RHOMBERG

Temperature Controller

Auto-tune PID or ON/OFF control
Alarms, Programmable Sensor
3 digit dual display, incl. timer
Relay control or SSR drive

TC 515

ORDERING CODE

TYPE	SENSOR TYPE	SUPPLY VOLTAGE	CONTROL OUTPUT	ALARM OUTPUT
TC515	U0	240E	R	R

85 - 265 VAC/DC = **240E**
24 - 48 VAC/DC = **024E**
U0 = Universal (Programmable) Sensor Type

R = 8A/250VAC Relay output
S = 10mA/8V Solid State Drive

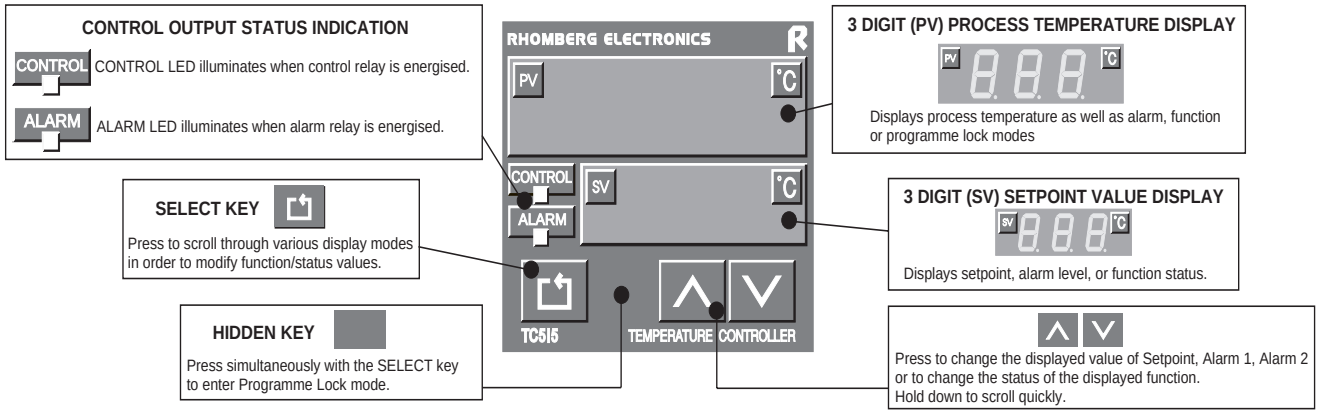
Note: TC515 supersedes TC505 & TC500

THERMOLINE

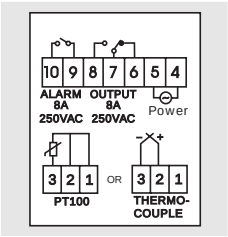
Features and Benefits

- User friendly installation and operation.
- PID algorithm control with auto-tuning of the process which ensures precision control.
- ON/OFF control operation with a programmed hysteresis value to prevent the control relay from rapidly switching on and off.
- Programmable Trip and Recovery control mode to allow the independent control of two heating or cooling systems.
- Keypad programmable for use with 9 sensor types.
- A unique 16 hour timer for batch processing.
- An 8 Amp relay output or Solid State Relay (SSR) drive output.
- Programmable relay action that allows for fail-to-safe operation.
- Two independently programmable temperature alarm levels can be used in 12 different modes and are selectable as an upper alarm level, a lower alarm level or both. They can be configured to operate as absolute or deviation alarm levels.
- Analogue and digital input filtering.
- A programme lock security feature to prevent unauthorised adjustments by providing four levels of security.
- A plug connector system that allows quick and easy connections.
- Programmable process temperature offset that can be set to the difference between the process and sensor temperatures. This is used when the sensor cannot be positioned ideally.
- A process protection feature, which when enabled, confines the setpoint to a range determined by the two alarm levels and prevents accidental changing of the setpoint to outside the alarm limits.
- Multi-voltage (24 - 48V AC/DC, or 85 - 265V AC/DC).
- Sensor failure detection and display of out of range error conditions which enables quick diagnosis of process or sensor faults.
- Digitally calibrated.

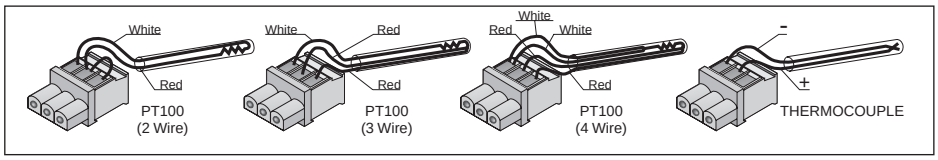
Description of Controls



Wiring and Connection



The following figure illustrates how the thermocouple or PT100 is connected.



Function Highlights

PID CONTROL WITH PROPORTIONAL BAND AUTO-TUNE
The Thermoline TC515 has been designed with a rugged and proven PID algorithm.

ON/OFF CONTROL WITH HYSTERESIS
A hysteresis parameter is programmed to prevent the control relay from rapidly switching on or off. This is set in degrees and is the difference between the output relay energise and de-energise.

TRIP & RECOVERY CONTROL MODE
This programmable control mode allows the independent control of two heating or cooling systems.

PROGRAMMABLE SENSOR TYPE
The Thermoline TC515 may be configured for use with 9 sensor types by simply selecting the appropriate sensor, using the keypad.

VERSATILE ALARM OUTPUT
Two independent temperature alarms may be used in 12 different modes. There is a choice to use an upper alarm level, a lower alarm level or both, configured to operate as absolute or deviation alarm levels. In addition, the 8A relay (solid state available on special order) output can be programmed for normally open or normally closed operation.

PROCESS PROTECTION FEATURE
This unique feature offers added safety to critical processes. When protection is enabled, the setpoint is confined to a range determined by the two alarm levels. This prevents operators from accidentally changing to a setpoint outside the alarm limits.

PROGRAMMABLE RELAY ACTION
Programmable relay action allows for fail-safe operation.

PROGRAMMABLE RELAY CYCLE TIME
The Thermoline TC515 has programmable relay cycle times.

PROGRAMMABLE PROCESS TEMPERATURE OFFSET
Often, when the sensor cannot be positioned ideally, the measured temperature is either lower or above the actual process temperature. In order to alleviate this, the process offset is programmed to the difference between the process and sensor temperatures.

PRESELECT TIMER FOR BATCH PROCESSING
Use this option to maintain the setpoint for the preselected time, and thereafter to shut the process down.

PROGRAMME LOCK SECURITY FEATURE
This is used to prevent unauthorised adjustments by providing four levels of security. Once a function is locked out, it becomes inaccessible to a user until the lock is disabled.

Technical Specifications

GENERAL SPECIFICATIONS	
Operating Temperature	0 - 50°C
Humidity	5 - 85% non-condensing
Storage Temperature	-20°C to 70°C
Protection Class (Front Panel)	IP54
Protection Class (Rear Panel)	IP30
Connection	Plug-connector
Weight	250g
Standards	CE
Creepage Distance	VDE 0110 (Group C 250V) IEC 664/664A VDE 0435
Power Supply	24 - 48V AC/DC ± 10% 85 - 265V AC/DC
Power Consumption	Less than 3VA

EMC PROTECTION RATING	
Radiated Susceptibility	IEC 801-3, Class 3
Radiated Emission	CISPR11, Class B
Conducted Susceptibility	IEC 255-22-1, Class II
Conducted Emission	CISPR11, Class B

INPUT SPECIFICATIONS									
OPERATING TEMPERATURE	SENSOR TYPE								
	PT100	E	J	K	R	S	T	B	N
UPPER LIMIT	800	950	750	999	999	999	380	999	999
LOWER LIMIT	-99	-99	-99	-99	-40	-40	-99	-99	-99

CONTROLLER SPECIFICATIONS	
Setting Accuracy	1%
Linearisation Accuracy	±0.3%
Cold Junction Tracking	0.05°C per °C
Sampling Period	70ms
Control Method	PID, On/Off or Trip & Recovery
Control Relay Cycle Period	1 - 240secs for PID 0 - 999° for ON/OFF Control 1 - 99secs for Trip & Recovery
Integral Time	36s
Derivative Time	5s
Hysteresis (On/Off Control)	0 - 999°C
Proportional Band	50°C
Timer Range	1 - 999 minutes
Timer Accuracy	0.1% of preset time
Timer Resolution	1 minute

DISPLAY SPECIFICATIONS	
PV Display Type	3 x 10mm, red
SV Display Type	3 x 7mm, green
Resolution (PV, SV)	1°C
Temperature Display Range	-99 to 999°C

OUTPUT SPECIFICATIONS (specify when ordering)	
Control Output (Relay)	250V AC, 8A, SPDT
Control Output (SSR Drive)	10mA at 8V
Alarm Output (Relay)	250V AC, 8A, SPST (N.O.)
Alarm Output (SSR Drive)	10mA at 8V