Multifunction digital I/O modular

DR04E-U10

User Manual

DR04E-U10-C1

Please read this manual carefully before operate and keep this manual for future reference

Main Features

1. This modular is a din rail mount device, with plug-in terminal, very easy to conduct the wiring, multiple modular can be daisy-chained together with the plug-in terminals, wiring of the power supply and RS-485 can be done at once

2. LED display, various indicators, four setting buttons, address and software version will be displayed on the unit, you can manually configure the address of the modular if you want

3. RS-485 Modbus-RTU, support 03H(read multiple bytes), 06H(write single byte), 10H(write multiple bytes).

   03H command read maximum 36 bytes
   10H command write maximum 20 bytes

4. Input: 4 independent NPN inputs, total counting readable from master device
   Output: 4 relay output(NO), rating 3A/250Vac

5. Add-on features(digital alarm)
   To reduce the workload of the master device, the output and the input of this modular can be linked so that the relay will be energized if certain input is presented.

6. Add-on features(8 count down timers built-in)
   8 independent count down timers, Run/stop programmable for each channel timer unit, seconds and minutes selectable, readable from master device on how much time left for each channel after timer activated.

DR04E-U10 Quick Guide

1. Please refer to 5.2.2 section of this manual on how to set the address, baud rate, and verification method, refer to section "LCK-0202"

2. The address register table for input and output is listed under 5.2.3 of this manual.

3. Various digital alarm can be programmed
   Alarm can be triggered and linked to IN1/IN2/IN3/IN4
   For example: if alarm 1(OP1) linked to IN1 and IN3, if the input coming in from IN1 or IN3, the alarm 1(OP1) will be triggered.
   if alarm 2(OP2) linked to IN1, IN2, IN3 and IN4, if any of the input from IN1 to IN4 is coming in, the alarm 2(OP2) will be triggered
   refer to manual 5.2.3 for the RS-485 address register table.

4. Refer to manual 5.2.3, number 61 to number 78 for detailed information on the 8 channel timers.

5. Refer to manual 5.2.3, number 79 to number 82 for detailed information on counting function of IN1~IN4
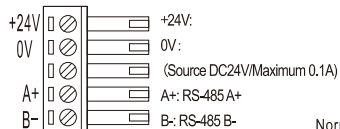
1.Model and ordering information

Make sure this is the item you need before place the order
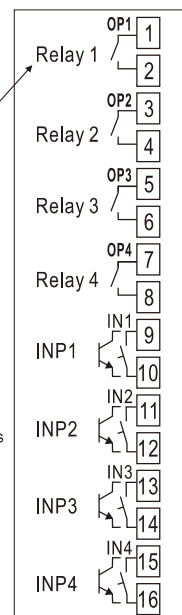
Model and ordering information
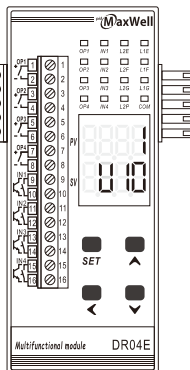
DR04E-U10

2.Wiring diagram

Power supply and communication connection

+24V   +24V:
0V   0V :
        (Source DC24V/Maximum 0.1A)
A+   A+: RS-485 A+
B-   B-: RS-485 B-

Normally Open output relay
3A 250VAC(Resistive load)

OP1 1 2 — Relay 1
OP2 3 4 — Relay 2
OP3 5 6 — Relay 3
OP4 7 8 — Relay 4
IN1 9 10 — INP1
IN2 11 12 — INP2
IN3 13 14 — INP3
IN4 15 16 — INP4

Input:
Dry contact input
or NPN input, NPN shares
the same source with the
DR04E

There are two ports for connection of power source and RS-485 one located on top of the unit, one located at the side of the unit for some of field application, the ports on the top might be easier and for most of application, the ports on the side will be used

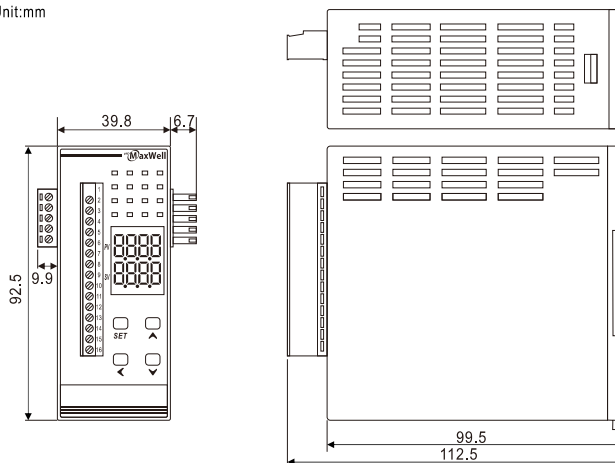Power Supply/RS-485 ports Number 1
Power Supply/RS-485 ports Number 2
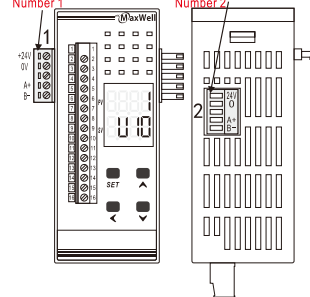
Up to 15 units of the modular can be connected via the quick connectors, Please connect in groups if you need more than 15 units
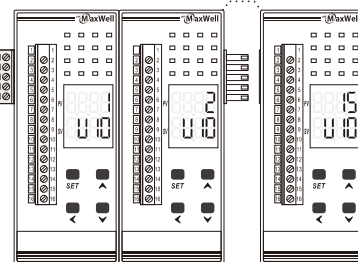
3.Dimension

Unit:mm

39.8   6.7
92.5   9.9
99.5
112.5

4.Panel description
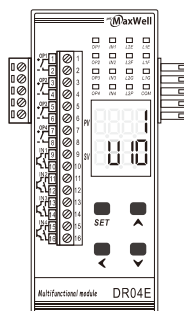
1 PV window, display address and parameter notation
2 SV window, software version and parameter value etc
3 OP1~OP4: Channel 1 to channel 4 output indicator
   IN1~IN4: Channel 1 to channel 4 input indicator
   COM: Communication indicator, flashing when communicate with master device
   Other indicator is not assigned with an indication for this device

4 SET: Function key
5 ◄ : Shift key
6 ▲ : Value increase key
7 ▼ : Value decrease key

5. Parameter setting, communication protocol and parameter address table

5.1 Power on self-diagnose process

Power on
All indicators and displays on

1 sec

Lower display: software edition
Upper display: software version

1 sec

Normal display status

Upper display: address of the unit
Software edition
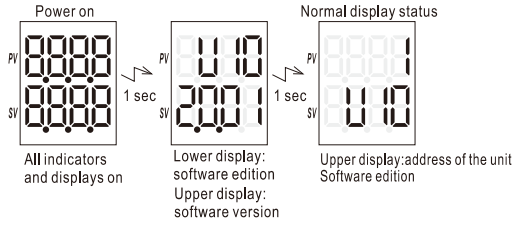
5.1.1 Communication protocol

(1) The communication protocol is Modbus-RTU protocol, which supports 03 read commands, 06 and 10 write commands
(2) Communication mode: RS485 asynchronous serial communication in single host mode.
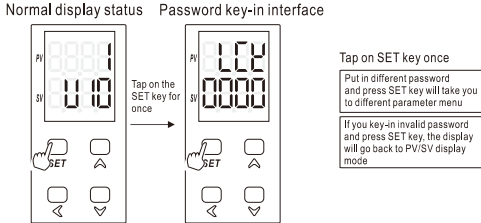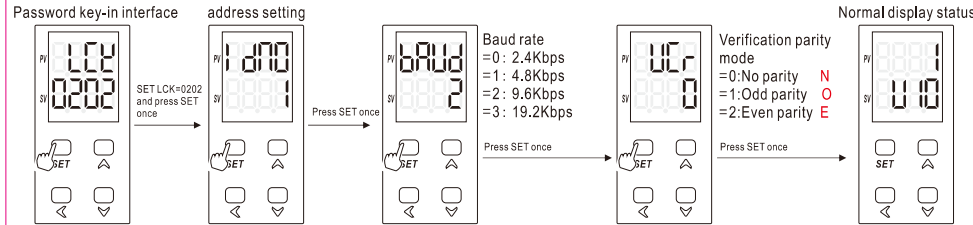 Baud rate: 2400, 4800, 9600, 19200 optional
  Byte data format: 1 start bit + 8 data bits + (none/odd/even) parity bit + 1 stop bit.
(3) The instrument supports a maximum of 20 bytes of data to be written at one time, and a maximum of 37 bytes of data to be read at one time.
(4) The factory default address of DR04E module is number 1, and the baud rate is 9600
(5) Please refer to the menu for detailed explanation of parameters

5.2 Communication parameter setting and address table (hexadecimal identification and decimal identification)

5.2.1 Parameter menus and their respective passwords

Normal display status   Password key-in interface

Tap on the SET key for once

Tap on SET key once

Put in different password and press SET key will take you to different parameter menu

If you key-in invalid password and press SET key, the display will go back to PV/SV display mode

5.2.2 Communication related parameter menu "LCK-0202"

Password key-in interface   address setting

SET LCK=0202 and press SET once

Press SET once

Baud rate
=0 : 2.4Kbps
=1 : 4.8Kbps
=2 : 9.6Kbps
=3 : 19.2Kbps

Press SET once

Verification parity mode
=0:No parity   N
=1:Odd parity   O
=2:Even parity E

Press SET once

Normal display status

R: means readable from master device
R/W: means readable and writable from master device

Parameter notation	Hex	Decimal	Data format	Read/Write
Reserved	0000H	0		R
Password LCK	0001H	1	16 bit positive integer Decimal number	R
Device address IDNO	0002H	2	16 bit positive integer Decimal number	R
Baud rate BAUD	0003H	3	16 bit positive integer Decimal number	R
Verification method UCR	0004H	4	16 bit positive integer Decimal number	R

5.2.3 Parameter address table

NO	Description	HEX	Decimal	Data format	Read/Write	Detailed information
6	Digital controlled Output Relay	0005H	5	16 bit positive integer Binary	R/W (RAM)	bit0 corresponds to OP1 relay bit1 corresponds to OP2 relay bit2 corresponds to OP3 relay bit3 corresponds to OP4 relay Write 1 to corresponds bit, relay pull-in Write 0 to corresponds bit, relay release
7	Digital controlled input indication	0006H	6	16 bit positive integer Binary	R	bit0 corresponds to IN1, bit1 corresponds to IN2 bit2 corresponds to IN3, bit3 corresponds to IN4. When there is input on the corresponds position, the corresponds bit will be "1", for example, if IN2 input feed, bit1=1 When there is no input on the corresponds position, the corresponds bit will be "0", for example, if IN2 input is absent, bit1=0 Write 0 to corresponds bit, relay release
8	N/A	0007H	7	N/A	N/A	N/A
9	N/A	0008H	8	N/A	N/A	N/A
10	N/A	0009H	9	N/A	N/A	N/A
11	In input filter strength	000AH	10	16 bit positive integer Decimal number	R/W (EEPROM)	0~255, You may set the value a little bit higher if you have a dry contact inputs Set the value to "0" for transistor input with high frequency
12	OP1 relay linked with input	000BH	11	16 bit positive integer Binary	R/W (EEPROM)	bit0=0 No correlation with IN1 input bit1=0 No correlation with IN2 input bit2=2 No correlation with IN3 input bit0=3 No correlation with IN4 input bit0=1 Link with IN1 input bit1=1 Link with IN2 input bit0=2 Link with IN3 input bit0=3 Link with IN4 input
13	OP2 relay linked with input	000CH	12	16 bit positive integer Binary	R/W (EEPROM)	bit0=0 No correlation with IN1 input bit1=0 No correlation with IN2 input bit2=2 No correlation with IN3 input bit0=3 No correlation with IN4 input bit0=1 Link with IN1 input bit1=1 Link with IN2 input bit0=2 Link with IN3 input bit0=3 Link with IN4 input
14	OP3 relay linked with input	000DH	13	16 bit positive integer Binary	R/W (EEPROM)	bit0=0 No correlation with IN1 input bit1=0 No correlation with IN2 input bit2=2 No correlation with IN3 input bit0=3 No correlation with IN4 input bit0=1 Link with IN1 input bit1=1 Link with IN2 input bit0=2 Link with IN3 input bit0=3 Link with IN4 input
15	OP4 relay linked with input	000EH	14	16 bit positive integer Binary	R/W (EEPROM)	bit0=0 No correlation with IN1 input bit1=0 No correlation with IN2 input bit2=2 No correlation with IN3 input bit0=3 No correlation with IN4 input bit0=1 Link with IN1 input bit1=1 Link with IN2 input bit0=2 Link with IN3 input bit0=3 Link with IN4 input
16	OP1 relay status check	000FH	15	16 bit positive integer Decimal number	R	=0 OP1 relay off =1 OP1 relay on Further elaboration on the OP1 relay: For example: if you set 000BH=1111, means OP1 linked to IN1/IN2/IN3/IN4 when input feed to any channel from IN1 to IN4, the OP1 relay will energized, and relay pull-in 000F=1 If you set 000BH=1010, means IN2 and IN4 linked to OP1, IN1 and IN3 has no correlation with OP1 When there is input feed to IN2 and IN4, OP1 relay energized, and OP1 relay pull-in, 000F=1 and IN1 and IN3 has no correlation with the OP1, the OP1 will not engage whether if you have input on IN1 or IN3 or not
17	OP2 relay status check	0010H	16	16 bit positive integer Decimal number	R	=0 OP2 relay off =1 OP2 relay on
18	OP3 relay status check	0011H	17	16 bit positive integer Decimal number	R	=0 OP3 relay off =1 OP3 relay on
19	OP4 relay status check	0012H	18	16 bit positive integer Decimal number	R	=0 OP4 relay off =1 OP4 relay on
20 to 61	Reserved	0013H to 003CH	19 to 60			Reserved address , do not input any value to these address

NO	Description	HEX	Decimal	Data format	Read/Write	Detailed information
62	Eight channel timer run/stop operation and obtain the status from master device	003DH	61	16 bit positive integer Binary	R/W (RAM)	bit0: Channel 1 timer ON/OFF digital switch bit1: Channel 2 timer ON/OFF digital switch bit2: Channel 3 timer ON/OFF digital switch bit3: Channel 4 timer ON/OFF digital switch bit4: Channel 5 timer ON/OFF digital switch bit5: Channel 6 timer ON/OFF digital switch bit6: Channel 7 timer ON/OFF digital switch bit7: Channel 8 timer ON/OFF digital switch How to engage the timer: If you put value "1" to corresponding bit, the corresponding timer will be activated, and if you read the bit status from master device the corresponding bit will be "1", the value of the corresponding bit will become "0" after timer ends
63	Eight channel timer timing units configuration	003EH	62	16 bit positive integer Binary	R/W (EEPROM)	bit0: Channel 1 timer timing unit bit1: Channel 2 timer timing unit bit2: Channel 3 timer timing unit bit3: Channel 4 timer timing unit bit4: Channel 5 timer timing unit bit5: Channel 6 timer timing unit bit6: Channel 7 timer timing unit bit7: Channel 8 timer timing unit if bit value of corresponding channel input as "0", for example bit0=0, then channel 1 timer timing unit is 0.1 second if bit value of corresponding channel input as "1", for example, bit0=1, then channel 1 timer timing units is minutes
64	Setting value of channel 1 timer	003FH	63	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 1 timer =0 timer off, =other value except "0", setting value of channel 1 timer
65	Setting value of channel 2 timer	0040H	64	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 2 timer =0 timer off, =other value except "0", setting value of channel 2 timer
66	Setting value of channel 3 timer	0041H	65	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 3 timer =0 timer off, =other value except "0", setting value of channel 3 timer
67	Setting value of channel 4 timer	0042H	66	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 4 timer =0 timer off, =other value except "0", setting value of channel 4 timer
68	Setting value of channel 5 timer	0043H	67	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 5 timer =0 timer off, =other value except "0", setting value of channel 5 timer
69	Setting value of channel 6 timer	0044H	68	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 6 timer =0 timer off, =other value except "0", setting value of channel 6 timer
70	Setting value of channel 7 timer	0045H	69	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 7 timer =0 timer off, =other value except "0", setting value of channel 7 timer
71	Setting value of channel 8 timer	0046H	70	16 bit positive integer Decimal number	R/W (EEPROM)	Setting value of channel 8 timer =0 timer off, =other value except "0", setting value of channel 8 timer
72	Channel 1 timer display	0047H	71	16 bit positive integer Decimal number	R	The display changes immediately after channel 1 timer engaged, you are able to see the real-time display of channel 1 timer if you connect this device to HMI, unit: 0.1 seconds or minute
73	Channel 2 timer display	0048H	72	16 bit positive integer Decimal number	R	The display changes immediately after channel 2 timer engaged, you are able to see the real-time display of channel 2 timer if you connect this device to HMI
74	Channel 3 timer display	0049H	73	16 bit positive integer Decimal number	R	The display changes immediately after channel 3 timer engaged, you are able to see the real-time display of channel 3 timer if you connect this device to HMI
75	Channel 4 timer display	004AH	74	16 bit positive integer Decimal number	R	The display changes immediately after channel 4 timer engaged, you are able to see the real-time display of channel 4 timer if you connect this device to HMI
76	Channel 5 timer display	004BH	75	16 bit positive integer Decimal number	R	The display changes immediately after channel 5 timer engaged, you are able to see the real-time display of channel 5 timer if you connect this device to HMI
77	Channel 6 timer display	004CH	76	16 bit positive integer Decimal number	R	The display changes immediately after channel 6 timer engaged, you are able to see the real-time display of channel 6 timer if you connect this device to HMI
78	Channel 7 timer display	004DH	77	16 bit positive integer Decimal number	R	The display changes immediately after channel 7 timer engaged, you are able to see the real-time display of channel 7 timer if you connect this device to HMI
79	Channel 8 timer display	004EH	78	16 bit positive integer Decimal number	R	The display changes immediately after channel 8 timer engaged, you are able to see the real-time display of channel 8 timer if you connect this device to HMI
80	In1 input count value	004FH	79	16 bit positive integer Decimal number	R/W	Used to count IN1 input (NPN, count plus 1 when IN1 is turned on), You can write 0 to this address to clear it, or write other values as the initial count accumulation value. Do not save when power off。
81	In2 input count value	0050H	80	16 bit positive integer Decimal number	R/W	Used to count IN2 input (NPN, count plus 1 when IN1 is turned on), You can write 0 to this address to clear it, or write other values as the initial count accumulation value. Do not save when power off。
82	In3 input count value	0051H	81	16 bit positive integer Decimal number	R/W	Used to count IN3 input (NPN, count plus 1 when IN1 is turned on), You can write 0 to this address to clear it, or write other values as the initial count accumulation value. Do not save when power off。
83	In4 input count value	0052H	82	16 bit positive integer Decimal number	R/W	Used to count IN4 input (NPN, count plus 1 when IN1 is turned on), You can write 0 to this address to clear it, or write other values as the initial count accumulation value. Do not save when power off。

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