

Raychem

HTC-915




Universal heat tracing control system

chemelex



CAUTION: installation, configuration and commissioning should only be performed by properly trained personnel. Local regulations regarding the installation & safety must be followed.

APPLICATION

Type	Surface sensing/ambient sensing
Area of use	Non-hazardous area indoors, typically panel mounted
Approval certification	CE marked    TC RU C-BE.Б/108.В.01634 (Kazakhstan, Belarus) For other countries contact your local Chemelex representative.

PRODUCT SPECIFICATION

Temperature range controller	-60°C to 570°C in steps of 1 K
Control algorithms	EMR: Line sensing on/off, proportional ambient SSR: Line sensing on/off, proportional, proportional ambient, power limiting, soft start
Switching accuracy	1 K


ENCLOSURE

Ambient operating temperature range	-40°C to +50°C
Ambient storage temperature range	-40°C to +85°C
Relative humidity	0% to 90% Non condensing
Ingress protection	Housing: IP40, Terminals: IP20
Material	ASA-PC, color: green
Flammability class	V0 (UL94)
Mounting method	Panel mounting on 35 mm DIN rail

WARNING

	IEC 60417-5032 (2002-10) Alternating current
	IEC 60417-5031 (2002-10) Direct current

ELECTRICAL PROPERTIES

Connection terminals and cabling		Screw type terminals. All terminals suitable for stranded and solid core connection cables having a cross section between 0.5 and 2.5 mm ² (24 to 12 AWG) The 915-HTC and 915-Alarm Relay connector outputs (240V) require ferrules on the connecting wires if stranded wires are used. The wires shall handle a minimum wire temperature of 75°C
		
Supply voltage		CE/EAC: 100 Vac to 250 Vac, +10% -10%, 50/60 Hz, 0.15 A to 0.06 A CSA: 100 Vac to 277 Vac, 50/60 Hz, 0.15
Power consumption		Max 20 VA with limiter connected
Control output	Contact control output	(EMR) Electromechanical relay rated 3 A/250 Vac, 50/60 Hz
	Solid-state relay control output	(SSR) 12 VDC, 75 mA. max. to drive normally open Solid state relays. Depending on the application, one, two or three phase switching elements have to be used. (Solid state relays are not included)
Switching capacity		Depends on the type of switch element used (The switch element is external)
Alarm output relay		CE/EAC: Relay contact rated 3 A/250 Vac, 50/60 Hz CSA: Relay contact rated 3A/277Vac, 50/60 Hz Output is user programmable to open or to close on alarm.

Power output	12 Vdc, 200 mA max.
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TEMPERATURE SENSOR

Type	100 Ω platinum Pt 100, 3-wire, $\alpha = 0.00385 \Omega/^{\circ}\text{C}$. Can be extended with a three core shielded cable of maximum 20 Ω lead resistance per conductor.
Quantity	2 RTD inputs available

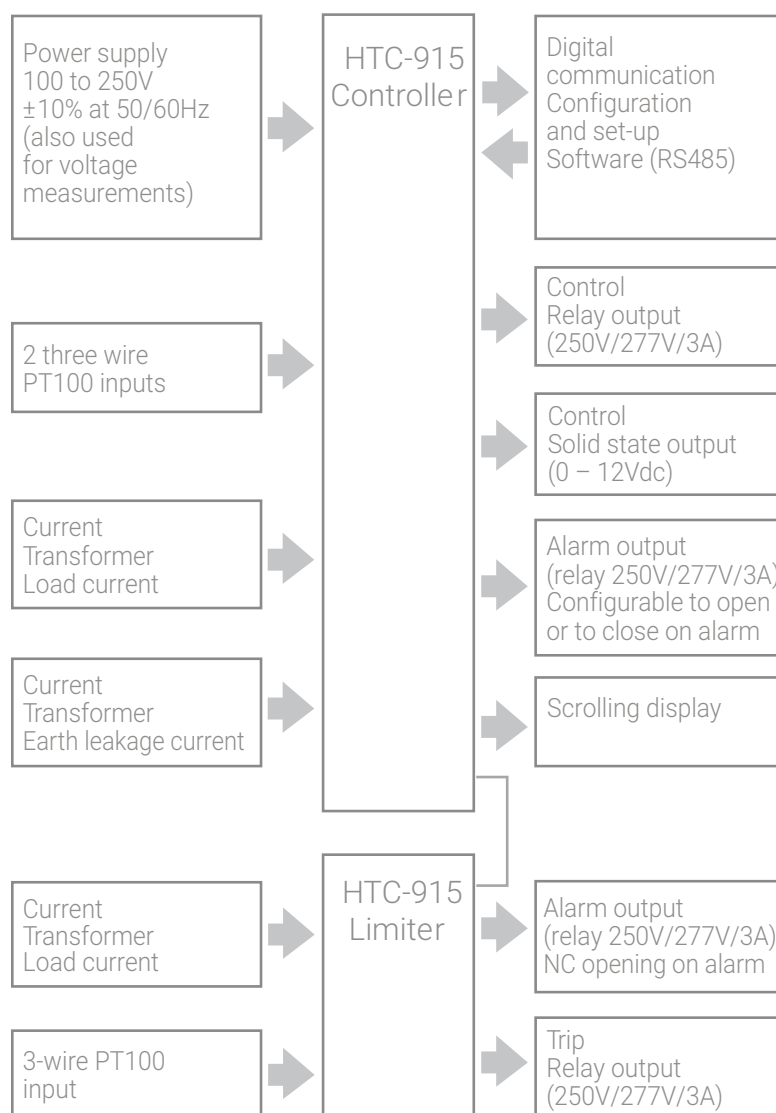
COMMUNICATIONS

Protocol	Modbus RTU or ASCII
Topology	Multidrop/daisychain
Cable	Single shielded twisted pair, 0.5 mm ² (24 AWG) or larger
Length	Typical 2.7 km max @ 9600 Baud
Quantity	Up to 32 devices
Address	Programmable

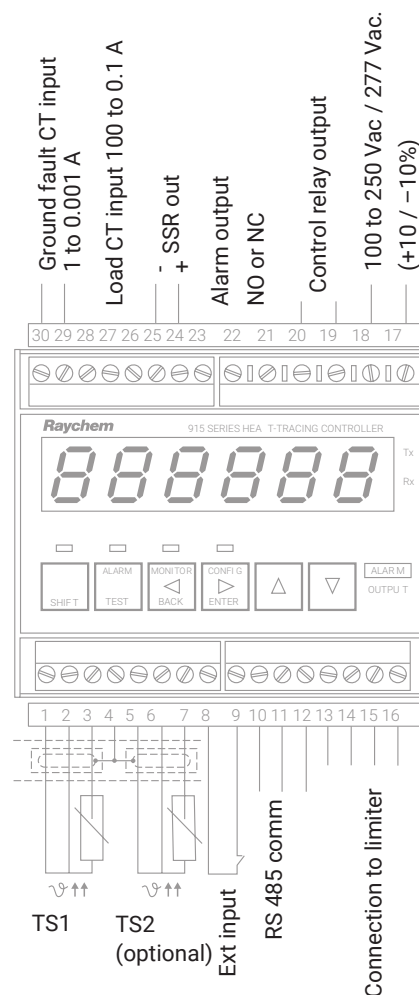
For technical support call Chemelex or write an E-mail to info@chemelex.com


FUNCTIONAL OVERVIEW

The Raychem HTC-915 is a full featured temperature control system for heattracing applications.



CONNECTION DIAGRAM TERMINAL ASSIGNMENTS



Terminal assignments for the controller	Terminal assignments of the limiter
1. RTD 1 source	1. Digital common (from HTC 13)
2. RTD 1 sense	2. +12Vdc in (from HTC 14)
3. RTD 1 common	3. RX data (from HTC 15)
4. Shield	4. TX data (to HTC 16)
5. RTD 2 source	5. RTD 1 source
6. RTD 2 sense	6. RTD 1 sense
7. RTD 2 common	7. RTD 1 common
8. External Input + (Inhibit/override)	8. Shield
9. External Input – (Inhibit/override)	9. Control relay output
10. Communications (RS-485+)	10. Control relay output
11. Communications (RS-485 –)	11. Alarm relay output
12. Shield	12. Alarm relay output
13. Digital common (to Limiter 1)	13. Load Current CT input
14. +12Vdc out (to Limiter 2)	14. Load Current CT input
15. TX data (to Limiter 3)	
16. RX data (from Limiter 4)	
 17. Mains Input (L1) 18. Mains Input (L2/neutral) 19. Control relay output 20. Control relay output 21. Alarm relay output 22. Alarm relay output	
23. PE	
24. SSR control output +	
25. SSR control output –	
26. Load Current CT input	
27. Load Current CT input	
28. Shield	
29. GF CT input	
30. GF CT input	

Alarm availability

An alarm can be generated if the actual measured value is higher or lower than the value specified in the controller's set-up. Alarms are available for: temperature, voltage, current, power, earth leakage current, etc... refer to HTC-915 operating manual for details. A copy of this manual can be downloaded from chemelex.com (Doc-2106)

OPERATOR CONSOLE & OPERATION

ALPHA-NUMERIC DISPLAY





The Console incorporates LED display. Messages and prompts that are greater than 6 characters long are scrolled.





KEYPAD

The local keypad consists of 6 keys that allow you to select the console mode function. For certain keys, the SHIFT key selects an alternate function, as shown by the text above that key.

Quick Notes on Operation

Basic rules for efficient Console use:

- use the SHIFT key followed by the appropriate function key – ALARM, MONITOR, or CONFIG – to select the operating mode
- use  and  to move around in the menu
- use  to enter a new menu, enter a new value, or select a menu item
- use  to exit the current menu or cancel an edit

Key	Function
SHIFT	<ul style="list-style-type: none"> • Press to activate a SHIFT function – the next key pressed uses the alternate (shifted) function. • The SHIFT LED illuminates, indicating the next key uses the alternate (shifted) function pressing SHIFT again cancels the alternate (shifted) function.
TEST	<ul style="list-style-type: none"> • Turns on tracing for 30 seconds when prefixed by the SHIFT key, this key switches the console to the Alarm mode.
 BACK [shift MONITOR]	<ul style="list-style-type: none"> • Exits the current menu (or cancels the new setting when editing a parameter). • Moves the cursor to the left when editing an alpha-numeric parameter. • When prefixed by the SHIFT key, this key switches the console to the Monitor mode.
 ENTER [shift CONFIG]	<ul style="list-style-type: none"> • Selects the item in the display (or accepts the setting when editing a parameter). • Moves the cursor to the right when editing an alpha-numeric parameter. • When prefixed by the SHIFT key, this key switches the console to the Configure mode.
	<ul style="list-style-type: none"> • Moves to the previous item in a menu increments the value when editing.
	<ul style="list-style-type: none"> • Moves to the next item in a menu decrements the value when editing.

LED INDICATORS

The console includes eight LED indicators:

Four LEDs indicate the Console operating mode.

(**SHIFT** function, **ALARM**, **MONITOR**, or **CONFIGURE** modes).






There are two status LED's which indicate the alarm and control output status of the controller:

The output LED, the alarm LED will flash

(approximately once per second) when the controller has detected an alarm condition. The two additional LEDs are used to indicate external communications activity.

Changing the Configuration








To change the Controller configuration:

- Position the desired parameter (menu item) in the display.
- Press the  key to initiate an edit session.
- If the console is "locked" you are prompted to enter the passcode.
- The present setting will flash on the display to indicate that you are editing the parameter.
- Use the  and  keys to change the value.
- The operation of the  and  varies depends on the type of data being edited.


Note: Once you have initiated an edit session, you must end it before switching to another mode or invoking another function.

Changing a Numeric Parameter

To change a numeric parameter (e.g. the control setpoint):

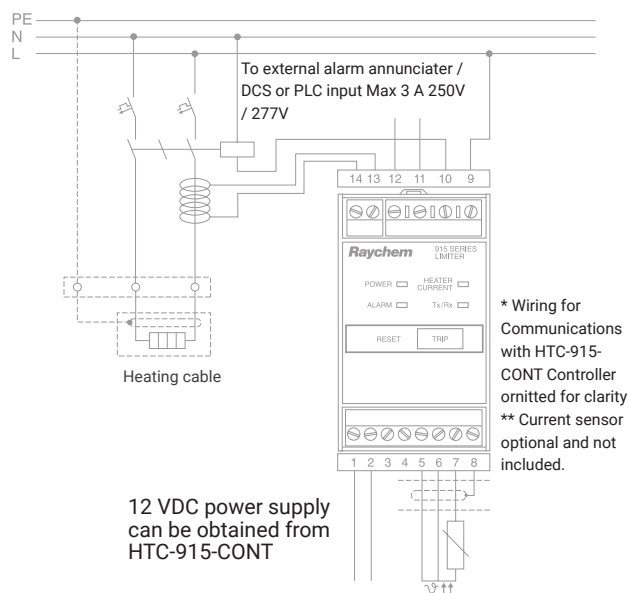
- Position the appropriate parameter in the display.
- Press the  key to initiate the edit session.
- If the console is "locked" you are prompted to enter the passcode.
- The present value is displayed and the last (rightmost) digit blinks.
- The blinking digit identifies the digit that you are editing.
- Use  or  to set the desired value.
- Use  or  to move to a different digit.
- To enter a negative value, scroll to the first (leftmost) digit until a "-" appears in the display.
- Pressing  while on the last (rightmost) digit saves the new value.
- Pressing  while on the first (leftmost) digit ends the edit session without altering the parameter.

Passcode Protection

The HTC-915 Series Controller provides a passcode for protection of its configuration. You may view any portion of the configuration with the console "locked", however, when you attempt to initiate an edit session by pressing , you are prompted to enter the passcode. A new unit will not be password protected.

USE OF THE HTC-915-CONT CONTROLLER WITH AN OPTIONAL HTC-915-LIM LIMITER

LIMITER CONNECTION DIAGRAM TERMINAL



Terminal assignments of the limiter

1. Digital common (from HTC 13)
2. +12Vdc out (from HTC 14)
3. RX data (from HTC 15)
4. TX data (to HTC 16)
5. RTD 1 source
6. RTD 1 sense
7. RTD 2 common
8. Shield
9. Control relay output
10. Control relay output
11. Alarm relay output
12. Alarm relay output
13. Load current CT input
14. Load current CT input

ASSIGNMENTS

PROGRAMMING THE LIMITER

In order to protect the settings of the limiter for unwanted changes the user interface provides some special restrictions.

Changing the Limiter set point

The limiter set point is changed through the user interface of the HTC-915-CONT in exactly the same manner as for the controller. However, before the new value will be copied in the limiter memory the user has to press and release the SHIFT key followed by CONFIG. This additional requirement avoids unwanted changes of the limiter set point.

Uninstalling the limiter from a HTC-915 control system

Once a limiter is added to the system it can only be removed (from software) by uninstalling it. This can be done through the Misc. Setup Sub-menu of the HTC-915-CONT. However, unlike for installing the limiter the user now will need to hit the SHIFT key before pressing the CONFIG button to confirm the removal of the limiter.

Limiter Current sensor input

For specific installations the limiter can be configured such that it will allow for a temperature overshoot as long as there is no current flowing to the heating system. This would be the case when the high temperature is caused by an external heat source such as steam cleaning, exothermal processes, etc..

Sensors are permanently monitored for short circuit and cable breakage.

In case an open / short input is detected, the limiter will trip instantaneously.

LIMITER OUTPUTS

Limiter Control output

The relay output of the limiter is typically used to operate an external electro mechanical relay (EMR). This relay will in case of excessive over temperature isolate the load from the mains supply.

Limiter Alarm output

The limiter alarm output relay will change state (from NC to NO) if

The limiter is powered up the first time after a power outage.
The limiter set point is exceeded and thus the limiter has tripped.

An RTD failure is detected.

A limiter current transformer failure (if the limiter CT is being used) is detected.

Limiter reset

Once the limiter has tripped it has to be reset manually. Resetting the limiter will only be possible if the actual temperature measured by the Pt100 is below the limit temperature minus the unit hysteresis.

The limiter can be reset using one of the following methods:

1. From the control panel on the HTC-915-CONT by pressing alarm and SHIFT + RESET (assuming presence of the digital communication between controller and limiter).
2. Via pushing and holding the RESET key on the limiter unit for $t > 2$ seconds.
3. Remotely via the external input of the HTC-915 and a remote contact.
4. Remotely via DCS system. (5 to 24 Vdc).
5. Remotely via the serial interface and the supervisor software.

APPENDIX - CONFIGURATION SHEET

915 HTC Configuration - Firmware versions V1.0X

BASIC MODE MENU

(All other parameters are set as shown in the Advanced Mode Sub-Menus)

CONFIGURATION MODE MENU		
Parameter	Factory	User
Control Setpoint	68°F (20°C)	
Lo TS 1	14°F (-10°C)	
Lo Load	1.0 A	
Switch Control Mode	Deadband	
Circuit Breaker	*n/a (30. A)	
Temp. Units	°C	
Feature Mode	Basic	

ADVANCED MODE MENUS

CONFIGURATION MODE MENU		
Parameter	Factory	User
Control Setpoint	68°F (20°C)	
Lo TS 1	14°F (-10°C)	
Lo Load	1.0 A	
Switch Control Mode	Deadband	
Circuit Breaker	*n/a (30. A)	
Temp. Units	°C	
Feature Mode	Basic	

TS ALARMS CONFIGURATION SUB MENU		
Parameter	Factory	User
TS 1 Fail	Enable	
Lo TS 1	Enable	
Lo TS 1	14°F (-10°C)	
Hi TS 1	Disable	
Hi TS 1	*n/a 212°F (100.0°C)	
TS 2 Fail	Disable	
Lo TS 2	Disable	
Lo TS 2	*n/a 14°F (-10°C)	
Hi TS 2	Disable	
Lo TS 2	*n/a 212°F (100.0°C)	
Lo TS Filter	0 min	
Hi TS Filter	*n/a (0 min)	
Latch TS Alarms	Yes	
CTL TS Fail	Enable	

OTHER ALARMS CONFIGURATION SUB MENU		
Parameter	Factory	User
Lo Load	Enable	
Lo Load	1.0 A	
Lo Load Filter	0 sec	
Hi Load	Disable	
Hi Load	*n/a (30.0 A)	
Hi Load Filter	*n/a (0 sec)	
Hi GFI	Enable	
Hi GFI	20 mA	
Hi GFI Filter	0 sec	
GFI Trip	Enable	
GFI Trip	30 mA	
Lo Volt	Enable	
Lo Volt	90 V	
Lo Volt Filter	0 sec	
Hi Volt	Disable	
Hi Volt	*n/a (270 V)	
Hi Volt Filter	*n/a (0 sec)	
Lo Resist	Disable	
Lo Resist	*n/a (50%)	
Lo Resist Filter	*n/a (0 sec)	
Hi Resist	Disable	
Hi Resist	*n/a (50%)	
Hi Resist Filter	*n/a (0 sec)	
Nominal Resist	*n/a (6.00 Ω)	
Overcurrent Trip	*n/a (Enable)	
Switch fail	Enable	
HTC Reset	Disable	
C.B. Limiting	*n/a (Disable)	
Output Limiting	*n/a (Disable)	
Switch Limiting	*n/a (Disable)	
Contact Count	Enable	
Contact Count	200,000	
EEROM data Fail	Enable	

POINT SETUP SUB-MENU		
Parameter	Factory	User
Tag	TAG-(factory ID)	
Switch Control Mode	Deadband	
Deadband	5°F (3°C)	
Prop Band	*n/a (4°F (2°C))	
Cycle time	*n/a (10 min)	
Switch Rating	*n/a (30.0 A)	
Circuit Breaker	*n/a (30.0 A)	
Outlet Limit Mode	Disable	
Max. Power	*n/a (7200 W)	
Max. Current	*n/a (30.0 A)	
3 Ph Pwr Calc	No	
TS Fail Mode	Off	
TS CTL Mode	TS1-Fail Off	
TS 1 Hi Limit	*n/a Disable	
TS 2 Hi Limit	*n/a Disable	
Volt Turns Ratio	1.00 to 1	
Current Turns Ratio	1.00 to 1	
Auto-cycle	Enable	
Auto-cycle Interval	8	
Auto-cycle Units	Hours	
Override Source	Remote	
Load Shedding	*n/a	
Limiter Cutout Temp.	*n/a (50.0°C)	
Limiter Current Sense	*n/a (Disable)	

MISC. SETUP SUB-MENU		
Parameter	Factory	User
Temp. Units	°C	n/a
Version	V1.0X.XX	
Limiter version	*n/a (V1.0X.XX)	
Ext. Input	Not used	
Flash Alarm Output	Yes	
Alarm output	N.C.	
Language	English	
Passcode	0	
Scroll Delay	0.15 secs	
Load Defaults	(See user manual)	
Limiter Installed	No	

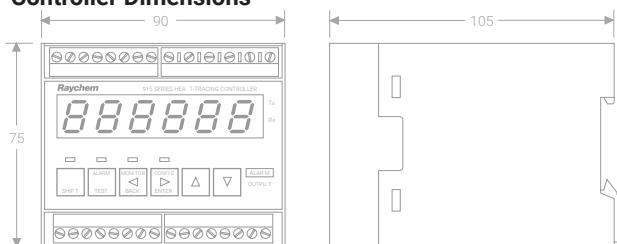
COMMUNICATION SETUP SUB-MENU		
Parameter	Factory	User
Protocol	Modbus RTU	
Modbus Addr	*n/a (1)	
Modbus Sub Addr	*n/a (0)	
Baud Rate	Auto	
Parity	*n/a (None)	
Tx Deley	0.06 secs	

* n/a: Parameter may only appear if certain features are enabled. Values shown in brackets are the Factory defaults if the settings are enabled.

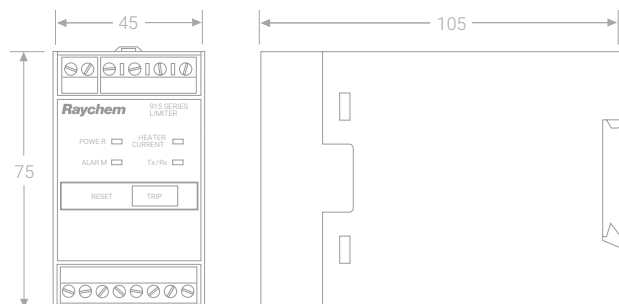
This information defines the default 915 Series Control Module configuration as set by the Factory for firmware V1.0X. These settings are subject to change without notice. It is the user's responsibility to verify that all configuration parameters are chosen appropriately for the intended application.

PRODUCT DIMENSIONS

Controller Dimensions



Limiter dimensions



INSTALLATION

Ensure all personnel involved in installation, servicing, and programming are qualified and familiar with electrical equipment, their ratings and proper practices and codes.

Installation Location

Considerations should include expected atmospheric conditions, accessibility for maintenance, testing and ambient temperature. The conditions at the place of installation may affect load current ratings.

Operator Safety Considerations

Caution: Some wiring configurations will use more than one power source and all must be de-energized prior to performing any maintenance on a control circuit.

Warning: The HTC-915 control module must be protected by external over current and disconnect devices.

Mounting Procedures

The HTC-915-CONT and HTC-915-LIM are designed for installation on a standard 35 mm x 7.5 mm (EN50022 compatible) DIN rail.
Pollution Degree 2
Altitude 0-2000m

MAINTENANCE

Operator Maintenance

The HTC-915 control system is designed to be a maintenance free product.

Replaceable Parts

There are no user-serviceable parts in the HTC-915 series controller or accessories. The unit is designed to be easily changed out in the field in a matter of minutes.

Any HTC-915 system component appearing inoperative should be returned to the nearest Chemelex office.

Cleaning

If the HTC-915 components require cleaning, a damp cloth may be used to wipe the units. This should only be done while the units are disconnected from their power source. Do not use any harsh chemicals or solvents, as this may damage the housing or finish.

ELECTRICAL CONNECTION

Connections are made via screw connections suitable to accept cable diameters between 0.5 and 2.5 mm² (24 to 12 Awg). Either solid or stranded wires may be used.

Do not rely on the controller as a disconnect device!

Installation notes

- If contact with live parts is possible while working on the unit, it must be completely isolated from the mains supply. Be aware that the unit might have cables connected to it which are powered from different sources.
- Magnetic or electric fields, eg: from transformers, mobile phones or electrostatic discharge must be avoided in the vicinity of the instrument.
- Route input, output and supply lines separately.
- Arrange sensor cable extensions as twisted and screened cables. Do not run them close to power cables. The shield, if any, shall be earthed on the controller's side only.
- Fluctuations in the supply signals are only permissible within the specified tolerances.

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