TCS2P125

UL 1008 - 2 Pole 125 Amp Automatic Transfer Switch
SECTION 1: INTRODUCTION

1.1 Safety Precautions (WARNINGS)
This manual covers the installation, operation and maintenance of the TCS3P125 Automatic Transfer Switch. It is intended for qualified personal only.

**WARNING**
HIGH VOLTAGES CAN KILL.

1.2 Products Overview
The TCS3P125 automatic transfer switch consist of two parts the TS3P125 switch and the TC-V2 electronic control unit:

1.2.1 TS125 Features
The contacts on the TS3P125 transfer switch are class PC, this means that it is capable of making and withstanding short circuits but is not intended for breaking short circuit current.

- Rated operating Voltage: 600VAC.
- Rated operating Current: 125Amps
- Number of poles: 3P
- Coil operating voltage: 220VAC ±20%
- Small size, light weight and low power consumption.
- Electrically operated and mechanically held.
- Manufactured using UL 94V-0 plastics.
- Adjustable time delay in OFF position when transferring.
- Designed for cell-phone repeaters, and many industrial and home ATS applications.

1.2.2 TC-V2 digital controller
The TC-V2 digital control unit offers programming flexibility to customize the ATS to different customer requirements.

The controller:
- Monitor normal source for full phase over and under voltages.
- Monitor emergency source for single phase over and under voltages.
- Normal & emergency source voltage and frequency parameter display.
- TDEN, TDNE, TDEC and TDOFF real time countdown display.
- Permit testing the transfer switch from the control panel.
- Permit testing the transfer switch with / without load from the front panel.
- Built-in 1 to 4 weeks exerciser timer.
- Permit customer plant exerciser test with / without load on a preset period.
- Store customer / factory established parameters in permanent memory.
- Shows status and fail alarm LED's on the front panel.
- No need for a PC connection and programming software. Any and all changes can be made in the field.
- Design for installation next to switch or on the front panel.
SECTION 2 : HARDWARE DESCRIPTION

2.1 Front Panel
2.2 TCS3P1 25 Dimensions (Unit: mm)

![Diagram of TCS3P1 Dimensions]

2.3 Panel Cut-Out for the TC-V2 (Unit: mm)

![Diagram of Panel Cut-Out for TC-V2]

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**TCS3P125**
SECTION 3 : FUNCTION DESCRIPTION

3.1 General
Operation of the TCS3P125 electronic control.

3.2 TDNE Settings
TDNE provides a time delay when transferring from Normal to Emergency. Timing begins when the Emergency Source (generator) becomes available.
TDNE : Adjustable from 0 to 99 seconds.

3.3 TDEN Settings
TDEN provides a time delay when transferring from Emergency to Normal. This permits stabilization of the Normal Power before transferring back to normal. Timing begins when the Normal Power returns and becomes available and steady.
TDNE : Adjustable from 0 to 99 seconds.

3.4 TDEC Settings
TDEC timer keeps the generator running without load (Engine Cool-down) after the ATS transfer back to Normal Power. Timing begins when the transfer back to normal is completed.
TDEC : Engine Cool-down - from 0 to 99 sec.

3.5 TDES Setting
TDES is the time delay for Engine Start when the Normal Source voltage is in over or under-voltage (OV or UV). If power return to normal while timing, the TDES timer resets and starts again.
TDEC : Adjustable from 0 to 30 seconds.

3.6 TD-OFF Setting
Time Delay on OFF this timer keeps the switch in the center neutral OFF position (completely disengaged) before transferring to the other side. You can preset the switch in Neutral or OFF from 0 to 18 seconds (2 to 3 sec in normal).
TD-OFF : Adjustable from 1 to 20 seconds.

3.7 Plant Exerciser
This feature provides for automatic test operation of the generator. The interval is fixed at once per 1 to 4 weeks with a specific test day and time. The exerciser can be set for either testing with load or without load.
When the exerciser is activated the exerciser LED (EX) on the right side of display flashes and turns on during the exercise period.

3.8 Over / Under Voltage Sensing
The TC-V2 constantly monitors normal & emergency power. When power falls outside the programmed voltages this LED turns RED and flashes to show OV /UV problems.
Adjustable Over voltage range : 110VAC ~ 530VAC
Over voltage reset: When voltage falls below 10VAC of the OV setting
Adjustable Under voltage range : 80VAC ~ 470VAC
Under voltage reset : When voltage exceeds 10VAC of the UV setting

3.9 Transfer Failure
When a transfer is made the TS125 communicates its position to the TC-V2 controller by using two small internal micro-switches, if this signal is not received, it will try switching 3 more times every 2 seconds or until the connection is made. A flashing light indicator and a "FAIL" signal displayed an incomplete transfer and that the ATS mechanism or wiring is defective.
If the ATS fails, the TC-V2 controller stops all ATS functions and starts' flashing until the failure is corrected and the control is reset.
To reset the transfer fail alarm:
1. Manually move the ATS to the correct position.
2. Press any buttons (Auto, Program or Test) on the front panel to reset the alarm.
SECTION 4 : OPERATION

4.1 General
This section specifically describes the operation and functional use of the TC-V2 controller.

4.2 Auto Mode
In AUTO the TC-V2 controller automatically transfer and retransfers from source to source as directed by the pre-programmed instructions.
In AUTO the controller, monitor the condition of both normal and standby power sources providing the logic for the transfer operation.

4.3 Test Mode
The TC-V2 is provided with a test pushbutton that simulates the loss of normal source. Pushing the Test key the TC-V2 runs a test on the ATS. The TDES and TDNE programmed time delays will be performed as part of the test. There are two test modes:

- Testing with load
- Testing without load

4.4 Programming Mode
The TC-V2 controller is fully programmable from the front panel when in Program Mode. The build-in program buttons have multiple functions:

- Real time clock displaying
- Programming mode operating

To enter programming mode, push & hold the “PEN” Program button for 10 seconds. In the first 10 seconds the screen showing internal real time clock and then the word “ Vr 1.0 ” appears on the front display window for 2 seconds indicating the version of the software.

At this time start a line by line programming sequence. To advance to the next line, push the Program button on the font panel. To change each line’s programming parameters, press the increase ( ) and decrease ( ) buttons. When pressing and releasing the ( ) or ( ) key the displayed parameter can be increased or decreased by one. The parameter will continue to scroll if the ( ) or ( ) button is pressed and not released.

Always push the “ Program ” button to advance to the next line or until the word “ End ” appears on the screen. To immediately end the programming mode, you simply push the “ Program ” button for 4 seconds. Then the word “ End ” shows on the screen indicating the end of the programming mode.

If you like to return to factory settings, stay in programming mode and simultaneously press all 3 buttons ( ), ( ) and Program buttons for 4 seconds. The TC-V2 will now automatically program itself to factory settings and the word “ Au.Po ” will appear on the display window.

4.5 Specification Summary

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SPECIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>600 VAC</td>
</tr>
<tr>
<td>Rated Current</td>
<td>125 Amp</td>
</tr>
<tr>
<td>Rated Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Poles</td>
<td>3P</td>
</tr>
<tr>
<td>Switch Type</td>
<td>Double Throw</td>
</tr>
<tr>
<td>ATS Class</td>
<td>Class PC</td>
</tr>
<tr>
<td>Operation Life</td>
<td>Over 6000 Times W/L</td>
</tr>
<tr>
<td>Transfer Current</td>
<td>2.0A @ 220VAC</td>
</tr>
<tr>
<td>Remote Start</td>
<td>6A @ 277VAC Max</td>
</tr>
<tr>
<td>N &amp; E On</td>
<td>7A @ 250VAC Max</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>&lt;1W</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-10°C ~ 70°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20°C ~ 80°C</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>0 to 95%</td>
</tr>
<tr>
<td>Weight</td>
<td>1.8kg ±2%</td>
</tr>
</tbody>
</table>
### 4.6 System Setting Reference Table

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>SETTING</th>
<th>FACTORY SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is this ATS operator in 1Ø or 3Ø</td>
<td>01) 1Ø  02) 3Ø</td>
<td>02</td>
</tr>
<tr>
<td>2</td>
<td>TDNE – Time delay normal to emergency</td>
<td>00 ~ 99 sec</td>
<td>10sec</td>
</tr>
<tr>
<td>3</td>
<td>TDEN – Time delay emergency to normal</td>
<td>00 ~ 99 sec</td>
<td>10sec</td>
</tr>
<tr>
<td>4</td>
<td>TDES – Time delay engine start</td>
<td>00 ~ 30 sec</td>
<td>5sec</td>
</tr>
<tr>
<td>5</td>
<td>TDEC – Time delay engine cool-down</td>
<td>00 ~ 99 sec</td>
<td>60sec</td>
</tr>
<tr>
<td>6</td>
<td>TD-OFF – Time delay on OFF position</td>
<td>01 ~ 20 sec</td>
<td>5sec</td>
</tr>
<tr>
<td>7</td>
<td>Normal source over voltage setting</td>
<td>11 ~ 53 (110V ~530V)</td>
<td>25 (250V)</td>
</tr>
<tr>
<td>8</td>
<td>Normal source under voltage setting</td>
<td>08 ~ 47 (80V ~ 470V)</td>
<td>18 (180V)</td>
</tr>
<tr>
<td>9</td>
<td>Time delay if there is a problem with normal source voltage output</td>
<td>0 ~ 99sec (0 = Without volt monitor function)</td>
<td>10sec</td>
</tr>
<tr>
<td>10</td>
<td>Standby source over voltage setting</td>
<td>11 ~ 53 (110V ~530V)</td>
<td>25 (250V)</td>
</tr>
<tr>
<td>11</td>
<td>Standby source under voltage setting</td>
<td>08 ~ 47 (80V ~ 470V)</td>
<td>18 (180V)</td>
</tr>
<tr>
<td>12</td>
<td>Time delay if there is a problem with standby source voltage output</td>
<td>0 ~ 99sec (0 = Without volt monitor function)</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>Current day of week setting</td>
<td>01 ~ 07 (Monday to Sunday)</td>
<td>current</td>
</tr>
<tr>
<td>14</td>
<td>Current hour setting</td>
<td>00 ~ 23</td>
<td>current</td>
</tr>
<tr>
<td>15</td>
<td>Current minute setting</td>
<td>00 ~ 59</td>
<td>current</td>
</tr>
<tr>
<td>16</td>
<td>Plant exerciser test day of week</td>
<td>01 ~ 07 (Monday to Sunday)</td>
<td>06</td>
</tr>
<tr>
<td>17</td>
<td>Plant exerciser hour</td>
<td>00 ~ 23</td>
<td>12</td>
</tr>
<tr>
<td>18</td>
<td>Engine run time on exerciser</td>
<td>0 ~ 60 min (0 = Without exerciser function)</td>
<td>00</td>
</tr>
<tr>
<td>19</td>
<td>Exerciser cycle</td>
<td>01) Once a Week  02) Once every 2 weeks  03) Once every 3 Weeks  04) Once every 4 weeks</td>
<td>01</td>
</tr>
<tr>
<td>20</td>
<td>Plant exerciser test with or without load</td>
<td>01) Without load  02) With load</td>
<td>01</td>
</tr>
<tr>
<td>21</td>
<td>Plant Manual test with or without load</td>
<td>01) Without load  02) With load</td>
<td>02</td>
</tr>
</tbody>
</table>
SECTION 5 : INSTALLATION INSTRUCTIONS

5.1 General
The TC-V2 controller is modular and is designed for installation next to switch or on the front door panel. A longer harness is required for door installation.

5.2 Installation On The Plate
5.3 Installation On The Door Panel

STEP-1

STEP-2

STEP-3

STEP-4

STEP-5

STEP-6
SECTION 6: TYPICAL WIRING

6.1 TCS 3P125 Standard Wiring Diagram (220V)