AT-502B

PID
TEMPERATURE CONTROLLER
User's Manual

RESTRICTIONS ON USE

When using this product in applications that require particular safety or when using this product in important facilities, please pay attention to the safety of the overall system and equipment. Install fail-safe mechanisms, perform redundancy checks and periodic inspections and adopt other appropriate safety measures when it is necessary. This product is rated at Class Ⅱ ▣ .

SAFETY PRECAUTION

This manual uses the following symbols to ensure safe operation of this controller.

⚠ **WARNING** Warnings are indicated when mishandling this product might result in death or serious injury to user.

⚠ **CAUTION** Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the controller.

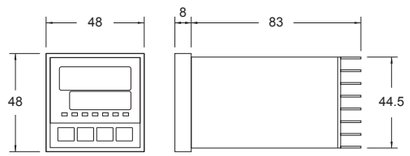
⚠ WARNING

- Note this incorrect wiring of this product can damage it and lead to other hazards. Make sure the product has been correctly wired before turning the power ON.
- Before wiring, or removing / mounting the product, be sure to turn the power OFF. Failure to do so might cause electric shock.
- Do not touch electrically charged parts such as the power terminals. Doing so might cause electric shock.
- Do not disassemble the product. Doing so might cause electric shock or faulty operation.

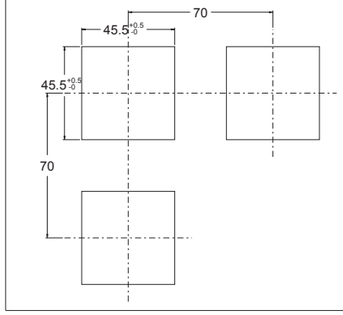
⚠ CAUTION

- Use the product within the operating ranges recommended in the specification (temperature, humidity, voltage, shock, mounting direction, atmosphere etc.). Failure to do so might cause fire or faulty operation.
- Firmly tighten the wires to the terminal. Insufficient tightening of the wires to the terminal might cause fire.

DIMENSIONS(mm)



PANEL-CUTOUT DIMENSIONS(mm)



INITIALIZATION

1.Make sure the key lock code value is (1122), as shown below.

2.Turn off the power.

3.Press and hold both SET & ∧ key at the same time. Turn on the power till the Display is shown, then release key, as shown below.

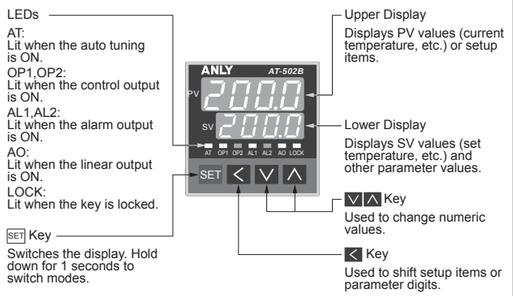
SPECIFICATIONS

Operating voltage		AC/DC: 100~240V	
Allowable operating voltage range		85 ~ 110% of rated operating voltage	
Rated frequency		50 / 60Hz	
Sensor input	0 (Switch by SW5)	Thermocouple	K, J, R
		RTD	Pt100
	1	Linear	Current(4~20mA)
Control output1	(Switch by SW5)	Relay 1	240VAC 3A (Resistive load)
		SSR	DC 24V
Control output2	1	Relay 2	240VAC 3A (Resistive load)
	2	Alarm 2(Relay)	240VAC 3A (Resistive load)
	3	Communication	RS-485
	4	Linear	Current(4~20mA)
Alarm 1 output		240VAC 3A (Resistive load)	
Control method		PID, PI, P, ON/OFF, Dead Band	
Power consumption		Approx. 3.5VA	
Life		Mechanical : 5,000,000 times / Electrical : 100,000 times	
Ambient temperature		-10~+50°C	
Ambient humidity		35 ~ 80%RH (with no icing or condensation)	
Weight		Approx. 150g	

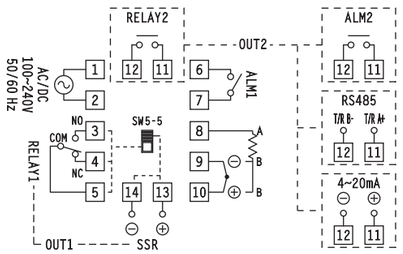
FEATURES

Measuring accuracy	Within ±0.3% of present value or ± 2°C whichever is greater
Proportional band(P)	0.0 ~ 300.0sec (0.1-second units)
Integral time(I)	0 ~ 7200sec (1-second units)
Derivative time(D)	0 ~ 1800sec (1-second units)
Control period	0 ~ 65sec (1-second units)
Sampling period	250ms
Memory protection	EEPROM (writing times : Approx. 100,000times)

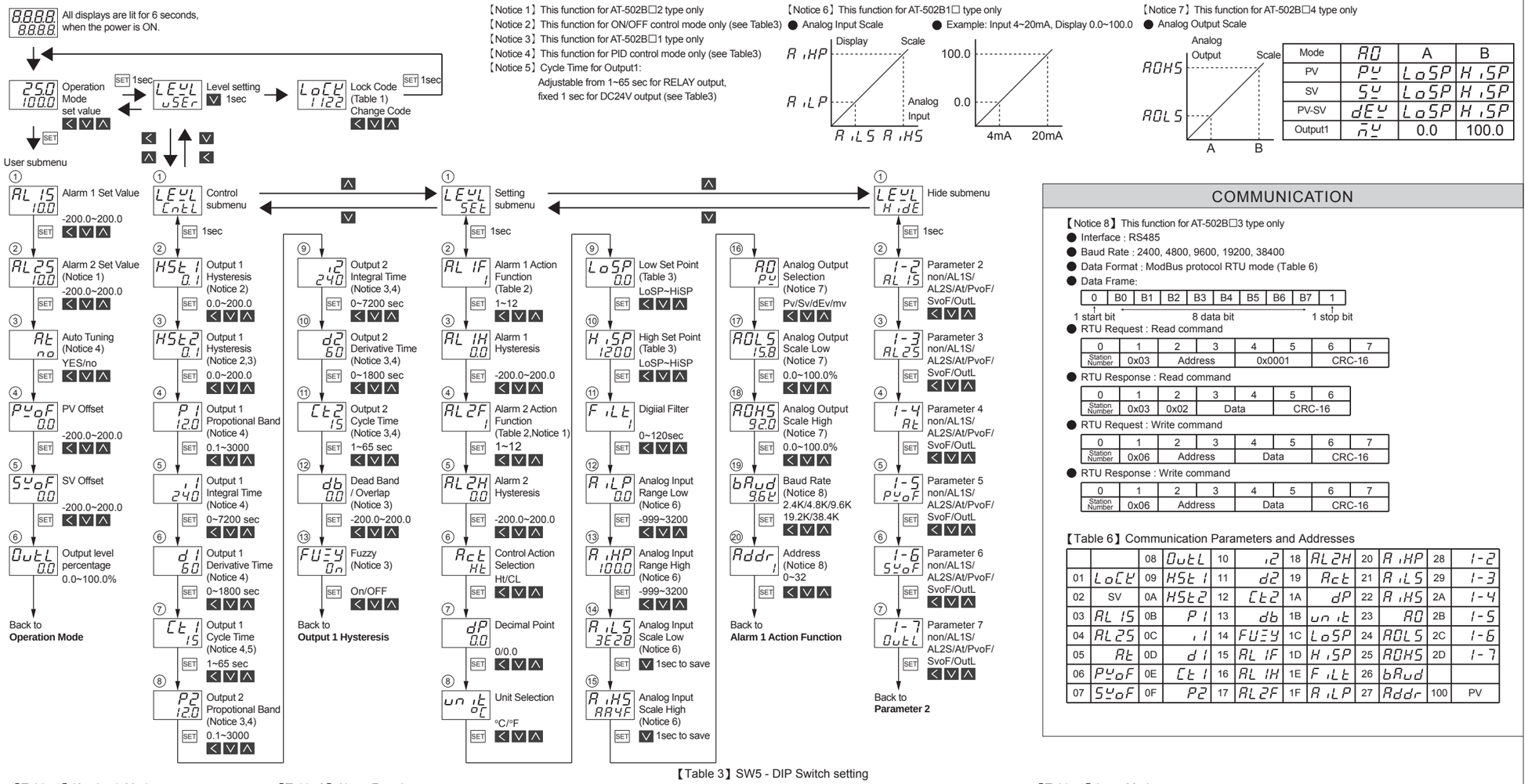
NAMES AND FUNCTIONS OF FACEPLATE



CONNECTION



SETTING PROCEDURE



【Notice 1】This function for AT-502B□2 type only
【Notice 2】This function for ON/OFF control mode only (see Table3)
【Notice 3】This function for AT-502B□1 type only
【Notice 4】This function for PID control mode only (see Table3)
【Notice 5】Cycle Time for Output1:
Adjustable from 1~65 sec for RELAY output,
fixed 1 sec for DC24V output (see Table3)

【Notice 6】This function for AT-502B1□ type only

● Analog Input Scale ● Example: Input 4~20mA, Display 0.0~100.0

【Notice 7】This function for AT-502B□4 type only

● Analog Output Scale

Mode	AO	A	B
PV	PV	LoSP	HiSP
SV	SV	LoSP	HiSP
PV-SV	dEV	LoSP	HiSP
Output1	nV	0.0	100.0

COMMUNICATION

【Notice 8】This function for AT-502B□3 type only

- Interface : RS485
- Baud Rate : 2400, 4800, 9600, 19200, 38400
- Data Format : ModBus protocol RTU mode (Table 6)
- Data Frame:

0	B0	B1	B2	B3	B4	B5	B6	B7	1

1 start bit — 8 data bit — 1 stop bit

- RTU Request : Read command

0	1	2	3	4	5	6	7
Station Number	0x03	Address		0x0001		CRC-16	

- RTU Response : Read command

0	1	2	3	4	5	6
Station Number	0x03	0x02	Data		CRC-16	

- RTU Request : Write command

0	1	2	3	4	5	6	7
Station Number	0x06	Address		Data		CRC-16	

- RTU Response : Write command

0	1	2	3	4	5	6	7
Station Number	0x06	Address		Data		CRC-16	

【Table 6】Communication Parameters and Addresses

		08	OutL	10	i2	18	AL2H	20	AiHP	28	1-2
01	LoCY	09	HSt1	11	d2	19	Act	21	AiLS	29	1-3
02	SV	0A	HSt2	12	Ct2	1A	dP	22	AiHS	2A	1-4
03	AL 1S	0B	P1	13	db	1B	Unit	23	AO	2B	1-5
04	AL2S	0C	i1	14	FUSY	1C	LoSP	24	AOLS	2C	1-6
05	At	0D	d1	15	AL 1F	1D	HiSP	25	AOHS	2D	1-7
06	PvoF	0E	Ct1	16	AL 1H	1E	FiLt	26	bAud		
07	SvoF	0F	P2	17	AL2F	1F	AiLP	27	Addr	100	PV

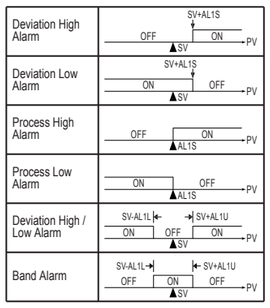
【Table 1】Key Lock Mode

○Can display and can be set ×Can't display nor can't be set

LoCY	uSEr	CntL	SEt	HidE
Others	○	×	×	×
22	○	○	×	×
111	○	○	○	×
1122	○	○	○	○

【Table 2】Alarm Function

1	Deviation High Alarm
2	Deviation Low Alarm
3	Process High Alarm
4	Process Low Alarm
5	Deviation High / Low Alarm
6	Band Alarm
7	Deviation High Alarm (Standby)
8	Deviation Low Alarm (Standby)
9	Process High Alarm (Standby)
10	Process Low Alarm (Standby)
11	Deviation High/Low Alarm (Standby)
12	Band Alarm (Standby)



【Table 3】SW5 - DIP Switch setting

Warning! Please make sure the power is off, before making any changes on the DIP switch.

SW5 - DIP Switch			1	2	3	4	5	6
Input type	K	0~1200°C	ON	OFF	OFF			
	J	0~500°C	ON	ON	OFF			
	R	0~1700°C	ON	OFF	ON			
	Pt100	-50~400°C	OFF	ON	ON			
	Linear	-999~3200	N/A	N/A	N/A			
Control Mode	ON/OFF control					OFF		
	PID control					ON		
Output1	Relay 1						OFF	
	SSR(DC 24V)						ON	
Key Protect	Key protect off							OFF
	Key protect on							ON

【Table 4】Input Mode

0	K, J, R, Pt100 Sensor input	AT-502B0□
1	4~20mA Linear Input	AT-502B1□

【Table 5】Output 2 Mode

0	None	AT-502B□0
1	Relay 2	AT-502B□1
2	Alarm 2 (Relay)	AT-502B□2
3	RS485 Communication	AT-502B□3
4	4~20mA Linear Output	AT-502B□4