BrainChild

1. Overview & Appearance

- Process Unit
- Lock Indicator
- Output Indicator
- Alarm Indicator
- Communication Indicator
- Manual Mode Indicator
- PV: Process Value, Menu Symbol, Error Code
- SV: Set Point or Control Output
- 4 User Access Keys for Menu Access and SetPoint Adjustment

Front Panel and Function

2. Keys and Displays

KEYPAD OPERATION

SCROLL KEY:
This key is used to select a parameter to be viewed or adjusted.

UP KEY:
This key is used to increase the value of the selected parameter.

DOWN KEY:
This key is used to decrease the value of the selected parameter.

SHIFT KEY:
This key is used to:
Move to the digit of the selected parameter and change the value by using up or down key to increase or decrease the value.

Scroll Up Dual-Key: ☐ + ▲
Two keys pressed synchronously are used to:
Go to the previous parameter
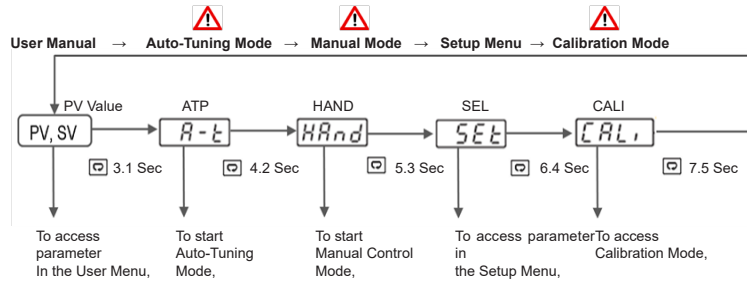
RESET Dual-Key: ▲ + ▼
Two keys pressed synchronously are used to:
- Revert the display to the home screen.
- Reset a latching alarm once the alarm condition is removed.
- Stop manual control mode, Auto-Tuning mode or calibration mode.
- Clear an Auto-Tuning or communication error message.
- Enter the manual control menu if a failure mode occurs.

3. Menu Flowchart

The Menu has been divided into 5 groups. They are as follows:
1. User Menu
2. Auto-Tuning Mode Menu
3. Manual Mode Menu
4. Setup Menu
5. Calibration Mode Menu

⚠ User Manual → ⚠ Auto-Tuning Mode → ⚠ Manual Mode → Setup Menu → ⚠ Calibration Mode

PV Value	ATP	HAND	SEL	CALI
PV, SV	A-t	HAnd	SEt	CALi
3.1 Sec	4.2 Sec	5.3 Sec	6.4 Sec	7.5 Sec
To access parameter In the User Menu,	To start Auto-Tuning Mode,	To start Manual Control Mode,	To access parameter in the Setup Menu,	To access Calibration Mode,

Press ☐ for the next parameter
Press ☐ and ▲ key to return to the previous parameter.

3.1 User Menu

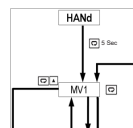The below user menu parameters are available depends on the user selection.
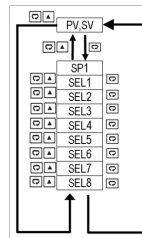
3.2 Auto-Tuning Mode

A-t

Press ☐ key 5 seconds to activate Auto-Tuning Mode

3.3 Manual Mode Menu

☐ 5 sec
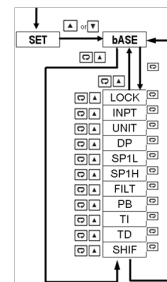Press ☐ key 5 seconds to execute the selected default program

3.4 Setup Menu

The setup menu has been categorized into eight categories.
They are listed as below.
1. Basic Menu
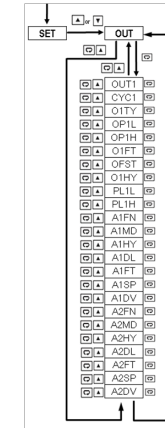2. Output Menu
3. Communication Menu
4. User Select Menu

3.4.1 Basic Menu (bASE)

Use ▲ or ▼ key to get bASE in the lower display
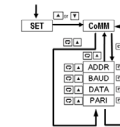then use ☐ key to enter to basic menu parameters.

3.4.2 Output Menu (oUT)

Use ▲ or ▼ key to get oUT in the lower display
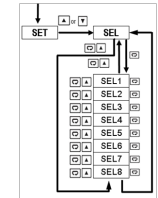then use ☐ key to enter to output menu parameters.

3.4.3 Communication Menu (CoMM)

Use ▲ or ▼ key to get CoMM in the lower display
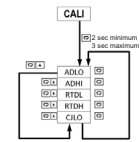then use ☐ key to enter intocommunication menu parameters.

3.4.4 User Select Menu (SEL)

Use ▲ or ▼ key get SEL in the lower display
then use ☐ key to enter to select the user menu parameters.

3.5 Calibration Mode

Press ☐ key for 2 seconds or longer (not more than 3 seconds)
then release it to enter calibration Mode.
Press ☐ key for 5 seconds to perform calibration.

Note:
- Using Manual, Auto-Tuning, Calibration modes will break the control loop and change some of the previous setting data. Make sure that the system is allowable to apply these modes.
- The flow chart shows a complete list of all parameters. For actual application, the number of available parameters will vary depending on the setup and model of the controller and will be less than that shown in the flow chart.
- The user can select up to 8 parameters to put in the user select menu by using the SEL1~SEL8 parameters in the setup menu

4. Parameters Description

Modbus	Parameter Notation	Parameter Description	Range	Default Value	Data Access Type
0	SP1	Set Point 1	Low: SP1L High: SP1H	25.0 °C (77.0 °F)	R/W
1	A1SP	Alarm 1 set point	A1FN=PVHI/PVLO Low: SP1L High: SP1H	100.0 °C (212.0 °F)	R/W
2	A2SP	Alarm 2 set point	A2FN=PVHI/PVLO Low: SP1L High: SP1H	100.0 °C (212.0 °F)	R/W
3	LOCK	Select parameters to be locked	0 *None:* None is 1 *SEt:* Setup data locked 2 *uSEr:* Setup data and user data are locked. Set point is unlocked. 3 *ALL:* All data are locked	0	R/W
4	INPT	Input sensor selection	0 *J_tC:* J type Thermocouple 1 *K_tC:* K type Thermocouple 2 *t_tC:* T type Thermocouple 3 *R_tC:* R type Thermocouple 4 *S_tC:* S type Thermocouple 5 *Pt. dN:* PT100 DIN 6 *Pt.JS:* PT100 JIS	1	R/W
5	UNIT	Input unit selection	*oC:* °C unit *oF:* °F unit	0	R/W
6	DP	Decimal point selection	0 *No.dP:* no decimal point 1 *1-dP:* 1 decimal point	1	R/W

Modbus	Parameter Notation	Parameter Description	Range	Default Value	Data Access Type
7	OP1L	OP1 linear output low limit value	0.0 ~ OP1H	0.0	R/W
8	OP1H	OP1 linear output high limit value	OP1L ~ 110.0 %	100.0	R/W
9	SP1L	Low limit of set point value	Low: J_TC: -120.0°C(-184.0°F) K_TC: -200.0°C(-328.0°F) T_TC: -250.0°C(-418.0°F) R_TC: 0.0°C(32.0°F) S_TC: 0.0°C(32.0°F) PTDN: -200.0°C(-328.0°F) PTJS: -200.0°C(-328.0°F) High: SP1H	-17.8 °C (0.0 °F)	R/W
10	SP1H	High limit of set point value	Low: SP1L High: J_TC: 1000.0°C(1828.0°F) K_TC: 1370.0°C(2498.0°F) T_TC: 400.0°C(752.0°F) R_TC: 1767.7°C(3214.0°F) S_TC: 1767.7°C(3214.0°F) PTDN: 850.0°C(1562.0°F) PTJS: 600.0°C(1112.0°F)	537.8 °C (1000.0 °F)	R/W
11	SHIF	PV shift (offset) value	Low: -200.0°C (360.0°F) High: 200.0°C (360.0°F)	0.0 °C (0.0 °F)	R/W
12	FILT	Filter damping time constant of PV	0 *0*: 0 second time constant 1 *0.2*: 0.2 second time constant 2 *0.5*: 0.5 second time constant 3 *1*: 1 second time constant 4 *2*: 2 second time constant 5 *5*: 5 second time constant 6 *10*: 10 second time constant 7 *20*: 20 second time constant 8 *30*: 30 second time constant 9 *60*: 60 second time constant	2	R/W
13	A1DV	Alarm 1 deviation value	A1FN=DEHI/DELO/DBHI/DBLO Low: 0.0 High: 500.0°C(900.0°F)	10.0 °C (18.0 °F)	R/W
14	PB	Proportional band value	Low: 0.0 High: 500.0°C(900.0°F)	10.0 °C (18.0 °F)	R/W
15	TI	Integral time value	Low: 0 High: 3600 sec	120	R/W
16	TD	Derivative time value	Low: 0 High: 360.0 sec	30.0	R/W
17	OUT1	Output 1 function	0 REVR: Reverse (heating) control action 1 dIRt: Direct (cooling) control action	0	R/W
18	O1TY	Output 1 signal type	0 RELY: Relay output 1 SSrd: Solid state relay drive output 2 DC.MA: DC current 3 DC.Vo: DC voltage	0	R/W
19	O1FT	Output 1 failure transfer mode	0~1000: 0.0 ~ 100.0 % to continue output 1 control function if the sensor fails, or select OFF (0) or ON (1) for ON-OFF control	0.0	R/W
20	O1HY	Output 1 ON-OFF control hysteresis	Low: 0.1 High: 50.0 °C (90.0°F)	0.5°C (0.9 °F)	R/W
21	CYC1	Output 1 cycle time	Low: 0.1 High: 90.0 sec.	18.0	R/W
22	OFST	Offset value for P control	Low: 0 High: 100.0 %	25.0	R/W
23	PL1L	MV1 power value limit low	Low: 0 High: 50 % or PL1H	0	R/W
24	PL1H	MV2 power value limit high	Low: PL1L High: 100 %	100	R/W
25	A1FN	Alarm 1 function for alarm 1 output	0 *NoNE*: No alarm function 1 *dE.HI*: Deviation high alarm 2 *dE.Lo*: Deviation low alarm 3 *db.HI*: Deviation band out of band alarm 4 *db.Lo*: Deviation band in band alarm 5 *PV.HI*: Process value high alarm 6 *PV.Lo*: Process value low alarm	1	R/W

Modbus	Parameter Notation	Parameter Description	Range	Default Value	Data Access Type
33	A2FN	Alarm 2 function for alarm 2 output	0 *NoNE*: No alarm function 1 *dE.HI*: Deviation high alarm 2 *dE.Lo*: Deviation low alarm 3 *db.HI*: Deviation band out of band alarm 4 *db.Lo*: Deviation band in band alarm 5 *PV.HI*: Process value high alarm 6 *PV.Lo*: Process value low alarm 7 COMM: RS485	2	R/W
34	A1DL	Alarm 1 delay	Low: 0 High: 5999 sec	0	R/W
35	A2MD	Alarm 2 operation mode	0 *NoRM*: Normal alarm action 1 *LtCH*: Latching alarm action 2 *HoLd*: Hold alarm action 3 *Lt.Ho*: Latching & Hold action	0	R/W
36	A2HY	Hysteresis control of alarm 2	Low: 0.1°C High: 50.0°C (90.0°F)	0.1 °C (0.2 °F)	R/W
37	A2FT	Alarm 2 failure forced transfer mode	0 oFF: Alarm output OFF if sensor fails 1 oN: Alarm output ON if sensor fails	1	R/W
38	A2DL	Alarm 2 delay	Low: 0 High: 5999 sec	0	R/W
39	ADDR	Address assignment of digital communication	Low: 1 High: 255	1	R/W
40	BAUD	Baud rate of digital communication	0 2.4: 2.4 Kbits/s baud rate 1 4.8: 4.8 Kbits/s baud rate 2 9.6: 9.6 Kbits/s baud rate 3 14.4: 14.4 Kbits/s baud rate 4 19.2: 19.2 Kbits/s baud rate 5 28.8: 28.8 Kbits/s baud rate 6 38.4: 38.4 Kbits/s baud rate 7 57.6: 57.6 Kbits/s baud rate 8 115.2: 115.2 Kbits/s baud rate	2	R/W
41	DATA	Data bit count of digital communication	0 7bIt: 7 bit 1 8bIt: 8 bit	1	R/W
42	PARI	The parity bit of digital communication	0 EVEN: Even Parity 1 odd: Odd parity 2 NoNE: No parity bit	0	R/W
43	A2DV	Alarm 2 deviation value	A2FN=DEHI/DELO/DBHI/DBLO Low: 0.0 High: 500.0°C(900.0°F)	10.0°C (18.0 °F)	R/W
44	SEL1	Select 1st parameter for user menu	0 NONE 7 TD 1 A1SP 8 SHIF 2 A2SP 9 OFST 3 LOCK 10 O1HY 4 INPT 11 A1HY 5 PB 12 A2HY 6 TI 13 ADDR	0	R/W
45	SEL2	Select 2nd parameter for user menu	Select 2nd parameter for user manual, Same as the SEL1	0	R/W
46	SEL3	Select 3rd parameter for user menu	Select 3rd parameter for user manual, Same as the SEL1	0	R/W
47	SEL4	Select 4th parameter for user menu	Select 4th parameter for user manual, Same as the SEL1	0	R/W
48	SEL5	Select 5th parameter for user menu	Select 5th parameter for user manual, Same as the SEL1	0	R/W
49	SEL6	Select 6th parameter for user menu	Select 6th parameter for user manual, Same as the SEL1	0	R/W
50	SEL7	Select 7th parameter for user menu	Select 7th parameter for user manual, Same as the SEL1	0	R/W
51	SEL8	Select 8th parameter for user menu	Select 8th parameter for user manual, Same as the SEL1	0	R/W
52	ADLO	mV calibration low coefficient	Low: -1999 High: 1999	------	R/W
53	ADHI	mV calibration high coefficient	Low: -1999 High: 1999	------	R/W

Modbus	Parameter Notation	Parameter Description	Range	Default Value	Data Access Type
56	CJLO	Cold junction calibration low coefficient	Low: -5.00 High: 40.00	------	R/W
57	CJCT	Cold Junction Temperature	Low: -4000 High: 9000	------	R
58	DATE	Date	Low: 0; High: 65535	------	R
59	SRNO	Serial Number	Low: 0; High: 65535	------	R
63	CJCL	Cold junction low calibration voltage	Low: 0 High: 7552	------	R
64	PV	Process value	Low: -19999 High: 45536	------	R
65	SV	Current set point value	Low: SP1L High: SP1H	------	R
66	MV1	Output 1 %Value	Low: 0.00 High: 100.00 %	------	R (R/W, Manual)
69	EROR	Error code	Low: 0 High: 65535	------	R
70	MODE	Operation mode & alarm status	Low: 0 High: 65535	------	R
71	PROG	Device version, firmware version	67.XX	------	R
72	CMND	Command code	Low: 0; High: 65535	------	R/W

5. Terminal Connection
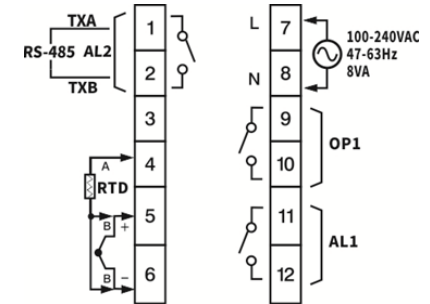
6. Error Code

The description of the Error code is explained below

Error Code	Display Symbol	Description & Reason	Corrective Action
10	ER10	**Communication error:** bad function code	Correct the communication software to meet the protocol requirements
11	ER11	**Communication Communication error:** register address out of range	Do not issue an over-range address of the register to the slave
14	ER14	**Communication error:** attempt to write a read-only data	Do not write read-only data or protected data to the slave
15	ER15	**Communication error:** write a value which is out of range to a register	Do not write an over-range data to the slave register
26	ATER	**Auto-Tuning Error:** Failed to perform Auto-Tuning function	1. The PID values obtained after Auto-Tuning process are out of range. Retry Auto-Tuning. 2. Do not change the setpoint value during Auto-Tuning process. 3. Use manual tuning instead of Auto-Tuning process. 4. Do not set a zero value for TI. 5. Do not set a zero value for PB. 6. Touch RESET key
29	EEPR	EEPROM can't be written correctly	Return to factory for repair.
30	CJER	Cold junction compensation for Thermocouple malfunction	Return to factory for repair.
39	SBER	Input sensor break	Replace the input sensor