Quick Operation Manual BrainChild For PID + Fuzzy Logic Process Controller Model: C22/C62/C82/C83/C72/C42/R22 Ver. UMQOC621B

1. DISPLAY AND KEYS



During power-up, the upper display will show PROG and the lower display will show the Firmware version for 6 seconds

SCROLL/ENTER KEY: I to select a parameter to be viewed or adjusted Press
for next parameter. Press
and
key for return to previous parameter. 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. RESET KEY: R This key is used to:

- 1.Revert the display to the home screen.
- 2.Reset a latching alarm once the alarm condition is removed.
- 3.Stop manual control mode, auto-tuning mode or calibration mode.
- 4. Clear an auto-tuning or communication error message.
- 5.Restart the dwell timer when the dwell timer has timed out.
- 6.Enter the manual control menu if failure mode occurs.

2. MENU FLOWCHART:



SCROLL/ENTER KEY:

1. Press and hold I for 5 seconds, display will show I FEE . Press I to enter the Setup Menu

2. Press and hold of for 6.2 seconds, display will show HRnd Presso and hold for 5 seconds to enter Manual Mode.

3. Press and hold of for 7.4 seconds, display will show R-E Presso and hold for 5 seconds to enter Auto-Tuning Mode.

4. Press and hold of for 8.6 seconds, display will show IRI Presso and hold for 2~3 seconds to enter Calibration Mode

1. bASE: Basic Menu

2. oUT: Output Menu

Menu

parameters.

SET

Input Menu

3. ALRM: Alarm Menu

4. EI: Event Input Menu

5. SEL: User Select Menu

6. CoMM: Communication

7. Ct: Current Transformer

2.2.2 Output Menu (oUT):

key to enter output menu

CYC1 C DFST C DUT2 C DUT2 C D2TY C D2TY C D2FT C CYC2 C

CPB C DB C PL1L C PL1H C

Use
I or
I key to get oUT in

the lower display, then use 🖸

8. PRoF: Profile Menu

2.1 User Menu: The below user menu parameters are available depends on user's selection.



2.2 Setup Menu: The setup 2.2.1 Basic Menu (bASE): Use A or V key menu has been categorized into eight categories as below. to get bASE in the lower display, then use 🖸 key to enter basic menu parameters.

A or

► bASE

OFS1 OFS2

RAMP C RR C RETY C RELO C REHI C RMSP C RINL C

RINH CODE OFTL OFTH

CALO CAHI SFT SFL1 SFL2 SFL2

SET









2.2.3 Alarm Menu

SET

2.2.4 Event Input Menu 2.2.5 User Select (EI): Use 🗠 or 💌 key to Menu (SEL): Use 🛋 get EI in the lower display, then use 🖻 key to enter event input menu parameters.

3. PARAMETERS DESCRIPTION:

(ALRM): Use ▲ or ▼	(EI): Use riangle or riangle key to	Menu (SEL): Use	or Mo	Ibus Parame	Parameter					Select BPLS (Bumpless				NoNE: No alarm function				A1SP: A1SP is moved to USER
key to get ALRM in	get El in the lower	key to get SEL in	Reg	ister ress Notatio	n Description	Range	30	O2FT	Output 2 failure transfer mode	transfer), or 0.0 ~ 100.0 % to continue output 2 control function				dtMR: Dwell timer action dE.HI: Deviation high alarm			Select 1st~8th	Menu A1dV: A1DV is moved to USER
the lower display,	display, then use 🖻 key	the lower display, the	n) SP1	Set Point 1	Low: SP1L High: SP1H		01/00	0.1.10.1.1	if the sensor fails				dE.Lo: Deviation low alarm	95~102	SEL1~8	parameter for user menu	Menu
then use 📼 Key to	to enter event input menu parameters	select menu parame-	ser	2 SP3	Set Point 2 Set Point 3	Low: SP1L High: SP1H	31	CPR	Cooling proportional	Low: 0.1 High: 90.0 sec.	55	A4EN	Alarm 4 function for	band alarm				Menu
parameters.	mona paramotoro.	ters. Up to 8 parame-	. –	3 SP4 4 SP5	Set Point 4 Set Point 5	Low: SP1L High: SP1H Low: SP1L High: SP1H	52	Or B	band value Heating-cooling	Low. 30 Thigh. 300 /6			alarm output	db.Lo: Deviation band in band alarm				A2SP: A2SP is moved to USER Menu
		ters by selecting	. –	5 SP6	Set Point 6	Low: SP1L High: SP1H	33	DB	dead band	Low: - 36.0 High: 36.0 %				PV.HI: Process value high alarm				A2dV: A2DV is moved to USER
		SEL1~SEL8 can be p	but	5 517	Dwell timer	Low. Srie High. Srift			overlap)					H.bK: Heater break alarm				A3HY: A3HY is moved to USER
				7 DTMR	(Minute:	Low: 0.0 High: 4553.5				NoNE: No alarm function dtMR: Dwell timer action				H.St: Heater short alarm NoRM: Normal alarm action				Menu A3SP: A3SP is moved to USER
O A A1MD O A1HY O		SET SEL +	,		Seconds)	J_tC: J type Thermocouple				dE.HI: Deviation high alarm	56	A4MD	Alarm 4 operation	LtCH: Latching alarm action				Menu A3dV: A3DV is moved to USER
						K_tC: K type Thermocouple				db.HI: Deviation band out of			mode	Lt.Ho:Latching & Hold action				Menu
	CA SP4					E_tC: E type Thermocouple	34	A1FN	Alarm 1 function for alarm 1 output	band alarm db.Lo: Deviation band in band	57		Hysteresis control	Low: 0.1°C				Menu
	CA E4FN C CA SP5 C	SEL1 C				B_tC: B type Thermocouple R_tC: R type Thermocouple				alarm PV.HI: Process value high alarm		74111	of alarm 4	High: 50.0°C(90.0°F) OFF: Alarm output OFF if sensor				A4SP: A4SP is moved to USER Menu
A2HY A2HY A2FT A2FT	CA E5FN C SP6 C					S_tC: S type Thermocouple N_tC: N type Thermocouple				PV.Lo: Process value low alarm	58	A4FT	Alarm 4 failure	fails				A4dV: A4DV is moved to USER
					Input sensor	L_tC: L type Thermocouple				H.St: Heater short alarm			uansier mode	fails				PL1L: PL1L is moved to USER
		Q ▲ SEL6 U Q ▲ SEL7 D		B INPT	selection	P_tC. P type Thermocouple			Alarea 4 anatria	NoRM: Normal alarm action LtCH: Latching alarm action	59	A4SP	Alarm 4 set point Alarm 4 deviation	Low: -19999 High: 45536				Menu C82/C83/C72/C42:
						D_tC: D type Thermocouple	35	A1MD	mode	HoLd: Hold alarm action Lt.Ho: Latching & Hold action	00	A4DV	value Bumpless transfer	Low 19999 Flight. 40000				NoNE: Not selected R485: RS-485 and Remote SP
Q A A3FT Q Q A A3SP Q						Pt.dN: P1100 Ω DIN curve Pt.JS: PT100 Ω JIS curve			Hustorosissontral of	SP.Ho: Set point holding alarm	61	BPL1	value of MV1	Low: 0.00 High: 100.00				C62:
QA A3DU Q QA A3DL Q	2 2 7 Current	▲ cr▼				4-20: 4-20mA linear current input 0-20: 0-20mA linear current input	36	A1HY	alarm 1	High: 50.0°C(90.0°F)	62	BPL2	value of MV2	Low: 0.00 High: 100.00				R485: RS-485
	Transformer Input					0-5V: 0-5VDC linear voltage input 1-5V: 1-5VDC linear voltage input	27	AIET	Alarm 1 failure	OFF: Alarm output OFF ifsensor fails	63	CJCL	Sense voltage during cold junction	Low: 0 High: 7552				C22/R22: NoNE: Not selected
OA AHY O OA AFT O	Menu (Ct): Use					0-10: 0-10VDC linear voltage input	51		transfer mode	ON: Alarm output ON if sensor fails	64	PV64	calibration low Process value	Low: -19999 High:45536				R485: RS-485 EI1: Event 1 input
	in the lower display,			9 UNIT	Input unit selection	oF: °F unit	38	A1SP	Alarm 1 set point	Low: -19999 High: 45536	65	SV65	Current set point	Low: SP1L High:SP1H	103	OFS1	selection	CT1: CT 1 input 4-20: 4-20mA retransmission
	then use 🖻 key to	CA HB2T C CA HSEN C				No.dP: No decimal point	39	A1DV	value	Low: -19999 High: 45536	66	MV1	Output 1	Low: 0.00 High: 100.00 %				output
2 2 6 Communication	enter current transformer input	HSHY O HSHT O	1	0 DP	selection	2-dP: 2 decimal digit	40	A2OT	Alarm 2 Output	RALM: Alarm 2 output 1 RALM: Reverse Alarm 2 Output	67	66 MV2	%Value(Heating) Output 2	Low: 0.00 High: 100.00 %				output
Menu (CoMM): Use	menu parameters.			1 1010	Input low	3-dP: 3 decimal digit				NoNE: No alarm function dtMR: Dwell timer action		67	%Value(Cooling) Remaining time of					0-5V: 0-5VDC retransmission output
or key to get CoMM				1 11420	scale value Input high	Low. •13333 11g1.43330				dE.HI: Deviation high alarm dE.Lo: Deviation low alarm	69	FROR	dwell timer Error code	Low: 0.0 High: 45535				1-5V: 1-5VDC retransmission output
then use key to	2.2.8 Profile Menu (Pl get PRoF in the lower	RoF): Use i or ikey display then use ike	to	2 INHI	scale value	Low:INLO+50 High:45536				db.HI: Deviation band out of	70	MODE	Operation mode &	Low: 0 High: 65535				0-10: 0-10VDC retransmission output
enter communication	to enter profile menu p	parameters.	, ,	3 SP1L	set point	Low: -19999 High :45536				db.Lo: Deviation band in band			alarm status	C22:22.XX C62:62.XX				C82/C83/C72/C42:
menu parameters.			E	4 00411	High limit of		41	A2FN	alarm 2 output	aiarm PV.HI: Process value high alarm	71	PROG71	Program code	C82:82.XX C83:83.XX C72:72.XX C42:42.XX				CT1: CT1 input and Remote SP
▲ or ▼			1 🗆	4 SPIH	value	Low: SPIL High:40030				PV.Lo: Process value low alarm H.bK: Heater break alarm	72	CMND	Command code	R22:23.XX Low: 0 High: 65535				Remote SP
						0: 0 second time constant 0.2: 0.2 second time constant				H.St: Heater short alarm E1.C.o: Event Input 1 Control	73	JOB1	Job code	Low: 0 High: 65535				C62: NoNE: Not selected
					Filter	0.5: 0.5 second time constant 1: 1 second time constant				Alarm Output	75	JOB2 JOB3	Job code	Low: 0 High: 65535				EI1.2: Event input 1 and Event input 2
	CA STAR O END O	OA SKT7 O DA TSP8 O		5 FILT	damping time constant of	2: 2 second time constant 5: 5 second time constant				Alarm Output	76	CJCT	Cold Junction Temperature	Low: -4000 High: 9000				EI.CT: Event input 1 and CT2
	PFR PFR HBL0	CA RPT8 C SKT8 C			PV	10: 10 second time constant			Alarm 2 operation	NoRM: Normal alarm action LtCH: Latching alarm action	77	ADLO	mV calibration low coefficient	Low: -1999 High: 1999				CT1.2: CT1 and CT2 inputs
		TSP9 C				30: 30 second time constant	42	A2MD	mode	HoLd: Hold alarm action Lt.Ho: Latching & Hold action	78	ADHI	mV calibration high	Low: -1999 High: 1999				C22: NoNE:No selected
CA STOP C		CA SKT9 C				None: No Display			Hysteresis control	SP.Ho: Set point holding alarm Low: 0.1°C	79	RTDL	RTD calibration low	Low: -1999 High: 1999				4-20:4-20mA retransmission output
		OL SKTA O		6 DISP	MV/TIME display	MV1: Display MV1 (66/130) MV2: Display MV2(67/131)	43	A2HY	of alarm 2	High: 50.0°C(90.0°F)	80	RTDH	RTD calibration	Low: -1999 High: 1999				0-20:0-20mA retransmission output
	C STAT C TSP1 C			-	selection	tIMR: Display Time (68) PRoF: Display STAT(162) if have	44	A2FT	Alarm 2 failure	fails			high coefficient Cold junction				Ontion function 2	0-5V: 0-5V retransmission
2.3 Manual Mode Menu: Press and hold	CA SKT1 C	OA SKTB O		7 00	Proportional	profile function			transfer mode	ON: Alarm output ON itsensor fails	81	CJLO	calibration low coefficient	Low: -5.00 High: 40.00	104	OFS2	selection	1-5V: 1-5V retransmission
key for 5 seconds				/ РВ	band value Integral time	Low: 0.0 High: 500.0 C (900.0 F)	45	A2SP	Alarm 2 set point Alarm 2 deviation	Low: -19999 High: 45536	82	CIHI	Cold junction	Low: -1999 High: 1999				0-10: 0-10 retransmission
until MANU indicator				8 TI	value	Low: 0 High: 3600 sec	40	R2DV	value	Al M: Alarm 3 output			coefficient	2011. 1000 Tright 1000				output AL2: Alarm 2 output
mode menu.parameters.				9 TD	time value	Low: 0.0 High: 360.0 sec	47	A3OT	Alarm 3 output	RALM: Reverse Alarm3 Output	83	V1L	coefficient	Low: -1999 High: 1999				R22: NoNE: No selected
HANd	CA RPT4 C			0 OUT1	Output 1 function	action				dtMR: Dwell timer action	84	V1G	V1 calibration high coefficient	Low: -1999 High: 1999				4-20: 4-20mA retransmission output
© 5 Sec	CA TSP5 C CA RPT5 C					RELY: Relay output				dE.Lo: Deviation low alarm	85	MA1L	MA1 calibration low coefficient	Low: -1999 High: 1999				0-20: 0-20mA retransmission
	OA SKT5 O DA TSP6 O				Quitout 1	SSrd: Solid state relay drive output 4-20: 4-20mA linear current				db.HI: Deviation band out of band alarm	86	MA1G	MA1 calibration high coefficient	Low: -1999 High: 1999				0-5V: 0-5V retransmission
	CA RPT6 C CA SKT6 C	O A SKTG O		1 01TY	signal type	0-20: 0-20mA linear current 0-5V: 0-5VDClinear voltage			Alarm 3 function for	<i>db.Lo</i> : Deviation band in band alarm	87	V2L	V2 calibration low	Low: -1999 High: 1999				output 1-5V: 1-5V retransmission
						1-5V: 1-5VDC linear voltage 0-10: 0-10VDC linear voltage	48	A3FN	alarm 3 output	PV.HI: Process value high alarm PV.Lo: Process value low alarm	88	V2G	V2 calibration high	Low: -1999 Hiah: 1999				output 0-10: 0-10 retransmission
			_ -		Output 1	Select BPLS (Bumpless transfer), or 0.0 ~ 100.0 % to continue output 1				H.bK: Heater break alarm	20	MADI	coefficient MA2 calibration low	Low: -1999 High: 1999				output AL2: Alarm 2 output
	2.5 Calibration Mode:	Press and hold key	, 2	2 01FT	failure transfer	control function if the sensor fails, or				E1.C.o: Event Input 1 Control	69	WHZL	coefficient MA2 calibration	Low 1999 High. 1999				EI2: Event2 Input
	for 2~3 seconds, release	se it to enter calibration	ו ו		mode	control				Alarm Output E2.C.o: Event Input 2 Control	90	MA2G	high coefficient	Low: -1999 High: 1999	<u> </u>			C82/C83/C42:
2.4 Auto-Tuning Mode:	perform calibration	key for 5 seconds to		3 01HY	Output 1 ON- OFF control	Low:0.1°C(0.2°F) High: 50.0°C(90.0°F)	<u> </u>			Alarm Output NoRM: Normal alarm action	92	PL1H	Power limit 1 high	Low: PL1L High: 100 %				4-20: 4-20mA retransmission
for 5 seconds until	Persenti Ganoration.	CALI 2 sec minimum,3 sec maximum	E.	4 0004	hysteresis Output 1	Low: 0.1 High: 00.0 con	49	A3MD	Alarm 3 operation	LtCH: Latching alarm action HoLd: Hold alarm action	93 94	PL2L PL2H	Power limit 2 low Power limit 2 high	Low: 0 High: PL2H or 50% Low: PL2L High: 100 %				output & Remote SP 0-20: 0-20mA retransmission
TUNE indicator flashes				4 0101	cycle time Offset value	Low. 0.1 High. 90.0 Sec.		10000	mode	Lt.Ho: Latching & Hold action				NoNE: No Parameter selected				output & Remote SP 0-5V: 0-5VDC retransmission
mode.	CA CA	ADH 0 RTDL 0		o OFST	for P control Ramp	Low: U High: 100.0 %	50	A3HY	Hysteresis control	Low: 0.1°C				dtMR: DTMR is moved to USER Menu				output & Remote SP 1-5V: 1-5VDC retransmission
	01		2	6 RAMP	function	MINR: Use unit/minute as Ramp Rate	<u> </u>	-	of alarm 3	OFF: Alarm output OFF if sensor				dISP: DISP is moved to USER Menu				output & Remote SP
A-t				7 RR	Ramp rate	Low: 0.0 High: 500.0°C(900.0°F)	51	A3FT	Alarm 3 failure transfer mode	fails ON: Alarm output ON if sensor				Pb: PB is moved to USER Menu				output & Remote SP
	C.	MA1L D MA1G D		8 01172	Output 2	COOL: Cooling PID Function	52	A3SP	Alarm 3 set point	fails Low: -19999 High: 45536				td: TD is moved to USER Menu				A.4.20: Alarm 4, 4-20mA retransmission output & Remote
	0 a 0 a 0 a		Ľ		function	AL1: Alarm 1 Function rAL1:Reverse Alarm 1 Function	53	A3DV	Alarm 3 deviation	Low: -19999 High: 45536			Select 1st~8th	o1HY: O1HY is moved to USER Menu				SP A.0.20: Alarm 4, 0-20mA
		MA2G 📼				RELY: Relay output SSrd: Solid state relay drive output	54	A4OT	Alarm 4 output	ALM: Alarm 4 output	95~102	SEL1~8	parameter for user menu	RR: RR is moved to USER Menu				retransmission output & Remote SP
				9 02TV	Output 2	4-20: 4-20mA linear current	L	I		RALIN: REVERSE Alarm 4 Output				CPb: CPB is moved to USER Menu			Option function 3	A.0.5V: Alarm 4, 0-5V retransmission output & Remote
Note: Using Manual, Auto-Tuning, Calibration modes will break the control loop and change some of the previous setting data. Make sure that the					signal type	0-5V: 0-5VDClinear voltage								db: DB is moved to USER Menu	105	OFS3	selection	SP 4 1 51/: Alarm 4 1 51/
system is allowable to apply these modes.						0-10: 0-10VDC linear voltage								Menu				retransmission output & Remote

Modbus Register	Parameter Notation	Parameter Description	Range	134	OFTL	Offset value for low point calibration	Low: -1999 High: 1999		
Address			A.0.10: Alarm 4, 0-10V	135	OFTH	Offset value for high point calibration	Low: -1999 High: 1999		
			retransmission output & Remote SP C72:	136	CALO	Input signal value during low point calibration	Low: -19999 High: CAHI-1		
105	OFS3	Option function 3 selection	NoNE: Not selected 4-20: 4-20mA retransmission output & Remote SP 0-20: 0-20mA retransmission	137	CAHI	Input signal value during high point calibration Reserved	Low: CALO+1 High: 45536		
			output & Remote SP	140	PROG	Program code	Same as PROG71		
			output & Remote SP				NoNE: none SP2: SP2 activated to replace		
			1-5V: 1-5VDC retransmission				SP1		
			0-10V: 0-10VDC retransmission output & Remote SP AL4: Alarm 4 Output				rS.A3: Reset alarm 2 output rS.A3: Reset alarm 2 output rS.A3: Reset alarm 3 output rS.A4: Reset alarm 4 output		
			C62: NoNE: Not selected		5451	Event input 1	rS.Ao: Reset all alarm outputs CA.LH: Cancel alarm latch		
			4-20: 4-20mA retransmission output 0-20: 0-20mA retransmission output	141	EIFN	function	d.o1: Disable output 1		
			0-5V: 0-5VDC retransmission output				d.o12: Disable output 1 and 2		
			0-10: 0-10VDC retransmission output				LoCK: Lock all parameters and Read only communication		
			RE.PV: Retransmit process				AU.MA: Switch Auto and Manua control mode		
106	RETY	Retransmission	value				F.tra: Failure Transfer		
		type	RE.SP: Retransmit set point value			Evention + 0	AL.oN: EI Control Alarm Output SP3: SP3 activated to replace		
107	RELO	Retransmission low	Low: -19999 High: 45536	142	E2FN	Event input 2 function	SP1 Others: Same as E1EN		
108	REHI	Retransmission	Low: -19999 High: 45536				NoNE: none		
		high scale value Address	· ···· 5 ····				SP4: SP4 activated to replace SP1		
109	ADDR	assignment of digital communication	Low: 1 High: 255				rS.A1: Reset alarm 1 output rS.A2: Reset alarm 2 output rS.A3: Reset alarm 3 output		
			2K4: 2.4 Kbits/s baud rate				rS.A4: Reset alarm 4 output		
			9K6: 9.6 Kbits/s baud rate				CA.LH: Cancel alarm latch		
110	BAUD	Baud rate of digital	14K4: 14.4 Kbits/s baud rate 19K2: 19.2 Kbits/s baud rate				d.o1: Disable output 1 d.o2: Disable output 2		
		communication	28K8: 28.8 Kbits/s baud rate	143	E3FN	Event input 3	d.o12: Disable output 1 and 2		
			57K6: 57.6 Kbits/s baud rate			Inction	Read only communication		
		Data bit count of	115K: 115.2 Kbits/s baud rate				AU.MA: Switch Auto and Manua control mode		
111	DATA	digital	8blt:8 data bits				F.tra: Failure Transfer StAR: Run profile as RUN=STA		
		Parity bit of digital	EVEN: Even parity				CoNt: Run Profile as		
112	PARI	communication	Odd: Odd parity NoNE: No parity bit				RUN=CONT PV: Run Profile as RUN=PV		
113	STOP	Stop bit count of digital	1blt: One stop bit				HoLd: Run Profile as RUN=HOLD		
		communication	2blt: Two stop bits				StoP: Run Profile as RUN=STO		
114	CT1R CT2R	Reading of CT 1 Reading of CT 2	Low: 0.0 High: 150.0 Low: 0.0 High: 150.0	144	E4FN	Event input 4 function	SP5: SP5 activated to replace		
116	HBEN	Enable Heater break detection	oFF: Off 1 oN: On				Others: Same as E3FN NoNE: none		
117	HBHY	Heater break hysteresis	Low: 0.1 High: 50.0				SP4: SP4 activated to replace SP1		
118	HB1T	Triple point current for heater break 1	Low: 0.0 High: 120.0				rS.A1: Reset alarm 1 output rS.A2: Reset alarm 2 output		
119	HB2T	Triple point current	Low: 0.0 High: 120.0				rS.A3: Reset alarm 3 output rS.A4: Reset alarm 4 output		
120	HSEN	Enable Heater short	oFF: Off 1 oN: On	145	E5FN	Event input 5	rS.Ao: Reset all alarm outputs CA.LH: Cancel alarm latch		
121	HSHY	Heater short	Low: 0.1 High: 50.0			function	d.o1: Disable output 1 d.o2: Disable output 2		
122	HS1T	Triple point current	Low: 0.0 High: 120.0				d.o12: Disable output 1 and 2		
102	LICOT	for heater short 1 Triple point current	Low 0.0 High: 120.0				Read only communication		
125	H321	for heater short 2	None: No Remote SP				AU.MA: Switch Auto and Manua control mode		
			4-20: 4-20mA retransmission				F.tra: Failure Transfer		
			output 0-20: 0-20mA retransmission	146	E6FN	Event input 6 function	SP1		
124	RMSP	Remote SP type	output 0-5V: 0-5VDC retransmission	447	A4DI	Alarm 1 Delay	Offers: Same as E5FN OFF: OFF		
	. anot	rionolo or type	output	147	AIDL	(Minutes: Seconds) Alarm 2 Delay	ON: Low: 00.01 High: 99.59		
			1-5V: 1-5VDC retransmission output	148	A2DL	(Minutes: Seconds)	ON: Low: 00.01 High: 99.59		
			0-10: 0-10VDC retransmission output	149	A3DL	Alarm 3 Delay (Minutes: Seconds)	OFF: OFF ON: Low: 00.01 High: 99.59		
125	RINL	Remote SP Input	Low: -19999 High:RINH-50	150	A4DL	Alarm 4 Delay (Minutes: Seconds)	OFF: OFF ON: Low: 00.01 High: 99.59		
126	RINH	Remote SP Input	Low: RINI +50 High:45536	151	SFT	Soft Start Time	Low: 00.00(OFF) High:99.59		
120	T AI WIT	high scale value	dFLt: Default Menu	152		(Hours: Minutes) Soft Start Power	Low: PI 11 High: PI 1H		
127	FILE	Default File Selection	Ld.Us: Load User Setting	192	or'Ll	Limit for Output 1 Soft Start Power	LOW. TETE TIGHT. PLIT		
128	PV	Process value	Low: -19999 High: 45536	153	SPL2	Limit for Output 2	Low: PL2L High:PL2H		
129	SV	Current set point value	Low: SP1L High: SP1H	154	SETE	Soft Start Threshold Soft Start Timer	Low: 0.0 00 High:45536		
120	M0./4	Output 1	Louis 0.00	155	For Profi	(Hours: Minutes)	tion, please refer to full version		
130	₩V1	(Heating) Output 2	Low: 0.00 High: 100.00	161~222	user mar	nual			
131	MV2	percentage value (Cooling)	Low: 0.00 High: 100.00						
132	PASS	Password entry	Low: 0 High: 9999						
133	CODE	parameter	0 = unprotected 1000 = user mode unprotected						
		protection	9999=SPx(1 to 7) unprotected						

4. WIRING DIAGRAM



5. PROGRAMMING

5.1 User Security: There are two

parameters PASS (password) and CODE (security code) to control the data security

CODE Value	PASS Value	Access Rights								
0	Any Value	All parameters are changeable								
4000	=1000	All parameters are changeable								
1000	≠1000	Only user menu parameters change								
0000	=9999	All parameters are changeable								
3333	≠9999	Only SP1 to SP7 are changeable								
Othors	=CODE	All parameters are changeable								
Oulers	≠CODE	No parameters can be changed								

5.3 Signal Input:

∆: Required if ON-OFF Control is configured **INPT:** Select the sensor type or signal type

configured

Heat PID

Cool ON-OFF

Heat PID

Cool PID

for signal input Range: (Thermocouple) J TC, K TC, T TC, E TC, B TC, R TC, S TC,

N TC, L TC, (RTD) PT.DN, PT.JS or (Linear) 4-20, 0-20, 0-60, 0-1V, 0-5V, 1-5V 0-10

UNIT: Select the process unit. Range: °C, °F, PU (Process unit). If the unit is neither °C nor °F then select PU

DP: Select the resolution of process value

Range: For Thermocouple and RTD Signal NO.DP, 1-DP and for Linear Sign al NO.DP. 1- DP. 2-DP. 3-DP.

INLO: Select the low scale value for the linear type input.

INHI: Select the high scale value for the linear type input

5.4 Alarm: The controller has up to four alarm outputs depending on the controller model. There are 11 types of alarm functions and one dwell timer that can be selected. There are 4 kinds of alarm modes (A1MD, A2MD, A3MD, and A4MD) available for each alarm function (A1FN, A2FN, A3FN, and A4FN). In addition to the alarm output, output 2 can also be configured as an alarm. But output 2 has only provides 8 different alarm functions or dwell timer available.

5.5 Alarm Modes: There are four types of alarm modes available for each alarm function

Normal Alarm (ALMD = NORM): When a normal alarm is selected, the alarm output is de-energized in the non-alarm condition and energized in an alarm condition

Latching Alarm (ALMD = LTCH): If a latching alarm is selected, once the alarm output is energized it will remain unchanged even if the alarm condition is cleared. The latching alarm can be reset by pressing the RESET key once the alarm condition is removed.

Holding Alarm (ALMD = HOLD): A holding alarm prevents an alarm condition during power up. This will ignore the alarm condition at first time after power on. Afterwards the alarm performs the same function as normal alarm

Latching / Holding Alarm (ALMD = LT.HO): A latching / holding alarm performs both holding and latching functions. The latching alarm is reset when the RESET key is pressed after the alarm condition is removed.

Set Point Holding Alarm (ALMD = SP.HO): A set point holding alarm prevents an alarm from power up and / or changing set point. The alarm output is de-energized whenever the set point is changed even if it is in an alarm condition. The alarm reverts to a normal alarm once the alarm condition is removed.

5.6 Alarm Delay: In certain applications during startup, nuisance alarms will be generated before the process value reaches the set point. To avoid these kinds of nuisance alarms, a time delay for alarms is available. To enable the time delay for alarms set the delay time using the A1DL A2DL A3DL and A4DL parameters. These parameters will avoid the nuisance alarm during the process value reaches set point

5.7 Ramp: The ramping function is performed during power up as well as any time the set point is changed. Choose MINR or HRR for the RAMP setting, and the controller will perform the ramping function. The ramp rate is programmed by adjusting the RR setting. The ramping function is disabled as soon as the Failure mode, the Manual control mode, the Auto-tuning mode or the Calibration mode 0000

5.8 Dwell Timer: The Dwell timer can be with or without a Ramp. Alarm outputs

can be configured as dwell timers by selecting dtMR for A1FN. If A1FN is set to dtMR, Alarm 1 will act as a dwell timer. Similarly, Alarm 2, Alarm 3 and Alarm 4 will act as dwell timers if A2FN, A3FN, or A4FN is set to dtMR. When the dwell timer is configured, the parameter DTMR is used for dwell time adjustment. The dwell time is measured in minutes ranging from 0.0 to 4553.6 minutes. The Timer starts to count as soon as the Process Value (PV) reaches its set point (SV), and triggers an alarm output once the time has elapsed.

5.9 User Calibration: User calibration allows the user to offset the permanent factory calibration. There are two parameters: Offset Low (OFTL) and Offset High (OFTH) for adjustment to correct an error in the process value.

There are two parameters for the sensor input. These two signal values are CALO and CAHI. The input signal low and high values are to be entered in the CALO and CAHI parameters respectively

Press and hold the D key until the setup Menu page is obtained. Then, press and release the 🖸 key to navigate to the calibration low parameter OFTL. Send your low signal to the sensor input of the controller, then press and release the key. If the process value (the upper display) is different from the input signal, the user can use A and keys to change the OFTL value (the lower display) until the process value is equal to the value the user needs. Press and hold the Rev for 5 seconds to complete the low point calibration. A similar procedure is applied for high scale calibration.

As shown below, the two points OFTL and OFTH construct a straight line. For the purpose of accuracy, it is best to calibrate with the two points as far apart as possible. After the user calibration is complete, the input type will be stored in the memory. If the input type is changed, a calibration error will occur and an error code EREF is displayed.



5.10 Digital Filter: In certain applications the process value is too unstable to be read. To improve this, a programmable low pass filter incorporated in the controller can be used. This is a first order filter with a time constant specified by the FILT parameter A value of 0.5 seconds is used as a factory default Adjust FILT to change the time constant from 0 to 60 seconds. 0 seconds represents no filter applied to the input signal

5.11 Failure Transfer: The controller will enter failure mode if one of the following conditions occurs.

1. SBER error occurs due to an input sensor break, input current below 1mA for 4-20mA or input voltage below 0.25V for 1-5V.

2 ADER error occurs due to the A-D converter of the controller fails. Output 1 and Output 2 will perform the failure transfer (O1.ft & O2.ft) function as the controller enters failure mode.

Alarm Failure Transfer: An alarm failure transfer is activated as the controller enters failure mode. After that, the alarm output will transfer to the ON or OFF state which is determined by the set value of A1FT A2FT A3FT and A4FT

5.12 Soft-Start: The controller has soft start function to limit the control output event input on out1 and out2 for a programmable time SFT or up to a programmed thresh-12. REMOTE SET POINT: The set point will change proportionally with old value SFTH. The first of two will terminate soft start function and the normal respect to the input given in the Remote Set point input terminals. The Remote PID control begins. This function is useful for effects such as suppressing the Set point function needs RMSP RINL RINH parameters to be set properly heater output during equipment startup, or lightening the load. 13. RAMP AND SOAK PROGRAM: The profiler option can be used in the

Note: In Profile Version controllers If PFR is set to other than SP1 then the profile function will continue with the set parameter during power recovery. If PFR is set to SP1 then the profile will continue to run with soft start parameters during power recovery.

There are 5 parameters available for soft start function. They are as below. 1. SFt: Soft start time. If SFt ≠0, then the Soft start function will be enabled. The SFt can be set in the form of Hour: Minute. The range can be set is 00.00 to 99:59.

2. SFL1: Soft Start output limit for output 1. It can be set from PL1L to PL1H.

3. SFL2: Soft Start output limit for output 2. It can be set from PL2L to PL2H.

4. SFtH: Soft start threshold value. The Soft start will be aborted when the process value is greater than or equal to SFtH.

5. SFtR: Soft start time. It will show the remaining time of soft start when it is running

- 6. AUTO-TUNING: Auto-Tuning Operation Steps:
- 1 The system has been installed normally

2. Don't use zero value for PB or TI, otherwise the auto-tuning program will be disabled. The LOCK parameter should be set to NONE.

3. Set the set point to a normal operating value or a lower value if overshooting beyond the normal process value will cause damage

4. Press and hold the 🖸 key until R-L appears on the upper display, then let go. 5. Press and hold the 🖸 key for at least 5 seconds. The TUNE indicator will begin to flash, and the auto-tuning process has begun

NOTE: If the ramping function is used, it will be disabled once auto-tuning is started. The auto-tuning mode is disabled if either a failure mode or manual control mode occurs

Auto-Tuning Error: If auto-tuning fails, an ATER REF. message will appear on the upper display in any of the following cases

* If PB exceeds 9000 (9000 PU, 900.0°F or 500.0°C)

* If TI exceeds 1000 seconds

* If the set point is changed during the auto-tuning process

X: Not applicable O: Adjust to meet process Requirements

5.2 Control Output: There are 4

Control Mode OUT 1 OUT 2 O1HY O2HY CPB DB

Heat Only REVR X A X X X

Х

Y

Y

Х

0

0

kinds of control modes can be

Cool Only DIRT X A X

REVR DE HI

REVR COOL

7. MANUAL CONTROL: To enable manual control, ensure the LOCK parameter is set to NONE. Press and hold
for 6.2 seconds or until Mand -----(Hand Control) appears on the display. Press and hold D for 5 seconds or until the has now entered manual control mode. \mathcal{H}_{aaa} Indicates the output control variable for output 1, and I indicates the control variable for output 2. The user can use the up-down keys to adjust the percentage values for the heating or cooling output. This % value is based on the CYC1 and CYC2 settings, where the associated output will stay on for the % of time the CYC1 & CYC2 values are set for. The controller performs open loop control as long as it stays in manual control mode. The manual mode menu can be reached by pressing Tokeys also.

Exit Manual Control: Press the R key will revert the controller to its normal display mode

8. DATA COMMUNICATION: The controllers support RS-485 Modbus RTU protocol for data communication

RS-485 Setup: Enters the setup menu. Set individual addresses for units connected to the same port. Set the Baud Rate (BAUD). Data Bit (DATA). Parity Bit (PARI) and Stop Bit (STOP) such that these values are accordant with PC setup conditions

9. RETRANSMISSION: The controller can output (retransmit) PV or SP via its retransmission terminals RE+ and RE- provided that the retransmission option is ordered A correct signal type should be selected for option board to meet the retransmission option installed. RELO and REHI are adjusted to specify the low scale and high scale values of retransmission

10. HEATER CURRENT MONITORING: A current transformer (CT98-1) is required to measure the heater current. The CT input signal conditioner measures the heater current when the heater is powered (output 1 is on), and the current value will remain unchanged the heater is unpowered (output 1 is off). There are 1 or 2 CT inputs that can be connected to the controllers depending on the model. The CT1R & CT2R will indicate the heater current

Heater break detection is enabled by enabling heater break detection setting HBEN. A Heater break alarm (H.bK) alerts the user when the current measured by CT1 in CT1R is lower than HB1T or CT2 in CT2R is lower than HB2T. When the current measured by CT1 in CT1R is higher than HB1T+HBHY and CT2 in CT2R is higher than HB2T+HBHY, the heater break alarm will be off. The Heater break alarm will be off when both CT values are in normal range. The Heater break alarm function will be enabled when OUT1 is in ON condition. Heater short detection is enabled by enabling heater short detection setting HSEN. A Heater short alarm (H.St) alerts the user when the current measured by CT1 in CT1R is higher than HS1T or CT2 in CT2R is higher than HS2T. When the current measured by CT1 in CT1R is lower than HS1T-HSHY and CT2 in CT2R is lower than HS2T-HSHY, the heater short alarm will be off. The Heater short alarm will be off when both CT values are in normal range. The Heater short alarm function will be enabled when OUT1 is in OFF condition

11. EVENT INPUT: There are 6, 2 or 1 Event Inputs that are available in this series of controllers depending on the size of the controller. Refer wiring section for wiring an event input. The Event input accepts a digital (on/off) type signal. One of the available functions can be chosen by using EIEN1 through EIEN6 contained in the setup menu. The same function cannot be set to more than one

application where the set point should be changed automatically with the time. It provides 1 program with 16 segment or 2 programs with each 8 segments or 4 programs with each 4 segments. Each segment has both ramp and soak function. PROF, RUN, RMPU, STAR, END, PFR, HBLO, HBHI, HBT, CYC parameters are used to configure the controller for ramp and soak programs. For . more information of Profiler, please refer to full version user manual. 14. ERROR CODE:

rror ode	Display Symbol	Description & Reason	Corrective Action
4	ER04	Illegal setup values used: COOL is used for OUT2 when DIRT (cooling action) is used for OUT1, or when PID mode is not used for OUT1 (PB =0 and/or TI=0)	Check and correct setup values of OUT2, PB1, PB2, TI1, TI2 and OUT1. IF OUT2 is needed for cooling control, the controller should use PID mode (PB# 0 and TI#0) and OUT1 should use reverse mode (heating action), otherwise, OUT2 cannot be used for cooling control.
10	ER10	Communication error: bad function code	Correct the communication software to meet the protocol requirements.
11	ER11	Communication error: register address out of range	Do not issue an over range address of register to the slave.
14	ER14	Communication error: attempt to write a read only data	Do not write a read only data or a 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.
16	EIER	Event Input Error: Two or more event inputs are set to the same function	Do not set the same function in two or more Event Input Function parameters (E1FN through E6FN).
26	ATER	Auto-Tuning Error: Failed to perform auto-tuning function	
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, or input current below 1mA if 4-20mA is used, or input voltage below 0.25V if 1-5V is used	Replace input sensor.
40	AAER	A to D converter or related component(s) malfunction	Return to factory for repair.