



Innovation in Automation

RTU300

HARDWARE MANUAL

- RTU300
- RTU302

RTU Series

01 / 2020

MIKRODEV_HM_RTU300_EN

v1.1

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Preface



Mikrodev RTU300 series RTUs can monitor and control Intelligent Electrical Devices (protection relays, reclosing cutters, energy and quality analyzers ... etc) via industry standard protocols like IEC 61850, Modbus TCP and Modbus RTU. They can also communicate with SCADA or control center software via IEC 60870, DNP3 and MODBUS TCP protocols. With its easy, flexible and fast programming capabilities and expandable I/O capability up to 1024 points, Mikrodev RTU products are preferred for electrical applications. MikroDev RTU300 and RTU400 Series RTUs are programmed mainly using Function Block Diagram - FBD language which is defined in IEC 61131-3 standard. Thanks to programming with FBD language, you can develop applications easily and quickly with drag and drop logic.

Please follow our website www.mikrodev.com for the up to date version of the document.

About Mikrodev



Since 2006, MIKRODEV has been developing and manufacturing industrial control and communication products. MIKRODEV serves the system integrators in the public and private sector, OEM and end users. Our products are manufactured complying with the quality standards required by the industrial automation industry and the quality of our products are proved on the field for many years MIKRODEV is one of the few companies in the world that has its own designed IEC 61131- 3 compliant library for its programmable logic control devices. In addition, the open, flexible, programmable SCADA solution developed by MIKRODEV is also available to customers. MIKRODEV products' performance and wide range of applications make them possible for customers to achieve faster, simplified and cost-effective results.

WARNING!

- ✓ Please take care of the following issues when using Mikrodev devices.
- ✓ Since the unit operates with 24 VDC (12-36 VDC) voltage, you should take care of the voltage level that the unit is connected to. If a voltage above this voltage level is applied, the device may be damaged and may be out of warranty.
- ✓ Make sure that the energy connection of your device is connected to the ground or to a properly grounded terminal.
- ✓ Make sure that the environment in which your device is being used is free of moisture, electric shock, vibration and dust.
- ✓ Pay attention to the supply voltage and the connections of the product. Mikrodev is not responsible for any issues due to power failure since there is no auxiliary supply (UPS) on the device.
- ✓ The fuse to be used must be a FF super fast type and current limit value 1A.
- ✓ Do not use the device under conditions other than the environmental conditions specified in the "Electrical Specifications" section (humidity, dust, liquid and temperature, etc.)
- ✓ Removing the warranty label on the product or removing the protective case will void the warranty.
- ✓ Products that are damaged, boxes have been changed and other brand labels are affixed are not covered by the warranty.
- ✓ The appliance must not be cleaned with solvents (thinner, benzine, acid etc.) or with abrasive cleaning agents.
- ✓ Only dry cloth should be used when cleaning the appliance.
- ✓ Do not open the device by removing the case of the appliance, do not interfere with the electronic components and circuits. There is no user-replaceable part inside the device.
- ✓ If there is a problem or malfunction on your device, it should only be repaired by an authorized service. Installation and electrical connections must be made by technical personnel in accordance with the instructions in the operating manual.

Failure to comply with these rules may result in death, serious injury or property damage

Mounting Information

DIN Rail Mounting

First, the upper part of the device is mounted on the DIN rail. Then, with the help of the springs behind the device, when a lightly force is applied to the lower part, the device locates into the DIN rail easily and the montage is completed (See Figure 1).

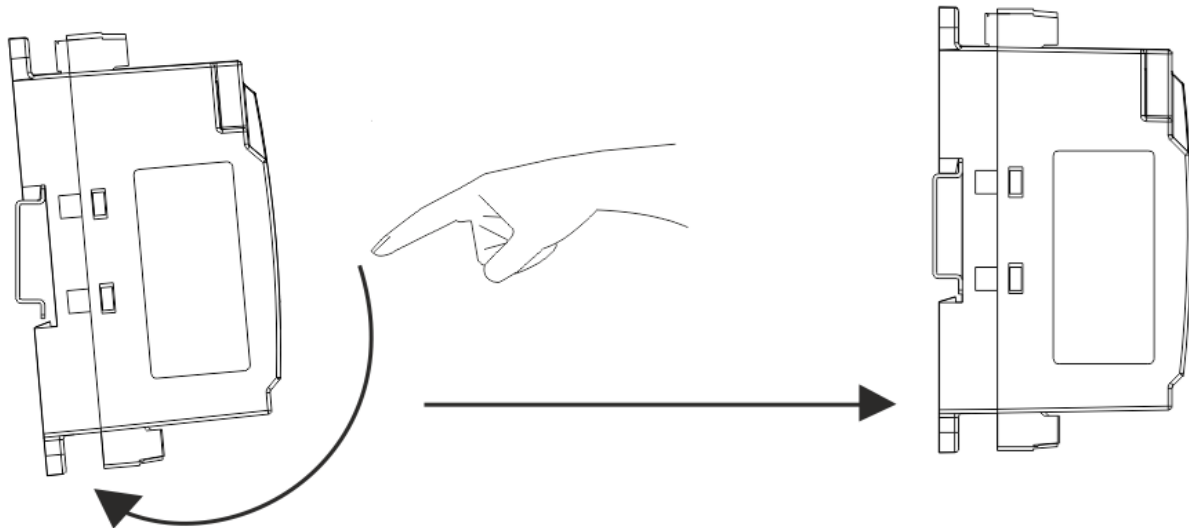


Figure 1 DIN Rail Mounting

Expansion Installation

Assembly between RTU300 series RTU products and XIO211 series expansion modules is carried out by sliding the tabs over the rail so that the tabs overlap each other

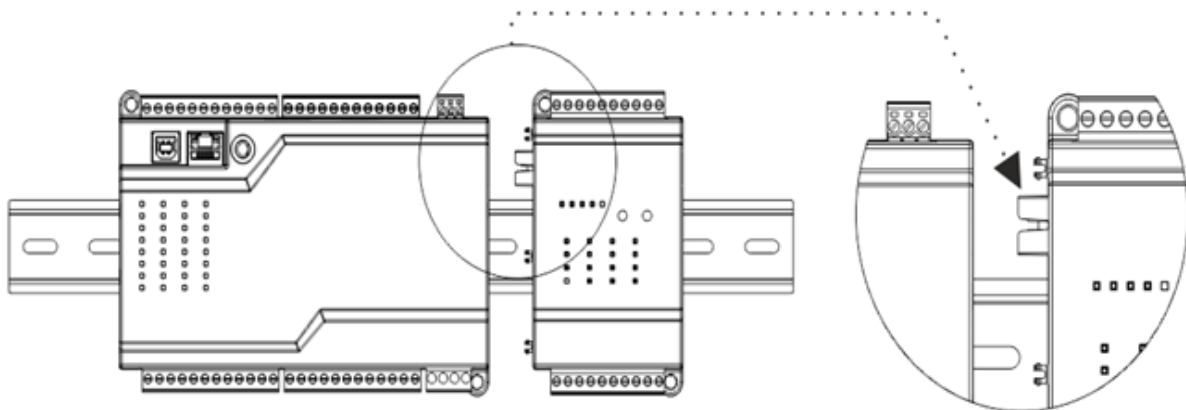


Figure 2 Expansion Module Mounting

1 RTU300 GENERAL INFORMATION

1.1 Physical Interfaces

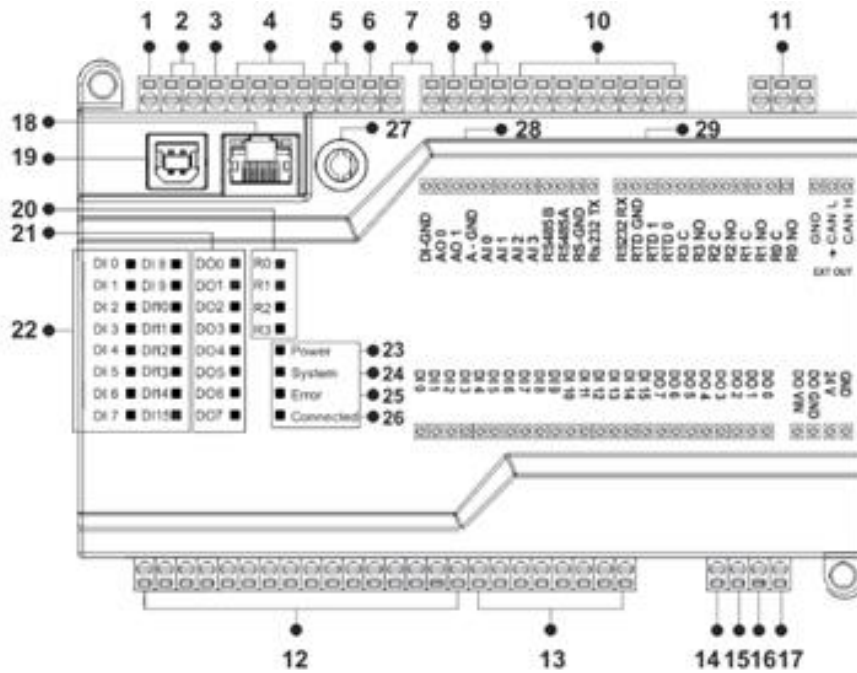


Figure 3 RTU300 Connector and Physical Interfaces

1	Digital Input GND Connection	16	Device Power (V+) Connection
2	Analog Output Connections	17	Device Power (V-) Connection
3	Analog GND Connection	18	Ethernet Port
4	Analog Input Connection	19	USB Port
5	RS485 Connections	20	Relay Status Information LED
6	RS-232 GND Connections	21	Digital Output Status Information LED
7	Rs232 TX-RX Connections	22	Digital Input Status Information LED
8	Empty	23	System Power LED
9	Empty	24	System Running LED
10	Relay Connections	25	System Error LED
11	CANBUS Connection	26	Protocol Data Transfer LED
12	Digital Input Connections	27	Antenna Connection
13	Digital Output Connections	28	SIM Card Slot
14	Digital Output Supply(Vin) Connection	29	SD Card Slot
15	Digital Output GND Connection		

1.2 General Device Specifications

SPECIFICATION	ITEM	DESCRIPTION
Processor	Processor Architecture	ARM Cortex M4
	Processor Internal RAM	196 KB
	CPU Speed	168 MHz
	Adressing Architecture	Little Endian Addressing
Electrical	Supply	24 VDC (12-36VDC)
	Power	<13W @ 24V DC
	Real Time Clock	Integrated
Input / Output	Digital Input	16 Channel
	Digital Output	8 Channel, 2A@30V DC, PNP
	Analog Input	4 Channel, 0-20 mA, 4-20 mA
	Analog Output	2 Channel, 0-20 mA, 4-20 mA
	Relay Output	4 Channel, 3A@30VDC - 5A@250VAC
Enviromental Conditions	Operating Temperature	-25...+75 C
	Storage Temperature	-30...+85 C
	Humidity	5...95 RH
	Operating Altitude	0...2000 m
Memory	Retentive Memory	4 KB, 128 Block/Register
	Max Event Log	20000
	Program Memory	4 MBit
Communication Ports	Ethernet Port	10/100 Mbps
	RS485	1 Port, 3 kV ESD Protection
	RS232	1 Port
Wireless Communication	UMTS/HSPA+ Module	HSDPA 14.4Mbps HSUPA 5.76Mbps GPRS/EDGE Multi-slot Class 12
Expansion Capacity	DIN Rail Type- CANBUS Expansion	Up to 1024 I/O Points

1.3 Power Connection Diagram

1.3.1 Supply Connection

Supply:	12-36 VDC, Protected
Power:	<13 W

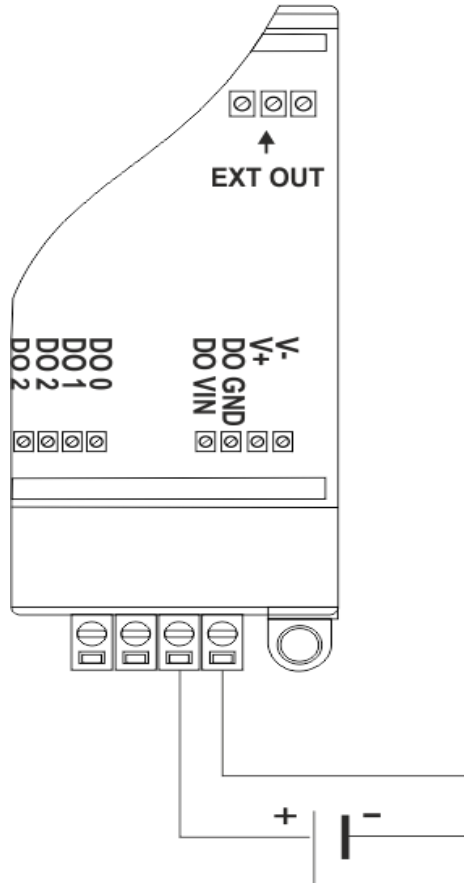


Figure 4 RTU300 Power Connection Diagram

1.4 Digital Inputs

Module Input:	16 Channel
Voltage Range:	0-36V DC
ON Voltage Level:	12-36V DC
OFF Voltage Level:	0-10V DC
Input Impedance:	>2M
Isolation:	Optical
OFF to ON Response:	20 us
ON to OFF Response:	90 us

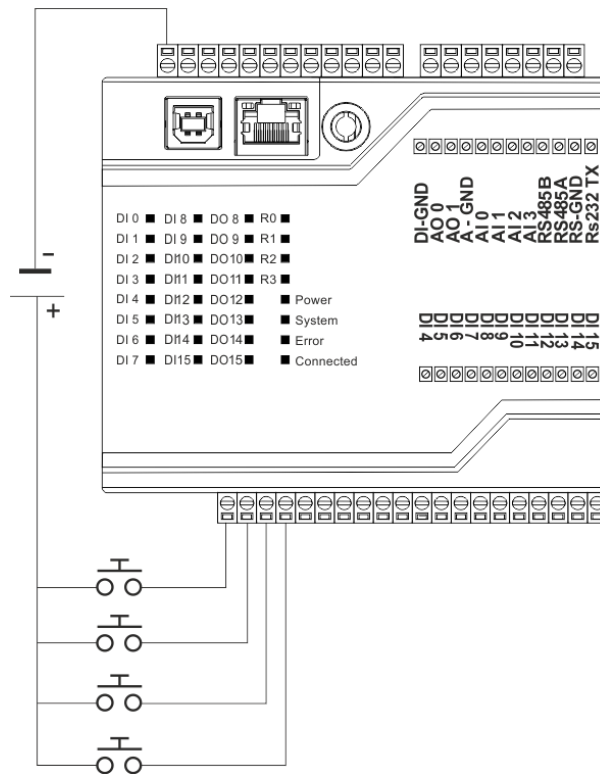


Figure 5 RTU300 Digital Input Connection Diagram

1.5 Digital Outputs

Module Output:	8 Channel, Mosfet Output
Module Output Type:	PNP Transistor
Voltage Range:	12-36V DC
Max. Output Current:	2A @ 30V DC
Isolation:	Optical

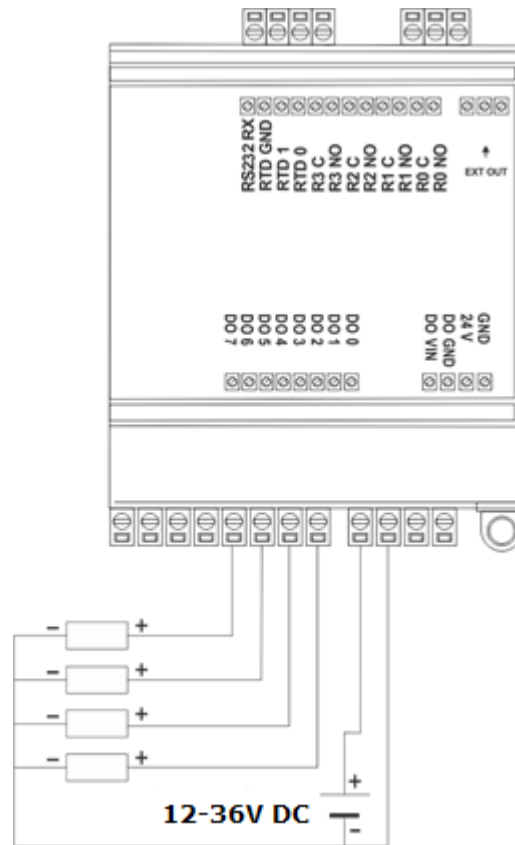


Figure 6 RTU300 Digital Output Connection Diagram

1.6 Relay Outputs

Module Output:	4 Channel
Relay Contact Outputs:	NO(Normally Open) Contact
Contact Max. Current:	3A@30VDC – 5A@250VAC
Isolation	Dry Contact

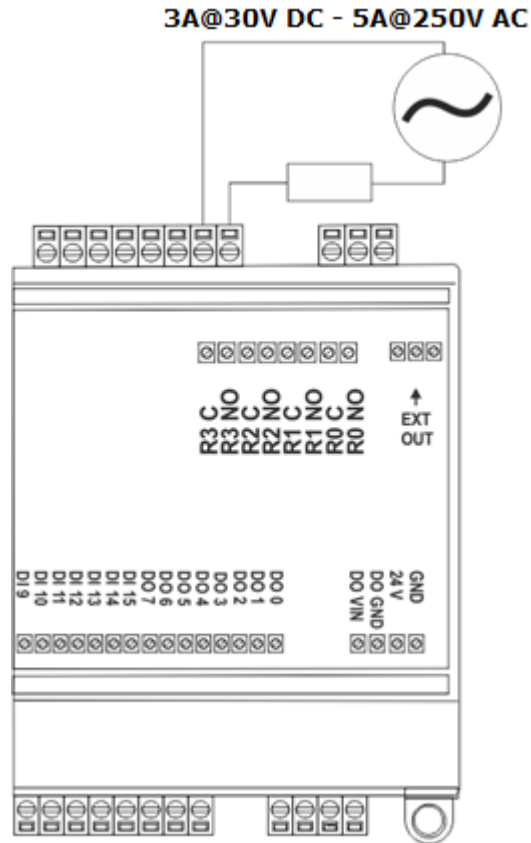


Figure 7 RTU300 Relay Connection Diagram

1.7 Analog Inputs

Module Input:	4 Channel
Analog Input Type:	0-20 mA, 4-20 mA
Analog Input Resolution:	12 Bit
Analog Input Precision:	%1 Precision
Common Input GND:	1 GND (4 Point / Common)

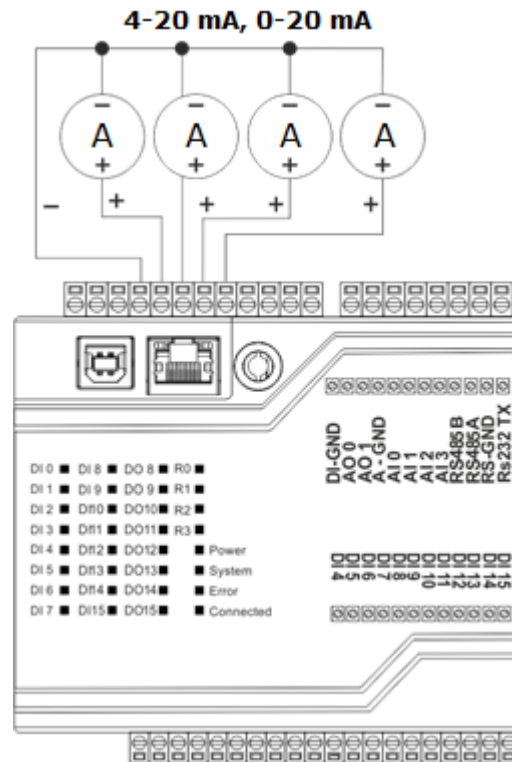


Figure 8 RTU300 Analog Input Connection Diagram

1.8 Analog Outputs

Module Output:	2 Channel
Analog Output Type:	0-20 mA, 4-20 mA
Analog Output Resolution:	12 Bit
Current Output Precision:	%1 Precision
Common Output GND:	1 GND (2 Point / Common)

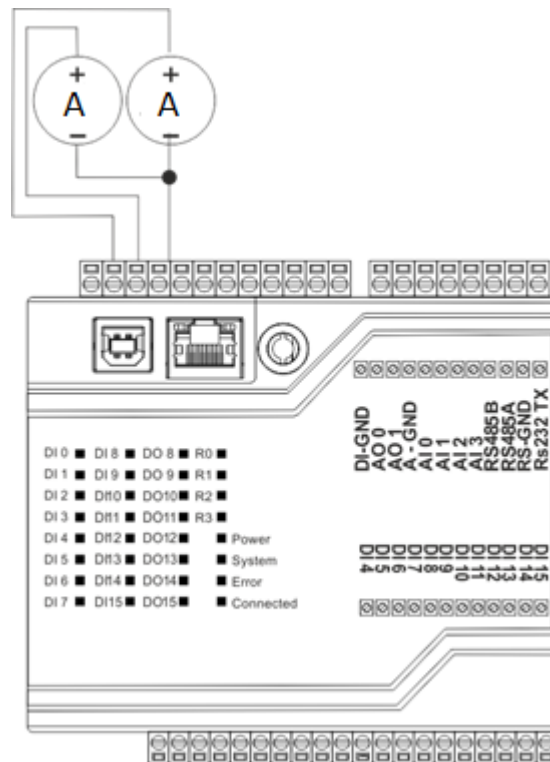


Figure 9 RTU300 Analog Output Connection Diagram

1.9 Serial Ports

1.9.1 RS485 Serial Port

RS485 Port Count:	1 Port, 3 kV ESD Protection
Maximum Slave Count	Limited to Hardware
Isolation:	Galvanic and Optical
Communication Distance:	1000 m
Data Bits:	7-8
Stop Bits:	1-2
Parity:	None-Even-Odd
Baudrate:	300 bps to 200 kbps

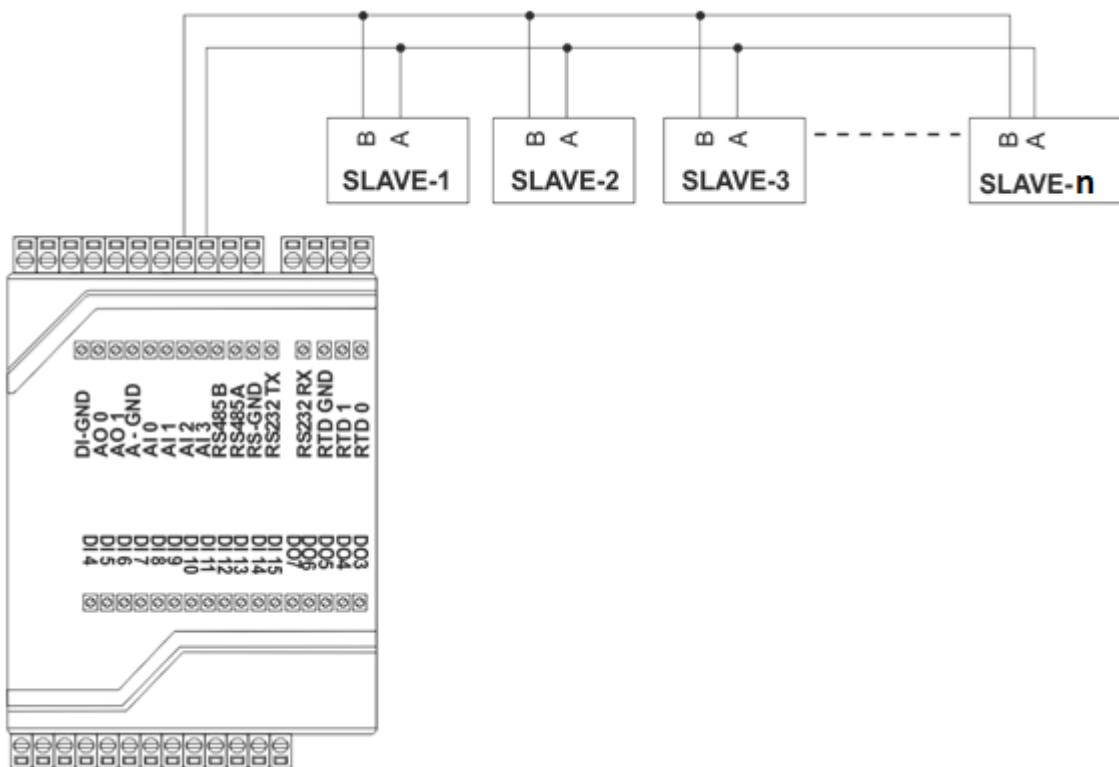


Figure 10 RTU300 RS485 Serial Port Connection Diagram

1.9.2 RS232 Serial Port

RS232 Port Count:	1 Port
Communication Distance:	10 m
Data Bits:	7-8
Stop Bits:	1-2
Parity:	None-Even-Odd
Baudrate:	300 bps to 200 kbps

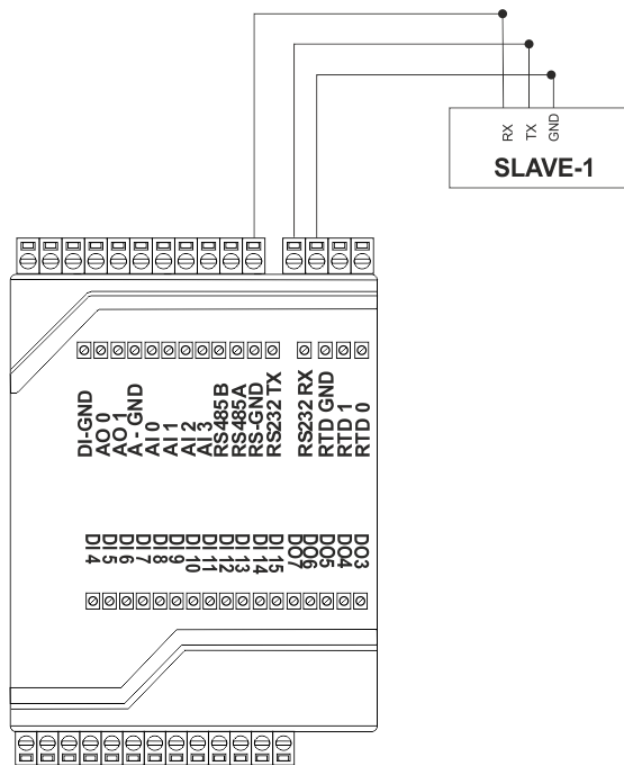


Figure 11 RTU300 RS232 Serial Port Connection Diagram

2 RTU302 GENERAL INFORMATION

2.1 Physical Interfaces

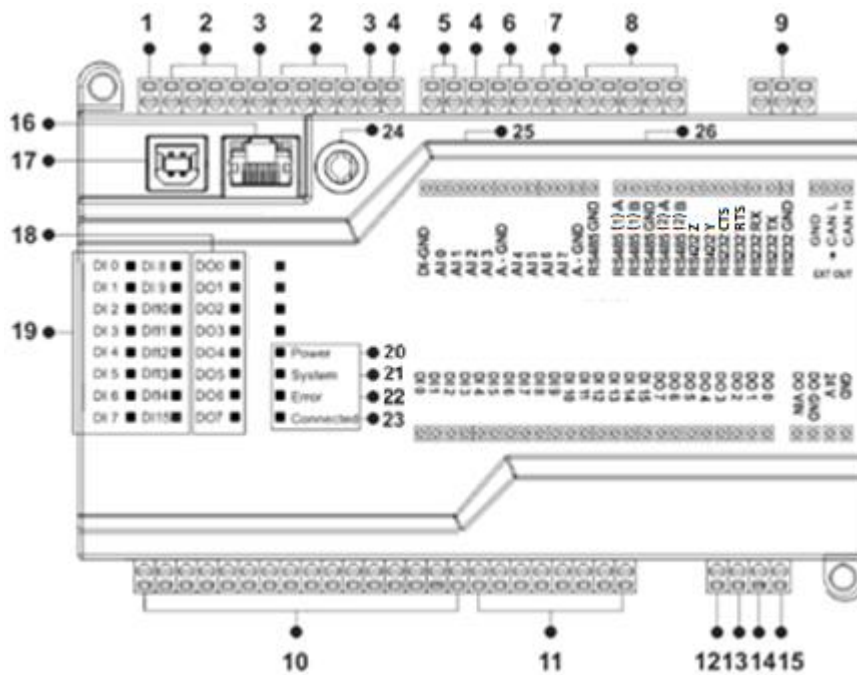


Figure 12 RTU302 Connector and Physical Interfaces

1	Digital Input GND Connection	14	Device Power (V+) Connection
2	Analog Input Connection	15	Device Power (V-) Connection
3	Analog Input GND Connection	16	Ethernet Port
4	RS485 GND Connections	17	USB Port
5	RS485 Port 1 Connections	18	Digital Output Status Information LED
6	RS485 Port 2 Connections	19	Digital Input Status Information LED
7	RS422 Connections	20	System Power LED
8	RS232 TX-RX Connection	21	System Running LED
9	CANBUS Connection	22	System Error LED
10	Digital Input Connections	23	Protocol Data Transfer LED
11	Digital Output Connections	24	Antenna Connection
12	Digital Output Supply(Vin) Connection	25	SIM Card Slot
13	Digital Output GND Connection	26	SD Card Slot

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	Analog Input	8 Channel, 0-20 mA, 4-20 mA, 16 Bit
Enviromental Conditions	Operating Temperature	-25...+75 C
	Storage Temperature	-30...+85 C
	Humidity	5...95 RH
	Operating Altitude	0...2000 m
Memory	Retentive Memory	4 KB, 128 Block/Register
	Max Event Log	20000
	Program Memory	4 MBit
Communication Ports	Ethernet Port	10/100 Mbps
	RS485	2 Port*, Galvanic Isolation
	RS232	1 Port (with Flow Control)
Wireless Communication	UMTS/HSPA+ Module	HSDPA 14.4Mbps HSUPA 5.76Mbps GPRS/EDGE Multi-slot Class 12
Expansion Capacity	DIN Rail Type- CANBUS Expansion	Up to 1024 I/O Points

* One of the RS485 ports can be used as RS422 port.

2.3 Power Connection Diagram

2.3.1 Supply Connection

Supply:	12-36 VDC, Protected
Power:	<13 W

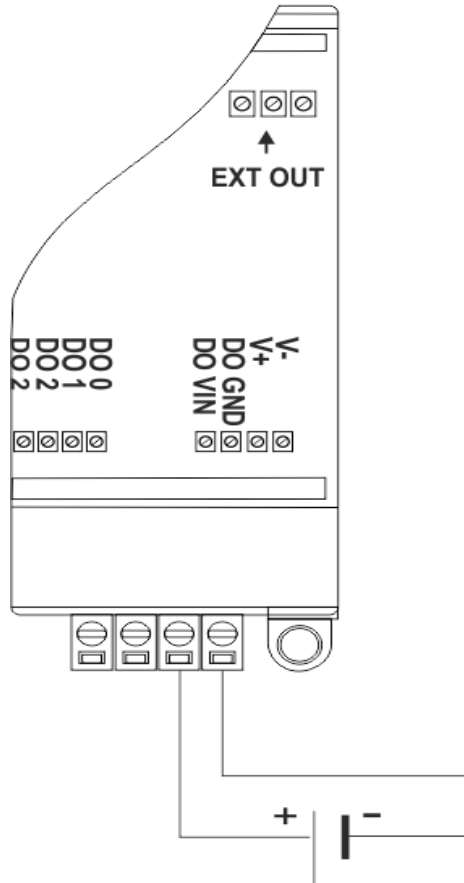


Figure 13 RTU302 Power Connection Diagram

2.4 Digital Inputs

Module Input:	16 Channel
Voltage Range:	0-36V DC
ON Voltage Level:	12-36V DC
OFF Voltage Level:	0-10V DC
Input Impedance:	>2M
Isolation:	Optical
OFF to ON Response:	20 us
ON to OFF Response:	90 us

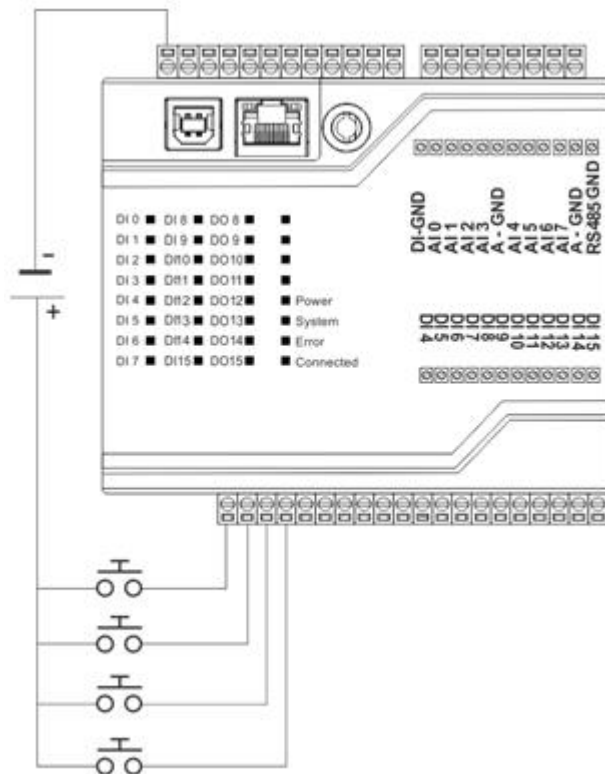


Figure 14 RTU302 Digital Input Connection Diagram

2.5 Digital Outputs

Module Output:	8 Channel, Mosfet Output
Module Output Type:	PNP Transistor
Voltage Range:	12-36V DC
Max. Output Current:	2A @ 30V DC
Isolation:	Optical

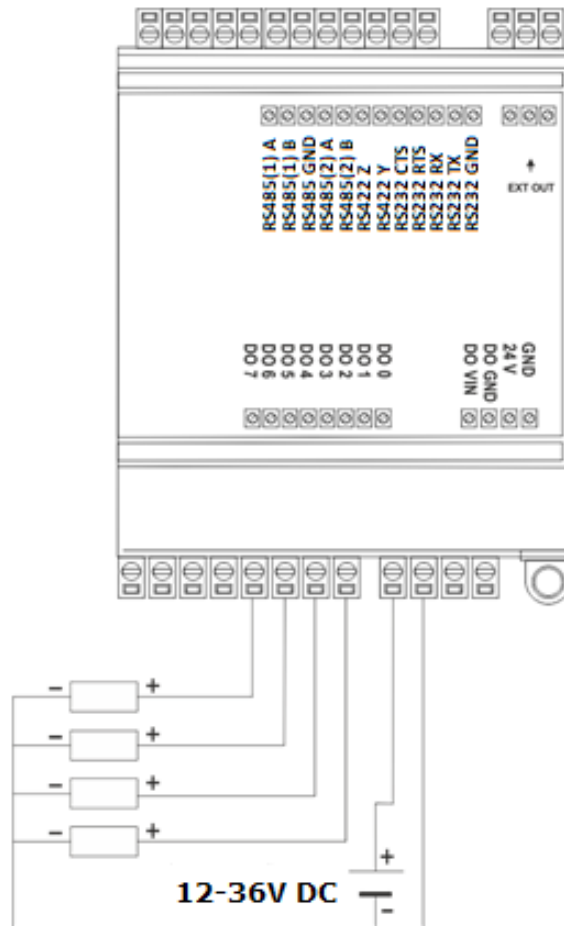


Figure 15 RTU302 Digital Output Connection Diagram

2.6 Analog Inputs

Module Input:	8 Channel
Analog Input Type:	0-20 mA, 4-20 mA
Analog Input Resolution:	16 Bit
Analog Input Precision:	%1 Precision
Common Input GND:	2 GND (8 Point / Common)

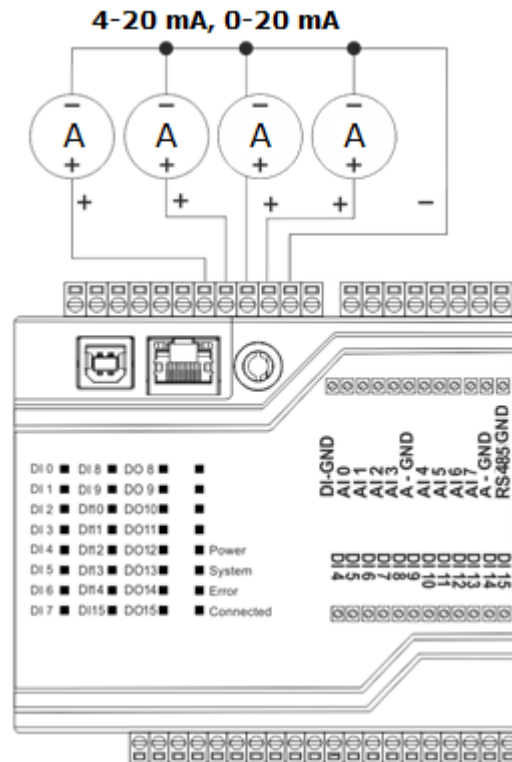


Figure 16 RTU302 Analog Input Connection Diagram

2.7 Serial Ports

2.7.1 RS485 Serial Port

RS485 Port Count:	2 Port, 3 kV ESD Protection
Maximum Slave Count	Limited to Hardware
Isolation:	Galvanic and Optical
Communication Distance:	1000 m
Data Bits:	7-8
Stop Bits:	1-2
Parity:	None-Even-Odd
Baudrate:	300 bps to 200 kbps

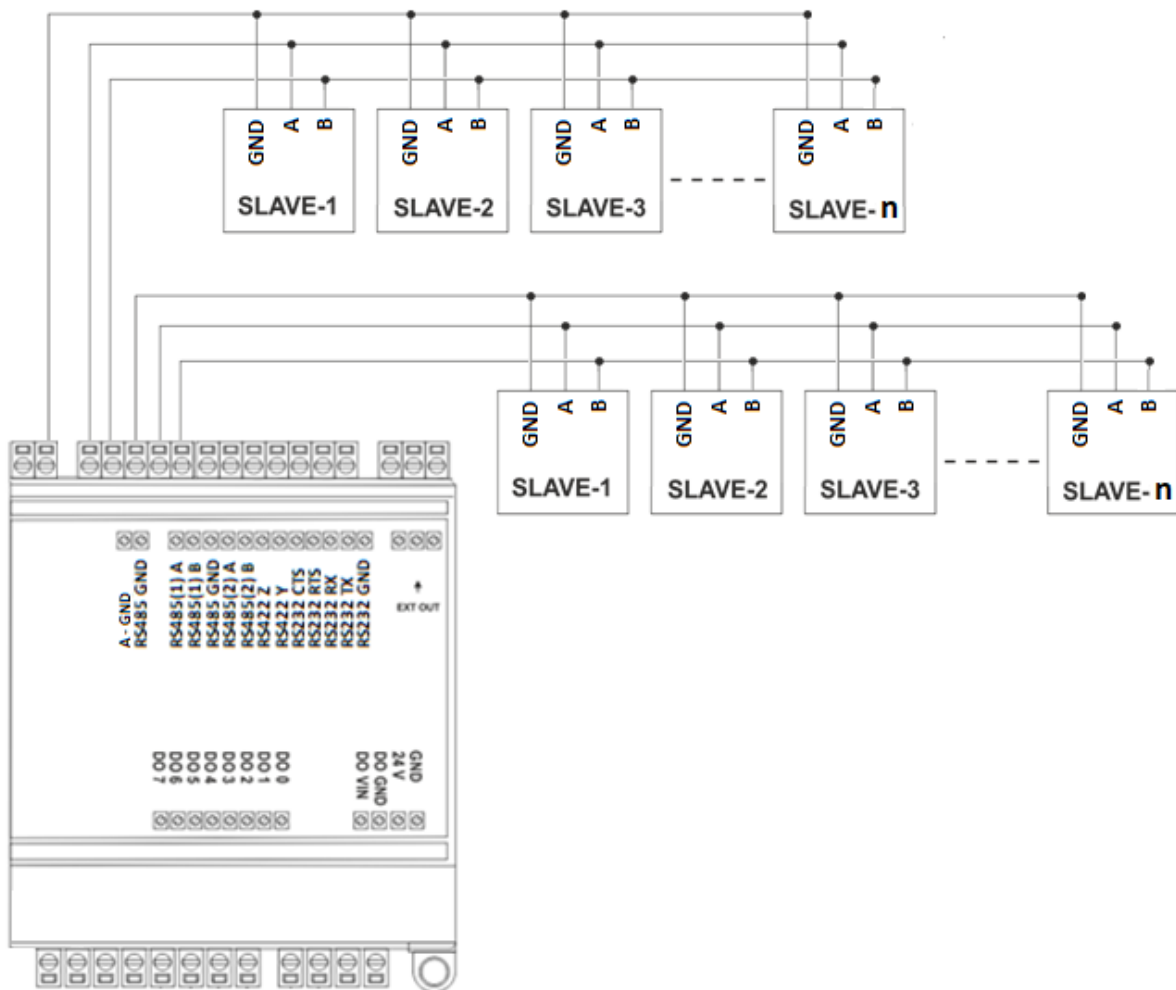


Figure 17 RTU302 RS485 Serial Port Connection Diagram

2.7.2 RS232 Serial Port

RS232 Port Count:	1 Port
Communication Distance:	10 m
Data Bits:	7-8
Stop Bits:	1-2
Parity:	None-Even-Odd
Baudrate:	300 bps to 200 kbps

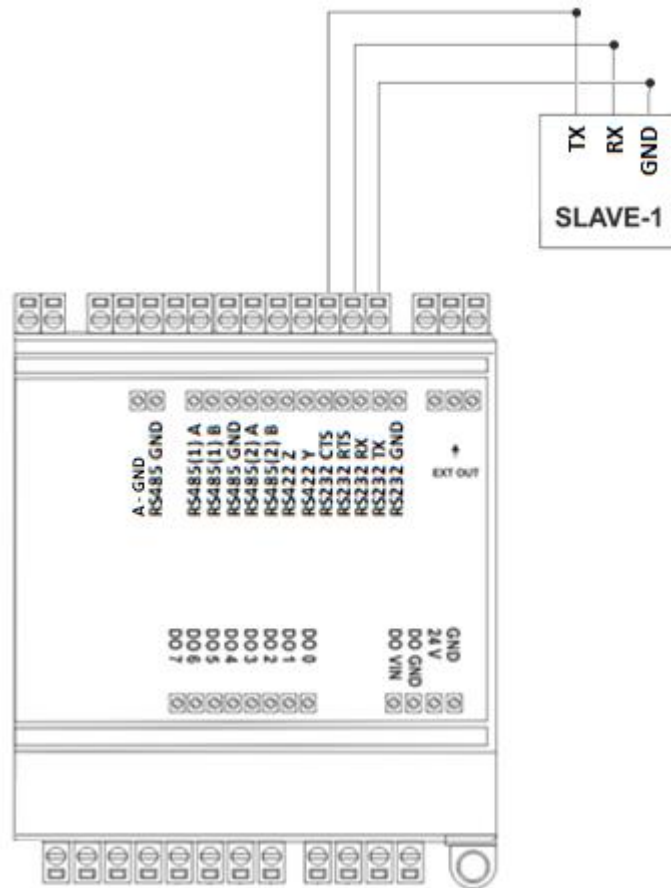


Figure 18 RTU302 RS232 Serial Port Connection Diagram