-6	Power 3 Vrms	A	A	A	A	A	A	A	A	A	A
Voltage Interrupt	IEC 61000-4- 11	0.5cycle 100%	A	A	A	A	A	A	A	A	A	A
Voltage changes, flicker	IEC 61000-3-3		A	A	A	A	A	A	A	A	A	A
Emissions Tes EN 61326-1 CI	st Results ass A											
Radiated Emissions	CISPR 11	Class A			0				0			
Conducted Emissions	CISPR 11	Class A			0							

6-1 EMC Test Results

6.4 CE Conformity Certificate

BrainChild Electronic Co., Ltd.

209, Chung Yang Rd. Nangang Dist. Taipei, Taiwan Tel : 886-2-2786-1299 Fax : 886-2-2786-1395 偉林電子股份有限公司 115台北市南港區重陽路 209號 E-mail: sales@brainchild.com.tw Website: www.brainchild.com.tw

We, Brainchild Electro	nic Co., Ltd. declare that our product:
	Ethernet IO Modules
with the	following model designation
IO-16DI-E, IO-16DO-E, IC IO-8TCS-E, IC	0-4RO-E, IO-8DIO-E, IO-8AIIS-E, IO-8AIVS-E, 0-6RTD-E, IO-8AOI-E, IO-8AOV-E
Is herewith confirmed to comp Directive on the Approximatio Electromagnetic Compatibility [2014/35/EU] . For the evaluation standards were applied:	ply with the requirements set out in the Council n of the Laws of the Member States relating to ([2014/30/EU] and Low-voltage Directive ion regarding the Directives, the following
EN 61326-1: 2013 CISPR 11: 2009 +A1: 2010 [C EN 61000-3-2: 2014 Class A EN 61000-3-3 : 2013	Group 1, Class A]
LVD:	
EN61010-1:2010	
Issued by:	Key Hurang / Senior Engineer

6-1 CE Certificate

6.5 ROHS Certificate

BrainChild Electronic Co., Ltd.

209, Chung Yang Rd. Nangang Dist. Taipei, Taiwan Tel : 886-2-2786-1299 Fax : 886-2-2786-1395 偉林電子股份有限公司 115台北市南港區重陽路 209號 E-mail: sales@brainchild.com.tw Website: www.brainchild.com.tw

ro, Diamornia Licolioi	nic Co., Ltd. declare that our product:
	Ethernet IO Modules
with the	following model designation
IO-16DI-E, IO-16DO-E, IC IO-8TCS-E, IC	D-4RO-E, IO-8DIO-E, IO-8AIIS-E, IO-8AIVS-E, D-6RTD-E, IO-8AOI-E, IO-8AOV-E
re herewith confirmed to con mendment [2015/863/EU] re valuation regarding the Direc N IEC 63000	nply with the RoHS Directive [2011/65/EU] and quirement without any exemptions. For the tive, the following standard was applied:
ead[Pb] [<0.1%] lercury[Hg] [<0.1%] admlum[Cd] [<0.01%] exavalent chromlum[Cr[VI]] [olybrominated biphenyls[PBI olybrominated biphenyl ether talan dl [2-etyloheksylu] DEH talan benzylu butylu BBP [<0 talan dibutylu DBP [<0.1%] talan dibutylu DBP [<0.1%]	[<0.1%] B] [<0.1%] rs[PBDE] [<0.1%] IP [<0.1%] D.1%]
Issued by:	Key Juong
	inding / demoi engineer

6-2 ROHS Certificate

6.6 REACH Certificate

BrainChild Electronic Co., Ltd.

209, Chung Yang Rd. Nangang Dist. Taipei, Taiwan Tel : 886-2-2786-1299 Fax : 886-2-2786-1395 偉林電子股份有限公司 115台北市南港區重陽路 209 對 E-mail: sales@brainchild.com.tw Website: www.brainchild.com.tw

We Breinshild Electr	ionia Co. Ital doctors that are product
we, Brainchlid Electr	onic Co., Lta. declare that our product:
	Ethernet IO Modules
with th	e following model designation
IO-16DI-E, IO-16DO-E, IO-8TCS-E,	IO-4RO-E, IO-8DIO-E, IO-8AIIS-E, IO-8AIVS-E, IO-6RTD-E, IO-8AOI-E, IO-8AOV-E
Are herewith confirmed to co Regulation [EC] No 1907/20 of 18 December 2006. On th Restriction of Chemicals [RE	omply with the requirements provided for in 06 of the European Parliament and of the Council ne Registration, Evaluation, Authorisation and FACH].
Products do not contain any [SVHC list can be found at:	/ SVHC substances of concern. https://www.echa.europa.eu/candidate-list-table]
Issued by:	Key Ilwang
Issued by: Approved by:	Key Jurang Key Huang / Senior Engineer

Human Machine Interface / Operator Interface · Recorder · Controller · GSM Controller · Energy Meter

6-3 REACH Certificate