## Product Description

- RS 485 Bus Control
- Modbus RTU Communication Protocol
- Max.Current: AC 20, 40A RMS
- Able to Detect 12 Channel Currents
- Address Range: 1~9

## Product Selection

| DRCA | 12 | A | 20 | A | S4 |
|---|---|---|---|---|---|
| DRCA Series | Channel<br>12:12 Channels | Current<br>A: AC | Rated Current<br>20: 20Amp<br>40: 40Amp | Deviation<br>A:±5% | Communication Mode<br>S4:RS 485 |

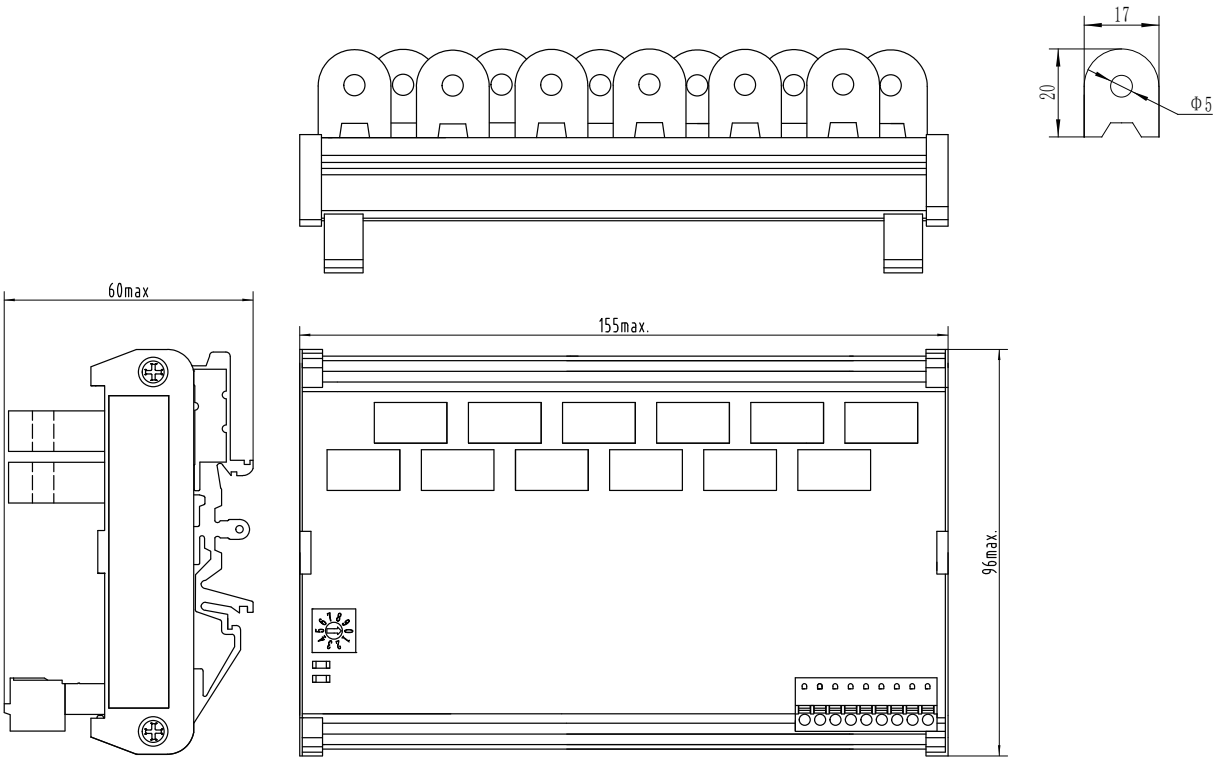
## Technical Specifications

| | | |
|---|---|---|
| Auxiliary Power Supply Voltage Range | | 19.6~28.8VDC/AC |
| Max.Auxiliary Power Supply Current | | 25mA |
| Input Control | | RS 485 (2 Connections) |
| Max. Current | | 20A/40A |
| Deviation | | ±5%(@5A,25℃) |
| Slave Station Address Range | | 1～9 |
| Expand Address Register Address | | 50 |
| Expand Address Range | | 1～250 |
| Maximum number of nodes | | 250 |
| Data Bit Rate | | 9600bps, 19200bps, 38400bps, 57600bps, 115200bps |
| Communication Protocol | | Modbus RTU |
| Current Register Address | 1 Channel | 01 |
| | 2 Channel | 02 |
| | 3 Channel | 03 |
| | 4 Channel | 04 |
| | 5 Channel | 05 |
| | 6 Channel | 06 |
| | 7 Channel | 07 |
| | 8 Channel | 08 |
| | 9 Channel | 09 |
| | 10 Channel | 10 |
| | 11 Channel | 11 |
| | 12 Channel | 12 |
| Operating Temperature Range | | -30℃ ～ +80℃ |
| Storage Temperature Range | | -30℃ ～ +100℃ |
| Weight (Typical) | | 250g |

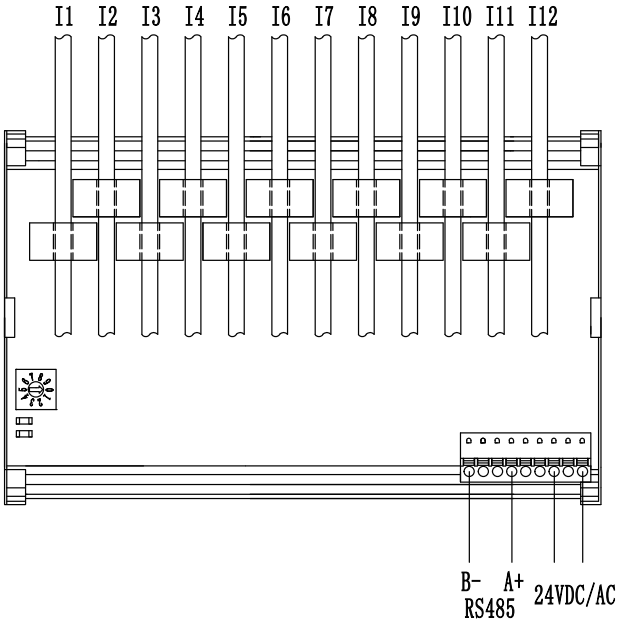
 

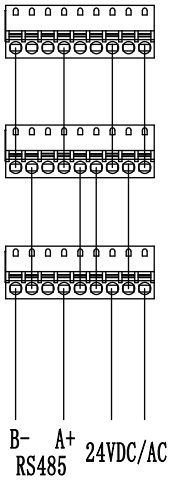
## Outline Dimensions

Unit:mm




## Wiring Diagram




Wiring modes of multiple control terminals

## Setting Introduction

1. When the slave station address is set from 1 to 9, please follow the wiring diagram in the datasheet for wiring, turn the address encoder to the required address, when the power is on then it can work normally.If you need to change the address, you need to power off first, and then turn the address encoder to the required address, when the power is on it can work normally.

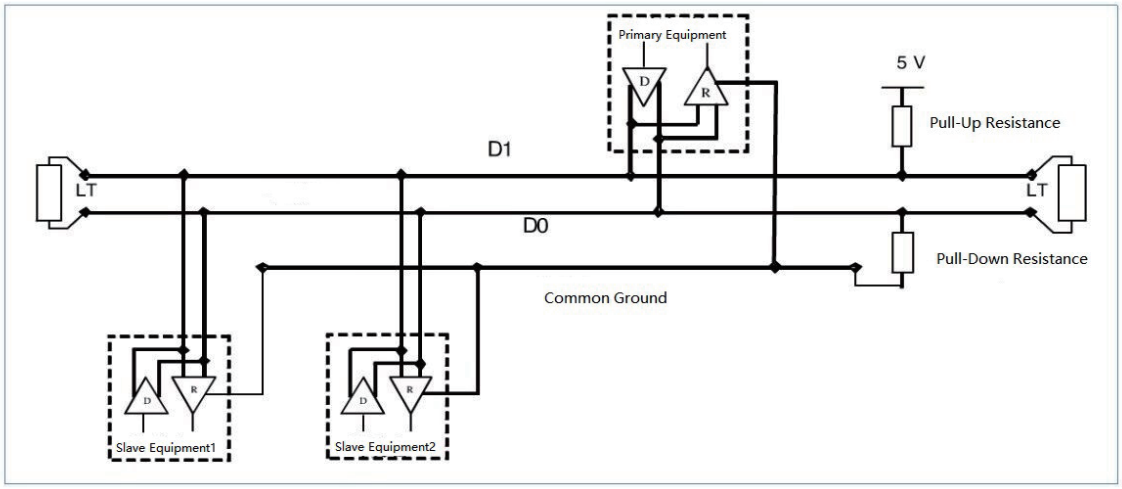
| Address | Fixed Communication Parameters |
|---|---|
| 9 | 9600, 8 data bites, even parity check, 1 stop bit |

when the address needs to be set for more than 9, use the expanded address.

2. Expanded address setting mode: the address encoder is set to 1, and write the new address into the address register (the register address is: 50) (1) . Set the address encoder to 0, power back on after the power is off, the module address is then changed to the new address.
Example: if the module address is set to 10, firstly the address encoder is set to 1 to establish communication; then the new address 10 is written into the address register (the register address is 50), then the address encoder is set to 0, power back on after the power is off, the module address is then changed to the new address 10.

Note: (1) If the address encoder is set to 0, the module uses the extended address; if the address encoder is not set to 0, the address set by the address encoder is preferred.

## Topology Structure of Two-line Modbus




## Register Introduction

DRCA has 12 input register and 2 holding register, their address and definition are as follows:

| Address | Definition | Whether to save when power is off |
|---|---|---|
| Input Register | | |
| 01 | I1 Current Value REG_CURR1 | No |
| 02 | I2 Current Value REG_CURR2 | No |
| 03 | I3 Current Value REG_CURR3 | No |
| 04 | I4 Current Value REG_CURR4 | No |
| 05 | I5 Current Value REG_CURR5 | No |
| 06 | I6 Current Value REG_CURR6 | No |
| 07 | I7 Current Value REG_CURR7 | No |
| 08 | I8 Current Value REG_CURR8 | No |
| 09 | I9 Current Value REG_CURR9 | No |
| 10 | I10 Current Value REG_CURR10 | No |
| 11 | I11 Current Value REG_CURR11 | No |
| 12 | I12 Current Value REG_CURR12 | No |
| Holding Register | | |
| 50 | Address Register REG_ADDRESS | Yes |
| 51 | Communication Parameter Setting Register REG_TX | Yes |

1) Current register: REG _ CURR(Add.:01-12)
Data format: a 16-bit unsigned integer
This register is the average of the absolute value of the current, whose value is updated in real time according to the current value measured by the module, and its value is 100 times of the actual current.
For example, if the REG CURR1 register value is 0x0112, then the I1 current is 2.74A.

2) REG_ADDRESS(Add.:50)
This register is a module address register, and the communication address of the module can be changed by writing a new address into the register.

3) Communication Parameter Setting Register REG_TX (Add.:51)
Data format: 16-bit unsigned integers
This register is used to set the communication parameters, as shown in the table below:

| Register value | Baud rate | Data bit | Check bit | Stop bit |
|---|---|---|---|---|
| 300 | 9600 | 8 Bit data bits | No check | 2 stop bits |
| 301 | 19200 | 8 Bit data bits | No check | 2 stop bits |
| 302 | 38400 | 8 Bit data bits | No check | 2 stop bits |
| 303 | 57600 | 8 Bit data bits | No check | 2 stop bits |
| 304 | 115200 | 8 Bit data bits | No check | 2 stop bits |
| 310 | 9600 | 8 Bit data bits | even parity check | 1 stop bit |
| 311 | 19200 | 8 Bit data bits | even parity check | 1 stop bit |
| 312 | 38400 | 8 Bit data bits | even parity check | 1 stop bit |
| 313 | 57600 | 8 Bit data bits | even parity check | 1 stop bit |
| 314 | 115200 | 8 Bit data bits | even parity check | 1 stop bit |
| 320 | 9600 | 8 Bit data bits | odd parity check | 1 stop bit |
| 321 | 19200 | 8 Bit data bits | odd parity check | 1 stop bit |
| 322 | 38400 | 8 Bit data bits | odd parity check | 1 stop bit |
| 323 | 57600 | 8 Bit data bits | odd parity check | 1 stop bit |
| 324 | 115200 | 8 Bit data bits | odd parity check | 1 stop bit |

The default value of this register is 300. If you want to change the communication parameters, for example, to 9600, even parity check, 1 stop bit, you only need to write 310 to the register, and then power on again.

## Communication Protocol

DRCA communication protocol uses the standard Modbus. Please refer to the official Modbus instructions for the relevant communication protocol. This document lists some formats for your reference:

### 0x03 - Read holding register(2)

Request: Slave station address-0x03-data byte number-Data-CRCL-CRCH
Answer: Slave station address -0x03-data byte number-data-CRCL-CRCH
Error: Slave station address-0x83-Error Code-CRCL-CRCH
For example, read the data of the current of I1 and I2 registers at the slave station address 10:
Request: 0x0A 0x03 0x00 0x01 0x00 0x02 CRCL CRCH
Answer: 0x0A 0x03 0x04 DATA1_H DATA1_L DATA2_H DATA2_L CRCL CRCH

### 0x04 - Read Input Register

Request: Slave station address -0x04-start address-registerquantities-CRCL-CRCH
Answer: Slave station address -0x04-data byte number-data-CRCL-CRCH
Error: -0x84-error code-CRCL-CRCH
For example, read the data of the current of I1 and I2 registers at the slave station address 10:
Request: 0x0A 0x04 0x00 0x01 0x00 0x02 CRCL CRCH
Answer: 0x0A 0x04 0x04 DATA1_H DATA1_L DATA2_H DATA2_L CRCL CRCH

### 0x06 - Write single register

Request: Slave station address -0x06-start address-registerquantities-CRCL-CRCH
Answer: Slave address -0x06- Register address - Value -CRCL-CRCH
Error: Slave address -0x86- Error code -CRCL-CRCH
For example, change the address of the module from 01 to 10:
Request: 0x01 0x06 0x00 0x32 0x00 0x0A CRCL CRCH
Answer: 0x01 0x06 0x00 0x32 0x00 0x0A CRCL CRCH

Note: (2)For convenience, DRCA read commands do not distinguish between reading holding registers and reading input registers; that is, read commands support both 0x03 and 0x04.

The following are partial communication commands with the target module address at 01:

| Action | Commands |
|---|---|
| To read first Channel Current | 01 03 00 01 00 01 D5 CA |
| To read second Channel Current | 01 03 00 02 00 01 25 CA |
| To read third Channel Current | 01 03 00 03 00 01 74 0A |
| To read first and second Channel Currents | 01 03 00 01 00 02 95 CB |
| To read 3 Channel Currents | 01 03 00 01 00 03 54 0B |
| To change address from 01 to 10 | 01 06 00 32 00 0A A8 02 |

## Important Notice

In order to reduce the external interference,we recommend to use twisted pair or shielding line as RS485 control line.

## ! Warnings

1. Disconnect all power before installing or using the relay.
2. Verify all connections are proper before turning on power.