



# RIO-98x0

Redundant IO module  
Hardware User Manual





# Preface

## Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

## Warning

ICP DAS assumes no liability for damages resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, or for any infringements of patents or other rights of third parties resulting from its use.

## Copyright

Copyright © 2024 by ICP DAS CO., LTD. All rights are reserved.

## Trademark

The names used for identification only may be registered trademarks of their respective companies.



---

## Revision History

Revision	Date	Description of Change
1.00	2024/08/14	Document release

---

# Table of Contents

<b>SECTION 1 INTRODUCTION</b> .....	<b>4</b>
1.1 PRODUCT OVERVIEW.....	4
1.2 FEATURE.....	5
1.3 HARDWARE STRUCTURE.....	6
1.4 HARDWARE LIST.....	7
1.5 INSTALLATION.....	9
1.5.1 Dimensions.....	9
1.5.2 Mounting.....	12
1.5.3 Module Installation.....	13
1.5.4 Termination Board Installation.....	14
1.5.5 Fan Module Installation.....	15
<b>SECTION 2 BASE UNIT</b> .....	<b>16</b>
2.1 RNOD-01.....	16
2.1.1 Overview.....	16
2.1.2 Specification.....	16
2.1.3 Dimensions.....	16
<b>SECTION 3 POWER MODULES</b> .....	<b>17</b>
3.1 RPM-D24.....	17
3.1.1 Overview.....	17
3.1.2 Specification.....	17
3.1.3 Pin Assignment.....	18
3.1.4 LED Indicator.....	18
3.1.5 Internal Hardware Structure.....	19
3.1.6 List of Power Consumption of Module.....	19
<b>SECTION 4 COMMUNICATION MODULE</b> .....	<b>20</b>
4.1 RCM-MTCP.....	20
4.1.1 Overview.....	20
4.1.2 Specification.....	20
4.1.3 LED Indicators.....	21
4.1.4 Seven-Segment LED.....	21
4.1.5 Dip Switch.....	22
4.1.6 Rotary Switch.....	22
4.1.7 Ethernet Port.....	23
4.2 RCM-ECAT (AVAILABLE SOON).....	24
4.3 RCM-EIP (AVAILABLE SOON).....	24
<b>SECTION 5 I/O MODULE</b> .....	<b>25</b>

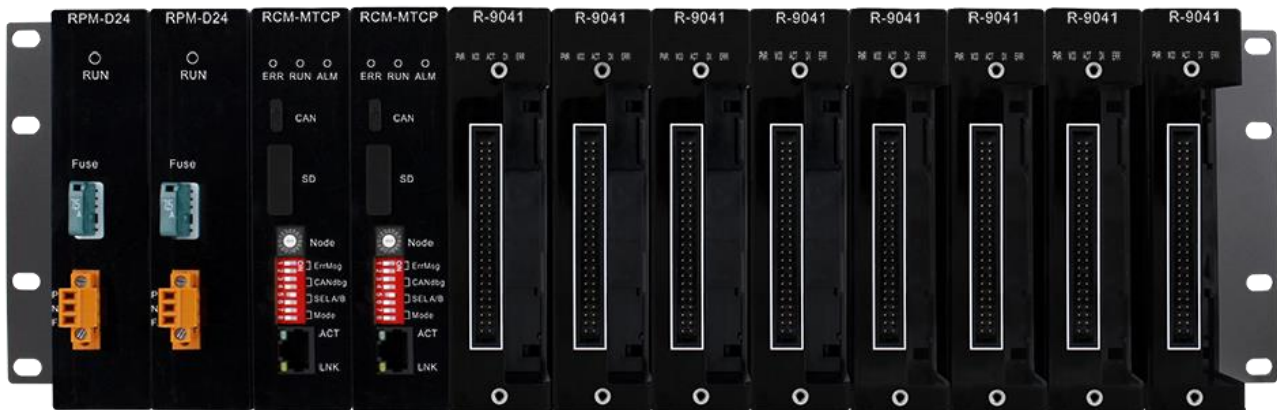
---

5.1 INTRODUCTION .....	25
5.1.1 LED status .....	25
5.1.2 Timing Characteristics .....	26
5.2 DIGITAL INPUT .....	27
5.2.1 R-9040.....	27
5.3 DIGITAL OUTPUT .....	30
5.3.1 R-9041.....	30
5.4 ANALOG INPUT.....	33
5.4.1 R-9017C1H.....	33
5.4.2 R-9017C2H.....	36
5.4.3 R-9015.....	40
5.4.4 R-9019.....	43
5.5 ANALOG OUTPUT.....	46
5.5.1 R-9028V1 .....	46
5.5.2 R-9028CH .....	49
5.6 PULSE INPUT .....	53
5.6.1 R-9084.....	53
5.7 BLANK MODULE.....	56
5.7.1 RBLK-01 .....	56
<b>SECTION 6 TERMINATION BOARD.....</b>	<b>57</b>
6.1 DIGITAL INPUT .....	57
6.1.1 RDB-S08 / RDB-D08.....	57
6.2 DIGITAL OUTPUT .....	59
6.2.1 RDB-S05 / RDB-D05 .....	59
6.3 ANALOG INPUT.....	61
6.3.1 RDB-S01 / RDB-D01 .....	61
6.3.2 RDB-S09 / RDB-D09.....	64
6.3.3 RDB-S02 / RDB-D02.....	67
6.3.4 RDB-S03 / RDB-S03.....	69
6.4 ANALOG OUTPUT.....	71
6.4.1 RDB-S01 / RDB-D01 .....	71
6.4.2 RDB-S09 / RDB-D09 .....	73
6.5 PULSE INPUT .....	75
6.5.1 RDB-S09 / RDB-D09.....	75

---

# Section 1 Introduction

The RIO-98x0 is distributed modular I/O which communicates with numerous controllers. The RIO-98x0 provides easy installation of the I/O modules and process cabling. It is highly modularized and flexible, so that I/O modules can be combined to suit many applications. The RIO-98x0 can be mounted in many configurations to fit most requirements, both in single or fully redundant applications.



## 1.1 Product Overview

The RIO-98X0 is a modular remote I/O system. It provides easy installation of the I/O modules and process cabling. It is highly modularized and flexible, so that the I/O modules can be combined to suit many applications including the most types of signals, digital, analog, counter and HART.

The station of an RIO-98X0 system consists of power module, communication module, I/O modules and termination board. The power module provides the isolated power to RIO-98X0 system. The communication module is the interface to the RIO-98X0 I/O modules. The RIO-98X0 I/O modules sense or control the device in the field. Termination boards are used to connect between signals to/from the field and I/O modules. All of these modules can be configured into single or redundant operation.



## 1.2 Feature

The RIO-98x0 is an open comprehensive, distributed, process I/O system. It communicates with controller over industry-standard field buses. It brings benefit for users install to RIO-98x0 in the field, to close to sensors and actuators, to reduce the installation cost by reducing the cost of cabling.

- **Various communication protocols**

The RIO-98x0 system supports a variety of ethernet communication protocol. Different RIO-98x0 systems can be assembled through the combination of communication modules.

- **Comprehensive**

The RIO-98x0 offers cost-effective solutions to practically all needs for field-device, including basic analog and digital I/O, pulse and HART, as well as high-integrity solutions.

- **Reliable**

The RIO-98x0 offers availability-improving feature such as:

- Hot swap of modules. A faulty I/O module can be replaced on-line without powering the station down and without affecting the rest of the station.
- The RIO-98x0 system also ensures that only right type of modules can be inserted when to replace on-line.
- Automatically re-configure same parameter when plugging a replaced module.
- Redundancy options in all modules, power, communication, I/O.

- **Flexible**

The I/O modules plugged in RIO-98x0 station can be configured into single or redundant operation. Users can easily upgrade I/O security in a same station by adding same I/O module and configuring into redundant operation without any additional wiring.

- **Wide industry-standard support**

The RIO-98x0 provides connectivity to most popular industry-standard to communicate with controller, and makes RIO-98x0 I/O compatible with various controller or PLC.

- **The up-to-date I/O**

The I/O modules plugged in the RIO-98x0 station will automatically update I/O data to communication module. This feature not only decreases the delay for updating I/O data but also acquire the up-to-date I/O data.

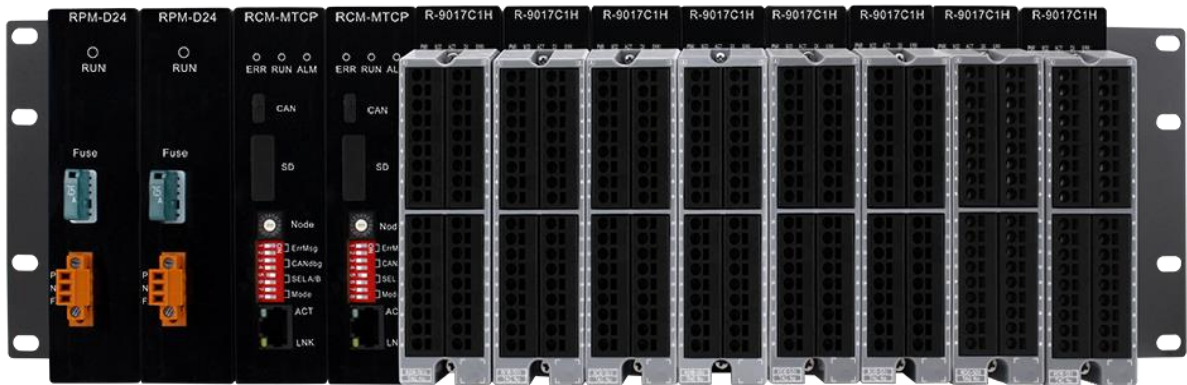
- **I/O redundant switching < 1ms**

The RIO-98x0 features a tiny time for I/O redundant switching within maximum 1ms.

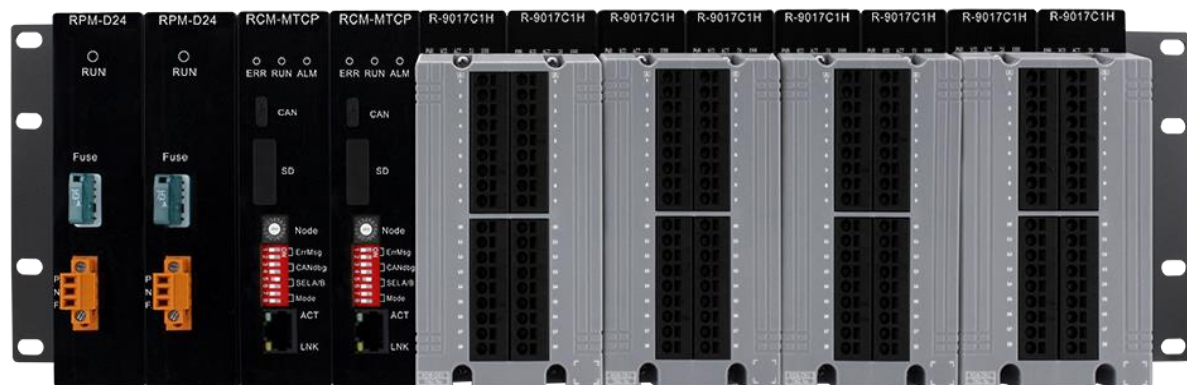
### 1.3 Hardware Structure

The RIO-98X0 is made by the combination of components of the backplane, power modules, communication modules and an termination board.

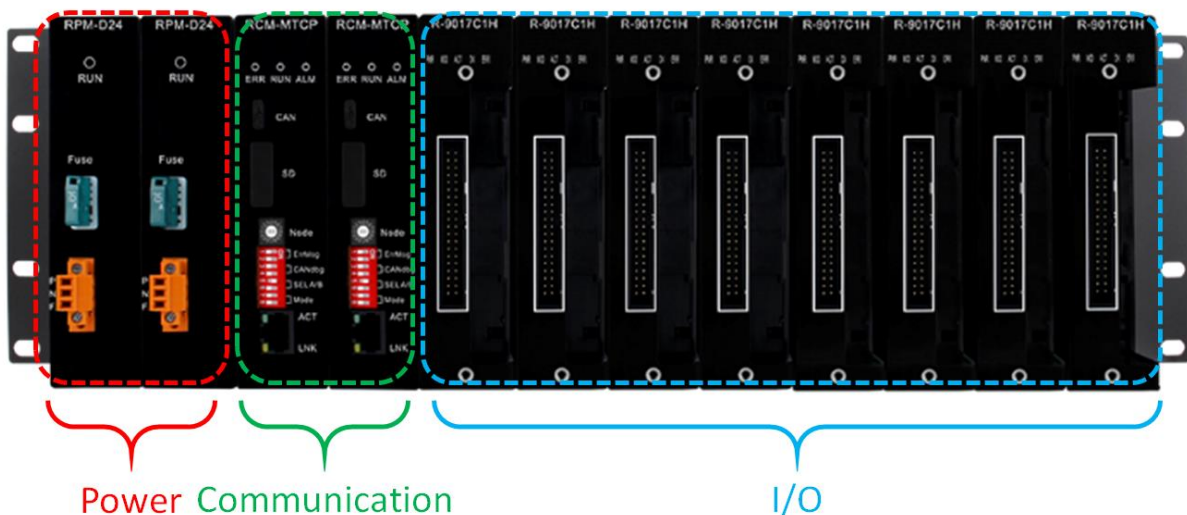
- Termination block is available of Singal configuration

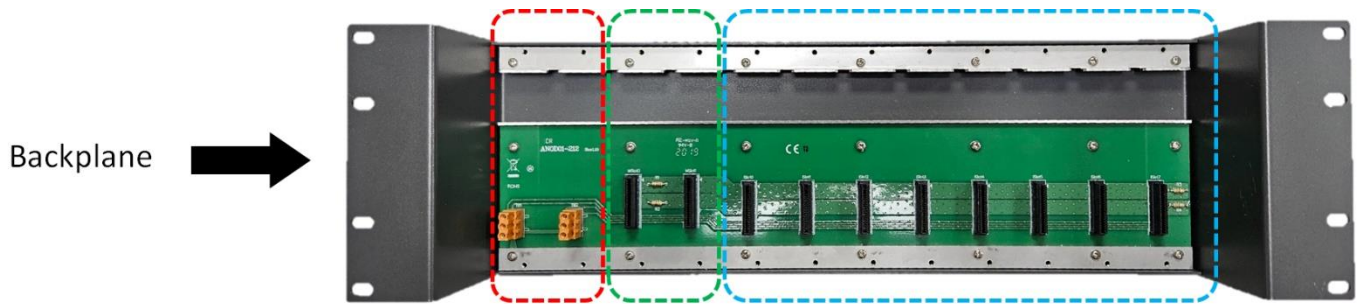


- Termination block is available of Duplex configuration



- RIO-98X0 backplane





- **Backplane**

The backplane consists of 2 slots of power, 2 slots of communication and 8 single or 4 pairs of redundant I/O modules.

- **Power Module**

It provides the power to the system. It also bypasses 24V<sub>DC</sub> to the I/O module to support passive loop. This module has hot-swappable and redundant functions.

- **Communication Module**

This module is a configurable communication interface that performs operation such as signal processing, automatically re-configuration, HART pass-through and configuration of I/O modules. The module connects to the controller or PLC through of the most popular industrial fieldbuses.

- **I/O Module**

The RIO-98X0 I/O modules can be inserted and removed from backplane without disturbing system operation.

- **Termination Board**

The termination boards provide the connection to the field. It also reduces the wiring and installation effort.

## 1.4 Hardware List

The equipment that is used as part of the RIO-98X0 station is presented in the following table.

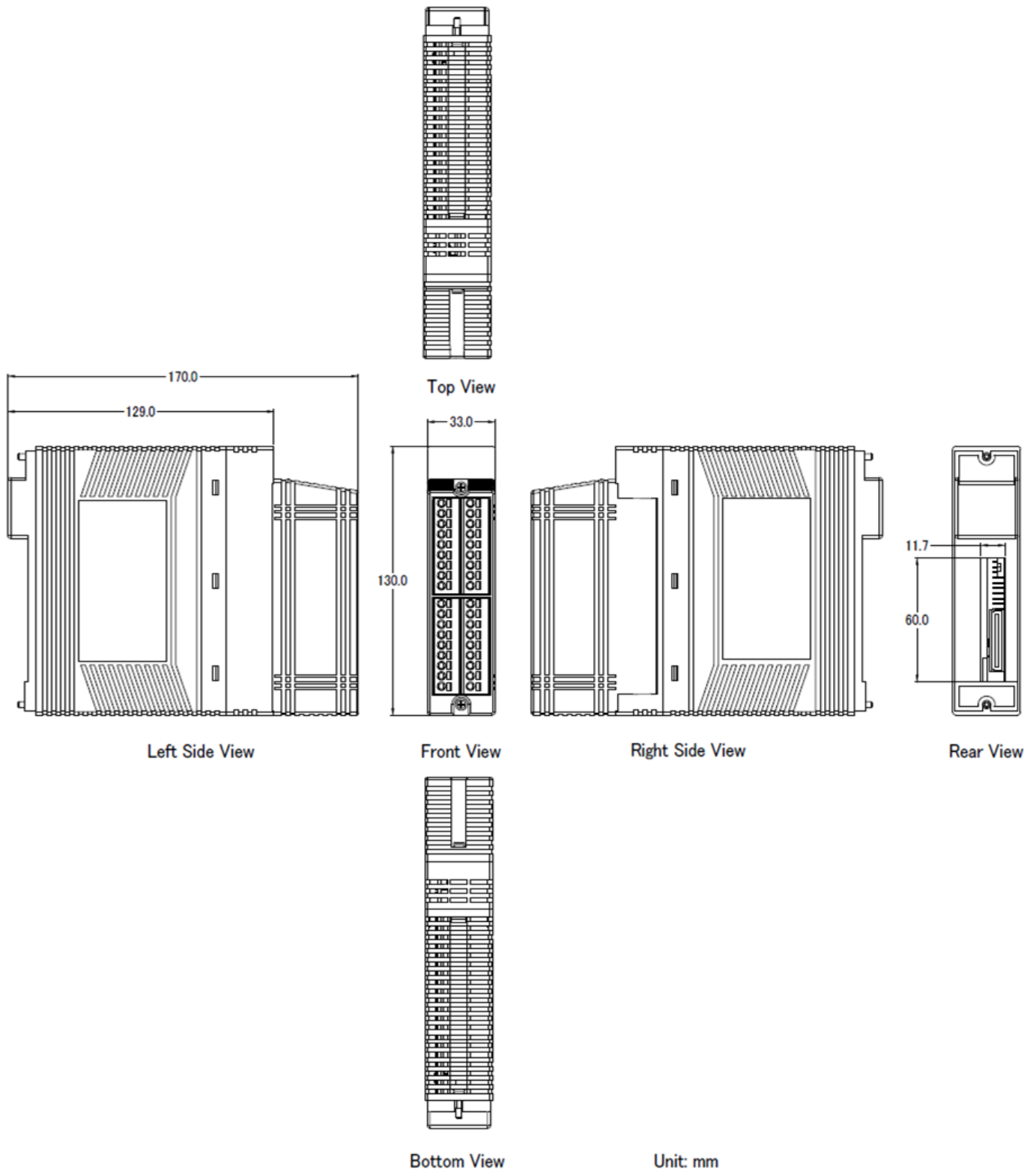
Type	Module Name	Description
Base Unit	RNOD-01	Backplane
Communication Module	RCM-MTCP	Modbus/TCP communication module
	RCM-ECAT	Ethercat communication module
	RCM-EIP	Ethernet/IP communication module
Power Module	RPM-D24	24V <sub>DC</sub> input, diagnostic, with redundant function
Digital I/O	Input R-9040	32 digital input channels, current sinking / sourcing, two common for 32 channels (every 16-ch)
	Output R-9041	32 digital output channel, current sinking, open collector, two common for 32 channels (every 16-ch)

Analog I/O	Input	R-9015	12 analog input channels, 3-wire RTD, Pt100, Pt1000
		R-9017C1H	8 isolated analog input channels, 4~20mA, HART interface, with loop power for passive loop
		R-9017C2H	16 analog input channels, 4~20mA, HART interface, with loop power for passive loop
		R-9019	16 analog input channels, thermocouple
	Output	R-9028V1	8 isolated analog output channels, 1 ~ 5 V, $\pm 10$ V
		R-9028CH	8 isolated analog output channels, 4~20mA, HART interface
Pulse I/O	Input	R-9084	8 isolated pulse input channels
Termination Board	Single	RDB-S01	Termination board for single non-isolated analog modules (R-9017C2H, R-9026C2H, R-9017V2, R-9028V2)
		RDB-S02	Termination board for single thermocouple I/O modules
		RDB-S03	Termination board for single RTD I/O modules
		RDB-S05	Termination board for single digital output modules
		RDB-S08	Termination board for single digital input modules
		RDB-S09	Termination board for single isolated analog modules (R-9017C1H, R-9026C1H, R-9017V1, R-9028V1, R-9028CH) and single pulse input modules
	Duplex	RDB-D01	Termination board for duplex non-isolated analog modules (R-9017C2H, R-9026C2H, R-9017V2, R-9028V2)
		RDB-D02	Termination board for duplex thermocouple I/O modules
		RDB-D03	Termination board for duplex RTD I/O modules
		RDB-D05	Termination board for duplex digital output modules
		RDB-D08	Termination board for duplex digital input modules
		RDB-D09	Termination board for duplex isolated analog modules (R-9017C1H, R-9026C1H, R-9017V1, R-9028V1, R-9028CH) and duplex pulse input modules
Fan Module		AFAN-04	1U universal active cooling module

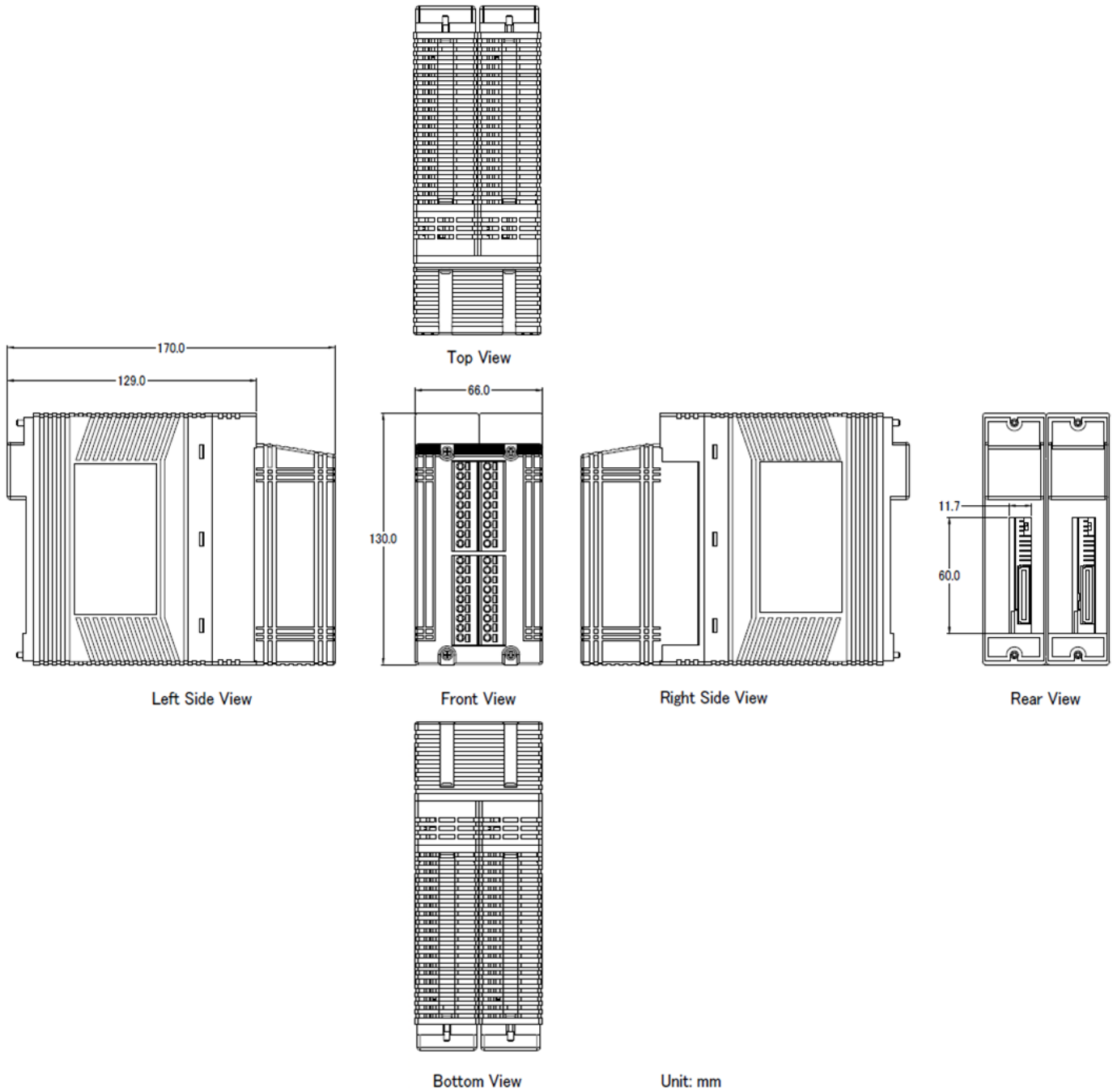
# 1.5 Installation

## 1.5.1 Dimensions

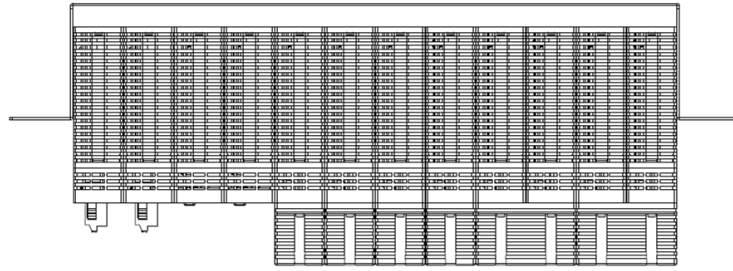
### 1.5.1.1 Single Mode (I/O module\*1 + Single Termination Board)



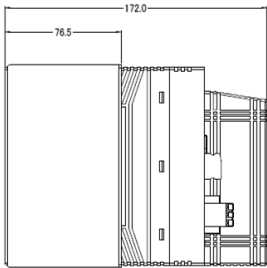
### 1.5.1.2 Duplex Module (I/O module\*2 + Duplex Termination Board)



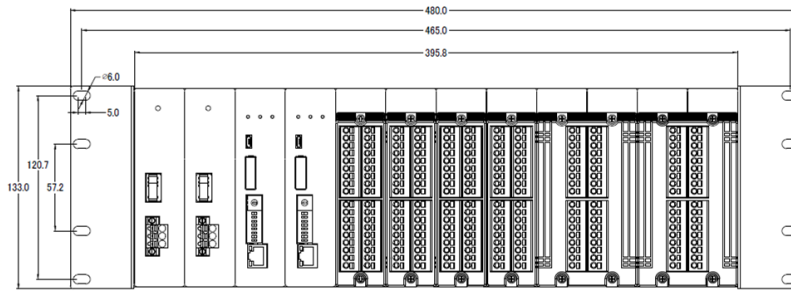
### 1.5.1.3 RIO-98X0 Body (Module Plugged)



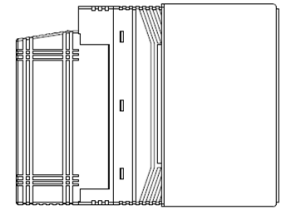
Top View



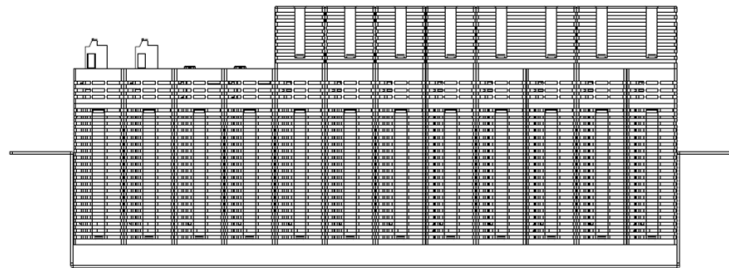
Left Side View



Front View

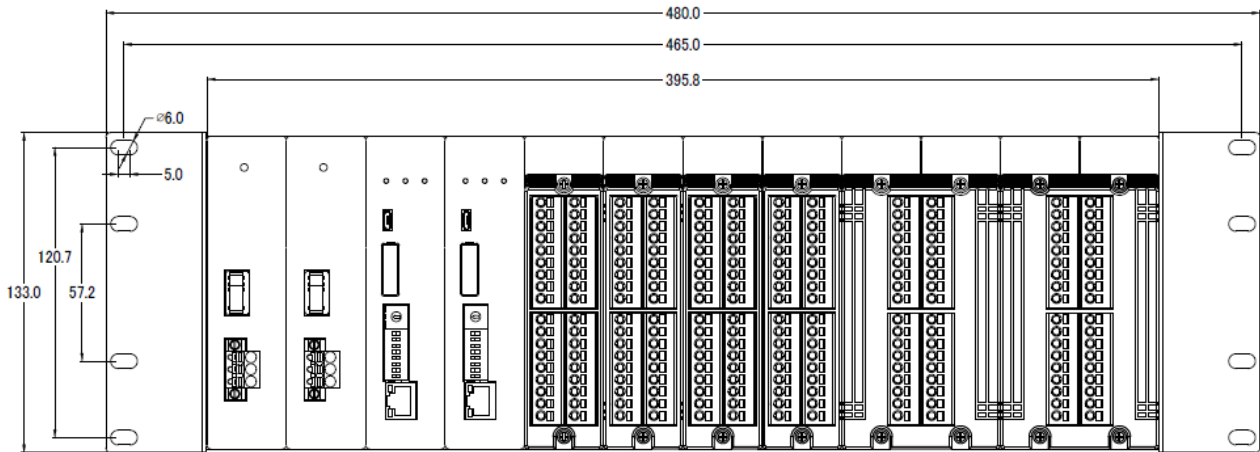


Right Side View



Bottom View

Unit: mm



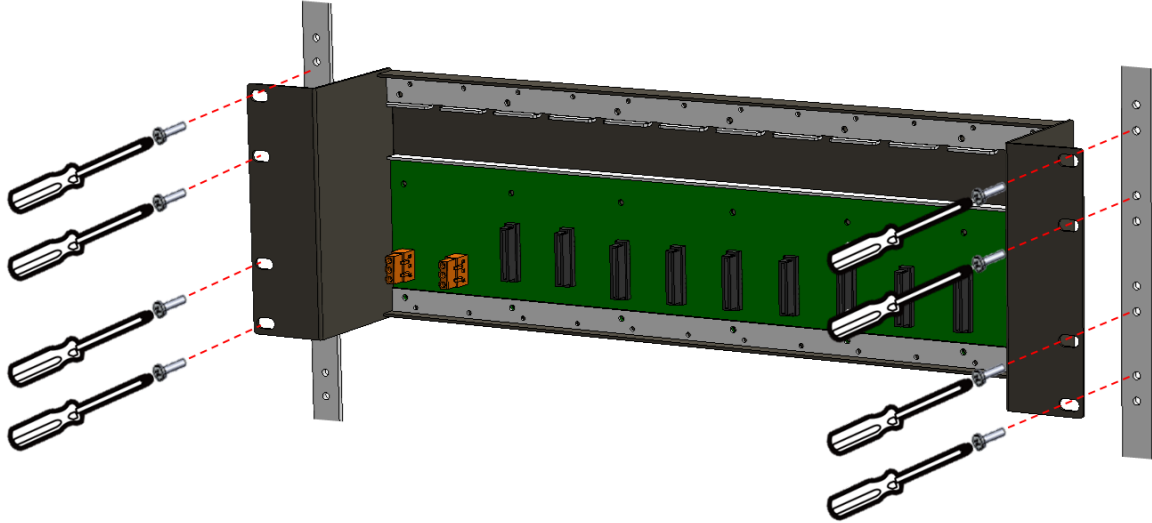
Front View

## 1.5.2 Mounting

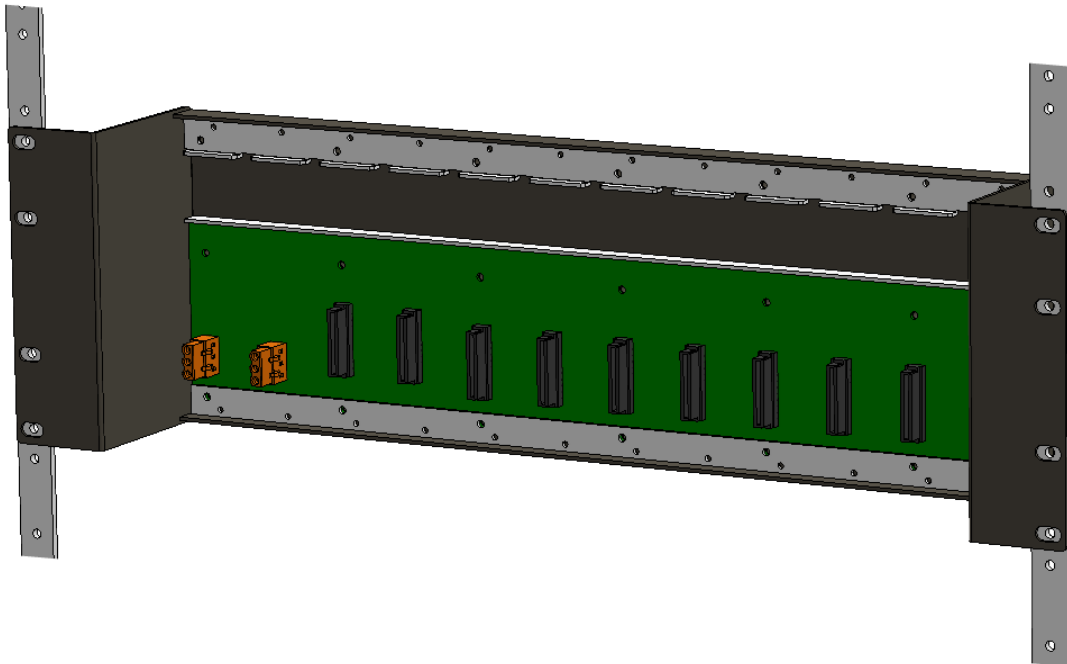
RIO-98X0 can be installed in a cabinet. The following sections will introduce how to install RIO-98X0.

### 1.5.2.1 Panel mounting

- Use screw drive to mount the RNOD-01 to the cabinet with M6 screws



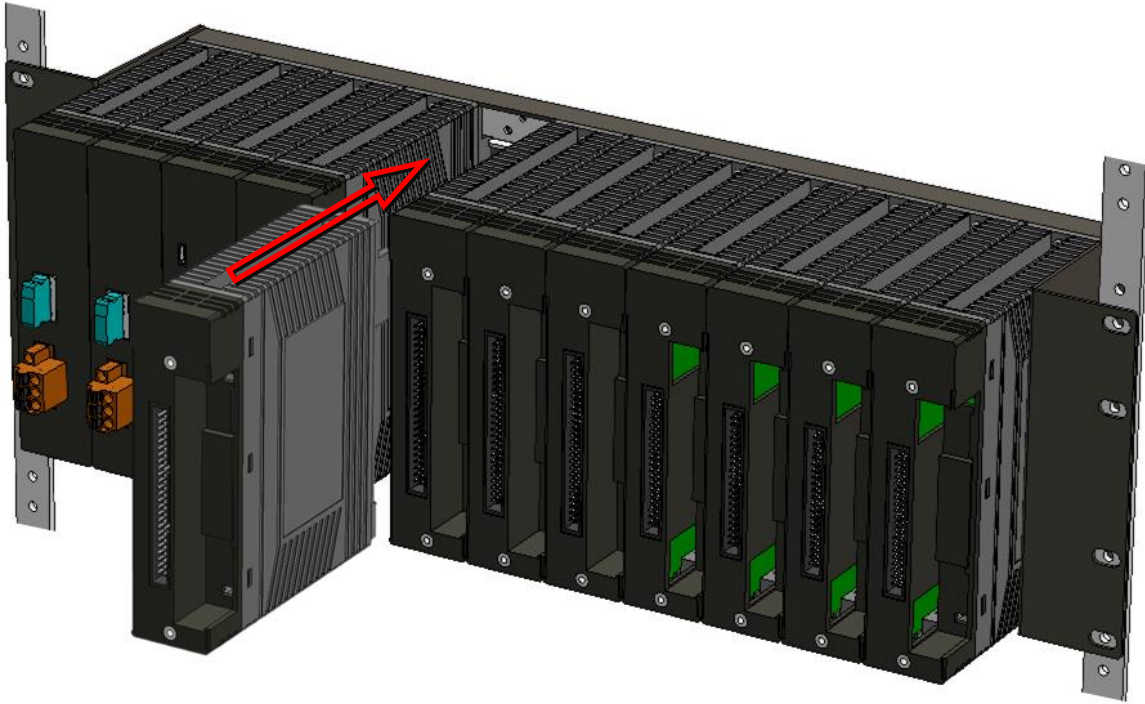
- Successfully installed RNOD-01 on the cabinet



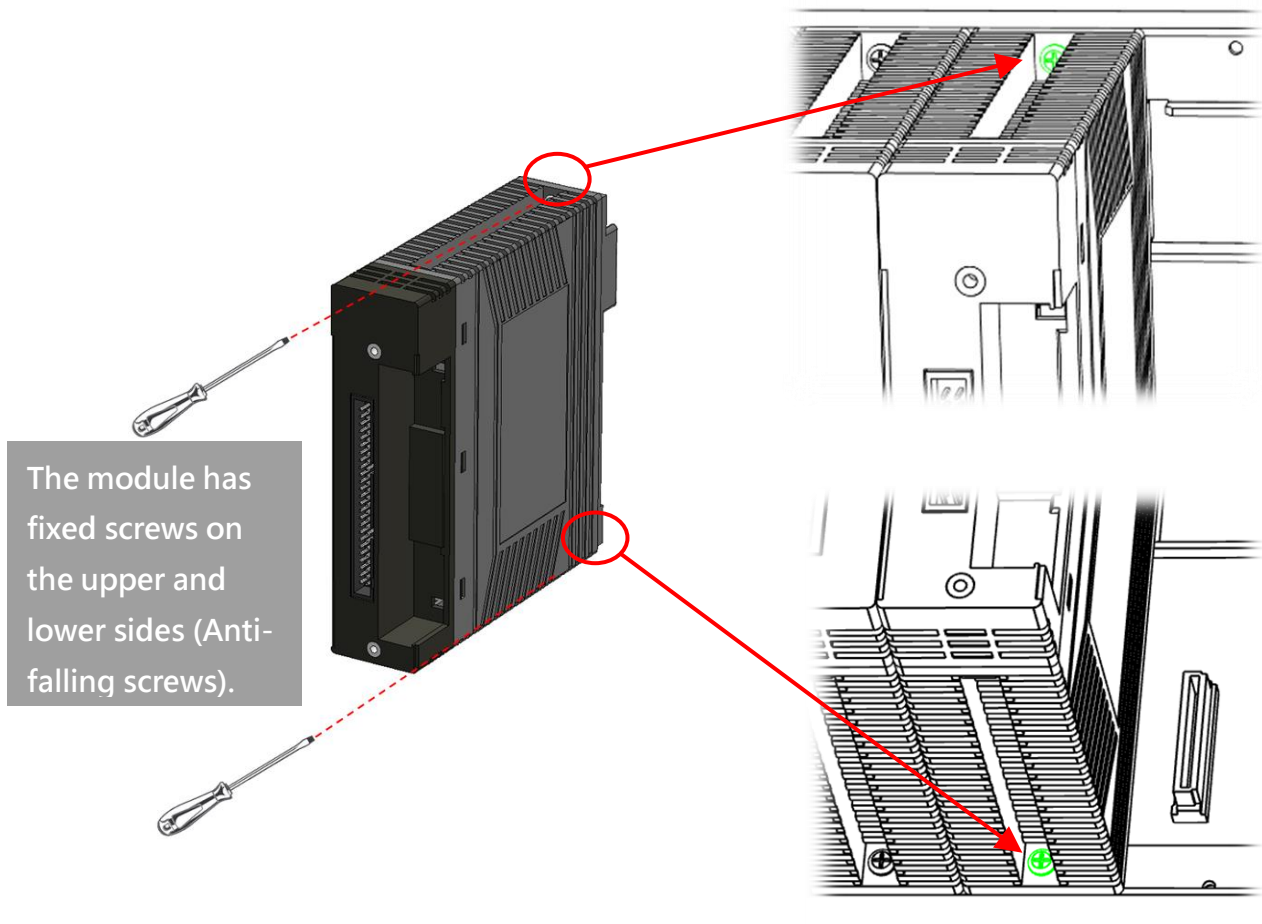


### 1.5.3 Module Installation

- Installing along the guiding rail then pushing into 40-pin socket

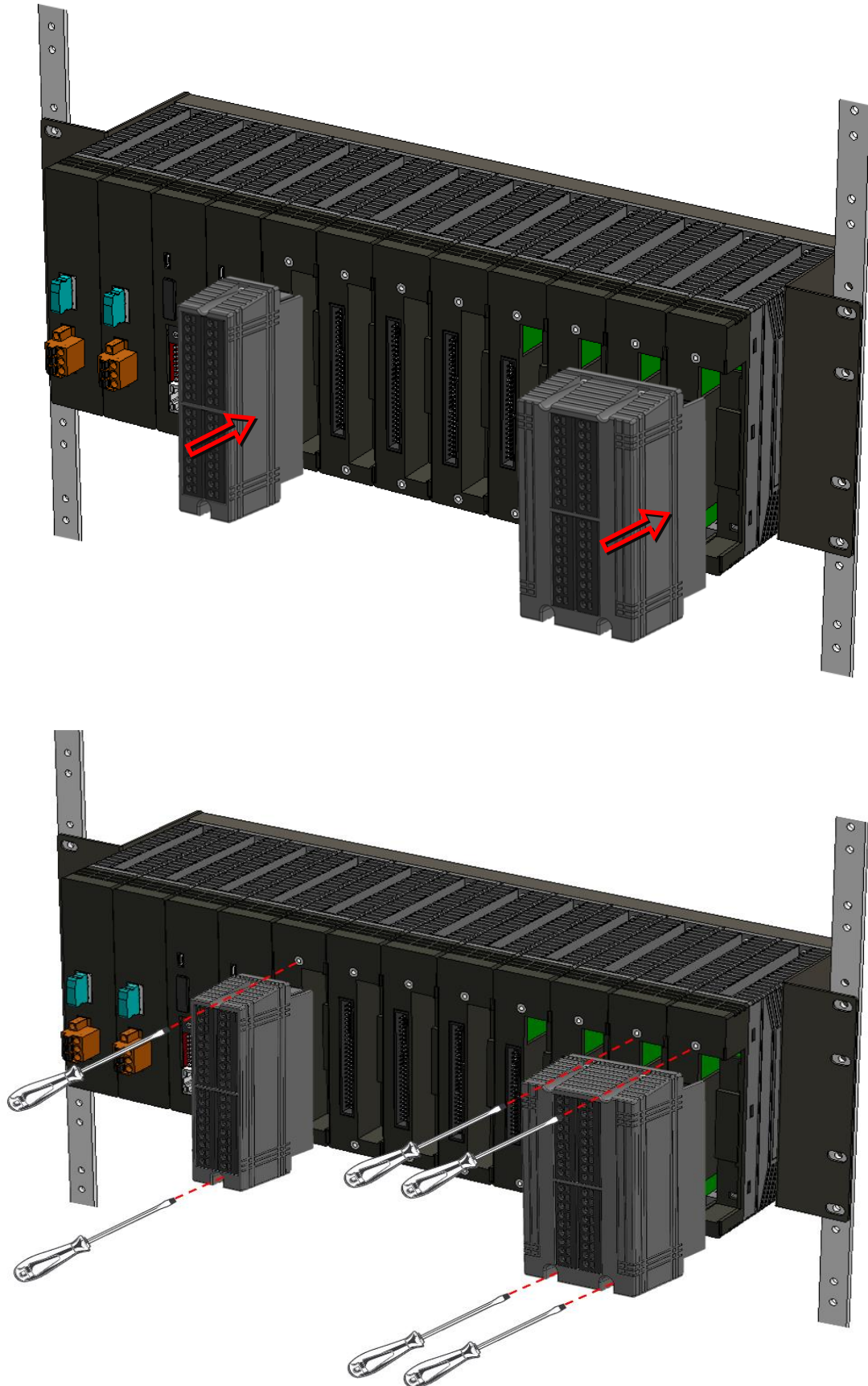


- Fixed by screws

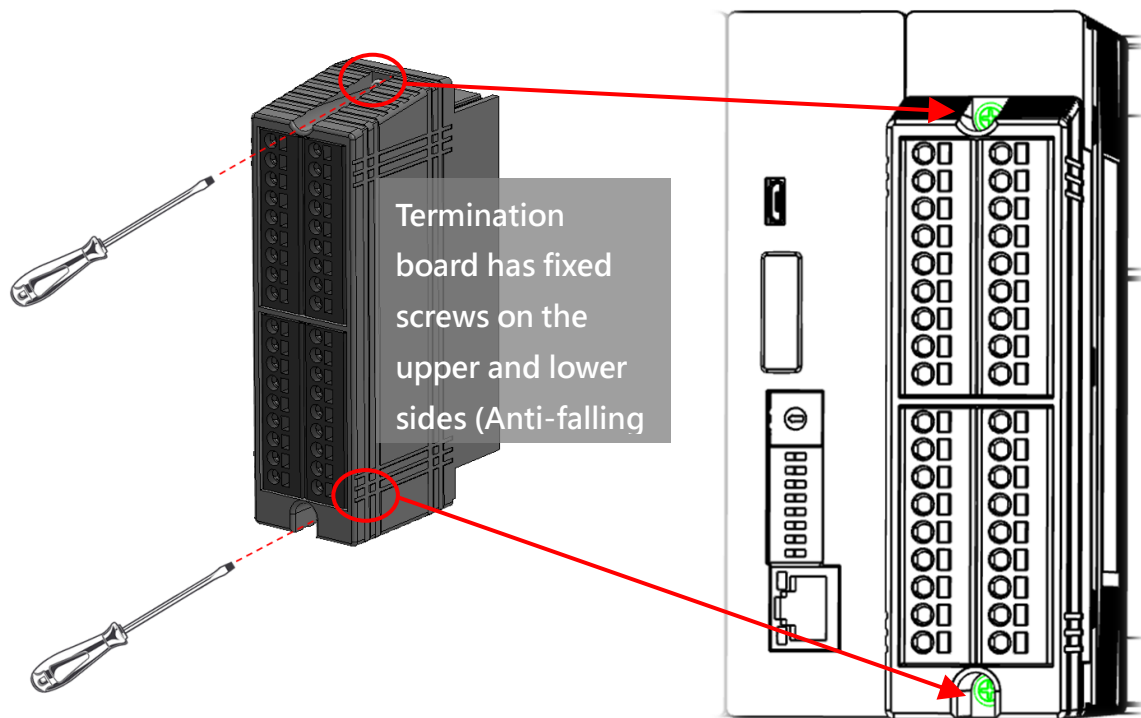


## 1.5.4 Termination Board Installation

- The module provides slots on the front panel for installing corresponding model termination boards.

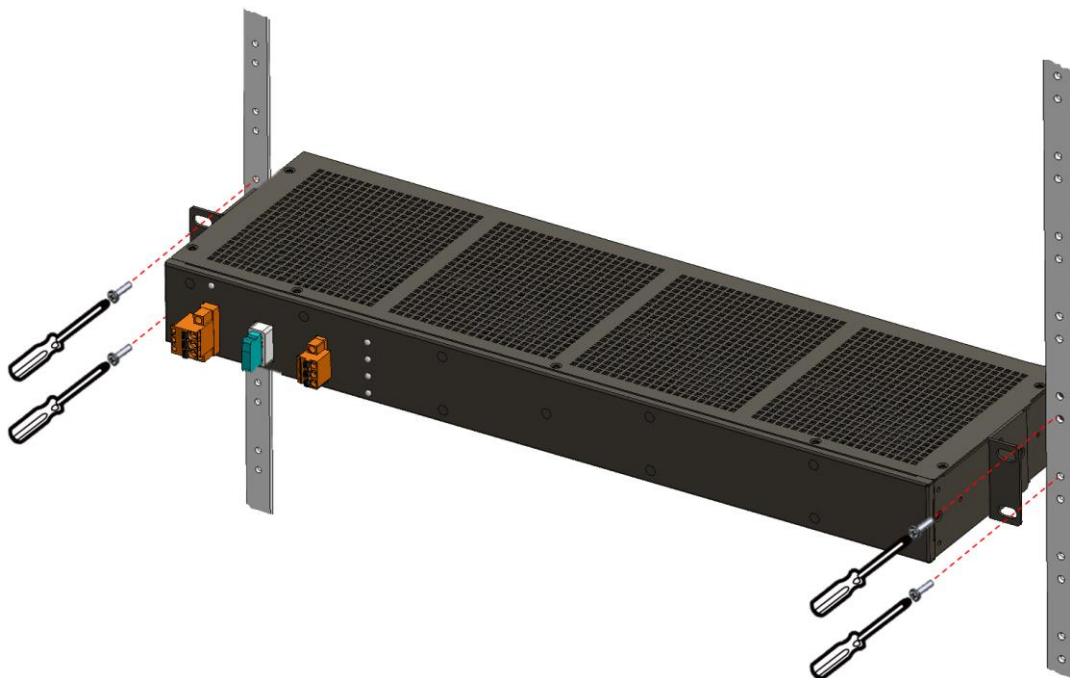


- Fixed by screws



### 1.5.5 Fan Module Installation

- Use screw drive to mount the 1U universal active cooling module (AFAN-04) to the cabinet with M6 screws



## Section 2 Base Unit

### 2.1 RNOD-01

#### 2.1.1 Overview

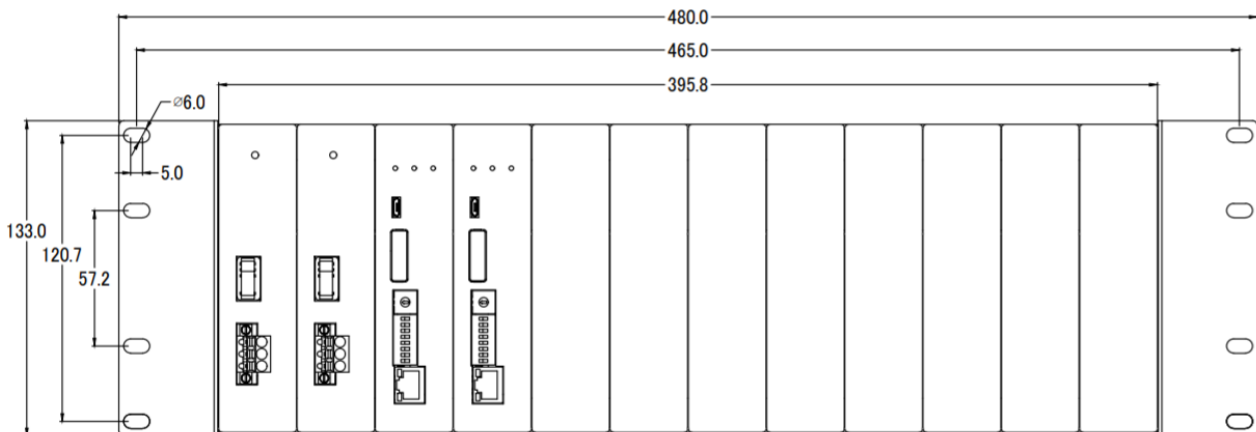


- On the base unit are mounted the power module (RPM-D24\*2)
- Bus interface module(RCM-MTCP\*2) and I/O module(IOM\*8).

#### 2.1.2 Specification

Parameter	Value
<b>General</b>	
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	1430 g
Dimensions (W x L x H)	480 x 133 x 76.5 mm

#### 2.1.3 Dimensions



## Section 3 Power Modules

### 3.1 RPM-D24

#### 3.1.1 Overview



- 24VDC input
- Diagnostic
- Redundancy

The RPM-D24 is a power module. It offers the isolated power source to the RIO-98X0 system. The RPM-D24 can be used to single or redundant application. It also has diagnostic to make system more reliable.

#### 3.1.2 Specification

Parameter	Value	
Voltage input	24V <sub>DC</sub> (20~26 V <sub>DC</sub> )	
Short circuit protection	Fuse (Daito 5A: SDP50, 7.5A: MP75)	
Conducted emission	EN55022 Class A	
Radiated emission	EN55022 Class A	
Short circuit protection	Yes (Continuous)	
Redundancy	Yes	
Power consumption	0.24W (0.01A@24V)	
Operating temperature	-25°C ~ +70°C	
Weight	180 g	
Dimensions (W x L x H)	33mm x 129mm x 130mm	
EMC	Emmision	IEC 61000-6-4: 2006/A1:2010 E, CISPR 11:2009/A1:2010
	Immunity	IEC 61000-6-2: 2005, IEC 61000-4-2: 2008, IEC 61000-4-3: 2006/A1:2007/A2:2010, IEC 61000-4-4: 2012, IEC 61000-4-5: 2005, IEC 61000-4-6: 2008, IEC 61000-4-8: 2009, IEC 61000-4-9: 1993/A1:2001,

		IEC 61000-4-10: 1993/A1:2001, IEC 61000-4-12: 2006, EN 61000-4-16: 2004
--	--	--

### 3.1.3 Pin Assignment



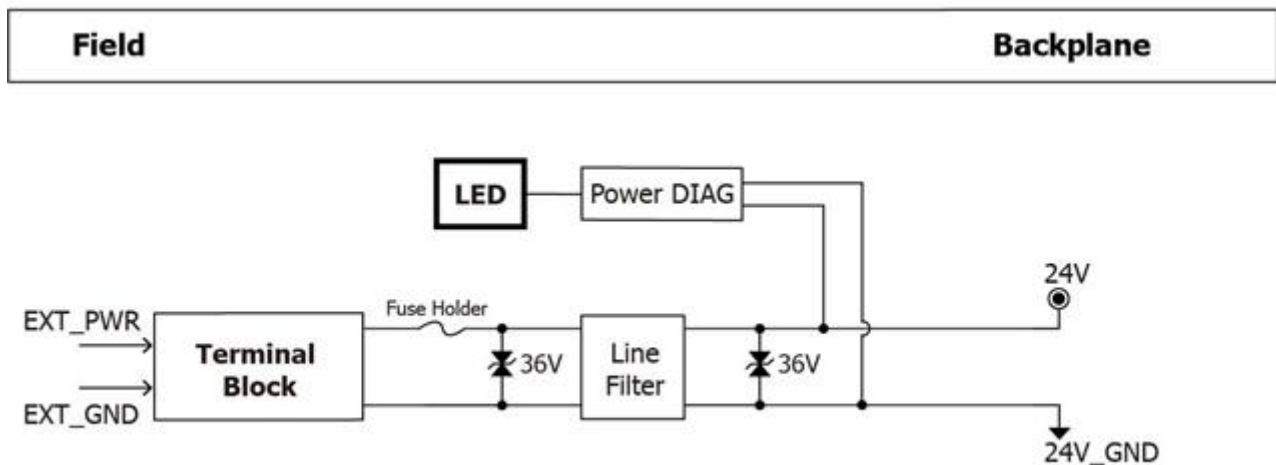
Pin	Description
P	24 VDC
N	Ground
F.G	Frame Ground

### 3.1.4 LED Indicator



LED	Status	Description
PWR	On	Input Power is between 20~26VDC
	Off	Input Power is not between 20 ~ 26VDC

### 3.1.5 Internal Hardware Structure



### 3.1.6 List of Power Consumption of Module

Model Name	Maximum Output Current
R-9040	1.7 W (0.07A@24V <sub>DC</sub> )
R-9041	1.7 W (0.07A@24V <sub>DC</sub> )
R-9017C1H	4.6 W (0.19A@24V <sub>DC</sub> )
R-9017C2H	2.4 W (0.1A@24V <sub>DC</sub> )
R-9028V1	6.3 W (0.26A@24V <sub>DC</sub> )
R-9028CH	5.6 W (0.23A@24V <sub>DC</sub> )
R-9084	6.8 W (0.28A@24V <sub>DC</sub> )
R-9015	2.0 W (0.08A@24V <sub>DC</sub> )
R-9019	2.2 W (0.09A@24V <sub>DC</sub> )

## Section 4 Communication Module

### 4.1 RCM-MTCP

#### 4.1.1 Overview



- Modbus/TCP
- Hardware selectable node ID
- Redundancy
- LED indicators for local diagnostic
- 7 Segment LED Display (Error code Display)
- Ethernet 10/100M
- Micro SD (Error record)
- RTC (Built-in)

The RCM-MTCP is a communication module with Modbus/TCP through ethernet port. The Modbus/TCP is a standard protocol commonly used in industrial applications. The RCM-MTCP can be used for the Modbus/TCP client to access I/O modules. It is built-in rotary switch to easily configure node ID without utility. There are also 3 LED indicators and 7 segment LED display for system diagnostic and 2 LED indicators for network status, users can locally check system and network status. The RCM-MTCP not only supports single operation but also redundancy, enhancing the reliability of the I/O system.

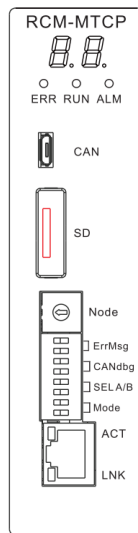
#### 4.1.2 Specification

Parameter	Value	
LAN Port	10/100BASE-TX (Auto negotiating, Auto MDIX)	
Protocol	Modbus/TCP	
LED indicators	1 Power, 2 Fault, 1 Link/Active/Speed	
Redundant	Yes	
EMC	Emmission	IEC 61000-6-4: 2006/A1:2010 E CISPR 11:2009/A1:2010
	Immunity	IEC 61000-6-2: 2005, IEC 61000-4-2: 2008, IEC 61000-4-3: 2006/A1:2007/A2:2010, IEC 61000-4-4: 2012, IEC 61000-4-5: 2005, IEC 61000-4-6: 2008, IEC 61000-4-8: 2009, IEC 61000-4-9: 1993/A1:2001, IEC 61000-4-10: 1993/A1:2001,



	IEC 61000-4-12: 2006, EN 61000-4-16: 2004
Power consumption	1.7 W
Operating temperature	-25°C ~ +70°C
Isolation	3000V <sub>DC</sub> (Between LAN port and F.G) 1000V <sub>DC</sub> (Between LAN port and backplane)

### 4.1.3 LED Indicators



LED	Status
ERR	On : Heavy fault Off : Normal
RUN	On : Normal Off : Have any errors
ALM	On : Light fault Off : Normal
ACT	On : Ethernet Activity Off : No Ethernet Activity
LNK	On : Ethernet Link Establish Off : No Ethernet Link

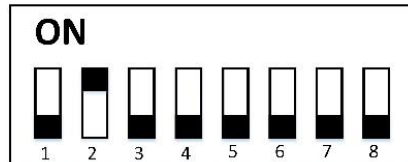
### 4.1.4 Seven-Segment LED

7-segment Display LED	Description
A0	Node0 Left Side
A1	Node1 Left Side
A2	Node2 Left Side
A3	Node3 Left Side
A4	Node4 Left Side
A5	Node5 Left Side
A6	Node6 Left Side
A7	Node7 Left Side
A8	Node8 Left Side
A9	Node9 Left Side
AA	Node10 Left Side
AB	Node11 Left Side
AC	Node12 Left Side
AD	Node13 Left Side
AE	Node14 Left Side
AF	Node15 Left Side

7-segment Display LED	Description
b0	Node0 Right Side
b1	Node1 Right Side
b2	Node2 Right Side
b3	Node3 Right Side
b4	Node4 Right Side
b5	Node5 Right Side
b6	Node6 Right Side
b7	Node7 Right Side
b8	Node8 Right Side
b9	Node9 Right Side
bA	Node10 Right Side
bB	Node11 Right Side
bC	Node12 Right Side
bD	Node13 Right Side
bE	Node14 Right Side
bF	Node15 Right Side

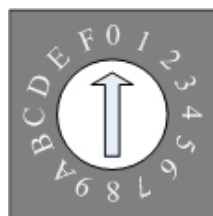
7-segment Display LED	Description
bL	MCU FW Update mode

### 4.1.5 Dip Switch



Number	Function	Description
1~ 2	Sw1 On & Sw2 Off	The 7-segment LED will show <b>the current state</b> of light and heavy error in MCU/IOM.
	Sw1 Off & Sw2 On	The 7-segment LED will show <b>the last state</b> of light and heavy error in MCU/IOM.
	Others	Not support and the 7-segment LED will show Ax/bx. (A/b: Left side/Right side), (x: NODE ID)
3~ 4	Sw3 On/Off	Enable/Disable <b>CAN1 debug</b> of CAN connector
	Sw4 On/Off	Enable/Disable <b>CAN2 debug</b> of CAN connector
5~ 6	Sw5 On & Sw6 Off	IP setting mode be used <b>hardware mode</b> ( <a href="#">4.1.6 Rotary Switch</a> )
	Sw5 Off & Sw6 Off	IP setting mode be used <b>User mode</b> (eSearch Utility)
	Others	Not support
7~ 8	Sw7 Off & Sw8 Off	<b>Modbus/TCP</b> Protocol
	Sw7 Off & Sw8 On	<b>FW Download</b> mode via Ethernet ( <a href="#">4.1.6 Rotary Switch</a> )
	Others	Not support

### 4.1.6 Rotary Switch



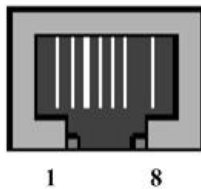
**Node**

When the RCM-MTCP dip Switch is in **IP hardware setting mode** or **FW Download mode**, the switch is used for the value of the 4th IP address. The valid number of the address is from 16 to 31 (left side) or 144 to 159 (right side). The other 3 addresses can be configured through MiniOS7 Utility.

Rotary Switch	Left Side		Right Side	
	IP	MASK	IP	MASK
0	192.168.0.16	255.255.0.0	192.168.0.144	255.255.0.0
1	192.168.0.17	255.255.0.0	192.168.0.145	255.255.0.0
2	192.168.0.18	255.255.0.0	192.168.0.146	255.255.0.0
3	192.168.0.19	255.255.0.0	192.168.0.147	255.255.0.0
4	192.168.0.20	255.255.0.0	192.168.0.148	255.255.0.0
5	192.168.0.21	255.255.0.0	192.168.0.149	255.255.0.0
6	192.168.0.22	255.255.0.0	192.168.0.150	255.255.0.0
7	192.168.0.23	255.255.0.0	192.168.0.151	255.255.0.0
8	192.168.0.24	255.255.0.0	192.168.0.152	255.255.0.0
9	192.168.0.25	255.255.0.0	192.168.0.153	255.255.0.0
10	192.168.0.26	255.255.0.0	192.168.0.154	255.255.0.0
11	192.168.0.27	255.255.0.0	192.168.0.155	255.255.0.0
12	192.168.0.28	255.255.0.0	192.168.0.156	255.255.0.0
13	192.168.0.29	255.255.0.0	192.168.0.157	255.255.0.0
14	192.168.0.30	255.255.0.0	192.168.0.158	255.255.0.0
15	192.168.0.31	255.255.0.0	192.168.0.159	255.255.0.0

### 4.1.7 Ethernet Port

The RIO-98X0 is equipped with one Ethernet port which is fully compliant with IEEE 802.3u 10/100BASE-TX. The Ethernet port provides a standard RJ-45 with green color LED indicator on the front side showing activity (Off: No activity, Green and Flash: Activity), and orange color LED indicator showing link status (Off: No Link, Orange: Link established).



Pin	Name	Color	Description
1	TX+	Clear white	Transmit Data+
2	TX-	Clear	Transmit Data-
3	RX+	Green white	Receive Data+
4	N.C.	Blue	Not Connected
5	N.C.	Blue white	Not Connected
6	RX-	Green	Receive Data-
7	N.C.	Brown white	Not Connected
8	N.C.	Brown	Not Connected

#### Recommended Media

UTP/STP Cable

10Mbps : Category 3 or greater

100Mbps : Category 5 or greater

## 4.2 RCM-ECAT (Available soon)

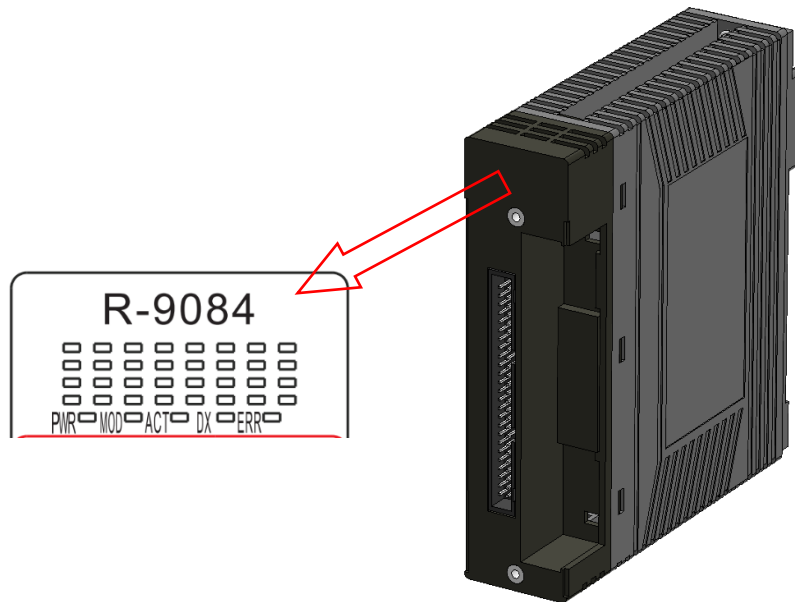
## 4.3 RCM-EIP (Available soon)

## Section 5 I/O Module

### 5.1 Introduction

#### 5.1.1 LED status

Each module has five status and 32 channel LED indicators. These indicators represent different conditions when the system is operating. The LED indicators can help users identify failures of the module.



Status		Description	
PWR	Solid	Normal (Have electricity)	
	Off	No electricity	
MOD	Solid	Operating Mode	
	Blink	0.5 second period	Stop Mode
		1 second period	Pre-OP Mode
Off	Standby		
ACT	Solid	Single	Output/Input Enable
		Redundant	Master & Output/Input Enable
	Off	Single	Output/Input Disable
		Redundant	Slave & Output/Input Disable
DUX	Solid	I/O Module is operating in redundant mode	
	Off	I/O Module is operating in single mode	
ERR	Solid	Heavy fault (Example: Hard damage)	
	Blink	Light fault (1 flash every 500ms)(Software setting error or disconnection checkout)	

	Off	Normal system
MOD/ ACT/ DX	Blink	In the bootloader mode and preparing upgrade firmware
IO*	Solid	The corresponding I/O channel is activated
	Off	The corresponding I/O channel is inactivated

\* Not all channel LED indicators on the I/O modules will light up.

## 5.1.2 Timing Characteristics

Parameter	Value	Description
T <sub>1</sub>	800 ms	Hardware watchdog activated
T <sub>2</sub>	50 ms	I/O modules lose connection to the termination board
T <sub>3</sub>	<1 ms	Response time for analog output high/low alarm
T <sub>4</sub>	<16 ms (8 channels)	Response time for analog input high/low alarm
	<32 ms (16 channels)	
T <sub>5</sub>	<1.2 s	Response time for TC/RTD high/low alarm
T <sub>6</sub>	<100 ms	Time when detect CJC broken
T <sub>7</sub>	<1.2 s	Time when detect TC/RTD channel broken

## 5.2 Digital Input

### 5.2.1 R-9040

#### 5.2.1.1 Overview



- 32 digital input (sink/source) channels
- Digital filter (1~32767ms)
- Input channel LED indication
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Digital input diagnostic function

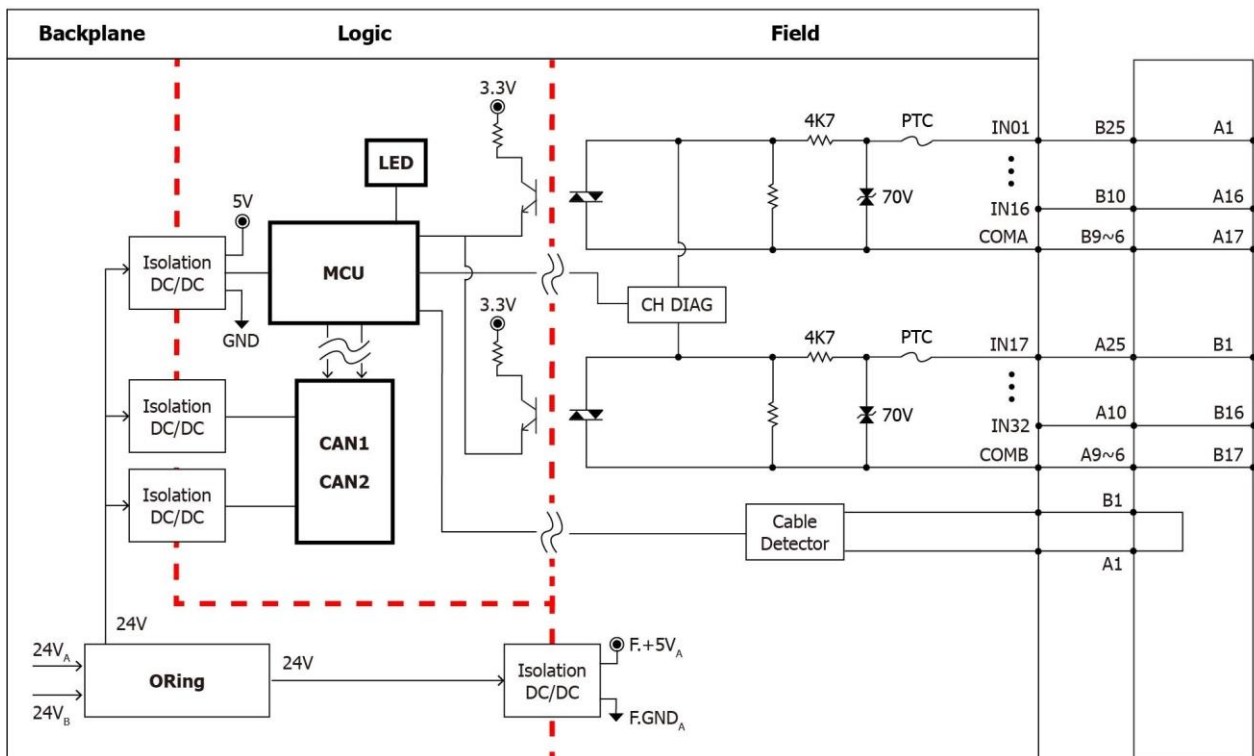
The F-9040 features 32 digital input (sink/source) channels. Either sink- or source-type input can be selected via different wiring. The F-9040 can determine binary input from a DC voltage source. The digital input channels also offer LED indicators to locally display digital input status. Moreover, the module offers 3000 V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages the channels, the system (backplanes, other modules, and control unit) won't be affected because of the benefits of isolation.

#### 5.2.1.2 Specification

Parameter	Value
<b>Feature</b>	
Redundant	Yes (Switching time < 100us)
Termination board break off detection	Yes
Digital filter	Yes (1ms~32767ms)
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	32 as channel 0~31 status
<b>Digital Input</b>	
Channels	32 (Ch00~15 : GND <sub>G1</sub> ; Ch16~31 : GND <sub>G2</sub> )
Type	P-COM(Source) or N-COM(Sink), Single-Ended
Rated Input voltage	24 V <sub>DC</sub>
Range of operating voltage	20.4~26.4 V <sub>DC</sub>
Allowable max. input voltage	30.0 V <sub>DC</sub>

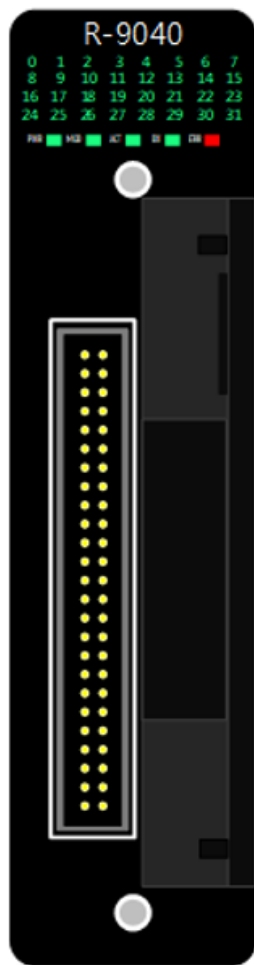
Input voltage range, "1"	18 V <sub>DC</sub>
Input voltage range, "0"	11 V <sub>DC</sub>
Detection time	100us
Input impedance	4.7KΩ / per channel
Input current	5.1mA@24V <sub>DC</sub> (122.4mW) / per channel
Field-to-Backplane isolation	3000V <sub>DC</sub>
Channel protection	110V <sub>AC</sub> / 140V <sub>DC</sub> (PTC+TVS)
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS)
	EN 61000-6-4 (EMI)
	IEC/EN 61000-4-2 (ESD)
	IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S08, RDB-D08
Maximum power consumption	1.7 W (0.07A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	200 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.2.1.3 Hardware Structure





### 5.2.1.4 Pin Assignment



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
IN01	A1	B1	IN17
IN02	A2	B2	IN18
IN03	A3	B3	IN19
IN04	A4	B4	IN20
IN05	A5	B5	IN21
IN06	A6	B6	IN22
IN07	A7	B7	IN23
IN08	A8	B8	IN24
IN09	A9	B9	IN25
IN10	A10	B10	IN26
IN11	A11	B11	IN27
IN12	A12	B12	IN28
IN13	A13	B13	IN29
IN14	A14	B14	IN30
IN15	A15	B15	IN31
IN16	A16	B16	IN32
COM_A	A17	B17	COM_B
COM_A	A18	B18	COM_B
COM_A	A19	B19	COM_B
COM_A	A20	B20	COM_B
X	A21	B21	X
X	A22	B22	X
X	A23	B23	X
X	A24	B24	X
BK	A25	B25	BK

## 5.3 Digital Output

### 5.3.1 R-9041

#### 5.3.1.1 Overview



- 32 digital output (sink) channels
- Safety value (Preset/Hold)
- Power-on(Initial) value
- Output channel LED indication
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Digital output diagnostic function

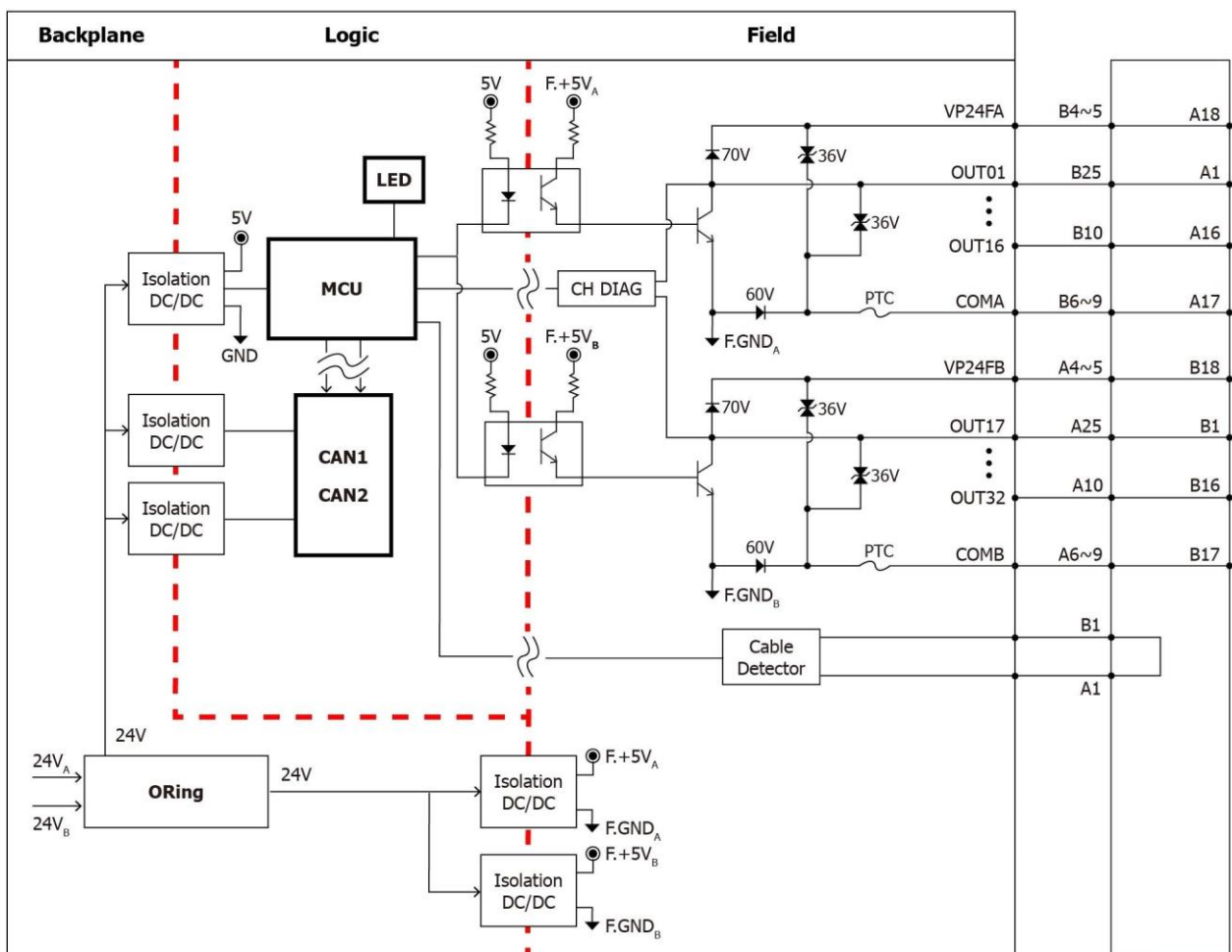
The F-8041 is a digital output module with 32 NPN channels. The output channel of F-8041 is a current sinking channel and can drive the load up to 0.5A current. The digital output channels offer LED to indicate digital output status. Moreover, the module offers 3000 V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages the channels, the system (backplanes, other modules, and control unit) won't be affected because of the benefits of isolation.

#### 5.3.1.2 Specification

Parameter	Value
<b>Feature</b>	
Redundant	Yes (Switching time < 100us)
Termination board break off detection	Yes
Safety output	Yes (Preset/Hold)
Power-on (Initial) output	Yes
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	32 as channel 0~31 status
<b>Digital Output</b>	
Number of channels	32 (NPN) (P-COM)(Ch00~15 : GND <sub>G1</sub> ; Ch16~31 : GND <sub>G2</sub> )
Type	Current Sinking, Open-Collector
Rated voltage	24 V <sub>DC</sub>
Output load current, maximum	100mA / Channel @24 V <sub>DC</sub>
Output switching time	100 us

Output impedance	<1 Ω
Field-to-Backplane isolation	3000V <sub>DC</sub>
Channel protection	Over current protection
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS)
	EN 61000-6-4 (EMI)
	IEC/EN 61000-4-2 (ESD)
	IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S05, RDB-D05
Maximum power consumption	1.7 W (0.07A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	200 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.3.1.3 Hardware Structure



### 5.3.1.4 Pin assignments



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
DO_0	A1	B1	DO_16
DO_1	A2	B2	DO_17
DO_2	A3	B3	DO_18
DO_3	A4	B4	DO_19
DO_4	A5	B5	DO_20
DO_5	A6	B6	DO_21
DO_6	A7	B7	DO_22
DO_7	A8	B8	DO_23
DO_8	A9	B9	DO_24
DO_9	A10	B10	DO_25
DO_10	A11	B11	DO_26
DO_11	A12	B12	DO_27
DO_12	A13	B13	DO_28
DO_13	A14	B14	DO_29
DO_14	A15	B15	DO_30
DO_15	A16	B16	DO_31
COM_A	A17	B17	COM_B
COM_A	A18	B18	COM_B
COM_A	A19	B19	COM_B
COM_A	A20	B20	COM_B
Ext. 24V_A	A21	B21	Ext. 24V_B
Ext. 24V_A	A22	B22	Ext. 24V_B
X	A23	B23	X
X	A24	B24	X
BK	A25	B25	BK

## 5.4 Analog Input

### 5.4.1 R-9017C1H

#### 5.4.1.1 Overview



- 8-channel isolated current input
- Overrange measurement
- Built-in HART master interface
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Channel break line detect

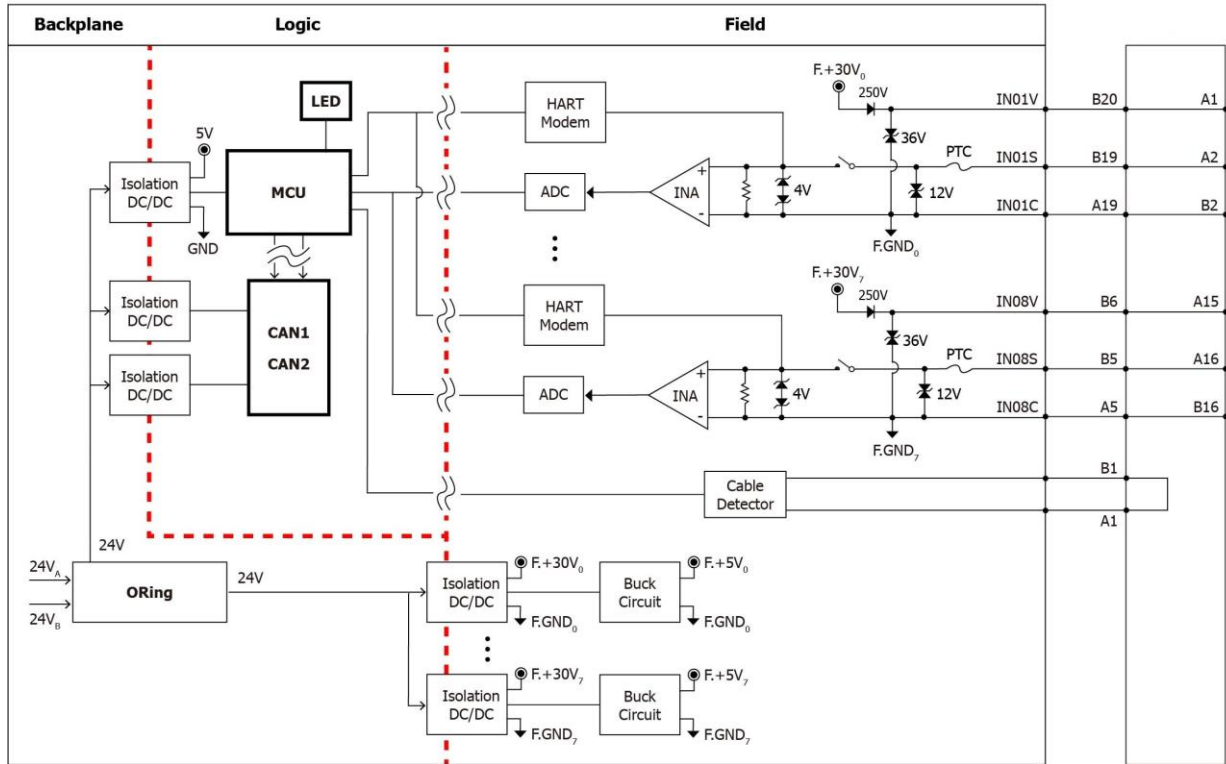
The R-9017C1H is a 16-bit, 8-channel isolated analog input module. This module accepts current input range 4~20mA and supports 25% over range measurement (Accuracy is not guaranteed). Besides, it has  $\pm 0.05\%$  accuracy for highly accurate application. Moreover, this module provides 500Hz sampling rate for some application. In addition to current input, R-9017C1H is also built-in HART master interface to remotely maintain devices via HART. The R-9017C1H provides 3000VDC optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

#### 5.4.1.2 Specification

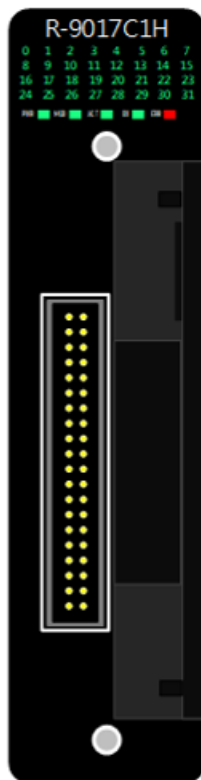
Parameter	Value
<b>Feature</b>	
HART interface	Yes, supports HART master
Redundant	Yes (Switching time < 100us)
Over-Current Protection	Yes
Termination board break off detection	Yes
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	LED 0~7 for CH Hi/Lo alarm
	LED 16~23 for CH Break Line
<b>Analog Input</b>	
Number of channels	8
Type	4~20 mA (Support $\pm 25\%$ overrange)
Maximum Allowable Input Current	25mA

Resolution	16 bit
Sampling Rate	100 Samples/sec (Total)
Accuracy	±0.05% FSR
Zero Drift	±0.002 LSB/°C
Span Drift	±5 ppm/°C
Common Mode Rejection	86 dB
Normal Mode Rejection	100 dB
Input Impedance	105.3Ω ±1% (Single/Duplex)
Data Range	-2500~12500
Field-to-Backplane isolation	3000V <sub>DC</sub>
<b>HART</b>	
Mode	Master, Monodrop (Point-to-Point)
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S09 / RDB-D09
Maximum power consumption	4.6 W (0.19A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	350 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.4.1.3 Hardware Structure



### 5.4.1.4 Pin assignments



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
IN01_V (V)	A1	B1	X
IN01_S (S)	A2	B2	IN01_C (0V)
IN02_V (V)	A3	B3	X
IN02_S (S)	A4	B4	IN02_C (0V)
IN03_V (V)	A5	B5	X
IN03_S (S)	A6	B6	IN03_C (0V)
IN04_V (V)	A7	B7	X
IN04_S (S)	A8	B8	IN04_C (0V)
IN05_V (V)	A9	B9	X
IN05_S (S)	A10	B10	IN05_C (0V)
IN06_V (V)	A11	B11	X
IN06_S (S)	A12	B12	IN06_C (0V)
IN07_V (V)	A13	B13	X
IN07_S (S)	A14	B14	IN07_C (0V)
IN08_V (V)	A15	B15	X
IN08_S (S)	A16	B16	IN08_C (0V)
X	A17	B17	X
X	A18	B18	X
X	A19	B19	X
BK	A20	B20	BK

## 5.4.2 R-9017C2H

### 5.4.2.1 Overview



- 16 current input channels
- Overrange measurement
- Built-in HART master interface
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Channel break line detect

The R-9017C2H is a 16-bit, 16-channel analog input module. This module accepts current input range 4~20mA and supports 25% over range measurement (Accuracy is not guaranteed). Besides, it has  $\pm 0.05\%$  accuracy for highly accurate application. Moreover, this module provides 100Hz sampling rate for some application. In addition to current input, R-9017C2H is also built-in HART master interface to remotely maintain devices via HART. The R-9017C2H provides 3000VDC optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

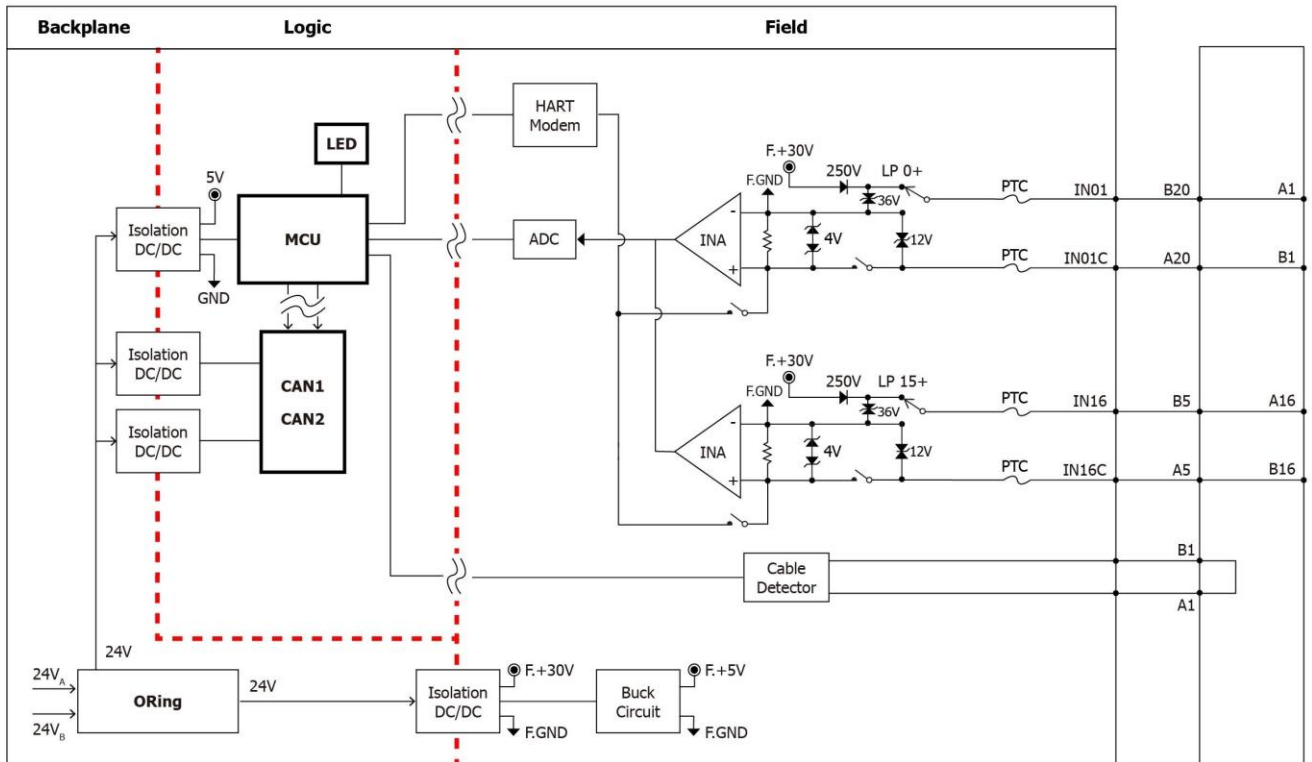
### 5.4.2.2 Specification

Parameter	Value
<b>Feature</b>	
HART interface	Yes, supports HART master
Redundant	Yes (Switching time < 100us)
Over-Current Protection	Yes
Termination board break off detection	Yes
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	LED 0~15 for CH Hi/Lo alarm
	LED 16~31 for CH Break Line
<b>Analog Input</b>	
Number of channels	16
Type	4~20 mA (Support $\pm 25\%$ overrange)
Maximum Allowable Input Current	25mA
Resolution	16 bit
Sampling Rate	10 Samples/sec (per channel)

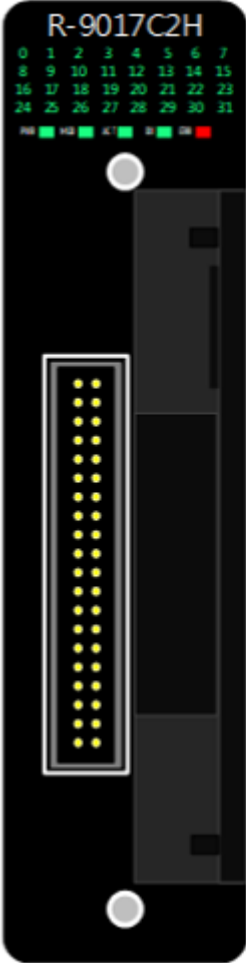


Accuracy	±0.05% FSR
Zero Drift	±0.002 LSB/°C
Span Drift	±5 ppm/°C
Common Mode Rejection	86 dB
Normal Mode Rejection	100 dB
Input Impedance	85.3Ω ±1% (Single/Duplex) (2.1V@20mA)
Data Range	-2500~12500
Field-to-Backplane isolation	3000V <sub>DC</sub>
<b>HART</b>	
Mode	Master, Monodrop (Point-to-Point)
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S01 / RDB-D01
Maximum power consumption	2.4 W (0.1A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	260 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.4.2.3 Hardware Structure



### 5.4.2.4 Pin assignments



The image shows a black R-9017C2H module with a green LED display at the top showing pin numbers 0-31. Below the display is a 20-pin connector with yellow LEDs. To the right is a schematic diagram of the connector with 20 pins labeled A1 through A20 and B1 through B20.

Pin Assignment Name	Terminal No.	Pin Assignment Name
IN01	A1	B1 IN01C
IN02	A2	B2 IN02C
IN03	A3	B3 IN03C
IN04	A4	B4 IN04C
IN05	A5	B5 IN05C
IN06	A6	B6 IN06C
IN07	A7	B7 IN07C
IN08	A8	B8 IN08C
IN09	A9	B9 IN09C
IN10	A10	B10 IN10C
IN11	A11	B11 IN11C
IN12	A12	B12 IN12C
IN13	A13	B13 IN13C
IN14	A14	B14 IN14C
IN15	A15	B15 IN15C
IN16	A16	B16 IN16C
X	A17	B17 X
X	A18	B18 X
X	A19	B19 X
BK	A20	B20 BK

## 5.4.3 R-9015

### 5.4.3.1 Overview



- 12 RTD input channels
- User defined up/down scale
- Open wire detection
- RoHS compliance
- 3000 VDC Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Channel break line detect

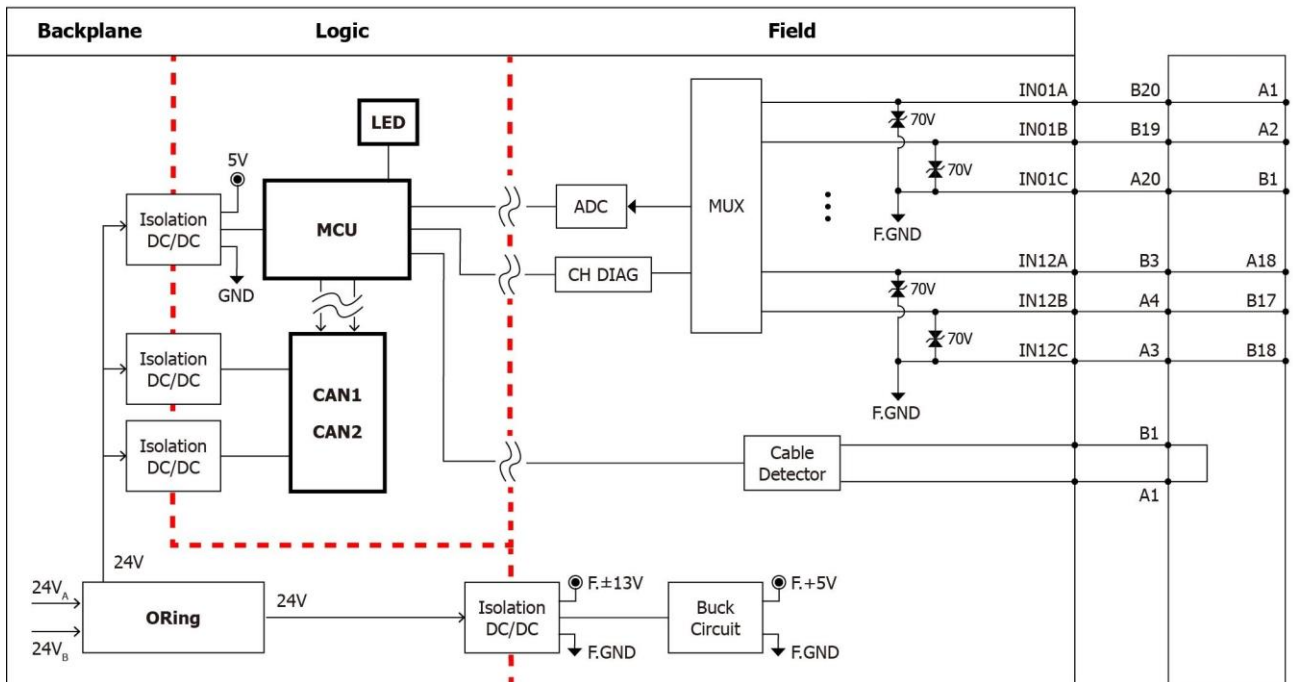
The R-9015 is a 16-bit, 12-channel RTD input module that features programmable input range on all channels. This module has  $\pm 0.05\%$  accuracy for highly accurate application. Besides, the R-9015 provides 3000V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

### 5.4.3.2 Specification

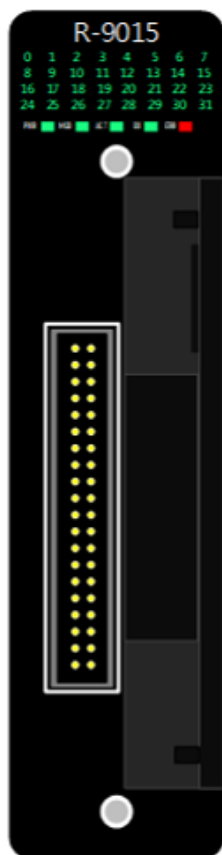
Parameter	Value	
<b>Feature</b>		
Redundant	Yes (Switching time < 100us)	
Over Voltage Protection	Yes	
Termination board break off detection	Yes	
Open Wire Detection	Yes	
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR	
	LED 0~11 for CH Hi/Lo alarm	
	LED 16~27 for CH Break Line	
<b>RTD Input</b>		
Number of channels	12 (Non-isolation)	
Wiring	3 Wire	
Type	Pt-100	IEC 60751 ITS90 (0.03851 $\Omega/\Omega/^{\circ}\text{C}$ )
	JPt-100	JIS C 1604 (0.03916 $\Omega/\Omega/^{\circ}\text{C}$ )
	Pt-1000	IEC 60751 ITS90 (0.03851 $\Omega/\Omega/^{\circ}\text{C}$ )

Temperature Range	Pt100	-200 ~ +850 (0~10000)
	JPt-100 , Pt1000	-200 ~ +630 (0~10000)
Resolution	16 bit	
Sampling Rate	1 Samples/sec (per )	
Accuracy	±0.05% FSR	
Zero Drift	±0.5 μV/°C	
Span Drift	±20 μV/°C	
Common Mode Rejection	106 dB	
Normal Mode Rejection	100 dB	
Input Impedance	20 MΩ (10M+10M, between CH+/-)	
Data Range	-2500~12500	
Field-to-Backplane isolation	3000V <sub>DC</sub>	
Certification		
EMC	EN 61000-6-2 (EMS)	
	EN 61000-6-4 (EMI)	
	IEC/EN 61000-4-2 (ESD)	
	IEC/EN 61000-4-4 (EFT)	
<b>General</b>		
Termination board	RDB-S03 / RDB-D03	
Maximum power consumption	2 W (0.08A@24V <sub>DC</sub> )	
Operating temperature	-25°C ~ +70°C	
Humidity	5 ~ 95 % RH, Non-condensing	
Weight	200 g	
Dimensions (W x L x H)	33 x 129 x 130 mm	

### 5.4.3.3 Hardware Structure



### 5.4.3.4 Pin assignments



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
IN01A	A1	B1	IN01C
IN01B	A2	B2	IN02B
IN02A	A3	B3	IN02C
IN03A	A4	B4	IN03C
IN03B	A5	B5	IN04B
IN04A	A6	B6	IN04C
IN05A	A7	B7	IN05C
IN05B	A8	B8	IN06B
IN06A	A9	B9	IN06C
IN07A	A10	B10	IN07C
IN07B	A11	B11	IN08B
IN08A	A12	B12	IN08C
IN09A	A13	B13	IN09C
IN09B	A14	B14	IN10B
IN10A	A15	B15	IN10C
IN11A	A16	B16	IN11C
IN11B	A17	B17	IN12B
IN12A	A18	B18	IN12C
X	A19	B19	X
BK	A20	B20	BK

## 5.4.4 R-9019

### 5.4.4.1 Overview



- 16 thermocouple input channels
- User defined up/down scale
- Open wire detection
- RoHS compliance
- 3000 VDC Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block
- Channel break line detect

The R-9019 is a 16-bit, 16-channel thermocouple input module that features programmable input range on all channels. It measures thermocouple input (Type J, K, T, E, R, S, B, N, C). An external CJC is supported for accurate temperature measurement. Moreover, this module has  $\pm 0.05\%$  accuracy for highly accurate application. Besides, the R-9019 provides 3000V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

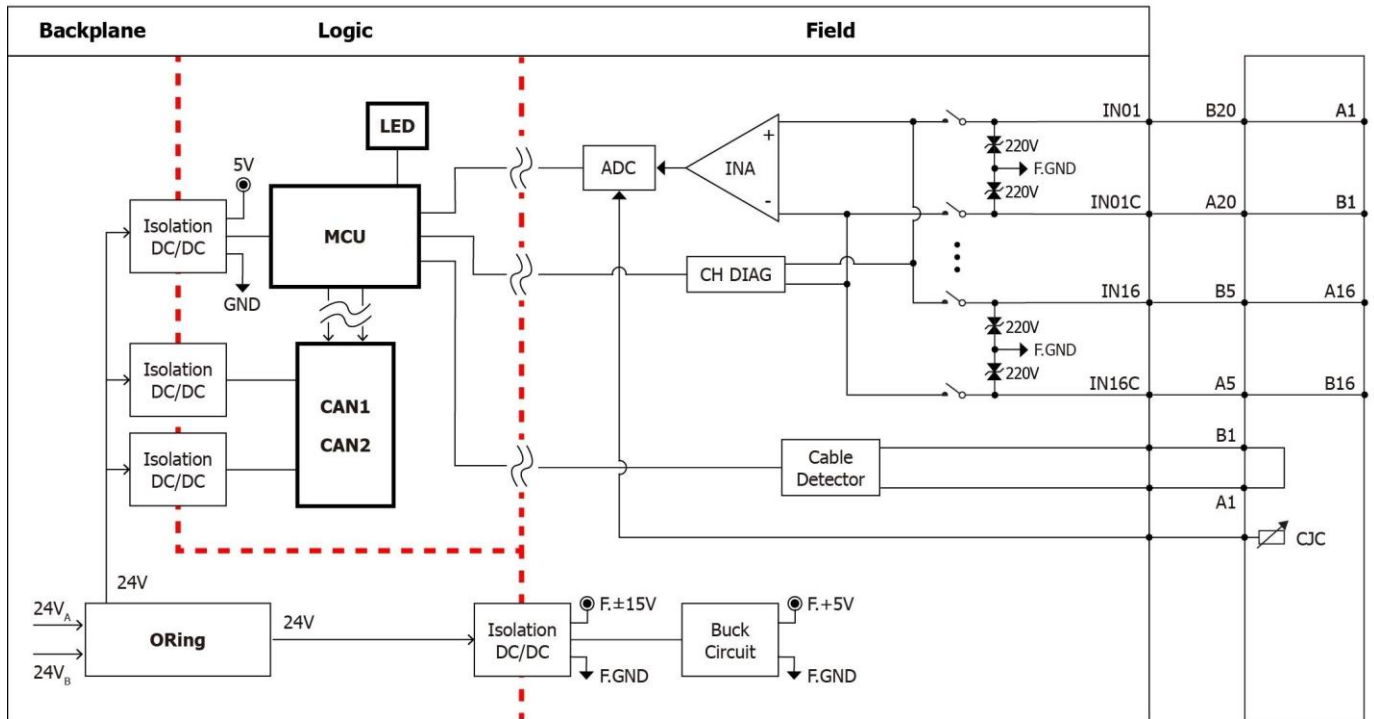
### 5.4.4.2 Specification

Parameter	Value	
<b>Feature</b>		
Redundant	Yes (Switching time < 100us)	
Over Voltage Protection	Yes	
Termination board break off detection	Yes	
Open Wire Detection	Yes	
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR	
	LED 0~15 for CH Hi/Lo alarm	
	LED 16~31 for CH Break Line	
<b>Thermocouple Input</b>		
Number of channels	16	
Type	Type J, K, T, E, R, S, B, N, C	
Temperature Range	J	-210 ~ +1200 °C
	K	-270 ~ +1372 °C
	T	-270 ~ +400 °C
	E	-270 ~ +1000 °C

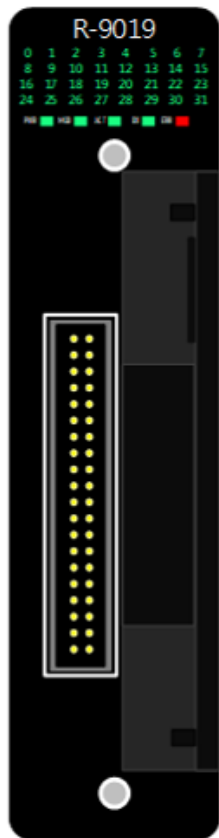
	R	-50 ~ +1765 °C
	S	-50 ~ +1765 °C
	B	0 ~ +1820 °C
	N	-270 ~ +1300 °C
	C	0 ~ +2320 °C
Resolution	16 bit	
Sampling Rate	1 Samples/1.5sec (per channel)	
Accuracy	±0.05% FSR (CJC<0.5°C)	
Zero Drift	±20 μV/°C	
Span Drift	±25 μV/°C	
Common Mode Rejection	106 dB	
Normal Mode Rejection	100 dB	
Input Impedance	20 MΩ (10M+10M, between CH+/-)	
Data Range	-2500~12500	
Field-to-Backplane isolation	3000V <sub>DC</sub>	
<b>Certification</b>		
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)	
<b>General</b>		
Termination board	RDB-S02 / RDB-D02	
Maximum power consumption	2.2 W (0.09A@24V <sub>DC</sub> )	
Operating temperature	-25°C ~ +70°C	
Humidity	5 ~ 95 % RH, Non-condensing	
Weight	200 g	
Dimensions (W x L x H)	33 x 129 x 130 mm	



### 5.4.4.3 Hardware Structure



### 5.4.4.4 Pin assignments



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
IN01	A1	B1	IN01C
IN02	A2	B2	IN02C
IN03	A3	B3	IN03C
IN04	A4	B4	IN04C
IN05	A5	B5	IN05C
IN06	A6	B6	IN06C
IN07	A7	B7	IN07C
IN08	A8	B8	IN08C
IN09	A9	B9	IN09C
IN10	A10	B10	IN10C
IN11	A11	B11	IN11C
IN12	A12	B12	IN12C
IN13	A13	B13	IN13C
IN14	A14	B14	IN14C
IN15	A15	B15	IN15C
IN16	A16	B16	IN16C
CJC	A17	B17	CJC
CJC	A18	B18	AGND
CJC	A19	B19	X
BK	A20	B20	BK

## 5.5 Analog Output

### 5.5.1 R-9028V1

#### 5.5.1.1 Overview



- 8 isolation voltage output channels
- Allowable range output: -12~12V
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<1 ms)
- Break line detect for termination block

The R-9028V1 is a 16-bit, 8-channel isolated analog output module that features programmable output range on all channels. It provides digital to analog converter controlled by the system module to convert the digital data into output signals. Users can specify the start up and safety value through configuration software. Moreover, this module has  $\pm 0.05\%$  accuracy for highly accurate application. Besides, the R-9028V1 provides 3000V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

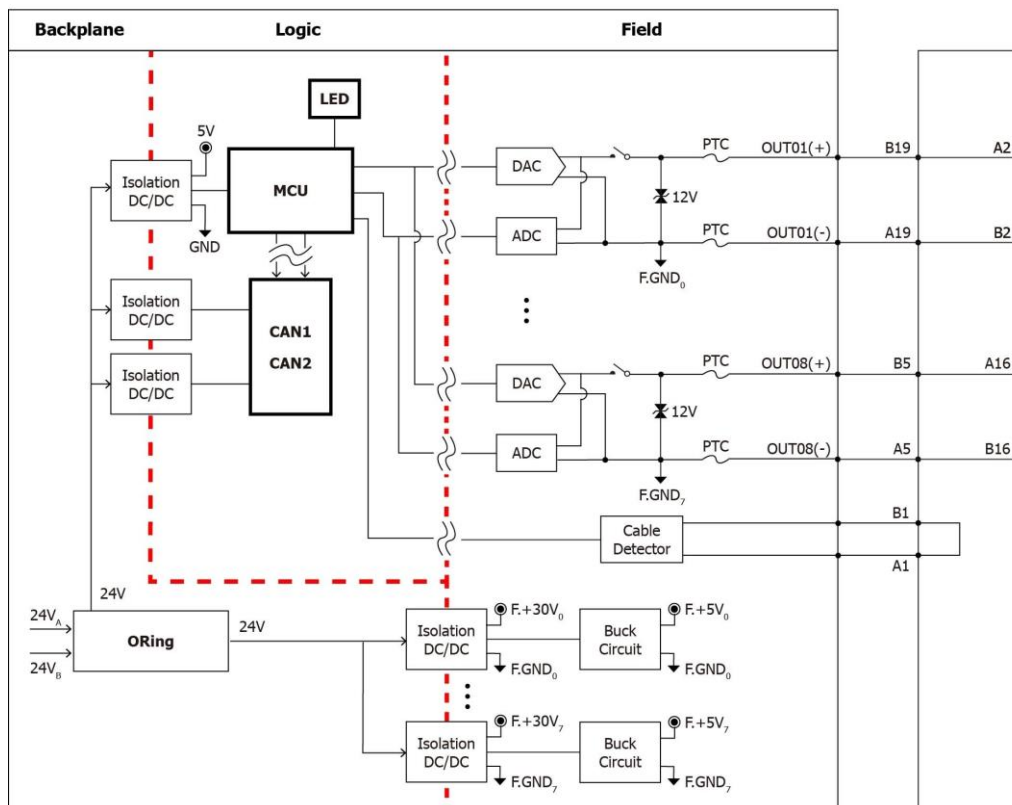
#### 5.5.1.2 Specification

Parameter	Value	
<b>Feature</b>		
Redundant	Yes (Switching time < 1 ms)	
Termination board break off detection	Yes	
Power-On Value	Yes	
Safety Value	Yes	
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR	
	LED 0~7 for CH Hi/Lo alarm	
<b>Analog Output</b>		
Number of channels	8	
Type	1 ~ 5 V, $\pm 10$ V	
Maximum Allowable Output Range	1 ~ 5 V	+20% (0 ~ 6 V <sub>DC</sub> )
	$\pm 10$ V	$\pm 20\%$ ( $\pm 12$ V <sub>DC</sub> )
Resolution	16 bit	

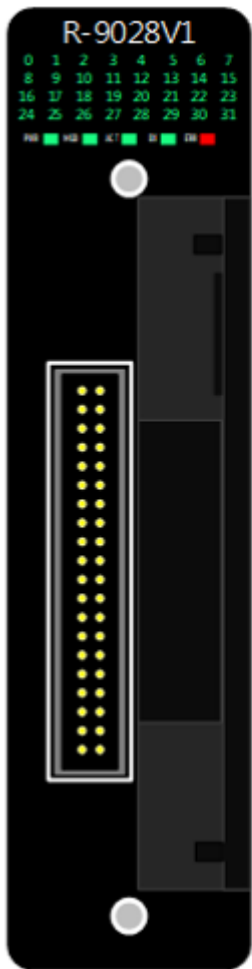
Accuracy	±0.05% FSR
Zero Drift	±4 ppm/°C
Span Drift	±3 ppm/°C
Min. Load Resistance	10 KΩ
Data Range	-2500~12500
Field-to-Logic isolation	3000V <sub>DC</sub>
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S09 / RDB-D09
Maximum power consumption	6.3W (0.26A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	270 g
Dimensions (W x L x H)	33 x 129 x 130 mm

1. The power consumption depends on the load.

### 5.5.1.3 Hardware Structure



## 5.5.1.4 Pin assignments



The image shows the R-9028V1 module on the left, which has a 20-pin connector. The top of the module is labeled 'R-9028V1' and has a status display with numbers 0-31 and colored LEDs. The connector is a vertical strip with 20 pins. To the right of the module is a diagram of the connector with 20 pins, each corresponding to a terminal number from A1 to A20 and B1 to B20.

Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
X	A1	B1	X
OUT01(+)	A2	B2	OUT01(-)
X	A3	B3	X
OUT02(+)	A4	B4	OUT02(-)
X	A5	B5	X
OUT03(+)	A6	B6	OUT03(-)
X	A7	B7	X
OUT04(+)	A8	B8	OUT04(-)
X	A9	B9	X
OUT05(+)	A10	B10	OUT05(-)
X	A11	B11	X
OUT06(+)	A12	B12	OUT06(-)
X	A13	B13	X
OUT07(+)	A14	B14	OUT07(-)
X	A15	B15	X
OUT08(+)	A16	B16	OUT08(-)
X	A17	B17	X
X	A18	B18	X
X	A19	B19	X
BK	A20	B20	BK

## 5.5.2 R-9028CH

### 5.5.2.1 Overview



- 8 isolation current output channels
- Built-in HART master interface
- Overrange output
- Open wire detection
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<1 ms)
- Break line detect for termination block
- Channel Break Line Detect
- Support output current readback

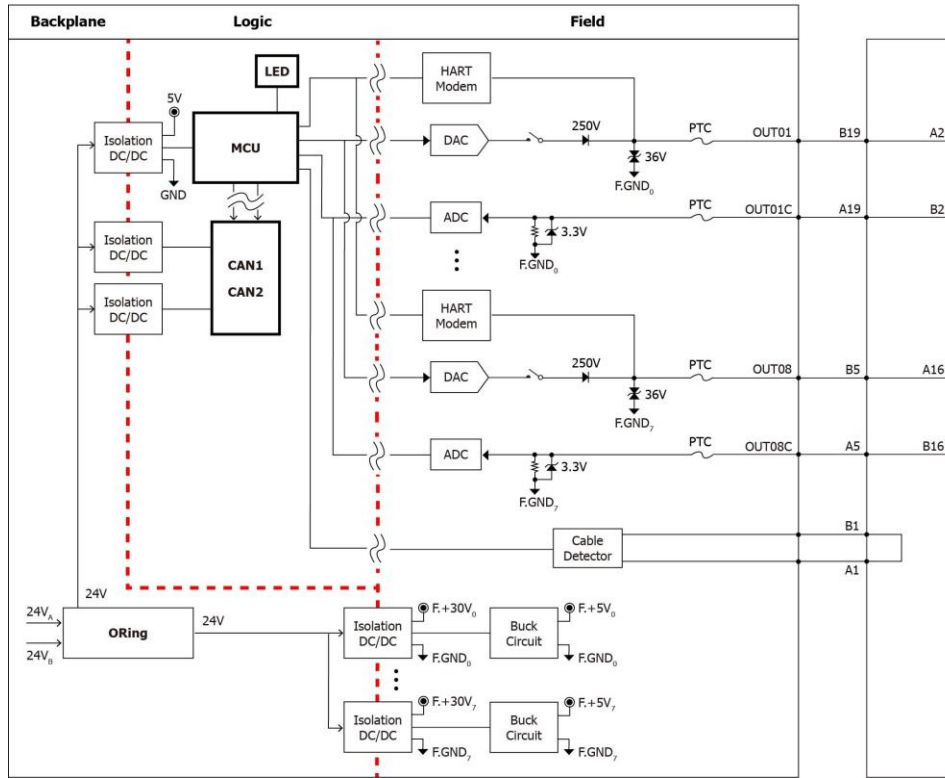
The R-9028CH is a 16-bit, 8-channel isolated analog output module. It provides digital to analog converter controlled by the system module to convert the digital data into output signals. Users can specify the start up and safety value through configuration software. Moreover, this module has  $\pm 0.05\%$  accuracy for highly accurate application. In addition to current output, R-9028CH is also built-in HART master interface to remotely maintain devices via HART. Besides, the R-9028CH provides 3000V<sub>DC</sub> optical isolation between channels and backplane bus. If any high voltage or current damages these channels, this module won't affect other component in RIO-98X0 system.

### 5.5.2.2 Specification

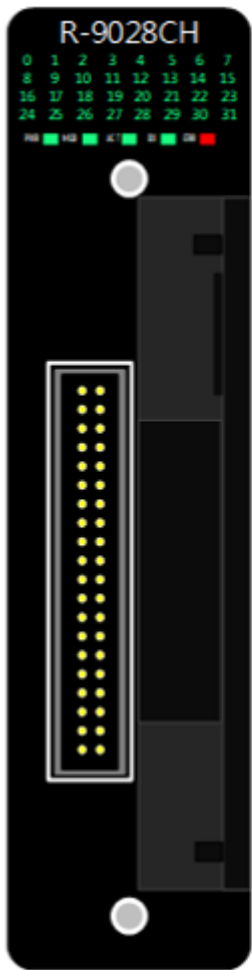
Parameter	Value
<b>Feature</b>	
HART interface	Yes, supports HART master
Redundant	Yes (Switching time < 1 ms)
Termination board break off detection	Yes
Open Wire Detection	Yes
Power-On Value	Yes
Safety Value	Yes
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	LED 0~7 for CH Hi/Lo alarm
	LED 16~23 for CH Break Line
<b>Analog Output</b>	
Number of channels	8
Type	4 ~ 20 mA (EU 0~1000)
Maximum Allowable Output Range	0 ~ 24 mA (EU -2500~12500)

Resolution	16 bit
Accuracy	±0.05% FSR
Zero Drift	±1.5 ppm/°C
Span Drift	±3 ppm/°C
Load Resistance	<1K Ω
Data Range	-2500~12500
Field-to-Logic isolation	3000V <sub>DC</sub>
<b>HART</b>	
Channel	1, Multiplexer Switchable
Mode	Master, Point-to-Point (Monodrop)
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S09 / RDB-D09
Maximum power consumption	5.6W (0.23A@24V <sub>DC</sub> )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	360 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.5.2.3 Hardware Structure



## 5.5.2.4 Pin assignments



The image shows the R-9028CH module on the left, which has a digital display at the top showing numbers 0-31 and status LEDs. Below the display is a 20-pin connector. To the right is a schematic diagram of the connector with 20 pins labeled A1 through A20 and B1 through B20.

Pin Assignment Name	Terminal No.	Pin Assignment Name
X	A1	B1
OUT01	A2	B2
X	A3	B3
OUT02	A4	B4
X	A5	B5
OUT03	A6	B6
X	A7	B7
OUT04	A8	B8
X	A9	B9
OUT05	A10	B10
X	A11	B11
OUT06	A12	B12
X	A13	B13
OUT07	A14	B14
X	A15	B15
OUT08	A16	B16
X	A17	B17
X	A18	B18
X	A19	B19
BK	A20	B20



## 5.6 Pulse Input

### 5.6.1 R-9084

#### 5.6.1.1 Overview



- 8 isolation pulse input channels
- Digital low pass filter
- RoHS compliance
- 3000 V<sub>DC</sub> Field-to-Backplane isolation
- Redundancy
- Fast redundant switching time (<100us)
- Break line detect for termination block

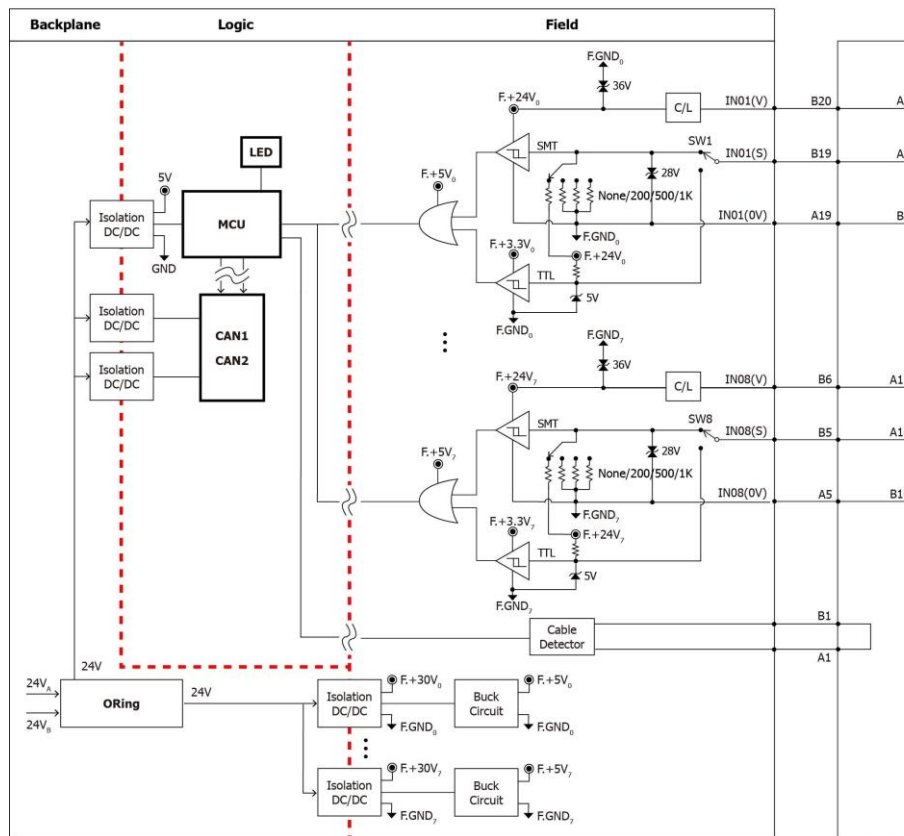
The R-9084 is a 32-bit high speed up-counter/frequency module. It can count up to 10 KHz input signal, and accuracy of the frequency mode is +/-0.4% FSR. The R-9084 features many diagnostic like some failures of communication, EEPROM, WDT, decoder, etc. When the modules are in the redundant mode and a failure occurs the slave module will take over as soon as possible. Moreover, the redundant switching is not only fast but also reliable for data exchanging. Thus, users can easily to use R-9084 to count.

#### 5.6.1.2 Specification

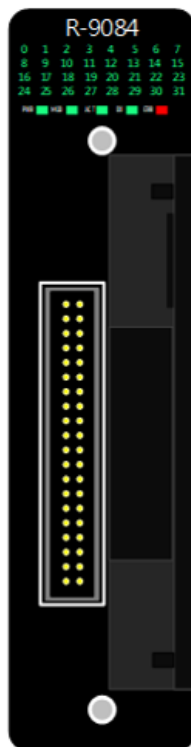
Parameter	Value
<b>Feature</b>	
Redundant	Yes (The counting error less than 1 counter when input signal < 10 KHz)
Termination board break off detection	Yes
Digital filter	Yes (1~32767us)
LED indicator	1 PWR, 1 MOD, 1 ACT, 1 DX, 1 ERR
	8 channel status
<b>Pulse Input</b>	
Number of channels	8 (isolation)
Type	CH+/CH-: 3V <sub>DC</sub> /8V <sub>DC</sub> Level with schmitt trigger
	TTL/CH-: TTL Level with schmitt trigger
Digital filter	Yes (1~32767us, default is off)
Input signal level (Schmitt)	V <sub>H</sub> (high level): from 8V <sub>DC</sub> to 30V <sub>DC</sub>

between CH+ and CH-	$V_L$ (low level): less than $3V_{DC}$
Input signal level (TTL) between TTL+ and CH-	$V_H$ (high level): larger than $2V_{DC}$ $V_L$ (low level): less than $0.8V_{DC}$
Input impedance	200/500/1K $\Omega$ or none
Maximum input current	24mA @ $24V_{DC}$ 、30mA @ $30V_{DC}$ (Input impedance: 1K)
Pulse edge	Up / Down edge trigger
Loop power	LP / CH- voltage: $27\sim 28V_{DC}$ (<27mA/CH.)
Input frequency range	1 Hz ~ 10 KHz
Input reaction time	<3 ms
Field-to-Logic Isolation	3000V $_{DC}$
Over Voltage Protection	No
<b>Certification</b>	
EMC	EN 61000-6-2 (EMS) EN 61000-6-4 (EMI) IEC/EN 61000-4-2 (ESD) IEC/EN 61000-4-4 (EFT)
<b>General</b>	
Termination board	RDB-S09 / RDB-D09
Maximum power consumption	6.8W (0.28A@ $24V_{DC}$ )
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	360 g
Dimensions (W x L x H)	33 x 129 x 130 mm

### 5.6.1.3 Hardware Structure



### 5.6.1.4 Pin assignments



Pin Assignment Name	Terminal No.	Terminal No.	Pin Assignment Name
IN01(V)	A1	B1	X
IN01(S)	A2	B2	IN01(OV)
IN02(V)	A3	B3	X
IN02(S)	A4	B4	IN02(OV)
IN03(V)	A5	B5	X
IN03(S)	A6	B6	IN03(OV)
IN04(V)	A7	B7	X
IN04(S)	A8	B8	IN04(OV)
IN05(V)	A9	B9	X
IN05(S)	A10	B10	IN05(OV)
IN06(V)	A11	B11	X
IN06(S)	A12	B12	IN06(OV)
IN07(V)	A13	B13	X
IN07(S)	A14	B14	IN07(OV)
IN08(V)	A15	B15	X
IN08(S)	A16	B16	IN08(OV)
X	A17	B17	X
X	A18	B18	X
X	A19	B19	X
BK	A20	B20	BK

## 5.7 Blank Module

### 5.7.1 RBLK-01

#### 5.7.1.1 Overview



- On the base unit are mounted input/output module.
- If modules are not mounted on the base unit, a blank module should be attached to portions where modules are mounted.

#### 5.7.1.2 Specification

Parameter	Value
<b>General</b>	
Operating temperature	-25°C ~ +70°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	110 g
Dimensions (W x L x H)	33 x 129 x 130 mm

## Section 6 Termination Board

### 6.1 Digital Input

#### 6.1.1 RDB-S08 / RDB-D08



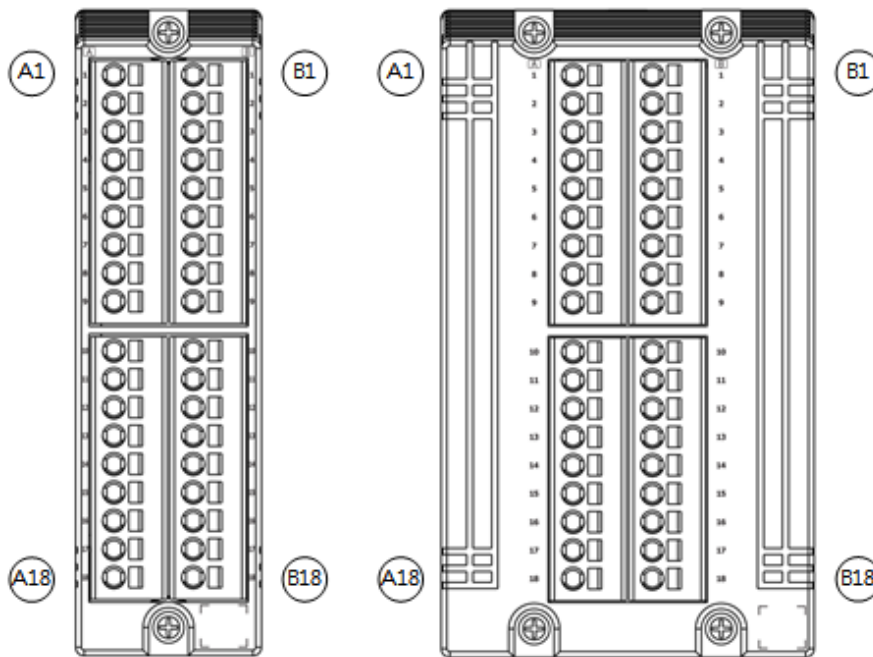
##### 6.1.1.1 Overview

The RDB-S08 and RDB-D08 are termination board for digital input modules. Termination boards are used for connections between modules and field devices.

##### 6.1.1.2 Specification

Digital Input		
Model	RDB-S08	RDB-D08
Mode	Single	Duplex
Type	P-COM(Source) or N-COM(Sink), Single-Ended	
Channel	32	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

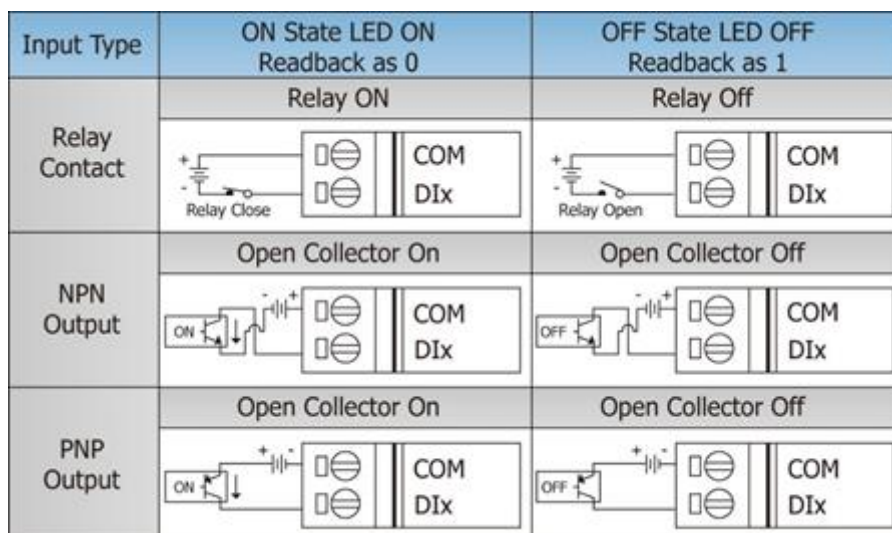
### 6.1.1.3 Pin assignment



A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8	DI9	DI10	DI11	DI12	DI13	DI14	DI15	COMA	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
DI16	DI17	DI18	DI19	DI20	DI21	DI22	DI23	DI24	DI25	DI26	DI27	DI28	DI29	DI30	DI31	COMB	N/A

### 6.1.1.4 Wiring

- Wet contact (Current sinking / sourcing)



## 6.2 Digital Output

### 6.2.1 RDB-S05 / RDB-D05



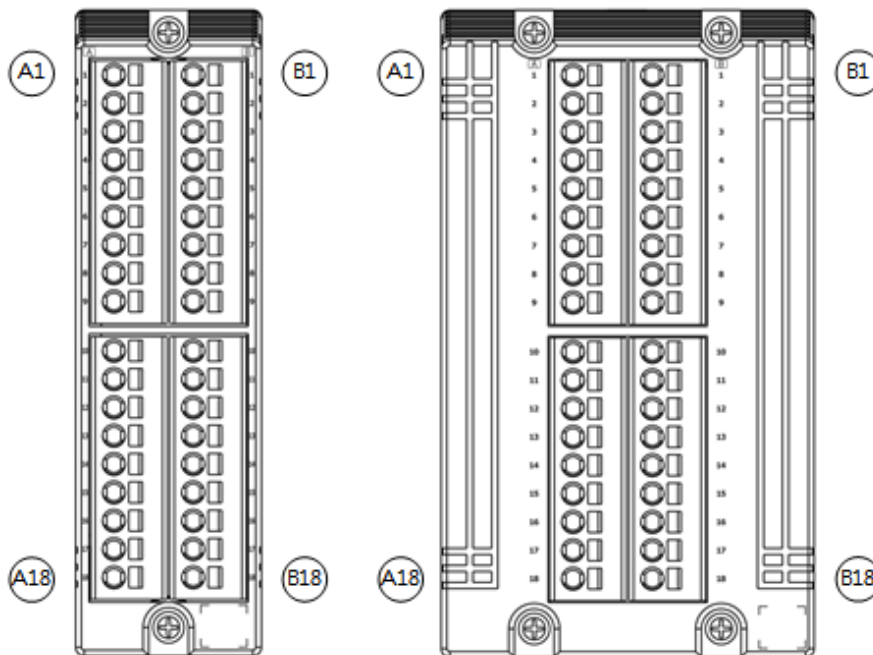
#### 6.2.1.1 Overview

The RDB-S05 and RDB-D05 are termination board for digital output modules. Termination boards are used for connections between modules and field devices.

#### 6.2.1.2 Specification

Digital Output		
Model	RDB-S05	RDB-D05
Mode	Single	Duplex
Type	Current sinking, Open-collector	
Channel	32	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.2.1.3 Pin assignment



A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
DO0	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DO8	DO9	DO10	DO11	DO12	DO13	DO14	DO15	COMA	PWRA
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
DO16	DO17	DO18	DO19	DO20	DO21	DO22	DO23	DO24	DO25	DO26	DO27	DO28	DO29	DO30	DO31	COMB	PWRB

### 6.2.1.4 Wiring

Output Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
	Relay ON	Relay Off
Drive Relay		
Resistance Load		



## 6.3 Analog Input

### 6.3.1 RDB-S01 / RDB-D01



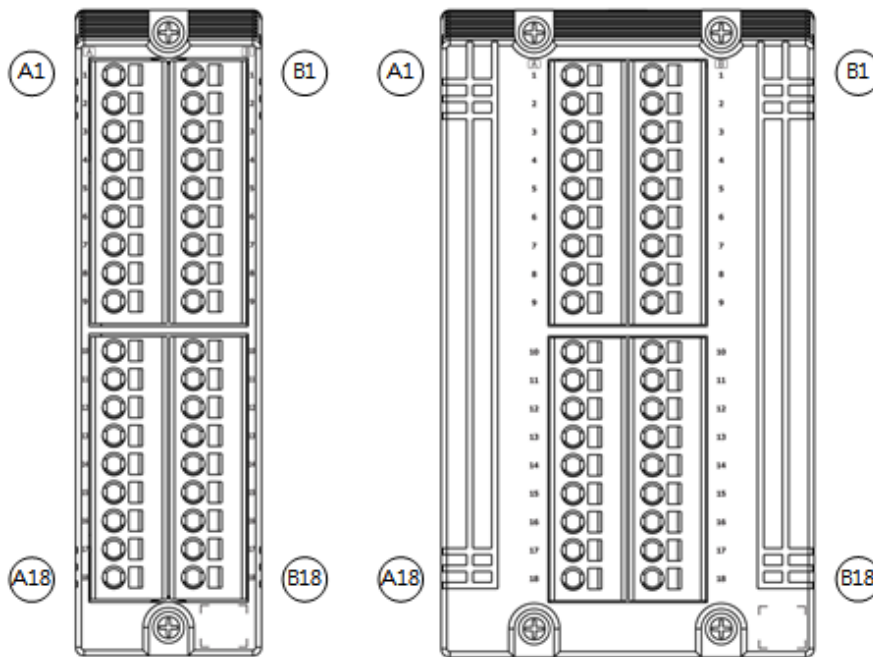
#### 6.3.1.1 Overview

RDB-S01 and RDB-D01 are **non-isolated** analog input and output module termination boards. Termination boards are used for connections between modules and field devices.

#### 6.3.1.2 Specification

Analog Input		
Model	RDB-S01	RDB-D01
Mode	Single	Duplex
Channel	16	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.3.1.3 Pin assignment



R-9017C2H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
CH0-	CH1-	CH2-	CH3-	CH4-	CH5-	CH6-	CH7-	CH8-	CH9-	CH10-	CH11-	CH12-	CH13-	CH14-	CH15-	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
CH0+	CH1+	CH2+	CH3+	CH4+	CH5+	CH6+	CH7+	CH8+	CH9+	CH10+	CH11+	CH12+	CH13+	CH14+	CH15+	N/A	N/A

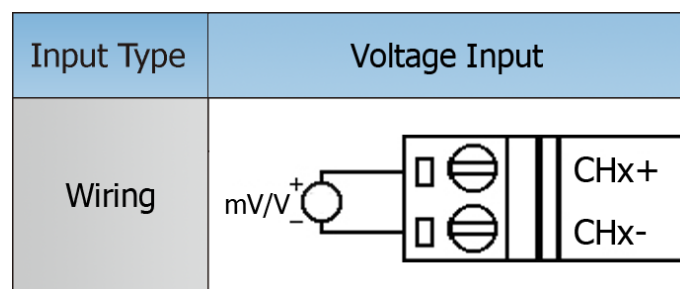
R-9017V2

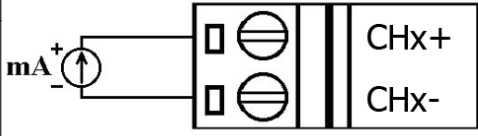
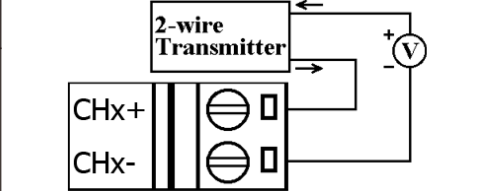
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
CH0+	CH1+	CH2+	CH3+	CH4+	CH5+	CH6+	CH7+	CH8+	CH9+	CH10+	CH11+	CH12+	CH13+	CH14+	CH15+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
CH0-	CH1-	CH2-	CH3-	CH4-	CH5-	CH6-	CH7-	CH8-	CH9-	CH10-	CH11-	CH12-	CH13-	CH14-	CH15-	N/A	N/A

R-9026C2H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
AI0-	AI1-	AI2-	AI3-	AI4-	AI5-	AI6-	AI7-	AO0+	AO1+	AO2+	AO3+	AO4+	AO5+	AO6+	AO7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
AI0+	AI1+	AI2+	AI3+	AI4+	AI5+	AI6+	AI7+	AO0-	AO1-	AO2-	AO3-	AO4-	AO5-	AO6-	AO7-	N/A	N/A

### 6.3.1.4 Wiring



Input Type	Current Input
Current Source	
2-Wire Transmitter (Passive)	

## 6.3.2 RDB-S09 / RDB-D09



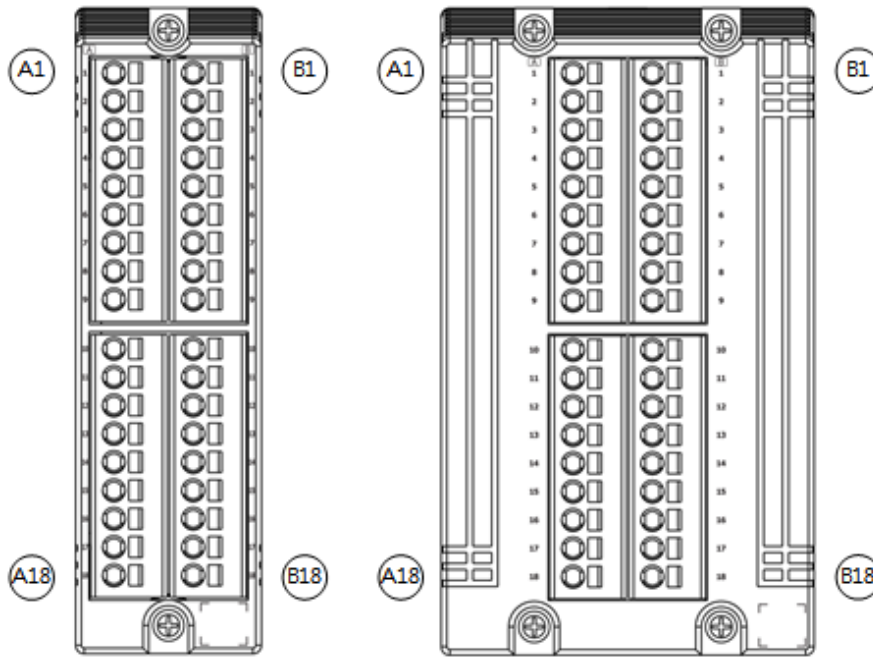
### 6.3.2.1 Overview

RDB-S09 and RDB-D09 are **isolated** analog input/output and pulse input termination boards. Termination boards are used for connections between modules and field devices.

### 6.3.2.2 Specification

Analog Input		
Model	RDB-S09	RDB-D09
Mode	Single	Duplex
Channel	16	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.3.2.3 Pin assignment



R-9017C1H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
LP0	AI0+	LP1	AI1+	LP2	AI2+	LP3	AI3+	LP4	AI4+	LP5	AI5+	LP6	AI6+	LP7	AI7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	AI0-	N/A	AI1-	N/A	AI2-	N/A	AI3-	N/A	AI4-	N/A	AI5-	N/A	AI6-	N/A	AI7-	N/A	N/A

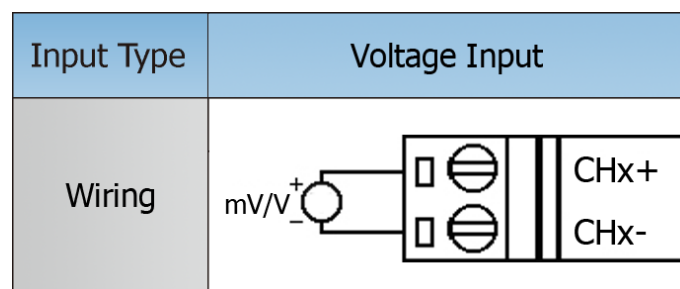
R-9017V1

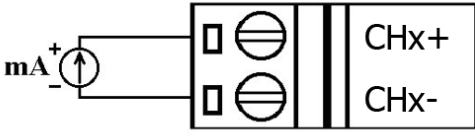
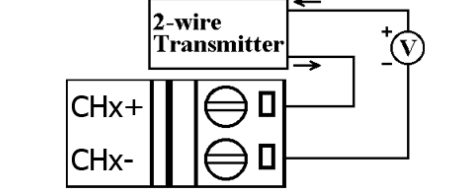
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
N/A	CH0+	N/A	CH1+	N/A	CH2+	N/A	CH3+	N/A	CH4+	N/A	CH5+	N/A	CH6+	N/A	CH7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	CH0-	N/A	CH1-	N/A	CH2-	N/A	CH3-	N/A	CH4-	N/A	CH5-	N/A	CH6-	N/A	CH7-	N/A	N/A

R-9026C1H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
LPI0	AI0+	LPI1	AI1+	LPI2	AI2+	LPI3	AI3+	LPO0	AO0+	LPO1	AO1+	LPO2	AO2+	LPO3	AO3+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	AI0-	N/A	AI1-	N/A	AI2-	N/A	AI3-	N/A	AO0-	N/A	AO1-	N/A	AO2-	N/A	AO3-	N/A	N/A

### 6.3.2.4 Wiring



Input Type	Current Input
Current Source	
2-Wire Transmitter (Passive)	

### 6.3.3 RDB-S02 / RDB-D02



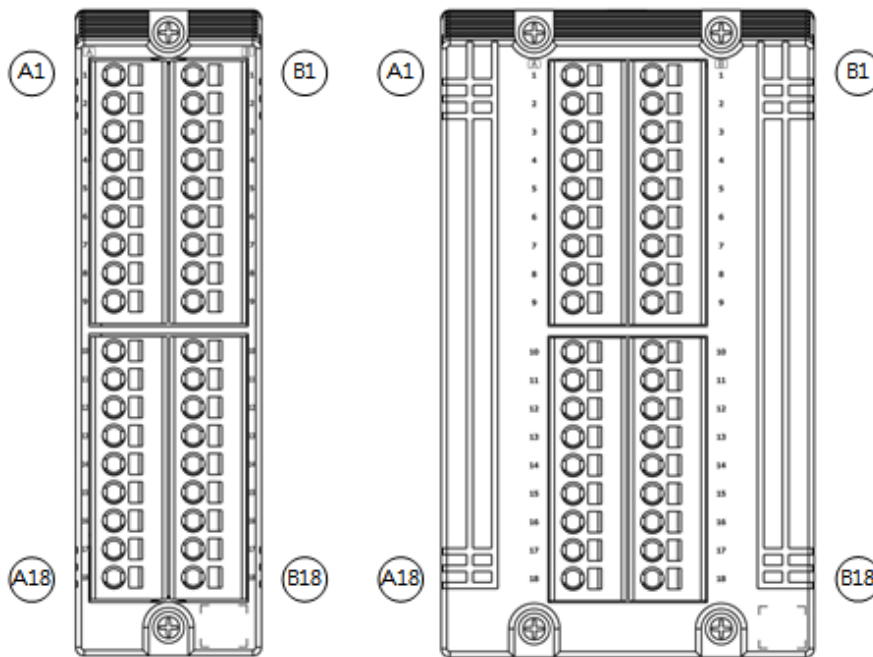
#### 6.3.3.1 Overview

The RDB-S02 and RDB-D02 are termination boards for TC input modules. The termination board is used for the connection between the module and field devices. In addition, the termination board also has a build-in CJC, which can measure the temperature more accurately.

#### 6.3.3.2 Specification

Analog Input		
Model	RDB-S02	RDB-D02
Mode	Single	Duplex
Channel	16	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.3.3.3 Pin assignment



A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
CH0+	CH1+	CH2+	CH3+	CH4+	CH5+	CH6+	CH7+	CH8+	CH9+	CH10+	CH11+	CH12+	CH13+	CH14+	CH15+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
CH0-	CH1-	CH2-	CH3-	CH4-	CH5-	CH6-	CH7-	CH8-	CH9-	CH10-	CH11-	CH12-	CH13-	CH14-	CH15-	N/A	N/A

### 6.3.3.4 Wiring

Input Type	Thermocouple Input
Voltage Input	
TC Input	



### 6.3.4 RDB-S03 / RDB-D03



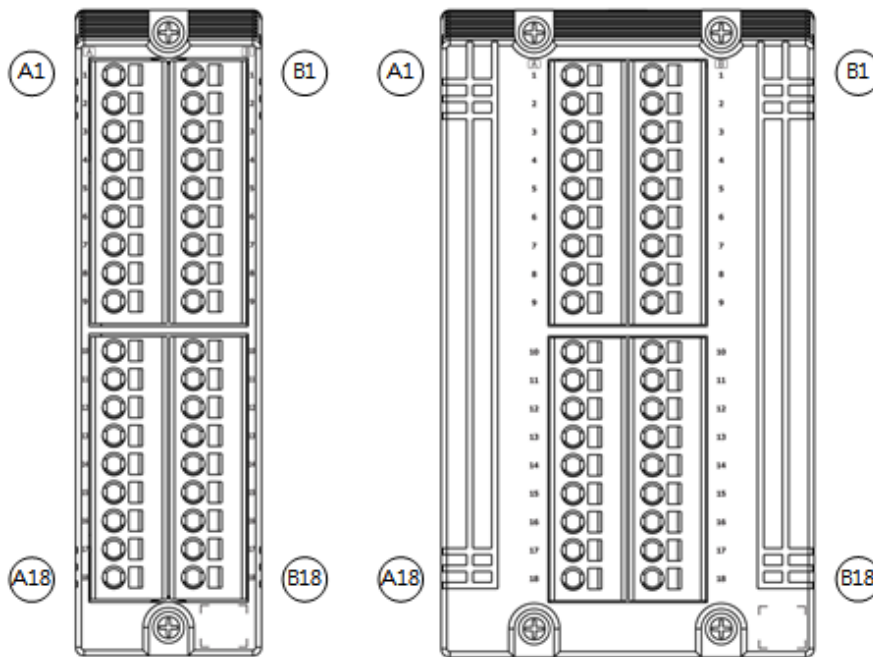
#### 6.3.4.1 Overview

The RDB-S03 and RDB-D03 are termination boards for RTD input modules. The termination board is used for the connection between the module and field devices.

#### 6.3.4.2 Specification

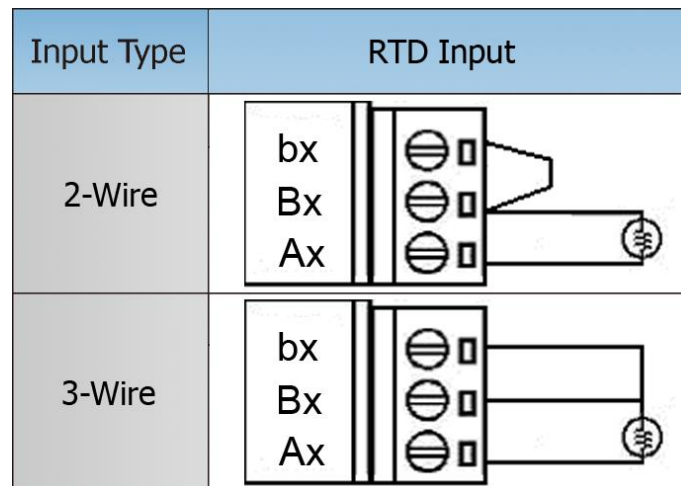
RTD Input		
Model	RDB-S03	RDB-D03
Mode	Single	Duplex
Channel	12	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.3.4.3 Pin assignment



A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
A0	B0	A1	A2	B2	A3	A4	B4	A5	A6	B6	A7	A8	B8	A9	A10	B10	A11
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
b0	B1	b1	b2	B3	b3	b4	B5	b5	b6	B7	b7	b8	B9	b9	b10	B11	b11

### 6.3.4.4 Wiring



## 6.4 Analog Output

### 6.4.1 RDB-S01 / RDB-D01



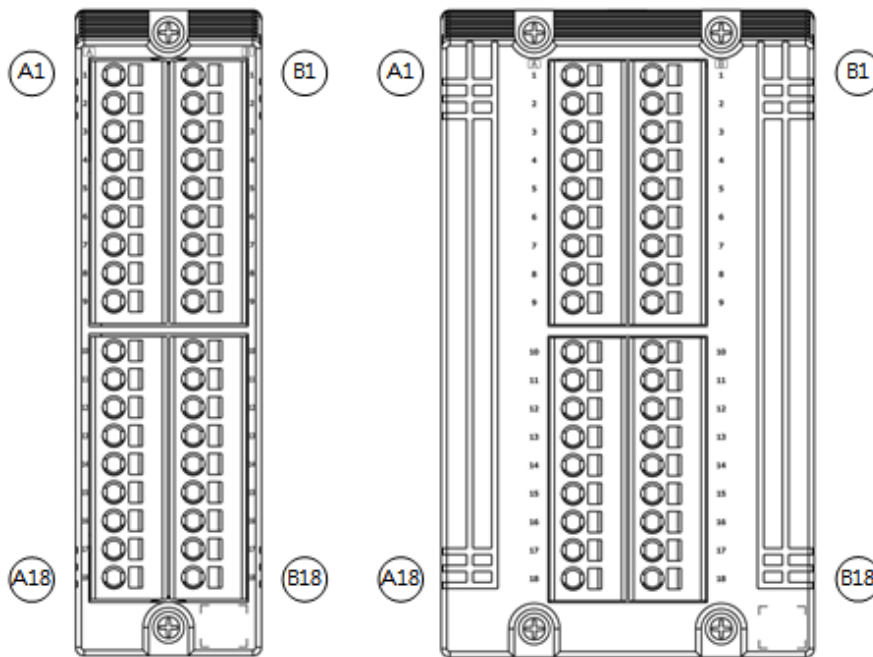
#### 6.4.1.1 Overview

RDB-S01 and RDB-D01 are **non-isolated** analog input and output module termination boards. Termination boards are used for connections between modules and field devices.

#### 6.4.1.2 Specification

Analog Input		
Model	RDB-S01	RDB-D01
Mode	Single	Duplex
Channel	16	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.4.1.3 Pin assignment



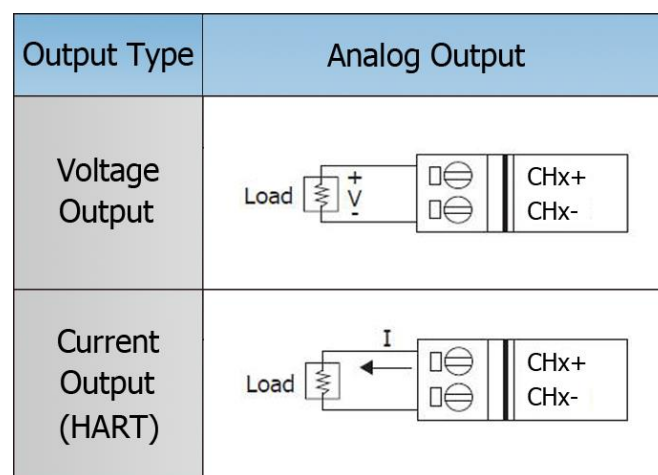
R-9028V2

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
CH0+	CH1+	CH2+	CH3+	CH4+	CH5+	CH6+	CH7+	CH8+	CH9+	CH10+	CH11+	CH12+	CH13+	CH14+	CH15+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
CH0-	CH1-	CH2-	CH3-	CH4-	CH5-	CH6-	CH7-	CH8-	CH9-	CH10-	CH11-	CH12-	CH13-	CH14-	CH15-	N/A	N/A

R-9026C2H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
AI0-	AI1-	AI2-	AI3-	AI4-	AI5-	AI6-	AI7-	AO0+	AO1+	AO2+	AO3+	AO4+	AO5+	AO6+	AO7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
AI0+	AI1+	AI2+	AI3+	AI4+	AI5+	AI6+	AI7+	AO0-	AO1-	AO2-	AO3-	AO4-	AO5-	AO6-	AO7-	N/A	N/A

### 6.4.1.4 Wiring



## 6.4.2 RDB-S09 / RDB-D09



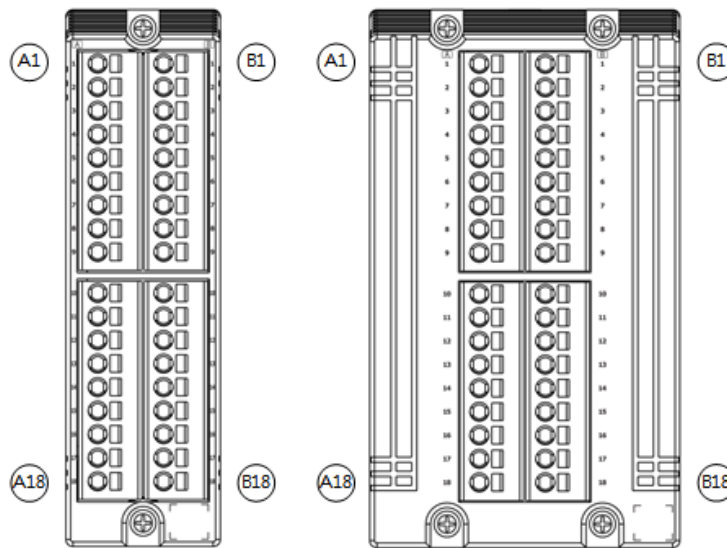
### 6.4.2.1 Overview

RDB-S09 and RDB-D09 are **isolated** analog input/output and pulse input termination boards. Termination boards are used for connections between modules and field devices.

### 6.4.2.2 Specification

Analog Input		
Model	RDB-S09	RDB-D09
Mode	Single	Duplex
Channel	16	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.4.2.3 Pin assignment



R-9028V1

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
N/A	CH0+	N/A	CH1+	N/A	CH2+	N/A	CH3+	N/A	CH4+	N/A	CH5+	N/A	CH6+	N/A	CH7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	CH0-	N/A	CH1-	N/A	CH2-	N/A	CH3-	N/A	CH4-	N/A	CH5-	N/A	CH6-	N/A	CH7-	N/A	N/A

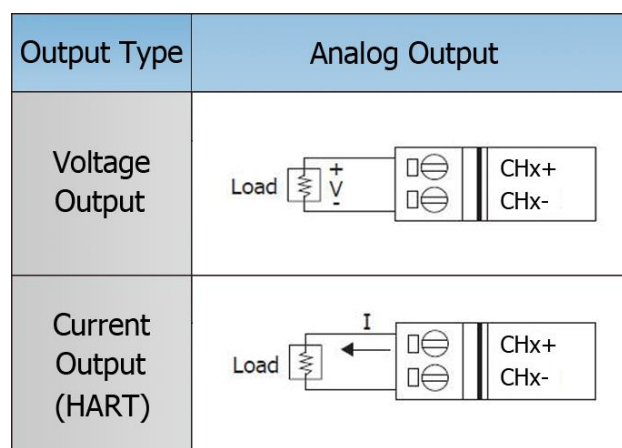
R-9028CH

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
N/A	CH0+	N/A	CH1+	N/A	CH2+	N/A	CH3+	N/A	CH4+	N/A	CH5+	N/A	CH6+	N/A	CH7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	CH0-	N/A	CH1-	N/A	CH2-	N/A	CH3-	N/A	CH4-	N/A	CH5-	N/A	CH6-	N/A	CH7-	N/A	N/A

R-9026C1H

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
LPI0	AI0+	LPI1	AI1+	LPI2	AI2+	LPI3	AI3+	LPO0	AO0+	LPO1	AO1+	LPO2	AO2+	LPO3	AO3+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	AI0-	N/A	AI1-	N/A	AI2-	N/A	AI3-	N/A	AO0-	N/A	AO1-	N/A	AO2-	N/A	AO3-	N/A	N/A

### 6.4.2.4 Wiring



## 6.5 Pulse Input

### 6.5.1 RDB-S09 / RDB-D09



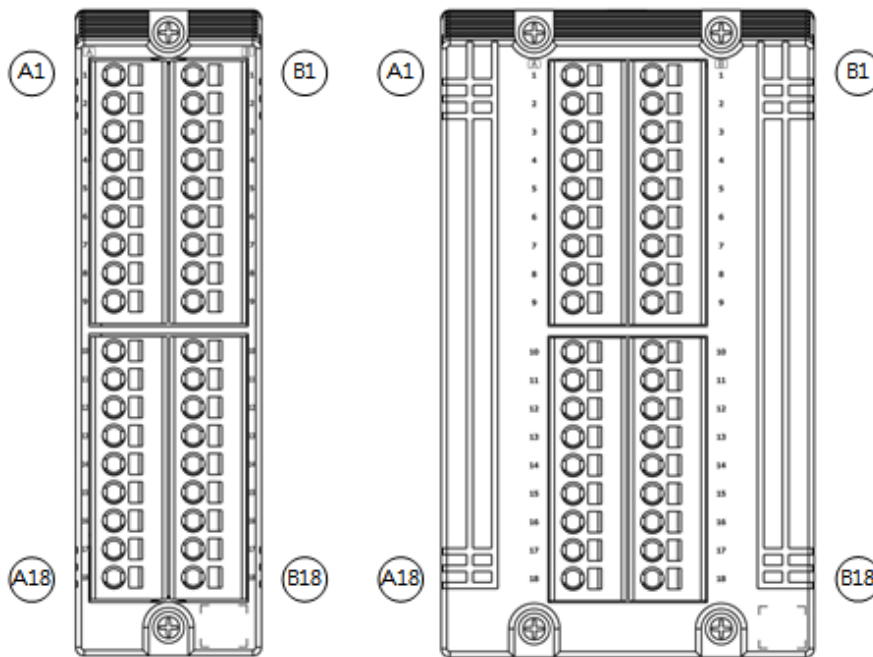
#### 6.5.1.1 Overview

RDB-S09 and RDB-D09 are **isolated** analog input/output and pulse input termination boards. Termination boards are used for connections between modules and field devices.

#### 6.5.1.2 Specification

Pulse Input		
Model	RDB-S09	RDB-D09
Mode	Single	Duplex
Channel	8	
General		
Dimension (W x L x H)	32 x 115 x 60 mm	65 x 115 x 60 mm
Operating temperature	-25 ~ 70°C	
Humidity	5 ~ 95 % RH, Non-condensing	

### 6.5.1.3 Pin assignment



A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
LP0	CH0+	LP1	CH1+	LP2	CH2+	LP3	CH3+	LP4	CH4+	LP5	CH5+	LP6	CH6+	LP7	CH7+	N/A	N/A
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18
N/A	CH0-	N/A	CH1-	N/A	CH2-	N/A	CH3-	N/A	CH4-	N/A	CH5-	N/A	CH6-	N/A	CH7-	N/A	N/A

### 6.5.1.4 Wiring

Input Type	Pulse Input	Appropriate Impedance			
		None	200Ω	500Ω	1000Ω
Source NPN & Switch		✓	✗	✗	✗
Sink 24V		✓	✗	✗	✗
Sink Switch		✗	✓	✓	✓
Sink 2-wire transmitter		✗	✓	✓	✓
Sink 3-wire transmitter		✓	✗	✗	✗



# No t e

