1/16 DIN
48mm x 48mm

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Supply Voltage</th>
<th>Control Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC518</td>
<td>85 - 270V AC/DC, 24V AC/DC</td>
<td>Relay</td>
</tr>
<tr>
<td>TC518-SSR</td>
<td>24V AC/DC</td>
<td>SSR (18V DC)</td>
</tr>
<tr>
<td>TC518-24</td>
<td>24V AC/DC</td>
<td>Relay</td>
</tr>
<tr>
<td>TC518-SSR-24</td>
<td>24V AC/DC</td>
<td>SSR (18V DC)</td>
</tr>
</tbody>
</table>

TECHNICAL SPECIFICATIONS

INPUT SPECIFICATIONS

Inputs  
Thermocouple (J,K,T,R,S) / RTD (Pt100)

Sampling time  
250 ms

Input Filter (FTC)  
0.2 to 10.0 sec

Resolution  
1° / 0.1°

Temperature Unit  
°C / °F selectable

Indication Accuracy  
For J, K & T inputs: 0.25% of F.S. ±1°
For R & S inputs: 0.5% of F.S. ±2°
(20 min of warm up time for TC input)
For RTD inputs: 0.1% of F.S. ±1°
(F.S. = Full Scale)

FUNCTIONAL SPECIFICATIONS

Control Action  
1) PID
2) ON-OFF

Proportional Band (P)  
0.0 to 400.0°

Integral Time (I)  
0 to 3600 sec

Derivative Time (D)  
0 to 200 sec

Cycle Time  
0.1 to 100.0 sec

Hysteresis Width  
0.1 to 99.9°

Manual Reset Value  
-99.9 to 99.9°

OUTPUT SPECIFICATIONS

Contact Rating (SPDT)  
10A @ 230V AC / 30V DC, resistive

SSR Drive Output (Voltage Pulse)  
18V DC, 20mA

GENERAL SPECIFICATIONS

Supply Voltage  
85 to 270V AC/DC (50 / 60Hz)
OPTIONAL - 24V AC/DC, ±10%

Power Consumption  
5VA max @230V AC

Temperature  
Operating: 0 to 50°C (32 to 122°F)
Storage: -20 to 75°C (-4 to 167°F)

Humidity (non-condensing)  
95% RH

Weight  
160 g (0.352 lbs)

Protection Level  
IP65 for faceplate

FEATURES

- High Performance
- Dual Display, 4 digit, 7 segment LED
- LED Status Indicator: Relay ON, Tune
- 3 Front Panel Control Buttons
- TC / RTD Inputs
- PID, ON/OFF Control
- Single Setpoint
- °C / °F Selectable
- Control Output : Relay or SSR Drive

TERMINAL CONNECTIONS

DIMENSIONS

All dimensions are in mm (to convert to inches, multiply by 0.03937)
OPERATING INSTRUCTIONS
TC518

SPECIFICATIONS
SENSOR - (Factory set)

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Temperature range (°C)</th>
<th>Resolution (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>-199 to 750</td>
<td>0.1</td>
</tr>
<tr>
<td>K</td>
<td>-200 to 1350</td>
<td>0.1</td>
</tr>
<tr>
<td>T</td>
<td>-200 to 400</td>
<td>0.1</td>
</tr>
<tr>
<td>R</td>
<td>0 to 1750</td>
<td>1</td>
</tr>
<tr>
<td>S</td>
<td>0 to 1750</td>
<td>1</td>
</tr>
<tr>
<td>RTD</td>
<td>-100 to 850</td>
<td>0.1</td>
</tr>
</tbody>
</table>

DISPLAY
4-digit, dual display 7 segment LED
Upper Display: 10mm high Red (Process value)
Lower Display: 7mm high Green (Set value)

MAIN CONTROL
PID or ON/OFF

OUTPUT
Time Proportioning
a) PROPORTIONAL BAND 0 to 400 °C (Programmable)
Cycle time: Auto/Manual (0.1 to 99.9 sec Programmable)
b) ON/OFF CONTROL Hysteresis from 0.1 to 99.9°C

AUTO TUNE
Via Keys on front Panel

ACCURACY
±0.25% of full scale/ ±1°C (whichever is greater)

SET POINT LIMIT
High limit and low limit settable by user

RELAY ACTION
a) COOL - for Cooling b) HEAT - for Heating

SENSOR BREAK
Indicated on display, relay off

TC REVERSE
Indicated on display, relay off

OUTPUT
One relay (optional SSR)

RELAY RATING
10A @ 230 VAC / 30 VDC

POWER SUPPLY
85 to 270 VAC / DC @ 50/60Hz.
24 VAC / DC models available on request

TEMPERATURE RANGE
0 - 50°C

HUMIDITY
95% RH

WEIGHT
Approx. 200 grams

SAFETY SUMMARY
All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the equipment. If the equipment is not handled in a manner specified by the manufacturer, it might impair the protection provided by the equipment.

CAUTION: Read complete instructions prior to installation and operation of the unit.

CAUTION: Risk of electric shock.

WIRING GUIDELINES
1. To prevent the risk of electric shock power supply to the equipment must be kept OFF while doing the wiring arrangement.

2. Wiring shall be done strictly according to the terminal layout with shortest connections. Confirm that all connections are correct.

3. Use lugged terminals to meet M3 screws.

4. To eliminate electromagnetic interference use of short wire with adequate ratings and twists of the same in equal size shall be made.

5. Cable used for connection to power source, must have a section of 1mm² or greater. These wires shall have insulation capacity made of at least 1.5KV.

MAINTENANCE
1. The equipment should be cleaned regularly to avoid blockage of ventilating parts.

2. Clean the equipment with a clean soft cloth. Do not use Isopropyl alcohol or any other cleaning agent.

INSTALLATION GUIDELINES

CAUTION:
1. This equipment, being built-in-type, normally becomes a part of main control panel and in such cases the terminals do not remain accessible to the end user after installation and internal wiring.

2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.

3. A circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power ‘ON’ or ‘OFF’ function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.

CAUTION:
1. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.

2. Fuse Protection: The equipment does not have a built-in type fuse. Installation of external fuse of rating 275 VAC/1Amp for electrical circuitry is highly recommended.

3. Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Such ventilation holes shall not be obstructed else it can lead to a safety hazard.

4. The output terminals shall be strictly loaded to the manufacturer specified values/range.

Mechanical Installation:
For installing the controller
1. Prepare the panel cutout with proper dimensions as shown:

DIMENSIONS (in mm)

1. For load current less than 0.5A

2. For bigger loads, use interposing relay / contactor

ELECTRICAL PRECAUTIONS DURING USE
Electrical noise generated by switching of inductive loads and can create momentary disruption, erratic display, latch up, data loss or permanent damage to the instrument.

To reduce noise:

a) Use of MOV across supply of temperature controller & snubber circuits across loads are recommended

b) Use separate shielded wires for inputs.

LOAD CONNECTIONS
1. For load current less than 0.5A

2. Connect Thermocouple (T/C) according to polarity shown. Positive of TC at terminal no 7 & Negative of TC at terminal no 8

3. Ircuit breaker or mains switch must be installed between power source and supply terminals to facilitate power ‘ON’ or ‘OFF’ function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.

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**TERMINAL CONNECTIONS**

<table>
<thead>
<tr>
<th>L (+)</th>
<th>1</th>
<th>N (-)</th>
<th>2</th>
<th>+ve of TC or RTD1</th>
<th>7</th>
<th>-ve of TC or RTD2</th>
<th>8</th>
<th>3rd wire of RTD (PT100)</th>
<th>9</th>
</tr>
</thead>
</table>

**TERMINAL DESCRIPTION**

<table>
<thead>
<tr>
<th>Description</th>
<th>NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L (Live)</td>
<td>1</td>
</tr>
<tr>
<td>N (Neutral)</td>
<td>2</td>
</tr>
<tr>
<td>COM</td>
<td>4</td>
</tr>
<tr>
<td>NC</td>
<td>5</td>
</tr>
<tr>
<td>+ve of TC or RTD1</td>
<td>7</td>
</tr>
<tr>
<td>-ve of TC or RTD2</td>
<td>8</td>
</tr>
<tr>
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<td>9</td>
</tr>
</tbody>
</table>

**CONFIGURATION SCHEME**

To enter configuration menu: Press A & V for 3 secs

1. **Tune**
   - Default setting: LOCK
   - Press A + / V to change value
   - Tune LED will blink indicating tune in progress.

2. **Press A to enter Temperature unit**
   - Default setting: °C
   - Press A + / V to change value
   - Celsius
   - Fahrenheit

3. **Press A to enter Lock code**
   - Default value: 0
   - Note: This parameter will not be prompted if internal jumper is shorted (See User Guide for explanations)
   - Press A + / V to change value
   - Lock code = 85

4. **Press A to enter Input sensor**
   - Default setting: TEMP
   - Press A + / V to change value
   - Input sensor
   - Range: -199 to 750
   - Range: -200 to 1350
   - Range: -200 to 400
   - Range: 0 to 1750
   - Range: 0 to 1750
   - Range: -100 to 850

5. **Press A to enter Resolution**
   - Default value: 100
   - Press A + / V to change value
   - Resolution

6. **Press A to enter Display Bias**
   - Default value: 0
   - Press A + / V to change value
   - Display Bias
   - Range: -99.9 to 99.9

7. **Press A to enter Set point low limit**
   - Default value: -150
   - Press A + / V to change value
   - Set point low limit

8. **Press A to enter Set point high limit**
   - Default value: 150
   - Press A + / V to change value
   - Set point high limit

9. **Press A to enter Relay mode**
   - Default setting: PID
   - Press A + / V to change value
   - Relay mode
   - Cool
   - Heat
   - FLY

10. **Press A to enter Proportional band**
    - Default value: 10
    - Press A + / V to change value
    - Proportional band
    - Range: 0 to 400°C

11. **Press A to enter Integral time**
    - Default value: 1.20
    - Press A + / V to change value
    - Integral time
    - Range: 0 to 3600 sec

12. **Press A to enter Derivative time**
    - Default value: 30
    - Press A + / V to change value
    - Derivative time
    - Range: 0 to 200 sec

13. **Press A to enter Hysteresis**
    - Default value: 0
    - Press A + / V to change value
    - Hysteresis
    - Range: 0.1 to 99.9

14. **Press A to enter Hysteresis bias**
    - Default value: 0
    - Press A + / V to change value
    - Hysteresis bias
    - Range: -99.9 to 99.9

15. **Press A to enter cycle mode**
    - Default setting: AUTO
    - Press A + / V to change value
    - Cycle mode
    - Auto
    - User

16. **Press A to enter cycle time**
    - Default value: 150
    - Press A + / V to change value
    - Cycle time
    - Range: 0.1 to 99.9

17. **Press A to enter Set 1 lock**
    - Default setting: UNLOCK
    - Press A + / V to change value
    - Set 1 lock
    - Unlock
    - Lock

18. **Press A to enter Reset all**
    - Default setting: UNLOCK
    - Press A + / V to change value
    - Reset all
    - Unlock
    - Lock

19. **Press A + / V for 3 sec. to come out of programming.

**USER GUIDE:**

1. **Display Bias:**
   - Default value: 0
   - This function is used to adjust the PV value in cases where it is necessary for PV value to agree with another recorder or indicator, or when the sensor cannot be mounted in correct location.

2. **ON/OFF control action (For heating):**
   - The relay is ‘ON’ up to the set temperature and cuts ‘OFF’ above the set temperature. As the temperature of the system drops, the relay is switched ‘ON’ at a temperature slightly lower than the Set point.

3. **Auto tuning:**
   - The auto tuning function automatically measures, computes and sets the proportional band (P), integral time (I) and Derivative time (D). While Auto tuning, the controller performs proportional Control and determine proper P.I.D. Values.

4. **Configuration lock code:**
   - Insert jumper J1 to disable configuration lock.

**HYSTERESIS:**

- The difference between the temperature at which relay switches 'ON' and at which relay switches 'OFF' is the hysteresis or dead band.

**Temp. set point**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**Reduced overshoot**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**PID - time proportioning**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**Reset all**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**Set 1 lock**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**Auto tuning**

- PID - time proportioning with auto reset & rate
- Reduced overshoot
- Set point
- Time

**Configuration lock code:**

- Insert jumper J1 to disable configuration lock.

**Operating/0812/TC518/SN-6015/7015/OP176(U1.1)-V04**

Page 2 of 3
WARRANTY / LIMITATIONS OF LIABILITY

Selec Controls USA., Inc. warrants the products to be free from defects in the materials and workmanship for a period of one year (or other period specified, if any) from the date of sale by Selec.

The warranty does not apply to defects resulting from any action of the buyer, including but not limited to improper handling, operating the product outside the specification limits, or unauthorized disassembling / altering of the product. The warranty shall be VOID if the product shows evidence of having been tampered or being damaged due to usage in corrosive environment; or current, heat, moisture or vibration; improper specification; wrong usage in an application; misuse or other operating conditions outside of Selec’s control.

Selec shall not be responsible for special, indirect or consequential damages, loss of profits or commercial loss in any way connected with the products, whether such claim is based on contract, warranty, negligence or strict liability.

In no event shall the responsibility of Selec for any act exceed the individual price of the product on which liability is asserted.

In no event shall Selec be responsible for warranty or other claims regarding the products unless Selec’s analysis confirms that the products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse, or

CALIBRATION CERTIFICATE

Date:
Model No: ____________________________
Sr. No.: ____________________________

Claimed Accuracy:
± 0.25% of full scale ±1 digit (After 20 min warmup time)

Sources calibrated against:
Hindtron Multimeter Model 86, Sr. No.: 1094

Multimeter calibration report no:
ERTL(W), Mumbai, INDIA

The calibration of this unit has been verified at the following values:

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>CALIBRATION TEMP (°C) (0.1 resolution)</th>
<th>DISPLAY VALUE (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35.0</td>
<td>35.0</td>
</tr>
<tr>
<td></td>
<td>700.0</td>
<td>700.0</td>
</tr>
<tr>
<td></td>
<td>1350</td>
<td>1350</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>500.0</td>
<td>500.0</td>
</tr>
<tr>
<td></td>
<td>800.0</td>
<td>800.0</td>
</tr>
</tbody>
</table>

The thermocouple / RTD curves are linearised in this microprocessor based product; and hence the values interpolated between the readings shown above are also equally accurate; at every point in the curve.

Unit is accepted as accuracy is within the specified limit of claimed accuracy and certificate is valid up to one year from the date of issue.

CHECKED BY: ____________________________

(Specifications subject to change as development is a continuous process).

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E-mail: sales@selecusa.com