

## Din Rail Mount Temperature Controller

# DR02B

## Microprocess Controller

DR02-651-C1

Read this manual carefully before using it and keep this manual for further reference

- DR02 Temperature controller: 0.2% F.S accuracy, 0.1 resolution
- 1: Dual output % readable
- 2: Auto-tuning can be activated separately or at the same time
- 3: Run/STOP function can be activated separately or at the same time
- 4: Maximum and minimum output configurable for both loops
- 5: RS-485 modbus RTU communication

## 1 : Model and ordering information

Please check and make sure you are ordering correct model

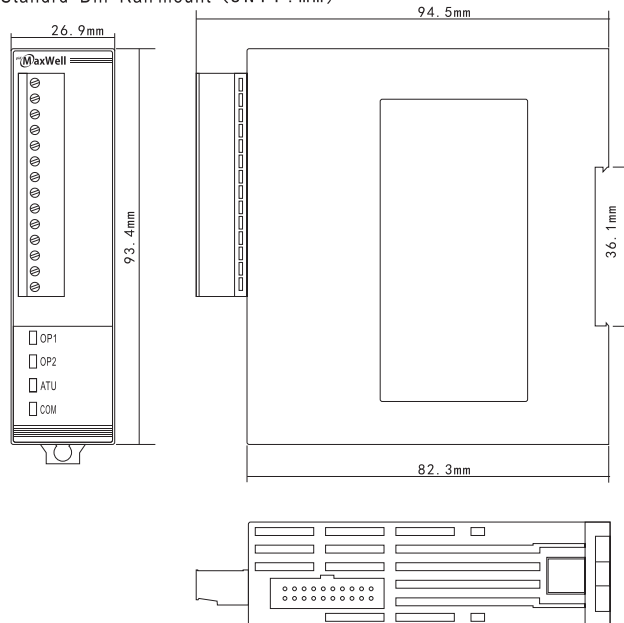
MODEL DR02B-65x : Dual output Relay or SSR drive output

CODE --  
 ① ② ③ ④ ⑤ ⑥

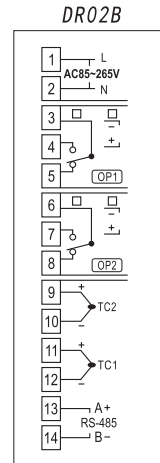
- ①. Control mode :  
 N: without PID control    F: PID reverse control(for heating)
- ②. Input type    ③. Range: refer to \*7. input range table\*
- ④. OUTPUT 1 [OP1]  
 N: without output output  
 M: Relay output  
 V: SSR Drive(with a modular inside)  
 R: SSR Drive output  
 T: Traic output
- ⑤ OUTPUT 1 [OP1]  
 N: without output output  
 M: Relay output  
 V: SSR Drive(with a modular inside)  
 R: SSR Drive output  
 T: Traic output
- ⑥ RS-485 communication  
 N: Without communication    5: With RS-485 communication

## 2. Size and mounting

Standrd Din Rail mount (UNIT : mm)



## 3.Wiring diagram

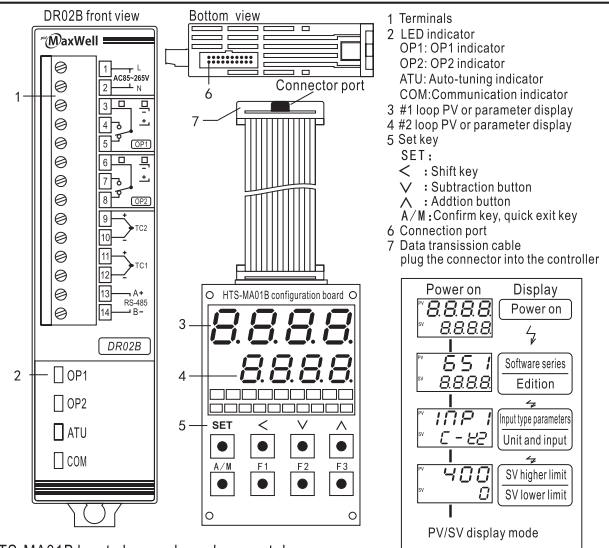


DR02B : standard version

Relay output  
 Relay rating: 3A/240VAC

SSR Drive output:  
 12VDC/20mA

## 4. Panel description



\*HTS-MA01B has to be purchased separately

## 5.1 Parameter level 1

### 5.1.1 Parameter menu level 1

Connect the configuration board with the controller and tap on set key once to enter into the parameter menu 1, below parameters will be displayed one by one when you tap on the set key, press SET key for 3 seconds to confirm and save the configuration

Parameter symbol	Parameter name	Range	1#	Parameter description
<b>AT</b>	Auto-tuning	Yes or No	0	=0, auto-tuning off, AT change to 0 after auto-tuning finished =1, initiate auto-tuning for #1 loop =2, initiate auto-tuning for #2 loop =3, initiate auto-tuning for both loop
<b>SP1</b>	SV for #1 loop	-1999 to 9999	10	setting value for #1 loop
<b>SP2</b>	SV for #2 loop	-1999 to 9999	10	setting value for #2 loop

### 5.2 Parameter level 2

Press SET key for 3 seconds to enter into parameter menu 2

Parameter symbol	Parameter name	Range	1#	Parameter description
<b>P1</b>	P1 P1 of #1 loop	0.0 ~ 200.0	20.0	Proportional band of #1 loop, range 0-200 output 1 switch to ON/OFF control when P1=0, Hysteresis is HYS1
<b>I1</b>	Integral time for #1 loop	0-3600S	210	Integral time of output 1, range 0-3600 seconds when I1=0, integral off
<b>D1</b>	Derivative time for #2 loop	0-3600S	30	Derivative time of output 1, range 0-3600 seconds When d1=0, derivative off
<b>ATOL</b>	Auto-tuning SV offset	0-199	0	Shift the SV value lower to prevent large overshoot during auto-tuning process range -199-199
<b>CYT1</b>	Cycle time for #1 loop	0 to 999S	20	cycle time for #1 loop, CYT1=20 seconds for relay CYT1=2 seconds, CYT1 not applicable for analog output
<b>HYS1</b>	Hysteresis for #1 loop	0.0 to 100.0	1.0	When P1=0.0, change to ON/OFF control, HYS1 0.1-900 Heating: OP1 terminated when PV1>SP1, OP1 active when PV1<SV1-HYS1

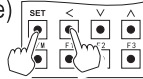
From previous page

<b>P2</b>	P2 P2 of #2 loop	0.0~200.0	20.0	Proportional band of #2 loop, range 0-200 output 2 switch to ON/OFF control when P2=0; Hysteresis is HYS2
<b>I2</b>	integral time for #2 loop	0~3600S	210	Integral time of output 2, range 0-3600 seconds when I2=0, integral off
<b>d2</b>	Derivative time for #2 loop	0~3600S	30	Derivative time of output 2, range 0-3600 seconds When d2=0, derivative off
<b>CYT2</b>	Cycle time for #2 loop	0 to 999S	20	cycle time for #2 loop, CYT2=20 seconds for relay CYT2=2 seconds, CYT2 not applicable for analog output
<b>HYS2</b>	Hysteresis for #2 loop	0.0 to 100.0	1.0	When P2=0.0, change to ON/OFF control, HYS2 0.1-900 Heating; OP2 terminated when PV2>SP2, OP2 active when PV2<SV2-HYS2
<b>rSt1</b>	Time proportional reset for #1 loop	-30 to 30	-5.0	OP1 is overshoot suppression for first round of heating up via auto-tuning, effected on #1 loop
<b>rSt2</b>	Time proportional reset for #2 loop	-30 to 30	0	OP2 is overshoot suppression for first round of heating up (rst1>-P1/2), value should be calculated via auto-tuning, effected on #2 loop
<b>OPL</b>	output lower limit for #1 loop	0.0 to 100.0%	0.0	output lower limit for #1 loop
<b>OPH</b>	output higher limit for #1 loop	0.0 to 100.0%	100.0	output higher limit for #1 loop
<b>OPL2</b>	output lower limit for #2 loop	0.0 to 100.0%	0.0	output lower limit for #2 loop
<b>OPH2</b>	output higher limit for #2 loop	0.0 to 100.0%	100.0	output higher limit for #2 loop
<b>LCK</b>	Access protection	0000~0255	0	LCK=0000: All parameters can be configured LCK=0001: Only SV can be configured LCK=0010: Only SV and parameter menu 1 can be configured LCK=0011: All parameters can't be configured LCK=0101: All parameters can be configured and accessible to parameter menu 3

### 5. Parameter menu 3(input sensor\address\baud rate)

5.3.1How to access to parameter menu 3

1: Locate the parameter LCK by following the instruction from 5.2  
change LCK to 0101, and press SET for 3 seconds to exit  
2: Press SET and left arrow key < to the menu 3

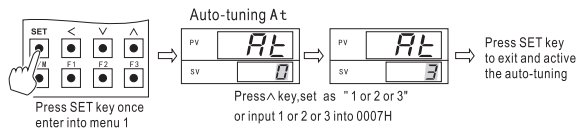


# factory default value

Parameter symbol	Parameter name	Range	1#	Parameter description
<b>INP1</b>	Input sensor type			
	Symbol	E1 E2 E1 E2 J1 J2 N U		
	Remark	K K E E J J N Wu3_Re25		
	Range	400.0°C 1300.0°C 300.0°C 600.0°C 400.0°C 800.0°C 1300.0°C 2000.0°C		
<b>INP2</b>	Input sensor type			
	Symbol	S T R B		
	Remark	S T R B		
	Range	1600.0°C 400.0°C 1700.0°C 1800.0°C		
<b>LSPL</b>	lower limit setting value	-1999 to 9999	0	To define the lower limit setting value of SP1/SP2 for configuration via external configurator
<b>USPL</b>	higher limit setting value	-1999 to 9999	400	To define the higher limit setting value of SP1/SP2 for configuration via external configurator
<b>UNIT</b>	Display unit	0, 1, 2	0	0: Celsius 1: Fahrenheit 2: no unit
<b>SC1</b>	Input offset for #1	-199 to 199	0.0	To compensate the input error caused by sensor faulty for #1 loop
<b>PFLT</b>	digital filter strength	0 to 60	25	1-30 for standard filter strength 31-60 for enhanced filter strength
<b>SC2</b>	Input offset for #2	-199 to 199	0.0	To compensate the input error caused by sensor faulty #2 loop
<b>ADDR</b>	Device address	0~254	1	To define the address of certain controller
<b>BAUD</b>	Baud rate	0, 1, 2, 3	2	=0, 2.4K, =1, 4.8K, =2, 9.6K, =3, 19.2K

### 6. Auto-tuning (Please proceed auto-tuning to have best control result)

The auto-tuning should be activated right after power on when PV is much lower than SV



Remark: AT=0, Auto-tuning off

=1, Auto-tuning for #1 loop on, or only auto-tuning for #1 is still active

=2, Auto-tuning for #2 loop on, or only auto-tuning for #2 is still active

=3, Auto-tuning for both loop on, or auto-tuning for both loop are active

The AT indicator keep flashing if any of the loop still under auto-tuning process

### 7. Input sensors(Factory default input sensor selection)

Input type	Code
K 0 to 1300 °C	K B3
E 0 to 600 °C	E A6
J 0 to 800 °C	J A8
T 0 to 400 °C	T A4
S 0 to 1600 °C	S B6
R 0 to 1700 °C	R B7
B 200 to 1800 °C	B B8
N 0 to 1300 °C	N B3
Wu3_Re25 600 to 2000 °C	W BO

The accuracy is not guaranteed for S thermocouple at the range of 0-100

## 8.RS-485 communication registry details

### 8.1 Communication protocol

- (1) Modbus-RTU protocol, support 03 read, 06 and 10 read command
- (2) Communication method, 2 wire system, half-duplex multidrop connection  
Baud rate: 2400,4800,9600,19200 selectable  
Start bit(1)+Data bit(8)+parity bit(None)+1 stop bit
- (3) Support maximum 36 input data, and support maximum 37 read data
- (4) DR02 default address is 1, baud rate is 9600

### 8.2 Registry details as below

No	Parameters	HEX	Decimal	Range	Read/Write	Remark
1	PV for #1 loop	0000H	0	-1999~99999	R	Reading gain 0.1
2	Indicators for #1 loop	0001H	1	0~1000 (100.0%)	R	Reading gain 0.1
3	Indicators on the panel	0002H	2	Refer to remarks 1	R	
4	PV for #2 loop	0003H	3	-19999~99999	R	Reading gain 0.1
5	Indicators for #2 loop	0004H	4	0~1000 (100.0%)	R	Reading gain 0.1
6	Reserved	0005H	5		R/W	
7	Reserved	0006H	6		R	
8	Auto-tuning	0007H	7	0-3 =0 Auto-tuning off =1 #1 loop auto-tuning on =2 #2 loop auto-tuning on =3 #1,#2 auto-tuning on	R/W	
9	SP1	0008H	8	-1999~99999	R/W	R/W gain 0.1
10	SP2	0009H	9	-1999~99999	R/W	R/W gain 0.1
11	Reserved	000AH	10		R/W	
12	Reserved	000BH	11		R	
13	P1	000CH	12	0~2000	R/W	R/W gain 0.1
14	I1	000DH	13	0~3600	R/W	
15	d1	000EH	14	0~200	R/W	
16	Reserved	000FH	15	0.0~10.0	R/W	
17	AtVL	0010H	16	0~199	R/W	
18	CYT1	0011H	17	0~100S	R/W	
19	HYS1	0012H	18	0~1000	R/W	R/W gain 0.1
20	P2	0013H	19	0~2000	R/W	R/W gain 0.1
21	I2	0014H	20	0~3600	R/W	
22	d2	0015H	21	0~200	R/W	
23	CyT2	0016H	22	0~100S	R/W	
24	HYS2	0017H	23	0~1000	R/W	R/W gain 0.1
25	Reserved	0018H	24		R	
26	Reserved	0019H	25		R/W	
27	Reserved	001AH	26		R	
28	rSt1	001BH	27	-300~300	R/W	R/W gain 0.1
29	rSt2	001CH	28	-300~300	R/W	R/W gain 0.1
30	OPL	001DH	29	0~1000 (100.0%)	R/W	R/W gain 0.1
31	OPH	001EH	30	0~1000 (100.0%)	R/W	R/W gain 0.1
32	OPL2	001FH	31	0~1000 (100.0%)	R/W	R/W gain 0.1
33	OPH2	0020H	32	0~1000 (100.0%)	R/W	R/W gain 0.1
34	Run/Stop function for #1 loop	0021H	33	=0 Run,=1 Stop	R/W	
35	Run/Stop function for #2 loop	0022H	34	=0 Run,=1 Stop	R/W	
36	LCK	0023H	35	0~255	R/W	
37	INP1	0024H	36	0-17 refer to remark 2	R/W	
38	Reserved	0025H	37		R/W	
39	LSPL	0026H	38	-1999~99999	R/W	R/W gain 0.1
40	USPL	0027H	39	-1999~99999	R/W	R/W gain 0.1
41	UNIT	0028H	40	0~2	R/W	
42	SC1	0029H	41	-1999~1999	R/W	R/W gain 0.1
43	PVft	002AH	42	0~60	R/W	
44		002BH	43		R/W	
45		002CH	44		R/W	
46	SC2	002DH	45	-1999~9999	R/W	R/W gain 0.1

Caution: Please do not input data to address after 46

Remark 1: Read 0002H bit data for panel indicators, Bit=0 indicator on, =1 indicator off

bit0: COM bit1:#1 loop stop bit2:#2 loop stop bit3: Reserved  
bit4:Reserved bit5: Auto-tuning bit6: OP2 bit7:OP1  
bit8:#1 auto-tuning bit9:#2 loop auto-tuning

\*Remark 2:input type parametersINP1,Read/write address:00024H

Type	K	E	J	N	Wu3/Re25	S	T	R	B
Data	1	3	5	6	7	8	9	10	11

