

### Features

- ◆ For industrial, office and residential applications
- ◆ Ultracompact plastic housing
- ◆ Connection by spring clamp terminals or detachable screw terminal block
- ◆ Reliable snap-on mounting on DIN-rails
- ◆ Adaptor for wall mounting
- ◆ Universal input 85–264 VAC, 50/60 Hz
- ◆ Models with 5, 12, 24 & 48 VDC output
- ◆ Output voltage adjustable
- ◆ Power OK signal
- ◆ Low ripple and noise
- ◆ Overload and short-circuit protection
- ◆ Parallel operation possible
- ◆ Worldwide safety approvals
- ◆ Redundancy module
- ◆ 3-year product warranty



The TRACOPOWER TCL series is a family of DIN-rail power supplies with an excellent price/performance ratio. With tightly regulated output voltage and high immunity against electrical disturbances on the mains they provide a reliable power source for sensitive loads in industrial process controls, machine tools and other equipment exposed to a difficult industrial environment. Compact size, light weight, easy snap-on mounting on DIN-rails and the choice of two connection terminal versions are other features of these power supplies. The TCL series complies with all major safety standards for Europe (EN60950-1, EN50178), North America (UL/cUL 60950, UL 508C listed) or elsewhere in the world (CB-Report).

### Models

| Order Code   | Input Voltage Ranges                        | Output Power max. | *Output Voltage nom. | Output Current max. | Connection                          |
|--------------|---------------------------------------------|-------------------|----------------------|---------------------|-------------------------------------|
| TCL 024-105  | 85 – 264 VAC<br>Universal Input<br>50/60 Hz | 24 W              | 5.1 VDC              | 4.0 A               | Detachable screw<br>terminal blocks |
| TCL 024-112  |                                             |                   | 12 VDC               | 2.0 A               |                                     |
| TCL 024-124  |                                             |                   | 24 VDC               | 1.0 A               |                                     |
| TCL 060-112  |                                             | 60 W              | 12 VDC               | 4.0 A               |                                     |
| TCL 060-124  |                                             |                   | 24 VDC               | 2.5 A               |                                     |
| TCL 060-148  |                                             |                   | 48 VDC               | 1.25 A              |                                     |
| TCL 120-112  | 85 – 375 VDC                                | 120 W             | 12 VDC               | 8.0 A               |                                     |
| TCL 120-124  |                                             |                   | 24 VDC               | 5.0 A               |                                     |
| TCL 240-124  | 85-132/187-264 VAC                          | 240 W             | 24 VDC               | 10.0 A              |                                     |
| TCL 024-124C | 85 – 264 VAC<br>Universal Input<br>50/60 Hz | 24 W              | 24 VDC               | 1.0 A               | Spring clamp<br>terminals           |
| TCL 060-112C |                                             | 60 W              | 12 VDC               | 4.0 A               |                                     |
| TCL 060-124C |                                             |                   | 24 VDC               | 2.5 A               |                                     |
| TCL 060-148C |                                             |                   | 48 VDC               | 1.25 A              |                                     |
| TCL 120-112C | 85 – 375 VDC                                | 120 W             | 12 VDC               | 8.0 A               |                                     |
| TCL 120-124C |                                             |                   | 24 VDC               | 5.0 A               |                                     |

\* adjustable

## Input Specifications

|                                                                  |                                                                         |                                                                                                 |
|------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Input voltage range                                              |                                                                         | 85–264 VAC/85–375 VDC                                                                           |
|                                                                  | TCL 240 model:                                                          | 85–132/187–264 VAC autoselect (no DC input)                                                     |
| Output derating                                                  | – at operation between 85...93 VAC/85...130 VDC                         | 15% for TCL 060 & TCL 120<br>20% for TCL 024-112 & TCL 024-124 & TCL 240<br>30% for TCL 024-105 |
| Input frequency                                                  |                                                                         | 47–63 Hz                                                                                        |
| Harmonic limits                                                  |                                                                         | EN 61000-3-2, Class A                                                                           |
| Input current at full load (typ.) (115 VAC / 230 VAC)            | TCL 024 models:<br>TCL 060 models:<br>TCL 120 models:<br>TCL 240 model: | 0.35 A / 0.2 A<br>1.2 A / 0.6 A<br>2.0 A / 1.0 A<br>3.3 A / 1.7 A                               |
| Recommended circuit breaker (characteristic C or slow blow fuse) |                                                                         | 5.0 A                                                                                           |

## Output Specifications

|                                                                  |                                                                      |                                                                                                                                  |
|------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Output voltage adjustable range<br>(potentiometer on frontpanel) | 5.1 VDC model:<br>12 VDC models:<br>24 VDC models:<br>48 VDC models: | 5.0 – 5.25 VDC<br>12 – 15 VDC (12 - 16 VDC for TCL 024-112)<br>24 – 28 VDC<br>48 – 56 VDC                                        |
| Output regulation (10 to 90% load variation)                     |                                                                      | 2.5 % (1 % for TCL 60-112)                                                                                                       |
| Ripple and noise (20MHz bandwidth)                               |                                                                      | <50 mV pk-pk                                                                                                                     |
| Electronic short circuit protection                              |                                                                      | current limitation at 120 % typ.<br>(constant current, automatic recovery<br>TCL 24 models: foldback, automatic recovery)        |
| Parallel operation                                               |                                                                      | output current characteristic suitable for<br>parallel operation of max. 5 units<br>(not for TCL 240-124)                        |
| Overvoltage protection, trigger point                            | 5.1 VDC model:<br>12/24 VDC models:<br>48 VDC models:                | <6.5 VDC<br><40 VDC<br><60 VDC                                                                                                   |
| Hold-up time (115 VAC / 230 VAC)                                 |                                                                      | min. 15 ms / min. 125 ms                                                                                                         |
| Power OK signal (TCL 60 & TCL 120 only)                          | trigger point<br>12 VDC models:<br>24 VDC models:<br>48 VDC models:  | output signal<br>(reference to – Vout)<br>11.0 V ±1.0 V / 60 mA max.<br>22.0 V ±2.0 V / 30 mA max.<br>44.0 V ±4.0 V / 15 mA max. |

## General Specifications

|                           |                                                                                                                              |                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| Temperature ranges        | – Operating<br>– Storage (non operating)                                                                                     | –10°C to +70°C max.<br>–25°C to +85°C                          |
| Temperature derating      | – at 187...264 VAC or 265...375 VDC operation<br>– at 93...132 VAC or 130...187 VDC operation<br>– at 85...130 VDC operation | 1.7 %/K above 50°C<br>1.1 %/K above 40°C<br>1.3 %/K above 30°C |
| Humidity (non condensing) |                                                                                                                              | 95 % rel. H max.                                               |
| Temperature coefficient   |                                                                                                                              | 0.02 %/K                                                       |
| Switching frequency       |                                                                                                                              | 55 – 180 kHz depending on load<br>(frequency modulation)       |
| Efficiency                |                                                                                                                              | 88 % typ.                                                      |

## General Specifications

|                                                                  |                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reliability, calculated MTBF at +25°C<br>(according to IEC-1709) |                                                                                                                                                                                                                                                                                                          | TCL 024 models: >2.68 Mio h<br>TCL 060 models: >2.94 Mio h<br>TCL 120 models: >1.62 Mio h (TCL 240 tbd.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Safety standards                                                 | <ul style="list-style-type: none"> <li>– Information technology equipment</li> <li>– Industrial control equipment</li> <li>– Electronic equipment for power installation</li> <li>– Electrical equipment for machines</li> <li>– Safety transformers for SMPS</li> <li>– Limited power source</li> </ul> | IEC 60950-1, EN 60950-1 (output SELV),<br>UL Std. 60950-1 (2nd Edition) +Am1:2011,<br>CAN/CSA-C22.2 No. 60950-1-07 +Am1:2011<br>UL 508<br>EN 50178<br>EN 60204<br>EN 61558-2-16<br>NEC Class 2 (TCL 60 models only)                                                                                                                                                                                                                                                                                                                                                           |
| Safety approvals                                                 | <ul style="list-style-type: none"> <li>– CB test certificate (IEC 60950-1)</li> <li>– UL approval</li> <li>– UL approval</li> <li>– CSA certification</li> <li>– BG certificate (by SIQ)</li> </ul>                                                                                                      | <a href="http://www.tracopower.com/products/tcl-cb.pdf">www.tracopower.com/products/tcl-cb.pdf</a><br>UL 508C listed, CSA C22.2 No. 14<br>File e210002<br><a href="http://www.ul.com">www.ul.com</a> -> certifications<br>UL 60950, File e181381 (except TCL 240)<br><a href="http://www.ul.com">www.ul.com</a> -> certifications<br>UL 60950-1, CSA 60950-1-03<br><a href="http://www.tracopower.com/products/tcl-csa.pdf">www.tracopower.com/products/tcl-csa.pdf</a><br><a href="http://www.tracopower.com/products/tcl-bg.pdf">www.tracopower.com/products/tcl-bg.pdf</a> |
| Environmental compliance                                         | <ul style="list-style-type: none"> <li>– Reach</li> <li>– RoHS</li> </ul>                                                                                                                                                                                                                                | <a href="http://www.tracopower.com/products/tcl-reach.pdf">www.tracopower.com/products/tcl-reach.pdf</a><br>RoHS directive 2011/65/EU                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Electromagnetic compatibility (EMC), emissions                   |                                                                                                                                                                                                                                                                                                          | EN 61000-6-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Electromagnetic compatibility (EMC), immunity                    | <ul style="list-style-type: none"> <li>– Voltage sag immunity</li> </ul>                                                                                                                                                                                                                                 | EN 61000-6-2<br><a href="http://www.tracopower.com/products/tcl-semiF47.pdf">www.tracopower.com/products/tcl-semiF47.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Safety class                                                     |                                                                                                                                                                                                                                                                                                          | degree of protection class 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Case protection                                                  |                                                                                                                                                                                                                                                                                                          | IP 20 (IEC 60529)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Enclosure material                                               |                                                                                                                                                                                                                                                                                                          | plastic 94V-0 rated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Mounting                                                         |                                                                                                                                                                                                                                                                                                          | DIN-rails as per EN 50022-35x15/7.5<br>(snap-on with self-locking spring)<br>Adapter for wall-/chassis mounting (included)                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Options                                                          |                                                                                                                                                                                                                                                                                                          | output characteristic optimized for battery charging available on request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Installation instructions                                        |                                                                                                                                                                                                                                                                                                          | <a href="http://www.tracopower.com/products/tcl-inst.pdf">www.tracopower.com/products/tcl-inst.pdf</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

## TCL-REM240 Redundancy Module

This module enables redundant operation of any two TCL models by decoupling the 2 power supplies. It can also be used to separate sensitive loads from the main power source.



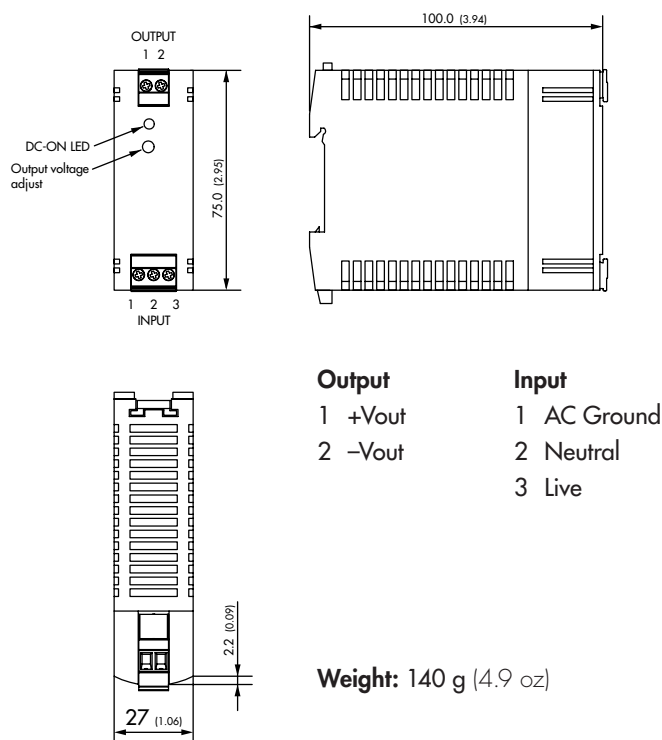
| Order Code | Nominal Input Voltage | Input Voltage Range | Max Power per Input | Output Voltage     | Output Current max. |
|------------|-----------------------|---------------------|---------------------|--------------------|---------------------|
| TCL-REM240 | 5...48 VDC            | 5...60 VDC          | 200 W               | $V_{in} - 0.9$ VDC | 8 A                 |

## Specifications

|                               |                                                                                                                |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|
| Operating temperature         | -10°C to +70°C max. (14°F ... +158°F)<br>derating above +40°C (104°F): 1.5 %/K                                 |
| Electromagnetic compatibility | in correspondence to connected units<br>(no internal switching device)                                         |
| Dimensions                    | same as model TCL 024 (see page 4)                                                                             |
| Connection                    | detachable screw terminal block                                                                                |
| Installation instructions     | <a href="http://www.tracopower.com/products/tcl-rem-inst.pdf">www.tracopower.com/products/tcl-rem-inst.pdf</a> |

## Case Dimensions

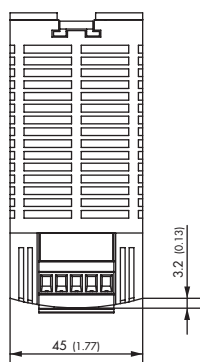
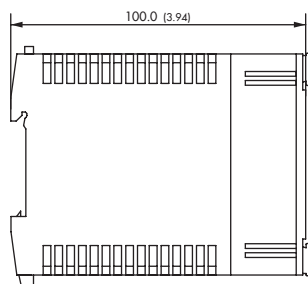
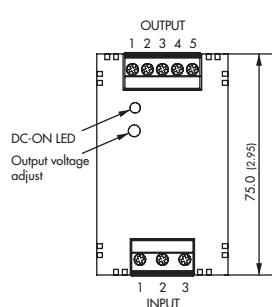
### TCL 024 and TCL-REM240 models



Dimensions in [mm], ( ) = Inch  
 Tolerances:  $\pm 0.5$  mm ( $\pm 0.02$ )

## Case Dimensions

### TCL 60 models



#### Output

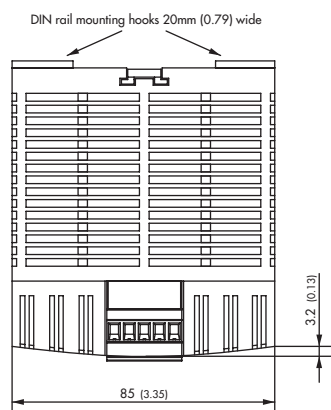
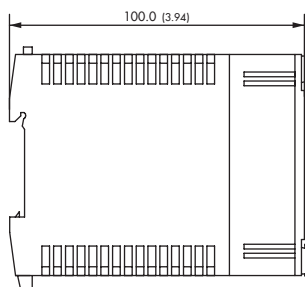
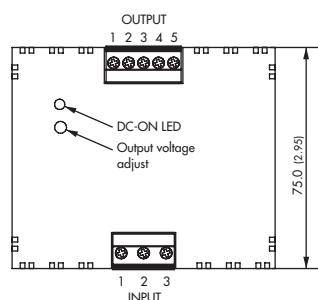
- 1 +Vout
- 2 +Vout
- 3 -Vout
- 4 -Vout
- 5 Power OK

#### Input

- 1 AC Ground
- 2 Neutral
- 3 Live

**Weight:** 265 g (9.4 oz)

### TCL 120 models



#### Output

- 1 +Vout
- 2 +Vout
- 3 -Vout
- 4 -Vout
- 5 Power OK

#### Input

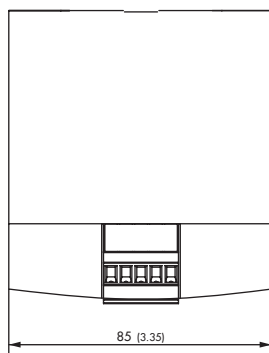
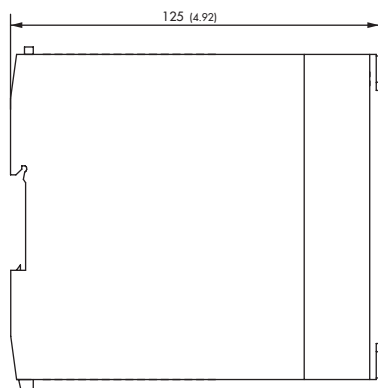
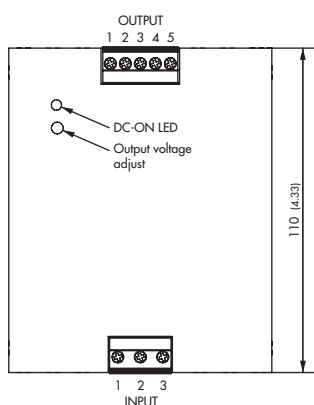
- 1 AC Ground
- 2 Neutral
- 3 Live

**Weight:** 440 g (15.5 oz)

Dimensions in [mm], ( ) = Inch  
Tolerances:  $\pm 0.5$  mm ( $\pm 0.02$ )

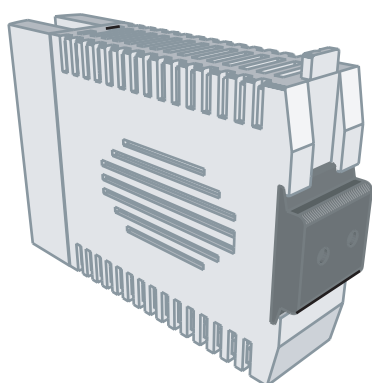
## Case Dimensions

### TCL 240 model



| Output     | Input       |
|------------|-------------|
| 1 +Vout    | 1 AC Ground |
| 2 +Vout    | 2 Neutral   |
| 3 -Vout    | 3 Live      |
| 4 -Vout    |             |
| 5 Power OK |             |

**Weight:** 950 g (33.5 oz)



#### Wall Mounting Bracket

Instead on a DIN-rail, the modules can be also mounted on a chassis or wall with help of a mounting bracket which is supplied as standard with each power supply

Dimensions in [mm], ( ) = Inch  
Tolerances:  $\pm 0.5$  mm ( $\pm 0.02$ )