

# C50 1/16-DIN PROCESS CONTROLLER CONCISE PRODUCT MANUAL – IM/C50

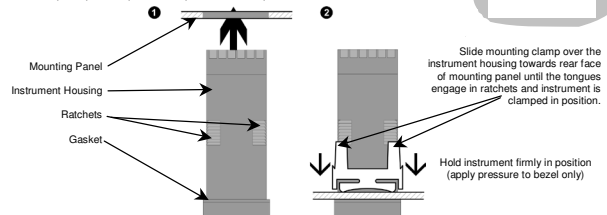


**CAUTION:** Installation and configuration should be performed only by personnel who are technically competent to do so. Local Regulations regarding electrical installation & safety must be observed.

## 1. INSTALLATION

### Panel-Mounting

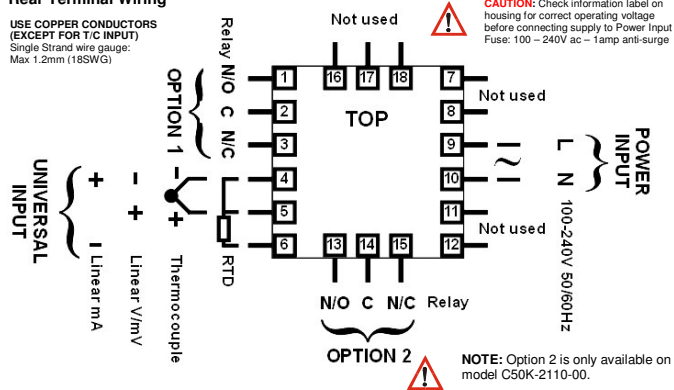
The mounting panel must be rigid and may be up to 6.0mm (0.25 inches) thick. The cut-out required for the instrument is shown on the right. Instruments may be mounted side-by-side in a multiple installation for which the cut-out width (for *n* instruments) is (48*n*-4)mm or (1.89*n*-0.16)inches.



**CAUTION:** Do not remove the panel gasket; it is a seal against dust and moisture.

### Rear Terminal Wiring

USE COPPER CONDUCTORS (EXCEPT FOR T/C INPUT)  
Single Strand wire gauge:  
Max 1.2mm (18SWG)



**CAUTION:** Turn off all power. Remove instrument by gripping the sides of the front panel and pulling the instrument out of its housing. **Note its orientation.**

**Note:** At first power-up the message **Go to Conf** is displayed, as described in section 8 of this manual. Access to other menus is denied until configuration mode is completed

## 2. SELECT MODE

Select mode is used to access the configuration and operation menu functions. It can be accessed at any time by holding down **⏏** and pressing **▲**. Once in select mode, press **▲** or **▼** to select the required mode. An unlock code is required to prevent unauthorised entry to Configuration, Setup & Automatic Tuning modes. Press **▲** or **▼** to enter the correct code number, then press **⏏** to proceed.

Mode	Upper Display	Lower Display	Description	Default	Unlock Codes
Operator	OPt	SLCt	Normal instrument operation.		None
Set Up	SEtP	SLCt	Tailor settings to the application.		10
Configuration	ConF	SLCt	Configures the instrument for use.		20
Product Info	InfO	SLCt	Check manufacturing information.		None
Auto-Tuning	Atun	SLCt	Invoke Pre-Tune or Self-Tune.		0

**Note:** The instrument will always return automatically to Operator mode if there is no key activity for 2 minutes.

## 3. CONFIGURATION MODE

First select Configuration mode from Select mode (refer to section 2). Press **⏏** to scroll through the parameters, then press **▲** or **▼** to set the required value. To accept a change **⏏** must be pressed, otherwise parameter will revert to previous value. To exit from Configuration mode, hold down **⏏** and press **▲**, to return to Select mode. **Note: Parameters displayed depends on how instrument has been configured. Parameters marked \* are repeated in Setup Mode.**

Parameter	Lower Display	Upper Display	Adjustment range	Default
Input Range/Type	inPt		See following table for possible codes	J T/C
Scale Range Upper Limit	rUL		Scale Range Lower Limit +100 to Range Max	Range max (Lin=1000)
Scale Range Lower Limit	rLL		Range Min. to Scale Range Upper Limit -100	Range min (Linear=0)
Decimal point position	dPoS		0=XXXX, 1=XXX.X, 2=XX.XX, 3=X.XXX (non-temperature ranges only)	1
Control Type	CtYP	SnCL	Primary (heat) only	SnCL
Primary Output Control Action	CtAL	rEAL	Primary & Secondary (heat/cool)	rEU
		d r	Reverse Acting	
Alarm 1 Type	ALR1	P_H I	Direct Acting	P_H I
		P_H I	Process High Alarm	
		P_Lo	Process Low Alarm	
		dE	Deviation Alarm	
		bAnd	Band Alarm	
		nonE	No alarm	
High Alm 1 value*	PhR1		Range Min. to Range Max in display units	Range Max.
Low Alm 1 value*	PLR1			Range Min.
Band Alm 1 value*	bAL1		1 LSD to span from setpoint in display units	S
Dev. Alm 1 value*	dAL1		+/- Span from setpoint in display units	S
Alm 1 Hysteresis*	AHY1		1 LSD to full span in display units	I
Alarm 2 Type	ALAR2	P_H I	Process High Alarm	P_Lo
		P_Lo	Process Low Alarm	
		dE	Deviation Alarm	
		bAnd	Band Alarm	
		nonE	No alarm	
High Alm 2 value*	PhR2		Range Min. to Range Max in display units	Range Max.
Low Alm 2 value*	PLR2			Range Min.
Band Alm 2 value*	bAL2		1 LSD to span from setpoint in display units	S
Dev. Alm 2 Value*	dAL2		+/- Span from setpoint in display units	S
Alm 2 Hysteresis*	AHY2		1 LSD to full span in display units	I
Loop Alarm	LAEn		d SA (disabled) or EnAb (enabled)	d SA
Loop Alarm Time*	LAt		1 sec to 99 mins. 59secs (only applies if primary proportional band = 0)	99.59
Alarm Inhibit	Inh	nonE	No alarms Inhibited	nonE
		ALR1	Alarm 1 inhibited	
		ALAR2	Alarm 2 inhibited	
		both	Alarm 1 and alarm 2 inhibited	

Parameter	Lower Display	Upper Display	Adjustment range	Default
Output 1 Usage	USE1	Pr I	Primary (Heat) Power	Pr I
		SEc	Secondary (Cool) Power	
		R1_d	Alarm 1, Direct	
		R1_r	Alarm 1, Reverse	
		R2_d	Alarm 2, Direct	
		R2_r	Alarm 2, Reverse	
		LP_d	Loop Alarm, Direct	
		LP_r	Loop Alarm, Reverse	
		Or_d	Logical Alarm 1 OR 2, Direct	
		Or_r	Logical Alarm 1 OR 2, Reverse	
		Rd_d	Logical Alarm 1 AND 2, Direct	
		Rd_r	Logical Alarm 1 AND 2, Reverse	
Output 2 Usage	USE2	Pr I	Primary (Heat) Power	R1_d
		SEc	Secondary (Cool) Power	
		R1_d	Alarm 1, Direct	
		R1_r	Alarm 1, Reverse	
		R2_d	Alarm 2, Direct	
		R2_r	Alarm 2, Reverse	
		LP_d	Loop Alarm, Direct	
		LP_r	Loop Alarm, Reverse	
		Or_d	Logical Alarm 1 OR 2, Direct	
		Or_r	Logical Alarm 1 OR 2, Reverse	
		Rd_d	Logical Alarm 1 AND 2, Direct	
		Rd_r	Logical Alarm 1 AND 2, Reverse	
Display Strategy	dISP		1, 2, 3, 4, 5 or 6 (refer to section 7)	I
Config Lock Code	CLoc		0 to 9999	20

### Input Ranges and Types







(See Configuration Mode Parameter inPt)

Code	Input Type & Range	Code	Input Type & Range	Code	Input Type & Range
bC	B: 100 – 1824 °C	LC	L: 0.0 – 537.7 °C		PIRh20% vs 40%: 32 – 3362 °F
bF	B: 211 – 3315 °F	LF	L: 32.0 – 999.9 °F	P24F	
cC	C: 0 – 2320 °C	nC	N: 0 – 1399 °C	PtC	PI100: -199 – 800 °C
cF	C: 32 – 4208 °F	nF	N: 32 – 2551 °F	PtF	PI100: -328 – 1472 °F
JC	J: -200 – 1200 °C	rC	R: 0 – 1759 °C	PtC	PI100: -128.8 – 537.7 °C
JF	J: -328 – 2192 °F	rF	R: 32 – 3199 °F	PtF	PI100: -199.9 – 999.9 °F
JL	J: -128.8 – 537.7 °C	SL	S: 0 – 1762 °C	0.20	0 – 20 mA DC
JF	J: -199.9 – 999.9 °F	SF	S: 32 – 3204 °F	4.20	4 – 20 mA DC
KC	K: -240 – 1373 °C	tC	T: -240 – 400 °C	0.50	0 – 50 mV DC
KF	K: -400 – 2503 °F	tF	T: -400 – 752 °F	10.50	10 – 50 mV DC
PL	L: -128.8 – 537.7 °C	tL	T: -128.8 – 400.0 °C	0.5	0 – 5 V DC
PF	L: -199.9 – 999.9 °F	tF	T: -199.9 – 752.0 °F	1.5	1 – 5 V DC
LC	L: 0 – 762 °C	P24C	PIRh20% vs 40%: 0 – 1850 °C	0.10	0 – 10 V DC
LF	L: 32 – 1403 °F	P24F		2.10	2 – 10 V DC

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






#### 4. SETUP MODE

**Note: Configuration must be completed before adjusting Setup parameters.**  
 First select Setup mode from Select mode (refer to section 2). While in Setup Mode  is lit. Press  to scroll through the parameters, then press  or  to set the required value. To exit from Setup mode, hold down  and press  to return to Select mode.  
**Note: Parameters displayed depends on how instrument has been configured.**

Parameter	Lower Display	Upper Display Adjustment Range	Default
Input Filter Time constant	FILt	OFF or 0.5 to 100.0 secs	2.0
Process Variable Offset	OFFS	+/- Span of controller	0
Primary (Heat) power	PPWJ	Current power levels (read only)	N/A
Secondary (Cool) power	SPWJ		
Primary Proportional Band	Pb.P	0.0% (ON/OFF) and 0.5% to 999.9% of input span.	10.0
Secondary Proportional Band	Pb.S		
Automatic Reset (Integral Time)	ARSt	1 sec to 99 mins 59 secs and OFF	5.00
Rate (Derivative Time)	rAtE	00 secs to 99 mins 59 secs	1.15
Overlap/Deadband	OL	-20 to +20% of Primary and Secondary Proportional Band	0
Manual Reset (Bias)	bRS	0%(-100% if dual control) to 100%	25
Primary ON/OFF Differential	dIFP	0.1% to 10.0% of input span centered about the setpoint	0.5
Secondary ON/OFF Diff.	dIFS		
Prim. & Sec. ON/OFF Diff.	dIFF		
Setpoint Upper Limit	SPUL	Current Setpoint to Range max	R/max
Setpoint Lower limit	SPLL	Range min to Current Setpoint	R/min
Primary Output Power Limit	OPUL	0% to 100% of full power.	100
Output 1 Cycle Time	Ct1	0.5, 1, 2, 4, 8, 16, 32, 64, 128, 256 or 512 seconds	32
Output 2 Cycle Time	Ct2		
High Alarm 1 value	PhA1	Range Min. to Range Max.	R/max
Low Alarm 1 value	PLA1		R/min
Deviation Alarm 1 Value	dAL1	+/- Span from SP in display units	5
Band Alarm 1 value	bAL1	1 LSD to span from setpoint	5
Alarm 1 Hysteresis	AH1	1 LSD to full span in display units	1
High Alarm 2 value	PhA2	Range Min. to Range Max.	R/max
Low Alarm 2 value	PLA2		R/min
Deviation Alarm 2 Value	dAL2	+/- Span from SP in display units	5
Band Alarm 2 value	bAL2	1 LSD to span from setpoint	5
Alarm 2 Hysteresis	AH2	1 LSD to full span in display units	1
Loop Alarm Time	LALt	1 sec to 99 mins. 59secs.	99.59
Auto Pre-tune	APt	disabled or EnAb enabled	d.SA
Auto/manual Control selection	PoEn		
Setpoint ramping	SPr		
SP Ramp Rate Value	rP	1 to 9999 units/hour or Off (blank)	Off
Setpoint Value	SP	Scale range upper to lower limits	Scale Range min
Setup Lock Code	SLoc	0 to 9999	10




#### 5. AUTOMATIC TUNING MODE

First select Automatic tuning mode from Select mode (refer to section 2). Press  to scroll through the modes, then press  or  to set the required value. To exit from Automatic tuning mode, hold down  and press  to return to Select mode. Pre-tune is a single-shot routine and is thus self-disengaging when complete. If APt in Setup mode = EnAb, Pre-tune will attempt to run at every power up\*.

Parameter	Lower Display	Upper Display Adjustment Range	Default
Pre-Tune	Ptun	On or OFF. Indication remains OFF if automatic tuning cannot be used at this time*.	OFF
Self-Tune	Stun		
Tune Lock	tLoc	0 to 9999	0




\* Note: Automatic tuning will not engage if either proportional band = 0. Also, Pre-tune will not engage if setpoint is ramping, or the PV is within 5% of span of the setpoint.




#### 8. ERROR/FAULT INDICATIONS

First select Product information mode from Select mode (refer to section 2). Press  to view each parameter. To exit from Product information mode, hold down  and press  to return to Select mode. Note: These parameters are all read only.





Parameter	Lower Display	Upper Display	Description
Input type	In_1	Un_1	Universal input only
Option 1 module type fitted	OPn1	nonE	No option fitted. Relay
Option 2 module type fitted	OPn2	nonE	No option fitted. Relay
Option 3	OPn3	nonE	Option 3 not available on this product
Option A	OPnA	nonE	Option A not available on this product
Firmware type	FWJ		Value displayed is firmware type number
Firmware issue	ISS		Value displayed is firmware issue number
Product Revision Level	PRL		Value displayed is Product Revision level.
Date of manufacture	dOY		Manufacturing date code (mmyy)
Serial number 1	Sn1		First four digits of serial number
Serial number 2	Sn2		Middle four digits of serial number
Serial number 3	Sn3		Last four digits of serial number





#### 7. OPERATOR MODE

This mode is entered at power on. It can also be accessed from Select mode (see section 2). **Note: All configuration mode and Setup mode parameters must be set as required before starting normal operations.** Press  to scroll through the parameters, then press  or  to set the required value. **Note: All parameters in Display strategy 6 are read only, and can only be adjusted via Setup mode.**

Upper Display	Lower Display	Display Strategy When Visible	Description
PV Value	Active SP Value	1 & 2 (initial screen)	PV and target value of selected SP <i>SP adjustable in Strategy 2</i>
PV Value	Actual SP Value	3 & 6 (initial screen)	PV and actual value of selected SP (e.g. ramping SP value). <i>Read only</i>
PV Value	(Blank)	4 (initial screen)	Process variable only. <i>Read only</i>
Active SP Value	(Blank)	5 (initial screen)	Target value of selected setpoint only. <i>Read only</i>
SP Value	SP	1, 3, 4, 5 & 6	Target value of SP <i>Adjustable except in Strategy 6</i>
Actual SP Value	SPrP	SPr enabled and rP is not zero	Actual (ramping) value of selected SP <i>Read only</i>
Ramp Rate	rP	SPr enabled in Setup mode	SP ramping rate, in units per hour. <i>Adjustable except in Strategy 6</i>
Active Alarms	ALSt	When one or more alarms are active. ALM indicator will also flash	 Alarm 2 active  Alarm 1 active  Loop Alarm active

#### Manual Control

If PoEn is set to EnAb in Setup mode, manual control can be selected/de-selected by pressing the  key while in Operator mode. The  indicator will flash while in the instrument is in Manual Control mode and the lower display will show Pxxx (where xxx is the current manual power level). Switching to/from manual mode is via Bumpless Transfer. Press  or  to set the required output power. **Caution: Not restricted by OPUL limit.**

Parameter	Upper Display	Lower Display	Description
Instrument parameters are in default conditions	Goto	ConF	Configuration & Setup required. Seen at first turn on or if hardware configuration changed. Press  to enter the Configuration Mode, next press  or  to enter the Unlock code number, then press  to proceed.
Over Range	rHHJ	Normal	Input > 5% over-range
Under Range	rLLJ	Normal	Input > 5% under-range
Sensor Break	OPEN	Normal	Break in input sensor or wiring
Option 1 Error	Err	OPn1	Option 1 module fault
Option 2 Error		OPn2	Option 2 module fault

#### 8. SPECIFICATIONS

##### UNIVERSAL INPUT

Impedance: >10MΩ resistive, except DC mA (5Ω) and V (47kΩ).  
 Isolation: Isolated from relay outputs and power supply at 240VAC.

##### OUTPUTS

**Relay**  
 Contact Type/Rating: Single pole double throw (SPDT); 2A resistive at 120/240VAC.  
 Lifetime: >500,000 operations at rated voltage/current.  
 Isolation: Isolated from input, other relay outputs and power supply at 240VAC.

##### OPERATING CONDITIONS FOR INDOOR USE

Ambient Temperature: 0°C to 55°C (Operating)  
 Ambient Temperature: -20°C to 80°C (Storage)  
 Relative Humidity: 20% - 95% non-condensing  
 Supply Voltage: 100 - 240VAC 50/60Hz 7.5VA for mains powered versions.

##### ENVIRONMENTAL

Standards: CE, UL, ULC  
 EMI: Complies with EN61326 (Susceptibility & Emissions)  
 Safety Considerations: Complies with EN61010-1 & UL3121  
 Pollution Degree 2, Installation Category II  
 Front Panel Sealing: To IP66

##### PHYSICAL

Dimensions Depth: 110mm (behind panel)  
 Front panel height: 48mm  
 Front panel width: 48mm  
 Weight: 0.21kg maximum