1030 Over-temperature Controller Quick Start Manual PK550 (0037-75583)

This manual is intended to be a quick reference guide for basic installation requirements and an overview of the connections, wiring considerations, and general specifications for the 1030 Over-temperature Controller. For complete installation and operation, refer to the PK552 1020 & 1030 Hardware Installation Manual. The most current revisions may be found on the Chromalox website: www.chromalox.com

1. IMPORTANT SAFEGUARDS

⚠WARNING

Electric Shock Hazard: Read and understand all instructions before installing, servicing or operating this controller. Failure to do so could result in equipment or property damage as well as personal injury and even death.

⚠WARNING

HIGH VOLTAGE is used in the operation of this equipment; DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high-voltage connections when installing or operating this equipment.

⚠WARNING

Be careful not to contact high-voltage connections when installing or operating this equipment. Before working inside the equipment, turn power off and ground all points of high potential before touching them.

⚠WARNING

ELECTRIC SHOCK HAZARD: Any installation involving control equipment must be performed by a qualified person and must be effectively grounded in accordance with the National Electrical Code or local governing electrical code/authority, to eliminate shock hazard.

⚠CAUTION

The owner/installer must provide all necessary safety and protection devices and follow all current electrical wiring standards and regulations. Failure to do so may compromise the integrity of the controller and/or cause product failure resulting in a safety risk to operational and service personnel.

⚠CAUTION

This controller utilizes a heat sink which is designed to cool the unit during operation. Under no circumstance should air flow around the controller be compromised in any way. Failure to do so may result in the overheating of the controller, product failure, product temperatures and even fire.

⚠WARNING

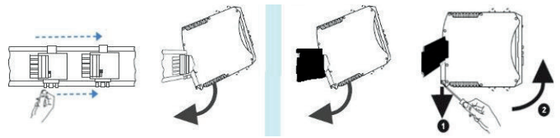
During continuous operation, the heat sink can reach very high temperatures, and keeps a high temperature even after the unit is turned off due to its high thermal inertia.

2. INSTALLATION

Installation Guidance

- Installation should only be performed by technically competent personnel.
- Standards compliance shall not be impaired when fitting into the final installation.
- It is the responsibility of the installing engineer to ensure configuration is safe.
- Local regulations regarding electrical installation & safety must be observed.
- Impairment of protection will occur if the product is used in a manner not specified by the manufacturer.
- Due to the low weight of this instrument there are no special lifting or carrying considerations.
- Designed to offer a minimum of Basic Insulation only.
- Ensure that supplementary insulation suitable for Installation Category II is achieved when fully installed.
- To avoid possible hazards, accessible conductive parts of the final installation should be protectively earthed in accordance with EN61010 for Class 1 equipment.
- Output wiring should be within a Protectively Earthed cabinet.
- Sensor sheaths should be bonded to protective earth or not be accessible.
- Live parts should not be accessible without the use of a tool.
- When fitted to the final installation, an IEC/CSA APPROVED disconnecting device should be used to disconnect both LINE and NEUTRAL conductors simultaneously.
- Do not position the equipment so that it is difficult to operate the disconnecting device.
- Ventilation slots must not be covered and adequate air circulation must be allowed.
- Use conductor sizes 30-12 AWG, minimum temp rating of cables to be 80c.

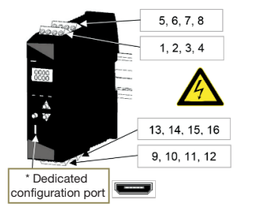
Bus Connector (Optional) **Mounting & Unmounting**



Terminal Wiring

⚠CAUTION

Check information label on housing for correct operating voltage before connecting supply to Power Inputs. Diagrams show all possible option combinations, check your exact product specification before connecting.



1	RS485 Data A (Rx/Tx+)	Communications
2	RS485 Data B (Rx/Tx-)	
3	Relay COM / Linear +	Output 3 (Alarm2/Retx PV)
4	Relay NO / Linear -	
5	Relay COM / SSR -	Alarm 1 output
6	Relay NO / SSR +	
7	L +	Power
8	N -	
9	Volt-free or TTL	Digital Input
10	Compatible	
11	Relay COM	Limit output
12	Relay NO	
16	Relay NC	
13	RTD	Input
14	TC / RTD / Linear +	
15	TC / RTD / Linear -	

*Never directly connect dedicated configuration socket to a USB port.

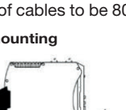
3. FRONT PANEL

Ok / Select — Up / Down

Display turns off after 5, 15 or 30 minutes without key presses.

Display shows PV (process variable), units, LIM (Limit value), alarm/latch statuses, error & warning messages.

LEDs show Limit, Exceed and Alarm state: LM EX AL



Navigation & Editing

Press ▲ or ▼ keys to navigate between parameters or menu items.

Press ● to highlight and edit a parameter value.

Press ▲ or ▼ to change the parameter value, then press within 60 seconds to confirm change.

NOTE: For security, no parameters can be changed from the Operator Mode.

Navigating to Setup Mode or Advance Configuration from Operator Mode:

Setup Mode - press ● & ▲.

Advanced Configuration - press ● & ▼.

Returning to Operator Mode:

Press ● & ▲ to move back one level. After 120 seconds without key presses the unit returns automatically to the first Operator Mode screen.

4. SETUP

Important Note: When powered up for the first time, or after a factory reset (default) the instrument enters Setup.

The device remains in Setup, or will keep powering up back into Setup, until all parameters have been reviewed and the user exits Setup.

Some parameters may be hidden depending on configuration & hardware.

Alternatively press ● & ▲ to enter Setup from Operator mode and ● & ▲ to exit.

Setup Lock	Enter Code & Press ●	Default 10

Parameter	Description		Default Value
Input Type	J Thermocouple*		K Thermocouple
	-200 to 1200ºC -328 to 2192ºF	-128.8 to 537.7ºC -199.9 to 999.9ºF	
	K Thermocouple*		
	-240 to 1373ºC -400 to 2503ºF	-128.8 to 537.7ºC -199.9 to 999.9ºF	
	PT100 *		
	-199 to 800ºC -328 to 1472ºF	-128.8 to 537.7ºC -199.9 to 999.9ºF	
	B Thermocouple		
	100 to 1824ºC 211 to 3315ºF		
	C Thermocouple		
	0 to 2320ºC 32 to 4208ºF		
	L Thermocouple*		
	0 to 762ºC 32 to 1403ºF	0.0 to 537.7ºC 32.0 to 999.9ºF	
	N Thermocouple		
	0 to 1399ºC 32 to 2551ºF		
	R Thermocouple		
	0 to 1759ºC 32 to 3198ºF		
	S Thermocouple		
	0 to 1762ºC 32 to 3204ºF		
	T Thermocouple*		
	-240 to 400ºC -400 to 752ºF	-128.8 to 400.0ºC -199.9 to 752.0ºF	
	Linear dc		
	0 – 20mA 0 – 50mV 0 – 5V 0 – 10V	4 – 20mA 10 – 50mV 1 – 5V 2 – 10V	
Input Units	°C or °F (hidden when a linear input is used)		°C
* Maximum of 1 decimal place for temperature inputs marked.			
Input Decimal Place	0000* 00.00	000.0* 0.000	0000
Scale Range max & min only visible when input is a linear type.			
Input Scale Range Max.	Maximum for application working range		1000
Input Scale Range Min.	Minimum for application working range		0
Limit Type	**High –** device will limit when PV is greater than the Limit value. (PV>Limit Value) **Low -** device will limit when PV is less than the Limit value. (PV<Limit value).		High
Limit Value	The exceed value at which the Limit output will trip.		-240
PV Retrans parameters only visible if Output 3 is Linear.			
PV Retrans Type	0-10V 2-10V 0-20mA	4-20mA 0-5V 1-5V	0-10V
PV Retrans Scale Range Max.	Maximum PV value corresponding to maximum linear output.		Input type Max
PV Retrans Scale Range Min.	Minimum PV value corresponding to minimum linear output.		Input type Min
Alarm 1 Value	Range minimum to range maximum, or OFF (maximum +1). OFF disables alarm. Default PV High alarm type.		1373
Alarm 2 visible if Output 3 is Relay or SSR Drive.			
Alarm 2 Value	Same options as Alarm 1. Default PV Low alarm type		-240
Coms Unit Address	Modbus address from 1 to 255		1
Coms Baud Rate	1200, 2400, 4800, 9600, 19200 & 38400		9600
Coms Parity	Odd, Even or None		None
Press ● & ▲ to Exit. When you exit, if necessary, press ● & ▲ to clear any Pop-up Alerts			

5. OPERATOR MODE

Name		
User Screen		PV - top LIM - bottom Temperature Unit - right.
Alarm State		To clear press ● then ▲ to select Yes. Press ● to accept. Alarm active Alarm set, but not active – Alarm not set
Latch State		Output Latched Latch set, but output not Latched – Latch not set
Maximum PV	To clear press ● then ▲ to select Yes. Press ● to accept.	Screens show the maximum & minimum PV reached.
Minimum PV		

⚠CAUTION

Do not continue your process until any issues are resolved.

Name		Details
Pop up Alerts: Warnings and Confirmations		For example, Pop Up Alert for Alarm 1. Pop Up Alerts need to be acknowledged. Press ● and ▲ to clear Pop Up Alert.
Pop up Alerts: Alarm 1, Alarm 2, Alarm 1 & 2, Starting Calibration, Calibration Ongoing, Calibration Fail, Setup not Completed & Limit Exceeded.		
LIMIT	Alternates with PV to show Limit is active.	
ALARM	Alternates with PV to show Alarm is active.	
LATCH	(Alternates with PV.) One or more outputs are latched on, and no alarm is active.	
HIGH	Process variable input > 5% over-range.	
LOW	Process variable input > 5% under-range.	
OPEN	Break detected in process variable input sensor, wiring or wrong input type selected. Shows OPEN until resolved, actives Limit exceed state..	
ERROR	Selected input range is not calibrated. Shows ERROR until resolved, actives Limit exceed state.	

6. SPECIFICATIONS

IMPORTANT: Check your product code for exact hardware fitted.

PROCESS INPUT

Thermocouple ±0.25% of full range, ±1LSD & ±1°C for Thermocouple CJC.
Calibration: Factory calibration is accurate 0.25% of span above -100°C, below -100°C accuracy is within +/- 0.9%. To meet 0.25% accuracy below -100°C recalibrate using procedure in full manual. BS4937, NBS125 & IEC584.
PT100 Calibration: ±0.25% of full range, ±1LSD. BS1904 & DIN43760 (0.00385Ω/Ω/°C).
DC Calibration: ±0.25% of full range, ±1LSD.
Sampling Rate: 4 per second.
Impedance: >1MΩ resistive, except dc mA (5Ω) and V (47kΩ)
Sensor Break Detection: Thermocouple, RTD, 4 to 20mA, 10 to 50mV, 2 to 10V and 1 to 5V ranges only. Limit output triggers when a sensor break is detected.

DIGITAL INPUT (Isolated or Non-Isolated version)

Signal: Non-isolated version - Open or Closed contacts only. Isolated version - Open (2 to 24Vdc) or Closed (<0.8Vdc).
Functions: Reset Limit Output & Latched Alarms. A Closed condition detected at power-on, or an Open to Closed transition during operation = Reset. Reset occurs only if the Limit Exceed/Alarm condition is not present at time of reset. Annunciator outputs always reset.

OUTPUTS

Relay Contacts: Limit (Output 1) Form C SPDT 2A @250vac or Other (Output 2 or 3) Form A SPST relay, 2A @ 250Vac.
Relay Lifetime: >150,000 operations at rated voltage/current, resistive load.
SSR Driver Capability: SSR drive voltage >10V at 20mA
Output 3 option only: DC (Linear) for PV Retransmit
Types: 0 to 20mA, 4 to 20mA, 0 to 5V, 0 to 10V or 2 to 10V
Load Resistance: Current Output 500Ω max, Voltage Output 500Ω min.
Resolution: 8 bits in 250ms (10 bits in 1s typ, >10 bits in >1s typ).

RS485 Serial Communications

Data Rate: 1200, 2400, 4800, 9600, 19200 or 38400 bps.
Protocol: Modbus RTU

OPERATING CONDITIONS

Usage: For indoor use only, DIN-rail mounted in suitable enclosure.
Ambient Temp: <95% humidity 0°C to 55°C (Operating), –10°C to 80°C (Storage).
Relative Humidity: 20% to 95% non-condensing.
Altitude: < 2000m
Power Supply: Mains power version - 100 to 240Vac ±10%, 50/60Hz, 9VA Low voltage version - 24Vac +10/-15% 50/60Hz 9VA or 24Vdc +10/-15% 5W.

ENVIRONMENTAL

Standards: CE, UL & cUL, FM 3545.
EMI: EN61326-1:2013, Table 2 & Class A.

⚠WARNING

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Safety: UL61010-1 Edition 3, EN61010-1 Version 2010, Pollution Degree 2 & Installation Class 2.
Protection Rating: IP20

PHYSICAL

Unit Size: Height - 99mm; Width – 22.5mm; Depth - 121mm
Ventilation: A min. space of 80mm must be allowed above & below each unit
Weight: 0.20kg maximum

ISOLATION

	PSU	Universal Input	Relay	SSR	Linear	RS485 Comms	Non-Isolated Digital Input	Isolated Digital Input	Config Port
PSU	■								
Universal Input		■							
Relay									
SSR				■					
Linear					■				
RS485 Comms						■			
Non-Isolated Digital Input							■	■	
Isolated Digital Input							■	■	
Configuration Port									■

■ Not Applicable; No Isolation; Reinforced Isolation

7. ADVANCED CONFIGURATION

Advanced Configuration gives access to all possible parameters; however, the device hides parameters that are irrelevant to your exact product specification & configuration.

ADVANCED CONGIFURATION NAVIGATION

Enter by pressing ◯ and ▽. Press △ or ▽ to navigate to the required menu, then press ◯ to enter.

Press ◯ & △, to exit up 1 level. Depending upon which menu you enter it may be necessary to exit 2 or 3 levels for Operator Mode.

Advanced Configuration Main Menu

Advanced Lock	Enter Code & Press ◯	Default 20

Menus	Description
Input	Configure the process input.
User Calibration	Single or two-point calibration adjustments for the process input.
Outputs	Configuration parameters for the outputs.
Communication	Modbus communications settings.
Display	Lock codes and Factory Default.
Information	View serial number & manufacturing details.

INPUT MENU

Parameter	Description	Default Value
Input Type	See Input Type table in SETUP (& FIRST POWER UP).	K Thermocouple
Units	Displayed as °C or °F (Units are hidden when a linear input is used)	°C
Decimal Place	0000	0000
	000.0	
	00.00 (Not for Temperature)	
	0.000 (Not for Temperature)	
Scale Range Maximum	Maximum for application working range	Max allowed for Input Type.
Scale Range Minimum	Minimum for application working range	Min allowed for Input Type.
Filter Time	OFF or 0.5 to 100.0 seconds in 0.5 increments	2.0
CJC Enable	Enable Enables the internal thermocouple CJC (Cold Junction Compensation).	Enable
	Disable Disables the internal CJC. External compensation must be provided for thermocouples.	Enable

USER CALIBRATION MENU

Single-point offset or two-point calibration adjustment for process input. Can be used together, if required.

Parameter	Description	Default Value
Offset	Shifts the input value up or down by a single offset amount across the entire range.	0
Low Point	Enter value at which the low point error was measured.	Lower Limit
Low Offset	Enter equal, but opposite offset value to the observed low point error.	0
High Point	Enter value at which the high point error was measured.	Upper Limit
High Offset	Enter an equal, but opposite offset value to the observed high point error.	0

OUTPUTS MENU

Parameter	Description	Default Value
Limit Output		
Type	High = Limit output trips when PV over Limit value. (PV>Limit Value). Low = Limit output trips when PV under Limit value. (PV<Limit value).	High
Value	The exceed value at which the Limit output will trip. Variable within the Scaled Range set in Input.	-240
Output Latching	OFF – Limit Output doesn't latch ON - Limit Output latches & needs to be cleared	ON
Startup Latch	Reset Latch Always Latch Last Latch	Last Latch
Alarm 1		
Type	None, PV high, Deviation, PV Low, Annunciator	PV High
Value	Range min. to range max., or OFF (maximum +1). OFF disables alarm. Default PV High alarm type.	1373
Hysteresis	0 to full span	1
Action	Direct - Output active when alarm is active. Reverse - Output active when alarm is not active.	Direct
Output Latching	OFF - Alarm doesn't latch ON - Alarm latches & needs to be cleared. * Default when Annunciator is ON.	Off*
Startup Latch	Reset Latch Always Latch Last Latch	Reset Latch
Alarm 2 (Alarm 2 visible if Output 3 is Relay or SSR Drive		
Type	Same options as Alarm 1	PV Low
Value		-240
Hysteresis		1
Action		Direct
Output Latching		Off
Startup Latch	Reset Latch Always Latch Last Latch	Reset Latch
PV Retrans (Parameters only visible if Output 3 is Linear)		
Output type	0-10V, 0-20mA, 0-5V, 4-20mA, 2-10V, 1-5V	0-10V
Scale Range Maximum	Display value for max. output, -1999 to 9999	Input type Max
Scale Range Minimum	Display value for min. output, -1999 to 9999	Input type Min
Alarm Options		
Start-up Inhibit	Inhibit Alarms on Start up. None, Alarm 1 Alarm 2, Alarm 1 & 2	None
Sensor Break	OFF or ON ON - triggers Alarm outputs when sensor break is detected.	Off

COMMUNICATIONS MENU

Only shown when RS485 option is fitted.

Parameter	Description	Default Value
Unit Address	Modbus address from 1 to 255	1
Baud Rate	Coms data rate in kbps 1200, 2400, 4800, 9600, 19200 & 3840	9600
Parity	Parity checking: Odd, Even or None	None

DISPLAY MENU

Lock codes & Factory Defaults.

Parameter	Description	Default Value
Setup Unlock Code	View & adjust Setup lock code. From 1 to 9999 or Off for no lock code.	10
Advanced Unlock Code	View & adjust Advanced lock code. From 1 to 9999 or Off for no lock code.	20
Screen Timeout	Screensaver time 5, 15 or 30 mins.	5
Selected language	Display language, 2 available – English plus either German or French.	English
Reset to Defaults	Reset parameters back to factory defaults. To clear press ◯ then ▽ to select Yes. Press ◯ to accept.	

INFORMATION MENU (READ ONLY)

Controls what appears in Operator Mode.

Parameter	Description
PRL	The hardware/software revision level
DOM	Date of manufacture (mmyy)
FW Version FW Type	The firmware version number & code type
Serial	Instrument serial number
Out1	Relay
Out2	SSR (SSR driver) or Relay
Out3	None, SSR (SSR driver), Relay or Linear.
Comm	Comms option - Fitted or None
DI	Digital Input options – Iso (isolated) or NonIs (non-isolated)

CHROMALOX
Advanced Thermal Technologies

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