

# TPCC MANUAL

ENGLISH VERSION



PSI  
Technics



000500 999000



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**TECHNICAL  
DOCUMENTATION**

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**Thermo Protection  
Cooling Case**

**MODELS**

**TPCC/DM  
TPCC/T/DM  
TPCC/CLV  
TPCC/LMS**



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## Changes and Revisions

Table 1: Changes and Revisions

Ver.	Date	Author	Changes	Revision
1.09	02/23/2011	J. Geukes	Modification	J. Geukes
1.10	05/09/2011	A. Neumann	Modification	J. Geukes
2.00	07/30/2012	M. Speich	New Version	M. Niecking
2.01	08/28/2012	M. Speich	Modification	J. Geukes
2.02	12/28/2012	J. Geukes	Modification	J. Geukes
2.03	05/10/2013	J. Geukes	Modification	J. Geukes
2.04	06/29/2013	J. Geukes	Cable Feed Update	J. Geukes
3.00	12/11/2013	M. Henn	Combined version	J. Geukes
3.10	09/16/2014	G. Holzbach	Board Update	J. Geukes
3.20	11/06/2014	G. Holzbach	Error Monitoring Update	J. Geukes
3.21	10/21/2015	G. Holzbach	Modification	J. Geukes
3.22	03/03/2016	G. Holzbach	Modification	G. Holzbach
3.3	04/06/2016	G. Holzbach	New Company Structure	G. Holzbach
3.4	10/04/2017	G. Holzbach	Update Device	G. Holzbach
3.4.2	11/17/2017	G. Holzbach	Modification	G. Holzbach
3.4.3	09/14/2018	G. Holzbach	Modification	G. Holzbach
3.4.4	12/18/2018	G. Holzbach	Error Monitoring Update	G. Holzbach

# Preface

## Welcome to PSI Technics

Thank you for choosing the PSI Technics Thermo Protection Cooling Case (TPCC). The TPCC Professional is a thermal protection system specifically designed for protecting sensors that are used in high-temperature environments. It was designed for use with a variety of sensors that are used in industrial applications, such as laser distance meters and data light barriers. The TPCC is made of state-of-the-art materials and equipped with temperature controls. It is an extremely powerful system, based on state-of-the-art technology with thermoelectric components.

Industrial environments are often subject to very harsh conditions, such as dust, humidity or extreme temperatures. These conditions, however, are rarely considered during the development of sensors and structural components. Excessive temperatures can cause electronic components and sensors to malfunction. Most often, these components and sensors play a critical role in production processes and failures or malfunctions can result in extremely costly outages.

PSI Technics addressed this problem by developing the TPCC product family. The TPCC product range comprises powerful solutions that prevent temperature-induced sensor failures.

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# 1 Introduction

This user manual describes different models of PSI Technics' "Thermo Protection Cooling Case" with thermostatic control. Although a variety of sensors can be used with the TPCC, this manual focuses on the use of SICK DMT-DML, DME3000/4000/5000 DL100 Pro, Dx1000, DS/DT500, WL12G, Lector® 620/ICR620, CLV631/CLV609, LMS400 and DL/DT20 sensors.

## 1.1 Overview

This technical documentation is an important tool for installing and using PSI Technics' TPCC Professional System. It is designed for technically trained staff and is aimed at facilitating the installation and use of the system.



**Warning** - A warning indicates situations that could lead to potential damage. Read this information carefully to prevent damage, errors or malfunctions.

Prior to installing and using the TPCC, PSI Technics recommends analyzing the environmental conditions at the operating site. To support this process, PSI Technics offers a thermal imaging spot analysis using a thermal imaging camera as well as a long-term temperature analysis that lasts over a period of several days.



**NOTE** - Inspect each shipment immediately upon receipt and report any damages to PSI Technics.

## 2 TPCC Professional

### 2.1 General Description

The TPCC Professional System consists of the Thermo Protection Cooling Case. It extends the sensors' application range to an environmental temperature of 176°F (+80°C).

The sensor is mounted on adapter plates that are specific to the sensor (as shown in the Appendix, Figures 25-36) and must be installed inside the TPCC Professional housing. The compact form of the TPCC allows for easy installation on site. When the TPCC is operated within the admissible ambient temperature range, the sensor will be kept at a permissible operating temperature at all times.

Different models of the TPCC Professional System are available (see Table 2). The appropriate version depends on the type of sensor you are using.

The TPCC/T/DM model is used for SICK DMT/DML distance meters. The differentiating feature of the 'T' model is the front pane that is mounted inside the tube and is tilted along the beam axis. This construction ensures a smooth operation of SICK DMT/DML sensors. The bottom of the tube has a small outlet hole that allows condensation to escape. The tube is integrated into the upper part of the 'T' model housing.

Table 2 below contains an overview of the TPCC models that can be used for the different sensors described in this manual. The glass panel for the sensor assembly is located either at the front or at the top of the corresponding TPCC model housing.

Table 2: Overview of Sensors and Corresponding TPCC Models

Sensor	DM	T/DM	CLV	LMS
SICK DMT-DML	X	X		
SICK DME3000 / DME4000/DME5000	X			
SICK DL100 Pro	X			
SICK Dx1000	X			
SICK DS/DT500	X			
SICK WLG12	X			
SICK Lector <sup>®</sup> 620 Professional / ICR 620	X			
SICK CLV631/CLV690			X	
SICK LMS400				X
SICK DL/DT20	X			

### 2.1.1 Package Contents

The TPCC includes the following standard components:

- Lower housing with cooling unit
- Sensor-specific upper housing
- Adapter plate for mounting the sensor
- Sensor mounting screws for adapter plate
- Solid state relay (SSR) for wear-free cooling control
- Dessicant bag
- Different types of cable feeds (4 types)
  - 1 40 x 40 mm cable feed with large feed-through
  - 2 20 x 20 mm cable feeds with large feed-through
  - 1 20 x 20 mm cable feed with small feed-through
  - 3 20 x 20 mm cable feeds without feed-through



**NOTE** - Please note that the mounting screws for installing the TPCC in the customer's facility are NOT part of the delivery, since the mounting screws depend on the installation and may vary. However, the TPCC can generally be mounted on the clamping and alignment bracket using three M10 screws (see Figure 9 in section 2.3).

**In addition, the following components can be ordered for a particular sensor:**

- 24VDC/20 power supply
- Circuit breaker
- TPCC cable (YSLYCY 7 x 1.5 mm<sup>2</sup>)
- Sensor cable
- Sensor connectors
- Installation kit  
(includes all required components for operating the TPCC)
  - Power supply
  - Fuse
  - Terminal board
  - Single-core cable
  - Grounding bar with mount
  - Shielding terminal



**NOTE** - If a particular item that you would like to order is not listed in the specifications section or on the fax order form, please send an email to [info@psi-technics.com](mailto:info@psi-technics.com), we will provide the corresponding order details.

## 2.1.2 Product Specifications

**TPCC Specifications:** The protective case for industrial use is made of lightweight material (Polyamide-6) that provides excellent damping and insulation properties. The TPCC provides:

- Easy installation and alignment of the Y/Z axes
- 24V power supply
- Automatic deactivation at excessive temperatures (over-temperature shutdown)
- Operating temperature range: -40°F to 176°F (-40°C to +80°C)
- SKINTOP<sup>®</sup> CUBE Screw-type terminal block cable feeds
- Designed for industrial applications
- Thermostatic Control
- Weight: 15.43 lbs (7 kg)
- IP protection: IPX5 when mounted horizontally

### Available as an option:

- Error message in case of over-temperature shutdown, isolated switching contact
- Error message when one or both fans are failing, isolated switching contact

### 2.1.3 TPCC Front

The main feature at the front of the TPCC/DM is the centered protective glass panel (or the tube mounted in the TPCC/T/DM). The TPCC/CLV, and TPCC/LMS models have a closed front and the glass panel is located at the top of the TPCC housing. The protective glass panel is the opening the sensor uses for data collection and for calculating distances or reading data. The glass panel should be cleaned on a regular basis to avoid measurement errors or error messages. In addition, the sensor's working range must be taken into account when mounting the TPCC.



**NOTE** - Inspect each shipment immediately upon receipt and report any damages to PSI Technics.



**Warning** - During transport, the glass panel of the TPCC/DM, TPCC/CLV and TPCC/LMS models is protected by a cover. This cover must be removed prior to installing the TPCC Professional System. The TPCC/T/DM version does not require a separate protective cover as the housing design provides adequate protection for the glass panel during transport. The air supply holes shown in Figure 5 and the air vent holes shown in Figures 1, 2 and 4 must be kept clean and free of obstructions at all times during operation.



**Warning** - During operation, a laser beam is emitted through the glass panel. To prevent potential eye injuries, never look directly at the glass panel or through it while the device is running.



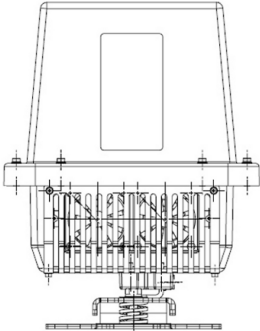


Figure 1: TPCC/DM Front

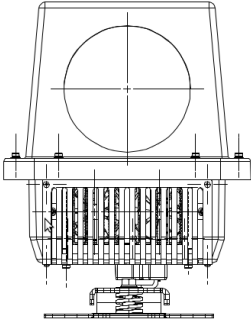


Figure 2: TPCC/T/DM Front

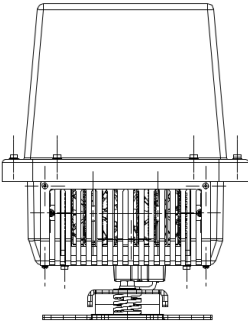


Figure 3: TPCC/CLV & TPCC/LMS Front

### 2.1.4 Top View

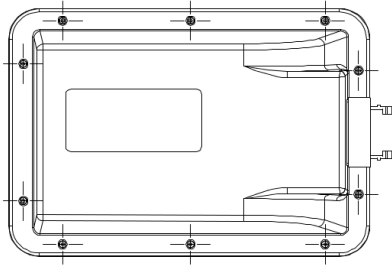


Figure 4: TPCC/CLV & TPCC/LMS Top View

### 2.1.5 Back

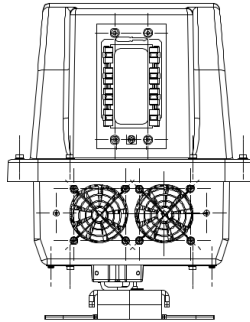


Figure 5: TPCC Back - All Models

The SKINTOP<sup>®</sup> CUBE screw-type terminal block cable feeds that supply power to the TPCC and the enclosed sensor are located at the back of the TPCC housing. The SKINTOP<sup>®</sup> CUBE cable feed system can be customized depending on the number of required cable feeds. Unused terminal blocks must be protected with a blind cap (see Section 2.4.4). The air vent and air supply holes are located underneath the terminal blocks.



**Warning** - The air vent and air supply holes must be kept clean and free of obstructions. Do not place any objects inside these holes.

### 2.1.6 TPCC Dimensions

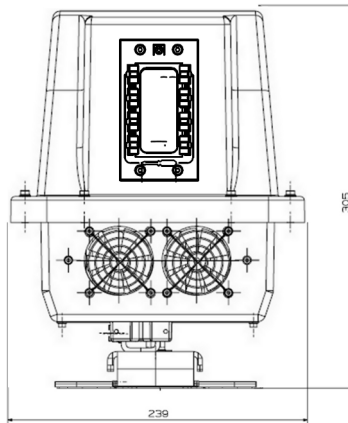


Figure 6: TPCC Back View - All Models

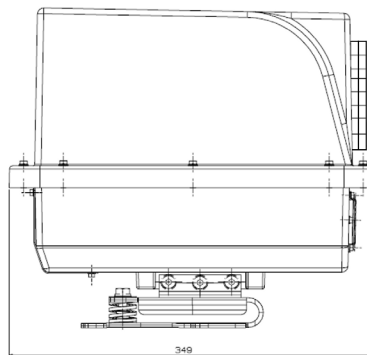


Figure 7: TPCC/DM and CLV Models - Side View

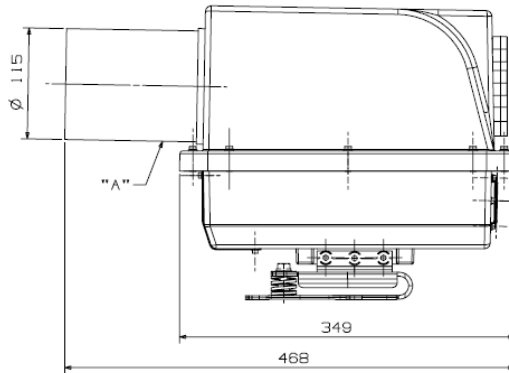


Figure 8: TPCC/T/DM with Tube - Side View

An aperture ('A') in the TPCC/T/DM model with a diameter of 5 mm at the bottom of the tube in front of the glass pane permits condensation to escape, as shown in Figure 8.



**Warning** - Aperture ('A') should be checked on a regular basis and kept free of obstructions.

## 2.2 Safety

### 2.2.1 Safety Overview



**Warning** - For your own safety, please read the following warnings carefully before using the system. Always keep this manual at hand for easy reference. To prevent personal injuries and property damage, strictly follow all instructions and procedures described in this manual. The system is an electromechanical device and may malfunction. To prevent potential malfunctions, appropriate safety measures must be taken prior to installing and operating the TPCC. This is especially important for systems that are critical for production.



**Warning** - The internal components are sensitive to static electricity. Never modify, disassemble or repair the system yourself. All modifications must be performed by authorized service personnel.



**Warning** - The system must be correctly installed, mounted and connected prior to initial operation.

### 2.2.2 Cabling



**Warning** - Always turn off the TPCC before connecting or removing any feeds or cables to avoid potential damage.

### 2.2.3 Transport



**Warning** - Only transport the TPCC inside the specially designed cover. Use the sturdy cardboard cover to transport the TPCC. Proper packaging ensures that the TPCC is protected from damage during transport.

### 2.2.4 TPCC Glass Pane



**Warning** - All TPCC models (except the TPCC/T/DM) have a protective film on both sides of the glass pane. Remove the protective films prior to operating the TPCC. The glass pane of the TPCC/T/DM does not require a protective film as the integrated tube provides sufficient protection.

### 2.2.5 Environmental Specifications

- Operating temperature: -40°F to 167°F (-40°C to +75°C)  
(Up to 176°F (+80°C) for about 1 hour)
- Storage temperature: -40°F to 122°F (-40°C to +50°C)



**Warning** - Ensure that the mounted sensor/device match the environmental specifications of the application case to avoid failures.

### 2.2.6 Power Supply

- Rated voltage: 24 VDC
- Operating current: 11 A maximum

### 2.2.7 Electromagnetic Interference (EMI)

#### Electric Welding



**Warning** - Electric welding creates an electromagnetic field. This electromagnetic field induces a strong electromagnetic noise. Remove all TPCC feeds and cable connections prior to performing electric welding close to the device.



**Warning** - Always disconnect the power supply prior to performing any welding on the housing.



## 2.2.8 Maintenance

Depending on the operating conditions of the TPCC Professional, the TPCC's cooling element should be inspected and cleaned every six months. A cooling element that is clogged with dirt can obstruct the airflow and affect the TPCC's cooling performance. Use canned compressed air with a small air nozzle that can be inserted via the fan vent holes to clean the cooling element. This also ensures that the fans are protected against over-revving that could be caused by a compressed air blast.



**Warning** - Disconnect the TPCC from the power supply prior to performing maintenance on the housing.



**Warning** - Ensure that the fans are working properly after the cooling element has been cleaned.

## 2.3 Mechanical Installation and Alignment

### 2.3.1 Mounting the TPCC Using Threaded Holes

1. The clamping and alignment bracket is already attached to the TPCC. To mount the TPCC with the alignment bracket, drill 3 holes into the mounting surface (diameter ( $\varnothing$ ) 8.5 mm) to hold the clamping and alignment bracket (shown in Figure 9).
2. Tap the three drill holes (M10).
3. Insert screws, washers and spring rings (not included) and lightly tighten the screws, as shown in Figure 9.
4. Align the TPCC.
5. After aligning the TPCC, securely tighten the screws with a torque wrench.

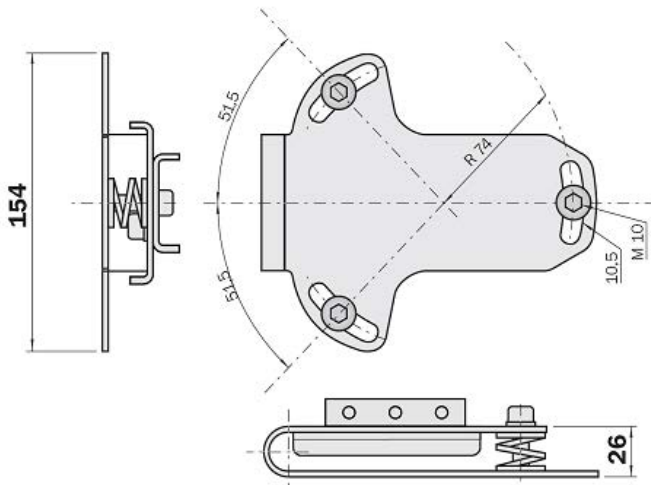


Figure 9: Mounting the TPCC

### 2.3.2 Mounting the TPCC Using Clearance Holes

1. The clamping and alignment bracket is already attached to the TPCC. To mount the TPCC with the alignment bracket, drill 3 holes into the mounting surface ( $\varnothing$  10.5 mm) to hold the clamping and alignment bracket (shown in Figure 9).
2. Insert and lightly tighten the screws (1), washers (4), spring rings (5) and nuts (6), as shown in Figure 10 (2=Mounting area, 3=Clamping and alignment bracket). Please note that the mounting components are not included and must be ordered separately.
3. Align the TPCC.
4. After aligning the TPCC, securely tighten the screws with a torque wrench.

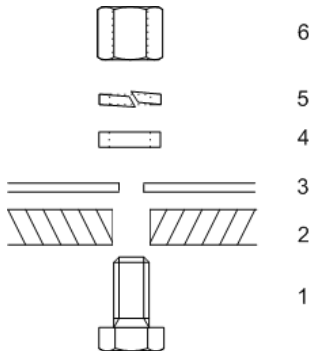


Figure 10: Mounting the TPCC Using Clearance Holes

### 2.3.3 Installing the Upper Housing

After mounting the sensor inside the TPCC according to the mounting instructions provided in Appendix A, the TPCC's upper housing must be mounted on the lower housing. The screws of the upper housing must first be hand-tightened and then tightened with a torque of  $1Nm$  using a torque wrench to ensure that the device is protected to IPX5.



**Warning** - The TPCC is only protected to IPX5 when mounted horizontally. If the TPCC needs to be mounted in a different position an appropriate mechanical protection must be used to protect the air outlet from spray water.

### 2.3.4 Aligning the TPCC for Use with Optical Sensors

Mount the TPCC so that the sensor beam always hits the center of the object or reflector, regardless of the distance from the TPCC. For additional information on aligning the sensor, please refer to the corresponding documentation of the sensor manufacturer.

## 2.4 Wiring

### General

All cables leading from the TPCC Professional system to the temperature controls must be installed safely and securely. Only cables that are appropriate for use with the TPCC Professional system should be connected to the device.



**Warning** - The existing board has been replaced with a new version (Rev. 2). The schematics and wiring information on the following pages refer to this new board. It will be shipped as a default board with all TPCC models starting **August 2014**.

The old and new board versions are shown in the pictures below. For TPCC models that were ordered prior to August 2014 and include an old board version, please use the wiring schematic for the old board in the manual version that was included in your shipment.

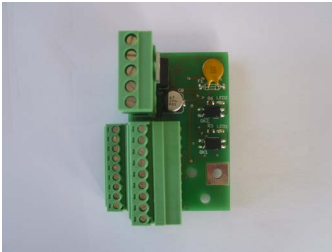


Figure 11: New Board

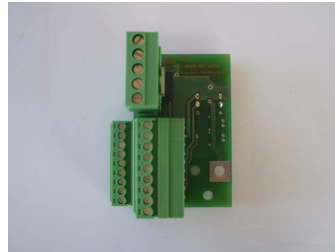


Figure 12: Old Board

Figure 13 contains a schematic representation of the TPCC Professional wiring.

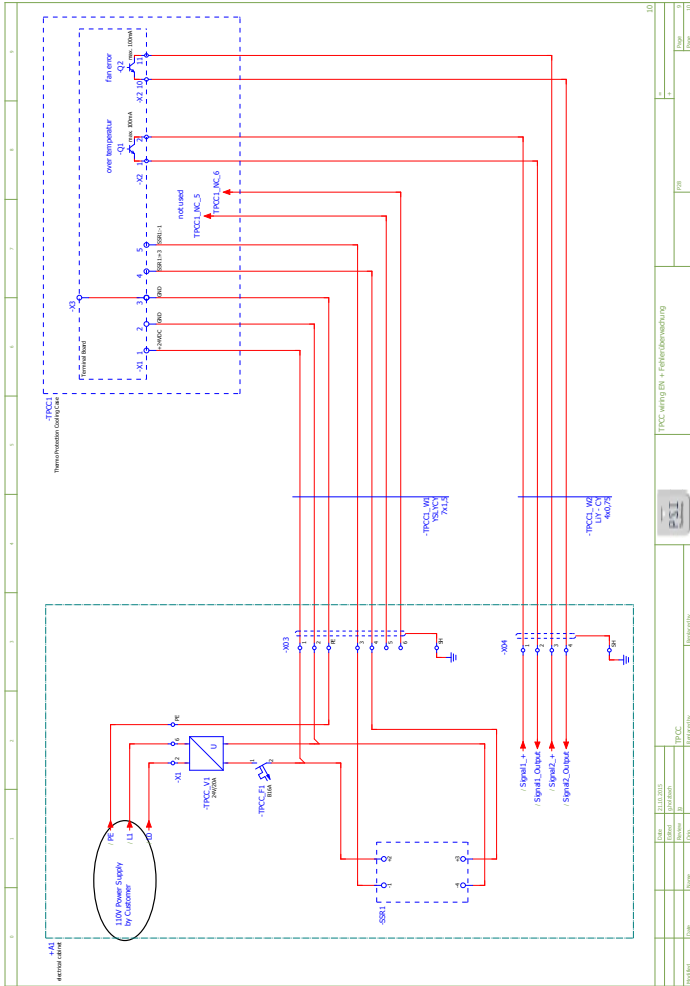


Figure 13: TPCC Professional Wiring

### **2.4.1 Cables**

### **2.4.2 Power Supply**

Feed the power supply cable through the cable screw located at the bottom of the back housing.

- Recommended cable: YSLYCY 7 x 1.5 mm<sup>2</sup>

Ensure that the +24 VDC feed has the right polarity to avoid damaging the components. Cable length is limited to 82 ft (25 m).

### **2.4.3 Cable Connections**

1. To connect the cables, remove the top of the TPCC housing.
2. Feed the cables through the screw-type cable feed connections and connect them to the terminal block. For additional information, please refer to sections 2.4.4, 2.4.5, 2.4.6 and 2.4.8 in this manual.

## 2.4.4 Cable Feeds

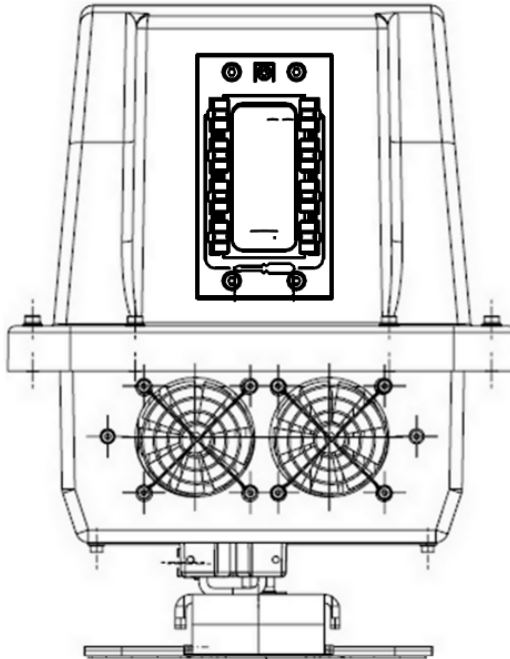


Figure 14: Cable Feeds at the Back of the TPCC Housing

The TPCC models have a modular SKINTOP<sup>®</sup> CUBE cable feed. The 40x40mm gasket must be used for the power supply cable feed. Several gasket inserts for the sensor cable feeds are included in the delivery. Unused feeds must be protected with corresponding blind caps to ensure that the device is protected to IPX5.



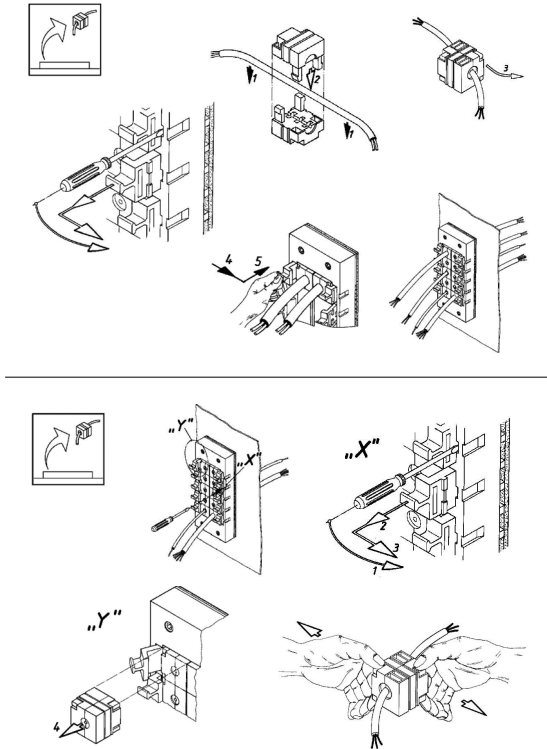


Figure 15: Cable Feeds and Frame Installation Overview

SKINTOP<sup>®</sup> CUBE screw-type terminal block cable feeds consist of two parts (clip modules) that are positioned around the cable and pushed together until the parts click into place. The cable feeds are positioned inside the corresponding frame and secured to the frame with the clamping brackets.

To remove the cables, proceed in reverse order. To remove the clip modules from the cable, the holding clips of the clip modules must first be unlatched, then the clip modules must be pulled apart.

## 2.4.5 Connecting the Cables

### Connecting the Cables to the Terminal Board

The terminal board contains the connections for the +24VDC power supply, the GND connector and the switch contact for the solid-state relay (X1, see Figure 16).

It also contains the connections for the cooling elements, fans and temperature monitoring (X2, see Figure 16), the optional error outputs, a protective circuit that protects the sensor from transient interference such as surges or bursts, and a separate ground connection (X3, see Figure 16).

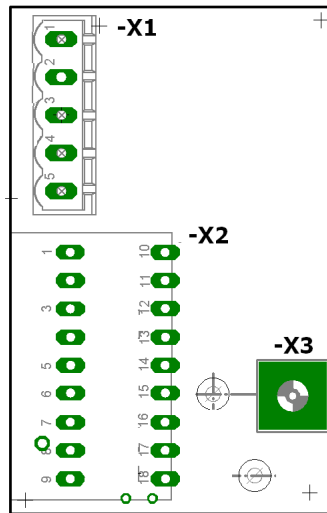


Figure 16: Terminal Board

### 2.4.6 Pin Allocation

Figure 17 shows the terminal board pin allocation.

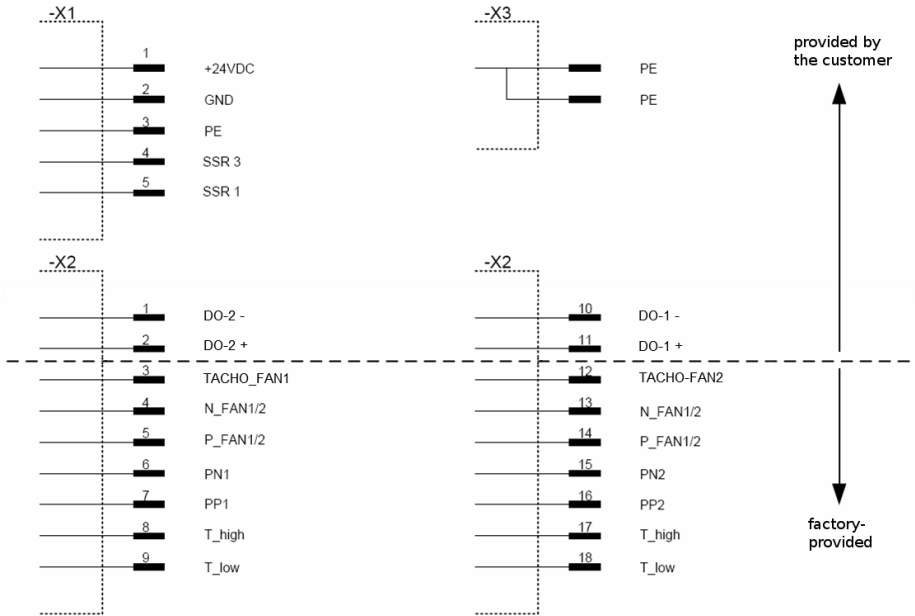


Figure 17: Terminal Board Pin Allocation

+24VDC, GND and PE on terminal -X1 are the power supply connections of the TPCC Professional and must be connected according to the diagram shown in Figure 17. Except for the optional error monitoring described in section 2.4.7 the pins on terminal -X2 are connected by PSI Technics. Terminal -X3 is used to ground the TPCC's aluminum profile. It is connected with the adapter plate mounting screws and does not have to be connected separately. Please note that the labels SSR1, SSR2, and SSR3 refer to the terminal for the solid-state relay.

### 2.4.7 Error Monitoring (optional)

The TPCC enables integrated error monitoring for the fans and the over-temperature set point.

Potential errors can be read from an transistor output (100mA maximum output) on terminal block X2. In addition, the board has two red indicator LEDs that indicate a fault status. The different switching states are described in the table below.

Table 3: Error Monitoring Switching States

<b>Error</b>	<b>Output 1</b>	<b>Output 2</b>	<b>LED1</b>	<b>LED2</b>
No Fault	Locked	Locked	ON	ON
Fan 1 defective	Switched	x	OFF	x
Fan 2 defective	Switched	x	OFF	x
Fans 1 and 2 defective	Switched	x	OFF	x
Over-temperature	x	Switched	x	OFF

- Error output 1 (terminal X2:11 - X2:10) transmits an over-temperature error.
- Error output 2 (terminal X2:2 - X2:1) transmits a failure of one or both fans.

If these signals should be monitored by a PLC, please use the connection diagram in Figure 17.

### 2.4.8 Connecting the Solid-state Relay

Connect the solid-state relay (SSR) as shown in the following Figure. The SSR LED indicates the SSR operating state. When the LED lights up the SSR output is connected and the TPCC is operating in cooling mode. When the LED is not illuminated the interior temperature of the TPCC is either below the minimum threshold of 86°F (+30°C) or above the maximum threshold of 122°F (+50°C). The minimum threshold protects the laser distance meter from being cooled down too much; the maximum threshold protects the laser distance meter from overheating.

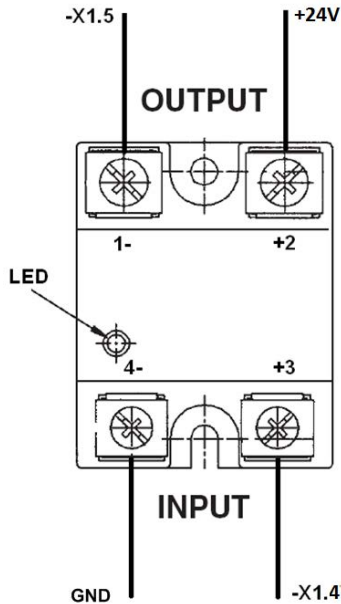


Figure 18: Connecting the Solid-state Relay

### 2.4.9 Installing the Solid-state Relay

The solid-state relay should be installed in a freely accessible location within the control cabinet. Use the mounting holes shown in Figure 19 to install the solid-state relay inside the cabinet.

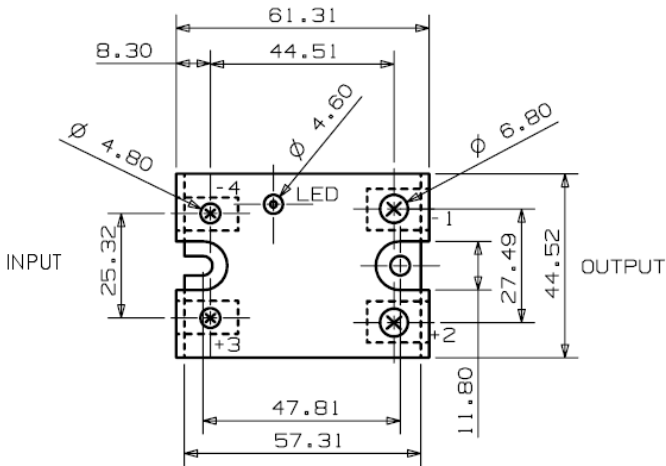


Figure 19: Installing the Solid-state Relay

## 2.5 Operating the TPCC

The system can be operated once the installation is complete. To guarantee a smooth operation of the TPCC Professional System, the system should be commissioned by authorized service personnel or by specifically trained personnel.



**Warning** - The TPCC models are only protected to IPX5 when mounted horizontally. If the TPCC needs to be mounted in a different position an appropriate mechanical protection must be used to protect the air outlet from spray water.



**Warning** - Prior to operating the TPCC, ensure that all cables are properly connected as shown in the connection diagrams in section 2.4.5. After all of the connections have been checked and are properly connected, the system can be switched on.



**Warning** - To ensure that the device is protected to IPX5 the screws that secure the upper housing to the lower housing must be tightened with a torque of  $1Nm$  using a torque wrench.

### **2.5.1 SICK DME3000/4000/5000 Distance Meters**

When using SICK DME3000/4000/5000 sensors, ensure that the lateral guide plates of the TPCC mount lie flat against the sensor. Mount the sensor according to the instructions in Appendix A, Figures 26 and 25.

### **2.5.2 SICK DS/DT500 Distance Meters**

For mounting SICK DS/DT500 sensors, please refer to the instructions in Appendix A, Figure 27.

### **2.5.3 SICK DMT-DML Distance Meters**

When using a SICK DMT-DML sensor, blanking should be enabled. Blanking is used to ignore objects that are located directly in front of the sensor to avoid measurement errors that can be caused by dirt on the glass pane and to ensure accurate readings even when the glass pane is slightly dirty. When blanking is enabled, the specified sensor data will be collected at a minimum range of 2.0 m. Mount the sensor according to the instructions in Appendix A, Figure 28.

### **2.5.4 SICK DL100 Pro Distance Meters**

When using a SICK DL100 Pro distance meter a 90-degree angle connector must be used to connect the sensor. Mount the sensor according to the instructions in Appendix A, Figure 29.

### **2.5.5 SICK CLV631/690 Bar Code Scanners**

When using SICK CLV631/690 sensors, ensure that the lateral guide plates of the TPCC mount lie flat against the sensor. Mount the sensor according to the instructions in Appendix A, Figures 31 and 32.

### **2.5.6 SICK LMS400 Distance Meters**

When using a SICK LMS400 sensor, ensure that the lateral guide plates of the TPCC mount lie flat against the sensor. Mount the sensor according to the instructions in Appendix A, Figure 33.



### **2.5.7 SICK WL12G Reflex Sensor**

When using a SICK WL12G reflex sensor, the sensor's transmission power must be adjusted using the sensor potentiometer. The sensor has a switching threshold at a measurement signal damping of 8%. The TPCC's glass panel has a transmission percentage of 98% at the corresponding signal wavelength range. Mount the sensor according to the instructions in Appendix A, Figure 34.

### **2.5.8 SICK Lector<sup>®</sup>620 Professional / ICR620 Bar Code Reader**

When using a SICK ICR620 sensor the internal sensor light must be adjusted to prevent it from reflecting on the TPCC's glass panel. It may be necessary to disable the internal sensor light and use an external light instead. Mount the sensor according to the instructions in Appendix A, Figure 35.

### **2.5.9 SICK DL/DT20**

When using a SICK DL/DT20 sensor, ensure that the lateral cooling plates located on the inside are mounted first. After the inner plates have been mounted, mount the outer cooling plates. The outer cooling plates must be lightly pressed against the sensors when mounted on the adapter plate to ensure optimum cooling. Mount the sensor according to the instructions in Appendix A, Figure 36.

### **2.5.10 SICK Dx1000**

While using the sensor Dx1000 care should be taken that this version uses a special front glass panel (art.-no.: 11380) to reach the specified maximal measuring distance of the manufacturers. The utilized panel is optimized for the infrared range of the sensor. For improving the heat dissipation lateral cooling plates are used. These have to be mounted onto the adapter plate before installing the sensor. Mount the sensor according to the instructions in Appendix A, Figure 30.

## 2.6 Troubleshooting

### 2.6.1 Troubleshooting the TPCC

If problems occur during the operation of the TPCC Professional System, please check the following and provide PSI Technics support (support@psi-technics.de) with a detailed description of the problem:

1. Ensure that the correct voltage is used
  - Check the power supply unit
  - Ensure that the +24 VDC feed is connected to TPCC terminals X1.1 - X1.2.
2. Check the environmental temperature
  - If the environmental temperature exceeds the maximum threshold, the TPCC's internal temperature is too high and the system will shut down automatically.
  - The system will restart once the temperature is within the specified temperature thresholds.
3. Error Monitoring
  - The optional error monitoring errors can be read from an isolated switching contact on terminal block X2. In addition, the board has two red indicator LEDs that indicate a fault status. The different switching states are described in the table 3 in chapter 2.4.7.
4. Check the plugs
  - Ensure that the plugs X1, X2:1-9 and X2:10-18 are plugged in.
  - Check the correct position of all plugs (No overlapping).
5. Visually check the fans
  - If the optional failure output is not available on the TPCC the proper function of the fans must be checked manually. If one of the fans is no longer working, the system must be shut down.

## 2.7 Cable Length

### 2.7.1 Cable Cross-Section $1.5\text{mm}^2$

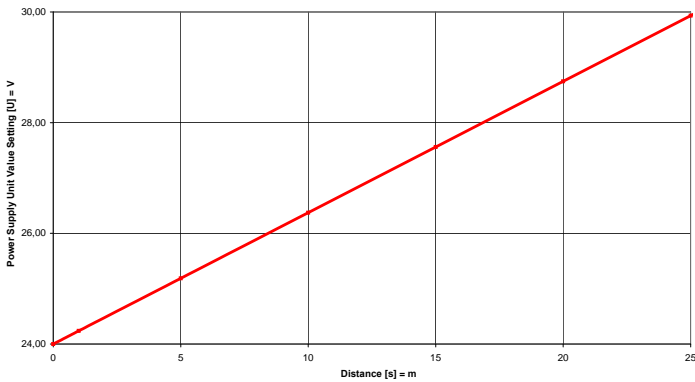


Figure 20: Line Drop,  $1.5\text{mm}^2$  Cable Cross-Section

PSI Technics recommends a maximum cable length of 82 ft (25 m). When using the maximum cable length the power supply needs to be adjusted as shown in Figure 20.

### 2.7.2 Cable Cross-Section $2.5\text{mm}^2$

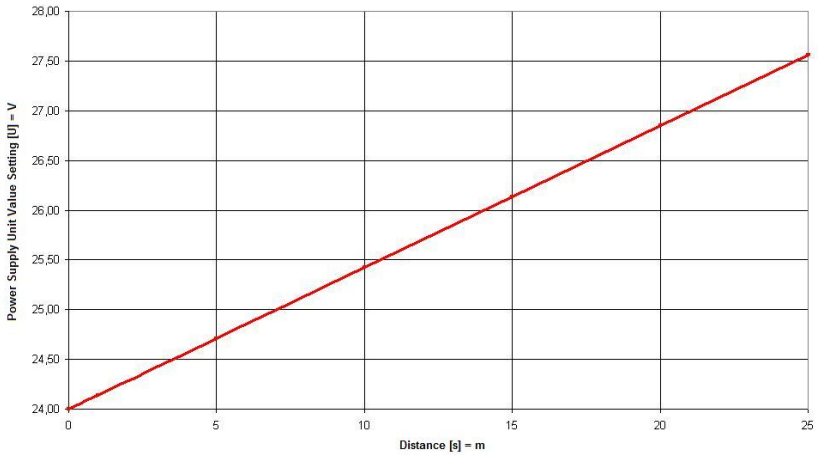


Figure 21: Line Drop,  $2.5\text{mm}^2$  Cable Cross-Section

PSI Technics recommends a maximum cable length of 82 ft (25 m). When using the maximum cable length the power supply needs to be adjusted as shown in Figure 21.

## 2.8 Recommended Connectors

The recommended connectors depend on the sensor you are using. All connectors and cables are available from PSI Technics. Connectors can be ordered using the fax order form at the end of this manual or by visiting <http://www.psi-technics.com/EN/Contact.php>.

### SICK DME5000

When using a SICK DME5000 Profibus-type distance meter, PSI Technics recommends using a Profibus BUS IN connector (see Figure 22) and a Profibus BUS OUT connector (see Figure 23) the part numbers are listed below.

BUS IN: Part No. KT\_1436

BUS OUT: Part No. KT\_1437



Figure 22: BUS IN



Figure 23: BUS OUT

## SICK DMT/DML

For SICK DMT/DML distance meters with RS232/RS422 interfaces, PSI Technics recommends using the following connector due to the sensor construction:

Part No. KT 1440

The following 45-degree and 90-degree angle connectors are recommended for use with the Profibus version of SICK DMT/DML distance meters:

Part No. KT\_1438 (45-degree)

Part No. KT\_1436 (90-degree)

## SICK DL100 Pro and Dx1000

For SICK DL100 Pro and Dx1000 distance meters the following connectors must be used due to the sensor construction.

Part No. Ethernet connector 10391 (90-degree)

Part No. SSI 10341 (90-degree)

Part No. Power DC 10741 (90-degree)



Figure 24: 90-Degree Ethernet Connector

In addition, an angled cable socket must be used for the 8-pin SSI interface. For the SSI interface the same angled connector can be used as for SICK DMT/DML sensors (Part number KT\_1436 (90-degree)). Prefabricated cables in various lengths are available. Adapter cables for replacing

DME3000/4000/5000 sensors with DL100 Pro distance meters are also available from PSI Technics.

### **SICK Lector<sup>®</sup> 620 Professional / ICR620**

For SICK ICR620 sensors cables with straight connectors must be used.



**NOTE** - All connectors and cables are available from PSI Technics. Connectors can be ordered using the fax order form at the end of this manual or by visiting:

<http://www.psi-technics.com/EN/Contact.php>.

### 3 Reader Comment Form

**TPCC Technical Documentation - TPCC  
(DM, T/DM, CLV, LMS Models)  
December 2018 / Version 3.4.4**

We appreciate your comments and suggestions for improving this publication.

Which PSI Technics product do you use?

What are you using the PSI Technics product for?

Please circle a response for each of the statements below:

1 = Strongly agree 2 = Agree 3 = Neutral; 4 = Disagree; 5 = Strongly disagree

The manual is well organized	1	2	3	4	5
I can find the information I need	1	2	3	4	5
The information in the manual is accurate	1	2	3	4	5
The instructions are easy to understand	1	2	3	4	5
The manual contains sufficient examples	1	2	3	4	5
The examples are appropriate and helpful	1	2	3	4	5
The layout and format are attractive and useful	1	2	3	4	5
The illustrations are clear and helpful	1	2	3	4	5

**Please answer the following questions:**

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### **Reader Comment Form**

We appreciate your feedback. Your feedback about the supporting documentation helps us to improve it with each revision. Please use one of the following methods to send us your comments or suggestions:

- Email your feedback to [support@psi-technics.com](mailto:support@psi-technics.com)
- Fill in the Reader Comment Form and mail it to the address listed on the bottom of the form

If this manual does not include a Reader Comment Form, please send your feedback to the address listed at the beginning of this manual. Please use the following subject line:

Subject: **TPCC/DM, T/DM, CLV and LMS Reader Comment Form**

**Please send us your feedback using one of the following methods:**

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PSI Technics  
Subject: TPCC  
Rudolf-Diesel-Str. 21a  
D-56220 Urmitz  
Germany

**Fax to:**

+49 2630 91590 - 99  
Subject: TPCC

**Email to:**

[support@psi-technics.com](mailto:support@psi-technics.com)  
Subject: TPCC

All comments and suggestions become the property of  
PSI Technics.

## 4 Notes

## 5 Support

### 5.1 General

#### Technical Support

If you have a problem and cannot find the information you need in the product documentation, contact your local PSI Technics office or PSI Technics support. You can also request support:

- Via the PSI Technics website [www.psi-technics.com/EN/](http://www.psi-technics.com/EN/)
- By sending a support request email to:  
[support@psi-technics.com](mailto:support@psi-technics.com)

### 5.2 Service and Support

#### German Headquarters

PSI Technics GmbH  
Rudolf-Diesel-Str. 21a  
D-56070 Urmitz, Germany  
Phone +49 2630 91590 - 0  
Fax +49 2630 91590 - 99

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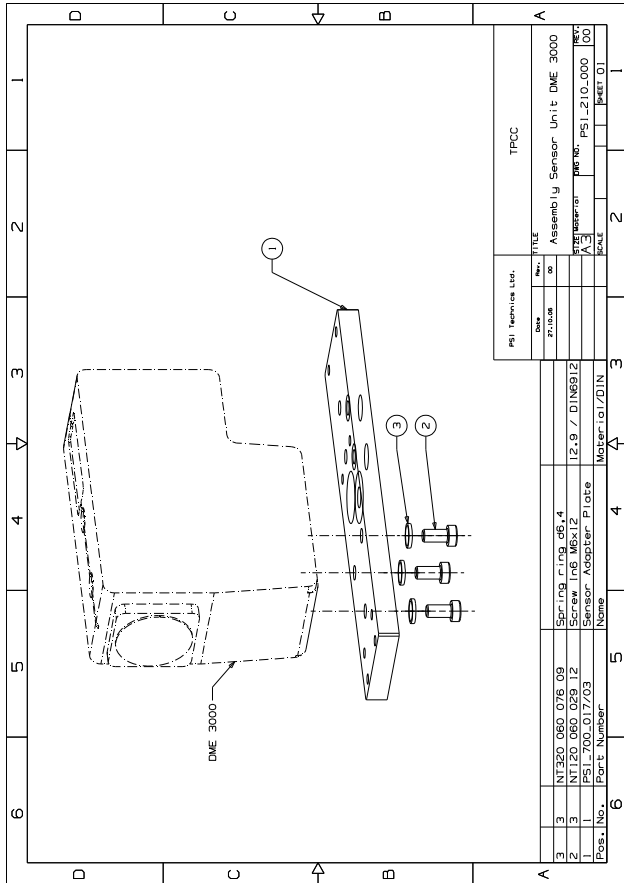


Figure 25: SICK DME3000 Mounting Instructions

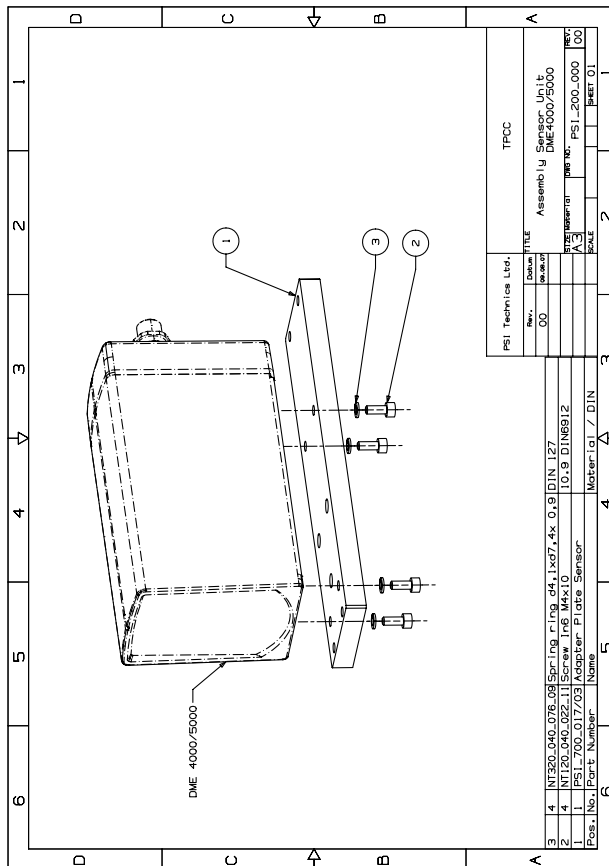
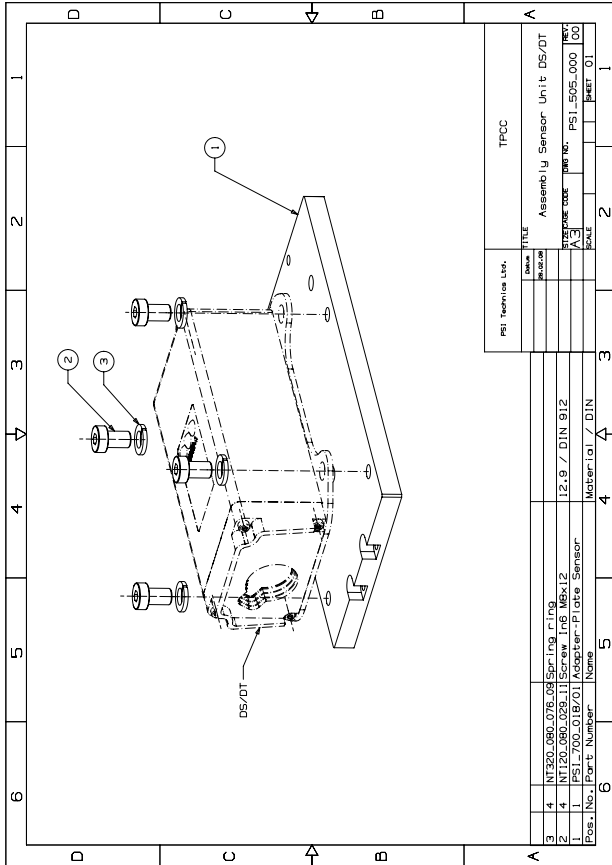


Figure 26: SICK DME4000/DME5000 Mounting Instructions



		TPCC	
PSI Technische List.	TPCC	Assembly Sensor Unit DS/DT	
Material		Part No.	PSI 505 000
Part No.		Material / DIN	Skizze 01

3	4	NT 320 080 076 08	Spr Ldg r Ing	
2	4	NT 120 080 093 11	Screw Tr8 MB512	
		PSI 505 000	12.9 / DIN 912	
Pos. No.	Part No.	Name	Material / DIN	Skizze
		Register-Plate Sensor		01

Figure 27: SICK DS/DT500 Mounting Instructions

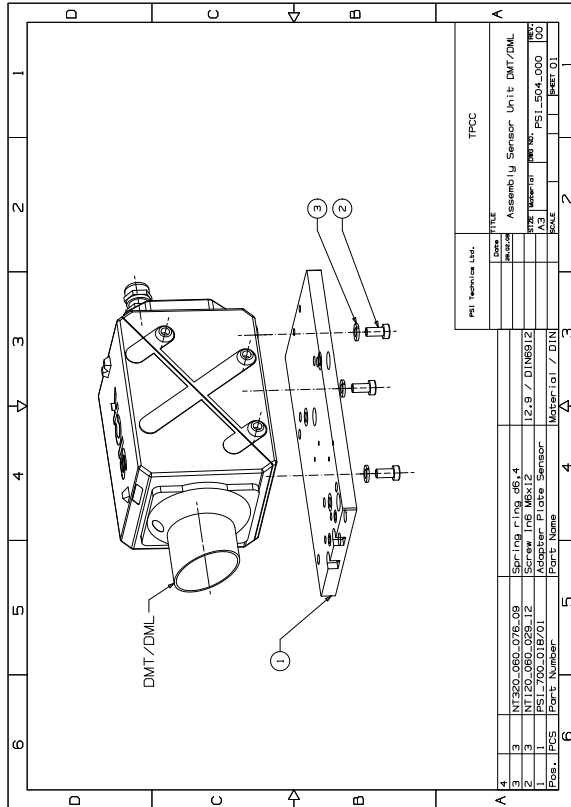


Figure 28: SICK DMT/DML Mounting Instructions

Pos.	Stück.	Benennung	Zeichn. Nr.	Material	Bemerkung
1	1	Adapterplatte DMX-D50/DX100	PSI_028_11_01_01_02_A	3.2315 (EN-NAV 6932)	-
2	1	Sensor Dx100	-	-	-
3	4	Scheibe DIN 125 - B E 3	-	-	-
4	4	Zylinderschraube DIN 913 - M3 x 12	-	-	-

pos.	piece	designation	drawing no.	material	remark
1	1	Adapter plate DMX-D50/DX100	PSI_028_11_01_01_02_A	3.2315 (EN-NAV 6932)	-
2	1	Sensor Dx100	-	-	-
3	4	Washer DIN 125 - B E 3	-	-	-
4	4	Cylinder head screw DIN 913 - M3 x 12	-	-	-

Technische Zeichnung	APPROBATION	PSI - A 04 01	MATERIAL	12	Größe	A3
MATERIAL	DUZ 01 - 01	ISO 13196	ISO 13196	12	Größe	A3
DATE	2014.03.07	M. Mascher	SENSOR UNIT DX100	12	Größe	A3
DATE	2014.03.07	M. Mascher	SENSOR UNIT DX100	12	Größe	A3
DATE	2014.03.07	M. Mascher	SENSOR UNIT DX100	12	Größe	A3

Figure 29: SICK DL100 Pro Mounting Instructions

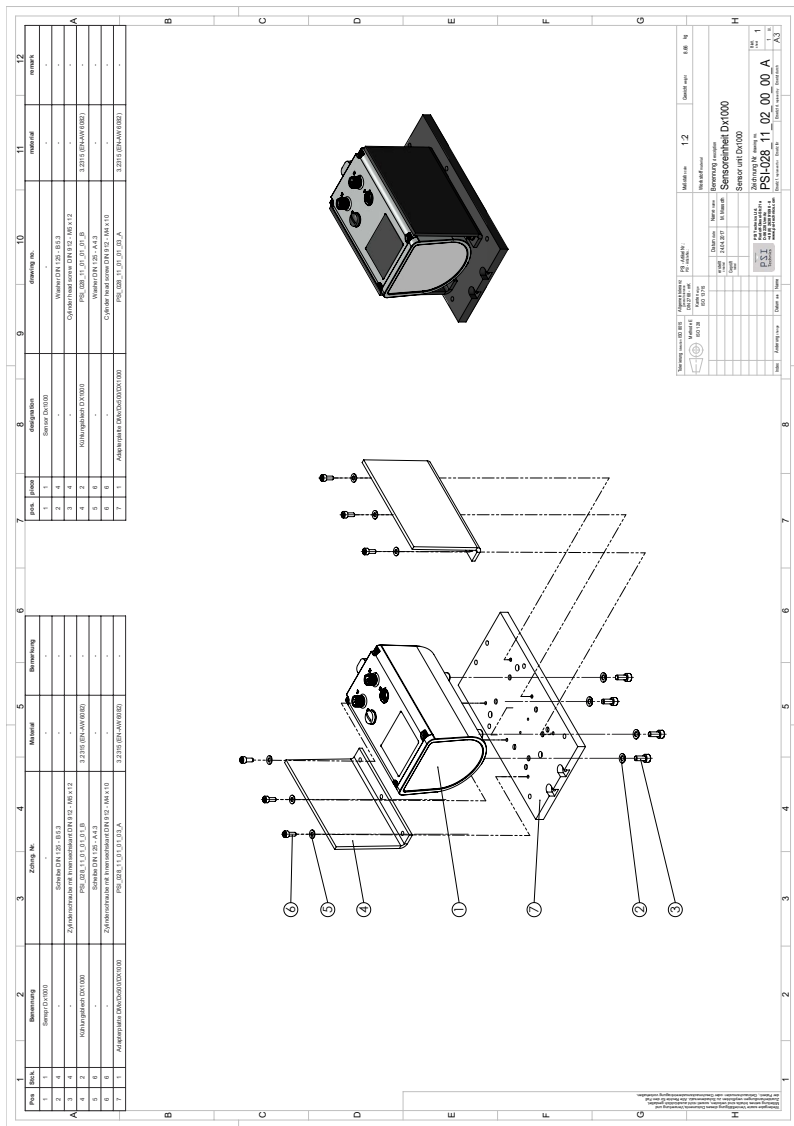


Figure 30: SICK Dx1000 Mounting Instructions

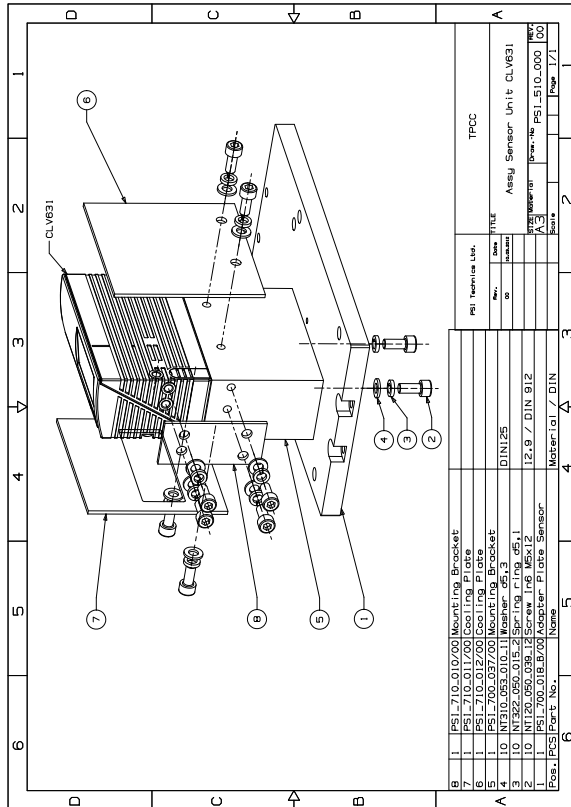


Figure 31: SICK CLV631 Mounting Instructions

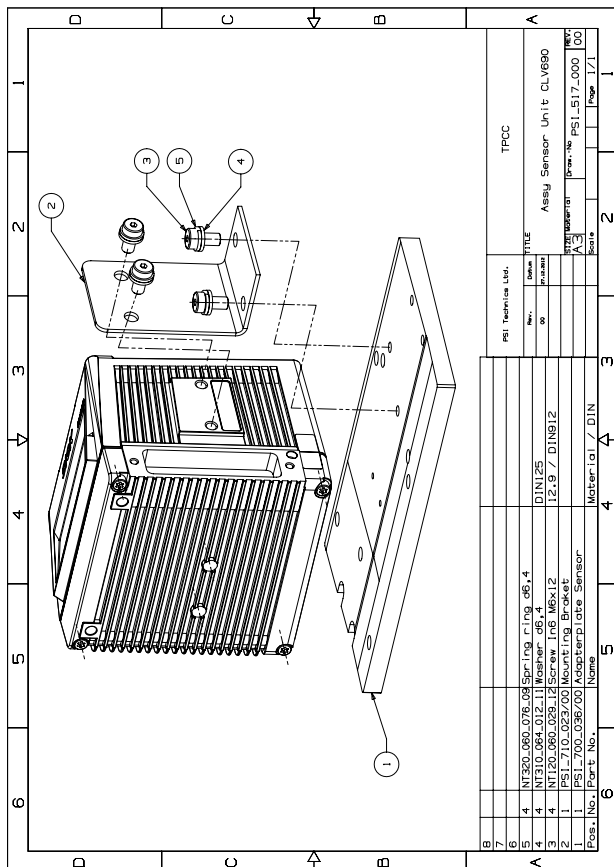


Figure 32: SICK CLV690 Mounting Instructions



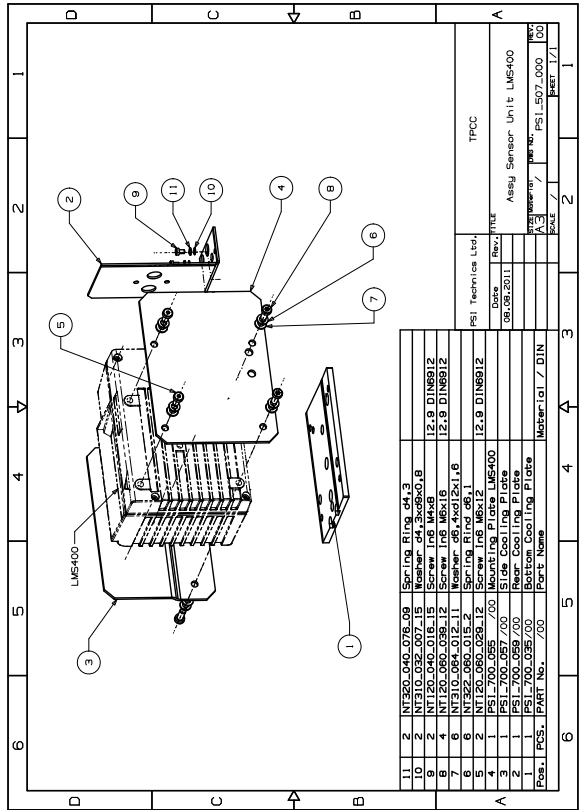


Figure 33: SICK LMS400 Mounting Instructions

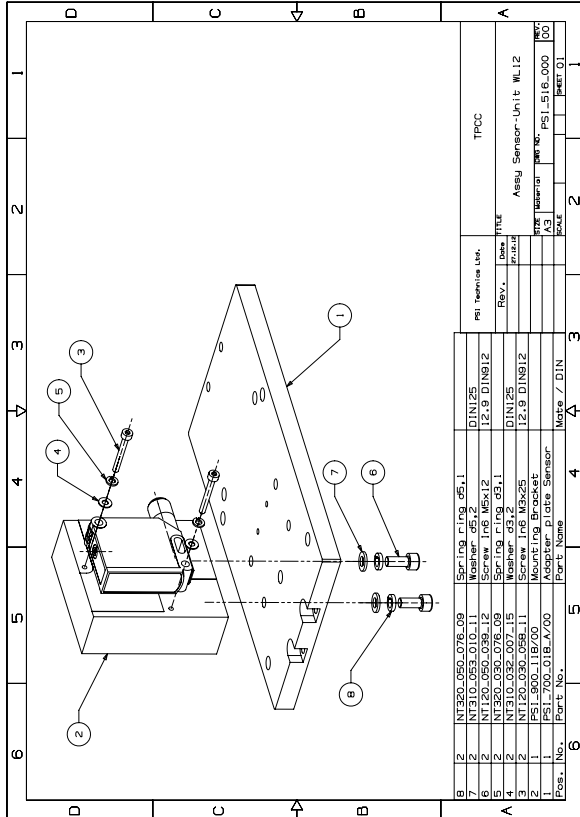


Figure 34: SICK WL12G Mounting Instructions

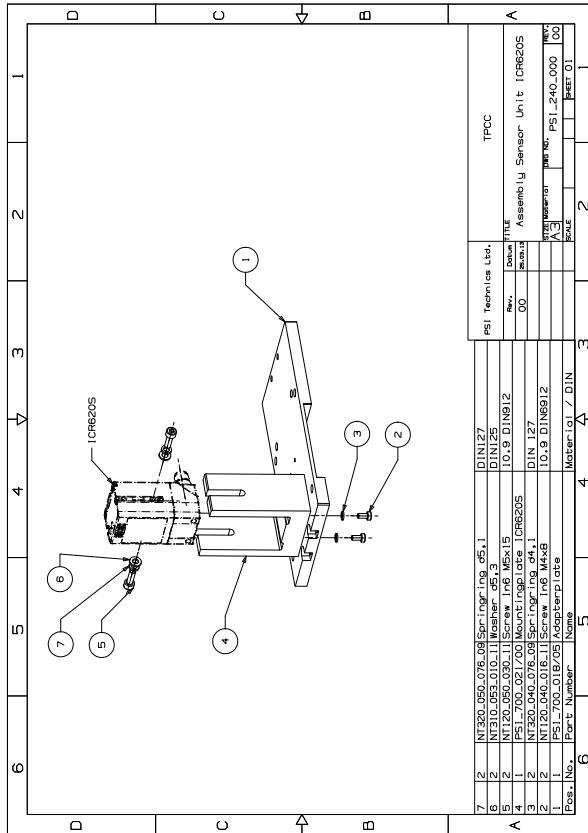


Figure 35: SICK Lector<sup>®</sup>620 Professional / ICR620 Mounting Instructions

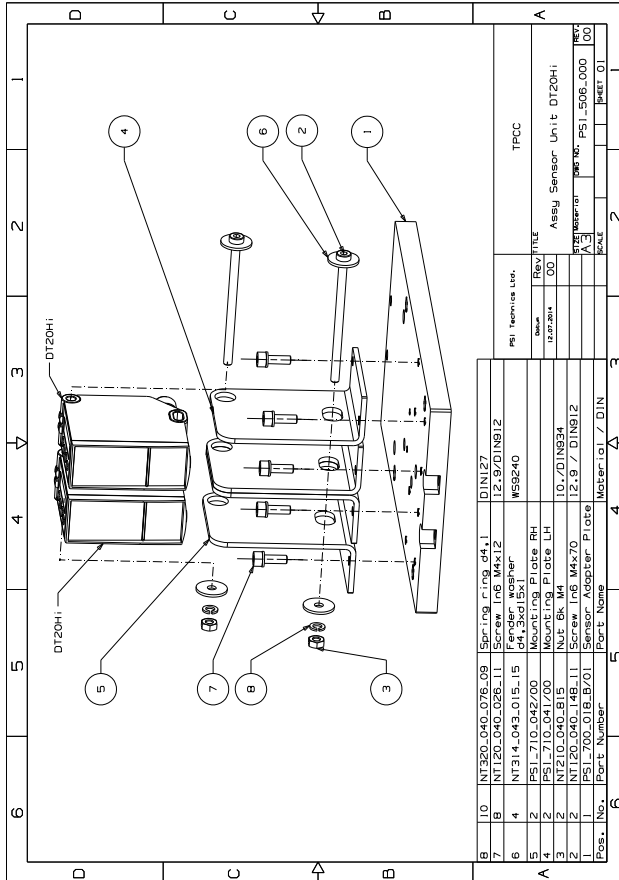


Figure 36: SICK DL/DT20 Mounting Instructions

## **Fax Order Form**

Fax-Nr. +49 2630 91590 - 99

**US customers: Please send this order form via email to  
sales@psi-technics.com**

Billing Address

Company:

Street:

ZIP/City:

Country:

Phone:

Fax:

Customer ID No.

VAT ID No.:

Shipping Address (if different)

Company:

Street:

ZIP/City:

Country:

Shipping Method:

Contact:

Phone:

Fax:

Quantity	Part No.	Description
	G0009_002_0028	TPCC / DME 3000
	G0001_002_0028	TPCC / DME 4000/5000
	G0005_002_0028	TPCC / DS/DT500
	G0007_002_0028	TPCC / DMT/DML
	G0017_002_0028	TPCC / DL100 Pro
	G0021-002-0028	TPCC / CLV 631-0000
	G0026-002-0028	TPCC / CLV 690-0000
	G0013-002-0028	TPCC / LMS 400
	G0029_002_0028	TPCC / WL12G-3B2531
	G0027-002-0028	TPCC / ICR620S-T11503
	10856	TPCC / DL/DT20
	11188	TPCC / Dx1000
	11380	TPCC Window Plane Dx1000
	10465	TPCC Installation Accessory Kit
	10195	TPCC Power Supply Unit 230VAC/24VDC; 20A
	KT_1436	BUS IN Profibus Connector 90-degree DME5000
	KT_1437	BUS OUT Profibus Connector 90-degree DME5000
	KT_1438	Profibus Connector for SICK DMT/DML 45- degree
	KT_1440	RS232/422 Connector for SICK DMT/DML
	10391	Ethernet Connector Dx1000/DL100 Pro (4- pin) 90-degree
	10341	SSI Connector Dx1000/DL100 Pro (8-pin) 90- degree
	10734	Power DC Connector Dx1000/DL100 Pro 90- degree
	KT_0800_000_0001	Solid State Relay
	10767	Fan replacement kit

---

**Date**

**Stamp/Signature**

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