275-270 to 275-300

# TEMPATRON

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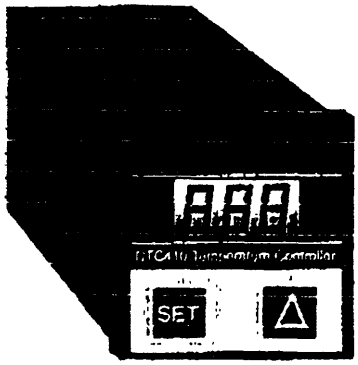
The DTC410 is a Digital On/Off Temperature or Process Controller designed to provide the functionality of general purpose PID Controllers but at a price suited to On/Off applications. The simple programming with just two front panel keys and uncluttered LCD display, combined with uncomplicated control functions and alarm programmability, have enabled the DTC410 to be widely used in applications as varied as flue gas monitoring to paint driers or even overheat control of generator windings.




## Features

- 4 Programmable Thermocouple Input options
- 10 Programmabe Alarm options
- PT100 and 4-20mA options
- Control Action selection
- Set-point limits
- Dual Relay outputs

**SET**

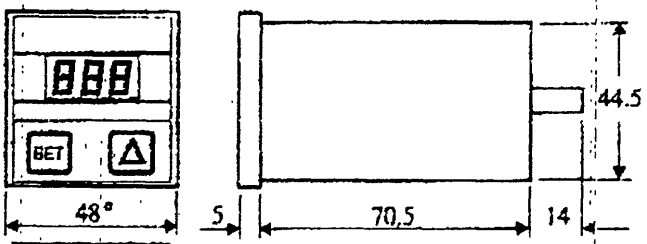
1) When momentarily pressed, enables Setpoint to be viewed
2) When held for >4 secs, enables access to Setpoint
3) When adjusting Setpoint, scrolls from left to right across each digit.
4) When in programming mode, scrolls through parameters and, for selected parameter, scrolls from left to right across each digit.

**△**

1) When adjusting Setpoint, increments the value of each digit selected by **SET** key.
2) When in Programming mode, increments the variable of parameters or digits selected by **SET** key.

With a suitable probe connected to the DTC410, when the supply is first applied, the display will go through the start-up routine of displaying the sofware issue (2.4 e.g.) followed by a display check (888) and then by the measured value (usually ambient temperature). It is advisable not to connect a load initially, as the Controller will attempt to control against the default values set at the factory.
After accessing the Setpoint (by holding down **SET** for >4 seconds) and adjusting it to the desired process value, the DTC410 will display CdE. The code 410 must then be entered to access the other programmable parameters; otherwise, if no other adjustments are required, a further press of **SET** will return the display to the process value. For details of how to program the DTC410, see Program Parameter Map on page 3.

## Dimensions




All dimensions in mm.

Cut-out
45 x 45

## OrderingCode: DTC410-01-230

| DTC410 | Series | Options |
|---|---|---|
| 01 | Input | 01 = Thermocouple<br>02 = PT100<br>03 = 4-20mA |
| 230 | Supply | 230 = 230Vac<br>110 = 110Vac<br>24 = 24Vac/dc |

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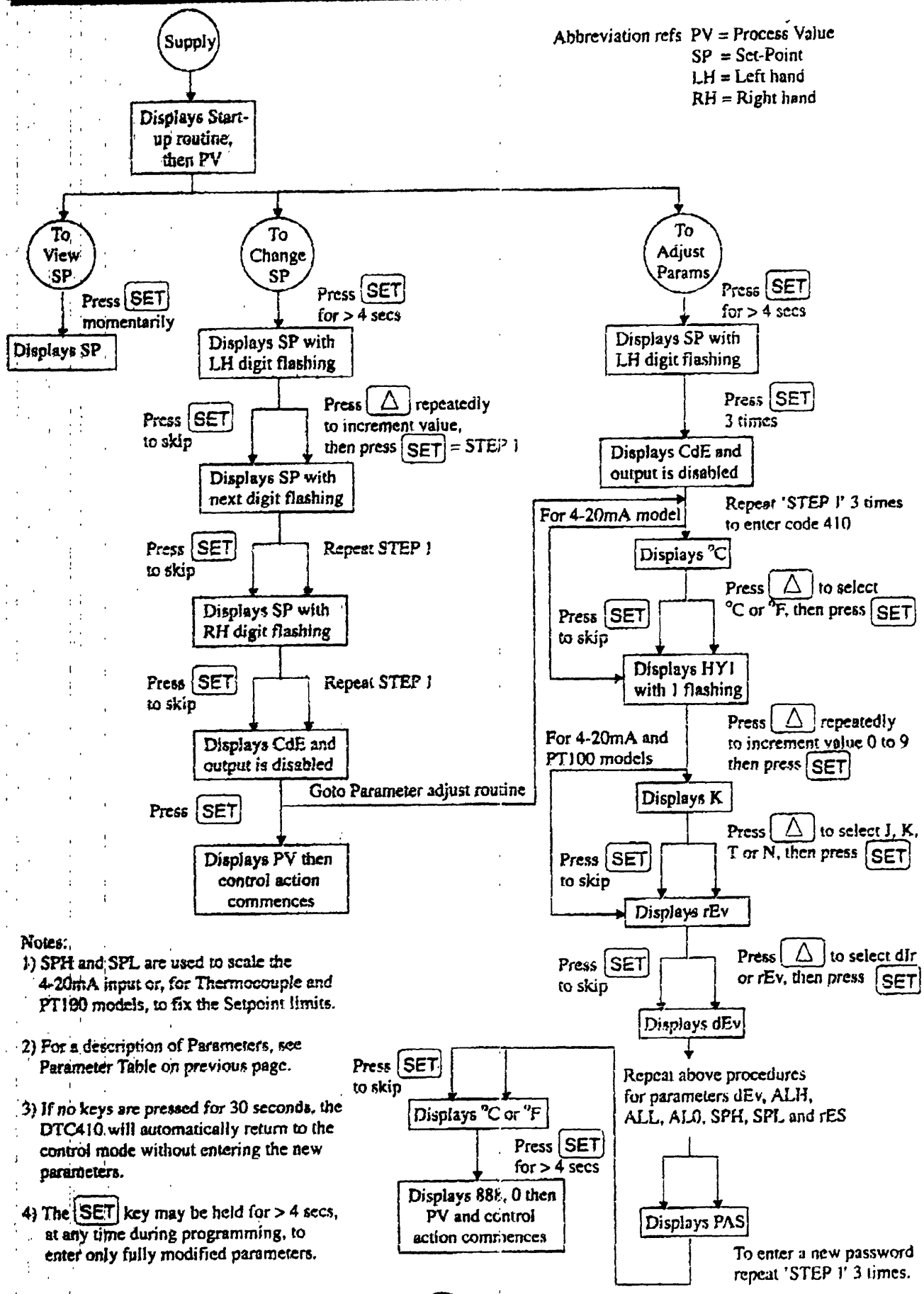
Ref No: Q03339 is1




Notes:

1) SPH and SPL are used to scale the 4-20mA input or, for Thermocouple and PT100 models, to fix the Setpoint limits.

2) For a description of Parameters, see Parameter Table on previous page.

3) If no keys are pressed for 30 seconds, the DTC410 will automatically return to the control mode without entering the new parameters.

4) The SET key may be held for > 4 secs, at any time during programming, to enter only fully modified parameters.

| Parameter | Display Code | Default Value | Range or options | Function/Comments |
|---|---|---|---|---|
| Scale units | °C | °C | °C, °F | This parameter is skipped for 4-20mA models. |
| Hysteresis | HY* | HY1 | HY0 to HY9 | Determines the band over which the On/Off control function operates. For HY0 the controller operates as a latch forcing the ouput permanently off when the set value has been reached, until the supply is removed. |
| Sensor Type | H(K) | K | K, J, T, N | Ensures compatibility of the controller with the applied sensor. This parameter is automatically skipped for PT100 and 4-20mA models. |
| Control Action | rEu | REV | REV, DIR | Selects the type of control action: reverse for heating, in which the output is on below the set-point(SP), and direct for cooling, where the output is on above the set-point (SP). |
| Deviation Alarm | dEu | 00 | 00 to 99 | Sets the value, above or below the SP, at which the alarm output is activated. For this mode, the alarm always tracks the SP. When set to 00 the deviation alarm function is inactive. |
| High Alarm | ALH | 999 | SP to 999 | Sets a value above which the Alarm output is activated. This value is independent of the SP. |
| Low Alarm | ALL | -99 | -99 to SP | Sets a value below which the Alarm output is activated. This value is independent of the SP. |
| Alarm Action | AL* | 0. | 0 to 9 | This parameter provides three functions:- 1) To determine the status of the Alarm contacts when an Alarm condition is satisfied (Note: the de-energised state of the alarm relay is normally open (N-O)). 2) To decide the symmetry of the Deviation Alarm. For AL0 to AL3 the Deviation Alarm band is 2 X dEv setting. For AL4 to AL9, the Alarm band is asymmetrical and dependent upon the Control Action. 3) To decide whether the Alarm output is active immediately, at power-up, or inhibited until after the process has first reached the SP. |

| Code | Status at Alarm condition | Alarm Action | Deviation Alarm Band | |
|---|---|---|---|---|
| | | | rev | dir |
| AL0 | Close | Inhibited | Symmetrical | |
| AL1 | Open | Inhibited | Symmetrical | |
| AL2 | Close | Immediate | Symmetrical | |
| AL3 | Open | Immediate | Symmetrical | |
| AL4 | Close | Inhibited | Low | High |
| AL5 | Open | Inhibited | Low | High |
| AL6 | Close | Immediate | Low | High |
| AL7 | Open | Immediate | Low | High |
| AL8 | Close | Inhibited | High | Low |
| AL9 | Open | Inhibited | High | Low |

| | | | | |
|---|---|---|---|---|
| Set-point High | SPH | 999 | SP to 999 | Sets the limit above which the SP cannot be adjusted. For 4-20mA models, this parameter scales the 20mA value. |
| Set-point Low | SPL | -99 | -99 to SP | Sets the limit below which the SP cannot be adjusted. For 4-20mA models, this parameter scales the 4mA value. |
| Reset | rES | 00 | -99 to +99 | Sets a +ve or -Ve offset to compensate for sensor differences or unavoidable process errors; such as displacement between sensor and desired control point temperatures. |
| Password | PAS | 410 | -99 to 999 | Provides a means of restricting access to program parameters by unauthorised personnel. When set to any number >500, the Set-point can be viewed but not adjusted. **Warning!!** If the password is amended then forgotten, the unit must be returned to the manufacturer to install the default settings. |

Each time the DTC410 is powered-up, the software checks the two portions of memory which contain the User Parameters and Calibration Constants. If the back-up battery fails or the controller is subjected to excessive electrical noise, either or both of these sets of parameters may become corrupted. In this case the following corrective actions must be taken:-

**User Parameter Corruption**

Once corrupted, the controller will immediately switch it's output off and then reset the User Parameters to the default values, warning the operator by flashing SEt on the display. By pressing [SET] the display will change to CdE and the default password (410) can be entered to access the set-up routine. Please refer to Parameter Map for programming details.

Operating Temperature: 0 to 50°C.

| | |
|---|---|
| Power Supply: | 24Vac/dc @ 60mA max.<br>110Vac, 47-63Hz @ 1.5VA max.<br>230Vac, 47-63Hz @ 1.5VA max. |
| Sensor Options: | 4-20mA, PT100, J,K,T & N T/C. |
| Ranges: | 4-20mA = scaleable<br>PT100 = -99 to 400°C (700°F)<br>J T/C = -99 to 700°C (999°F)<br>K T/C = -99 to 999°C (999°F)<br>T T/C = -99 to 300°C (570°F)<br>N T/C = -99 to 999°C (999°F) |
| LCD Annunciators: | Control output and Fahrenheit indicators. |
| Gain Accuracy: | T/C = +/- 0.25% of full scale<br>PT100 = +/- 0.60% of full scale<br>4-20mA = +/- 0.60% of full scale |
| Offset Accuracy: | T/C = +/-5°C, PT100 = +/- 2°C |
| Control Output: | SPDT relay rated @ 3A, 240VAC |
| Alarm Output: | SPNO relay rated @ 0.5A, 120Vac |
| Isolation: | 1500Vac for 1 minute between contacts and sensor terminals. |
| Approvals: | CE approved to EMC generic standards EN50081-1 and 50082-1 |
| Memory Back-up: | Lithium battery, 10 years operating, 5 years shelf life. |

**WARNINGS!!** When pin 11 and the sensor are both earthed, the DTC410 indicates OPn and will not operate correctly.
24V models are not isolated and must only be used with isolated or unearthed sensors.

**Calibration Constant Corruption**

When corrupted, the message CAL will be displayed. The controller must now be re-calibrated using two known input values. By pressing [SET] the display will change to CLL to prompt entry of a low calibration value (e.g. 25°C), via the [Δ] key. Pressing [SET] will enter this value, after which, the controller will display an arbitrary number and then progressively tune to the value entered. Once reached, the controller will display CLH, prompting entry of a high calibration value (e.g. 400°C). Using the same procedure as for CLL, the controller will tune to the new value and again prompt with CLL. The calibration procedure is iterative so the procedure must be repeated (usually only once more) until the display goes immediately to CLL and CLH. Holding [SET], for >4 seconds, with either value entered, until 888 is displayed, will complete the procedure.

**Note:** This procedure should only be attempted by trained personnel and only where the premises has the facilities for simulating calibrated temperature references. Otherwise the unit should be returned to the manufacturer.