Optical Fiber Transceiver

CTrans OL-.../P/RMD
CTrans OL-.../ST/RMD

User manual

EMS
Thomas Wünsche

User manual for Optical Fiber Transceiver CTrans OL version 3.0

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For technical assistance please contact:

EMS Dr. Thomas Wünsche
Sonnenhang 3

D-85304 Ilmmünster

Tel. +49-8441-490260
Fax +49-8441-81860
Email: support@ems-wuensche.com

If you discover a security vulnerability in one of our products, please report it to **security@ems-wuensche.com**. Thank you for your support.

Our products are continously improved. Due to this fact specifications may be changed at any time and without announcement.

FCC: **This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operstion.**

WARNING: **CTrans OL hardware and software may not be used in applications where damage to life, health or private property may result from failures in or caused by these components.**

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1 Overview

1.1 Attributes

- Coupling of CAN systems by optical fiber
- Available for PMMA- and glass fiber, connection by ST connector or by plugging
- Protocol transparent; CAN error handling mechanisms are preserved
- Extended error suppression

1.2 General Description

CTrans OL acts as a transceiver for protocol transparent transmission of CAN signals between copper based sections via an optical fiber.

Several technical improvements can be obtained by optical transmission of CAN signals, such as secure separation of high voltages and insensitivity to electromagnetic perturbation. Furthermore the transparent transmission of CAN signals with CTrans OL preserves the main benefits of CAN, such as error correction and priority driven bus access.

Like repeaters CTrans OL can be used to build flexible wiring topologies. Star and tree structures as well as stub lines can be realized. The integrated error supression reduces the influence of faulty segments onto intact sections.

Depending on the type of the device either cost effective 1mm PMMA/
POF fibers with plugged connection or 50/125µm or 62,5/125µm multimode glass fibers with ST connectors should be used. For CTransOL-ST a single mode fiber is not approved and may harm the device. Depending on the type of fiber a wiring distance up to 1000m can be achieved.

1.3 Ordering Information

12-03-0xx-yy	**CTrans OL-.../P/RMD** Optical fiber transceiver for rail mount application, pluggable connection for PMMA fiber, range up to 40m (...inhibit time)
12-03-1xx-yy	**CTrans OL-.../ST/RMD** Optical fiber transceiver for rail mount application, ST connector for optical fiber, range up to 1000m (...inhibit time)

Note: xx denotes inhibit time:

02	-5	500ns
03	-10	1000ns
04	-20	2000ns
05	-50	5000ns
06	-100	10000ns

yy denotes language of delivery:

10	german
20	english

2 Electrical Characteristics

2.1 Absolute Limiting Values

Any (also temporary) stress in excess of the limiting values may cause permanent damage on CTrans OL and connected devices.

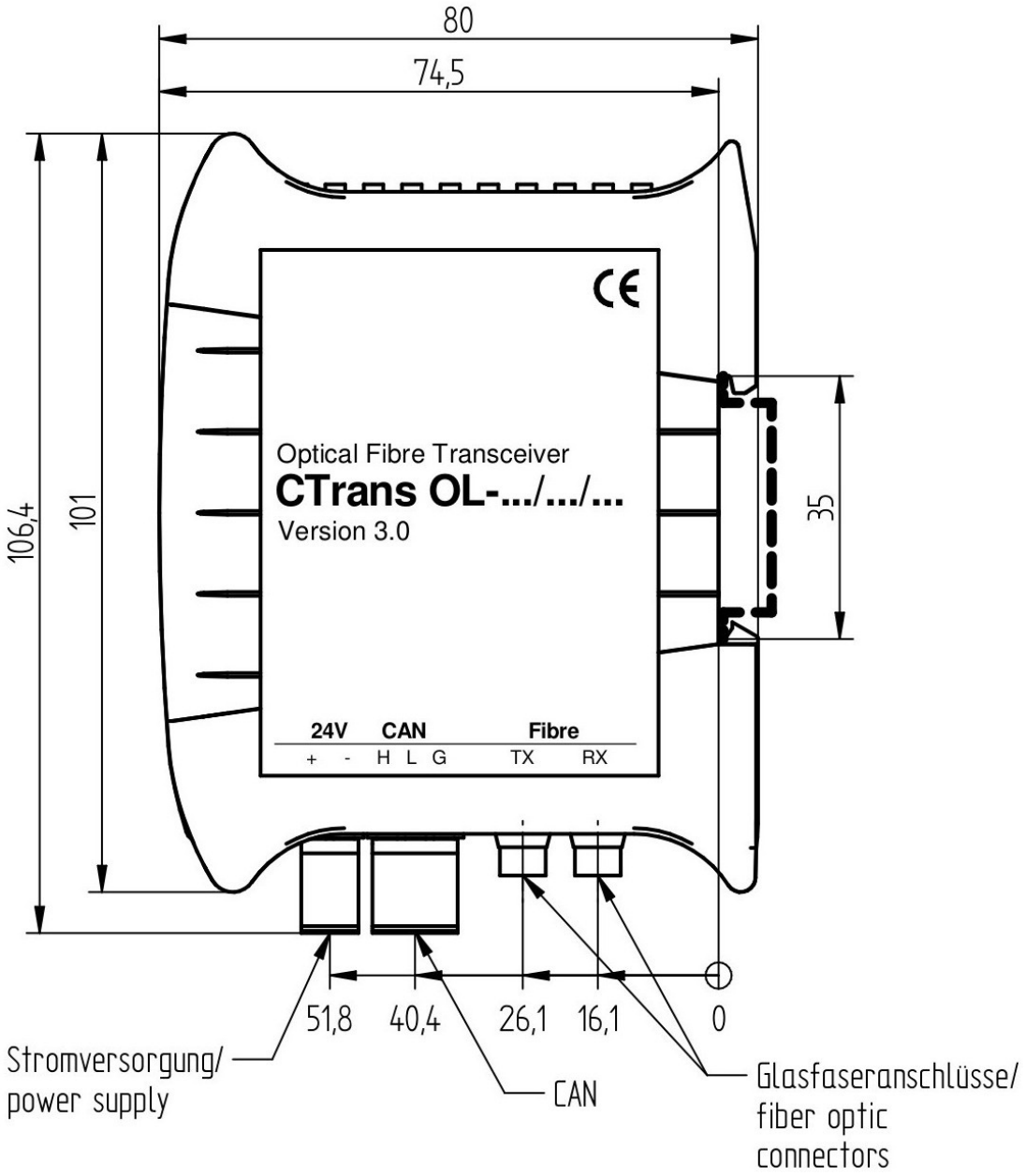
Parameter	Min.	Max.	Unit
Storage temperature	-30	+80	°C
Operating temperature	-20	+60	°C
Power supply voltage	-100	+35	V
Voltage on signal lines	-30	+30	V
Maximum power dissipation (at 60°C)	-	2000	mW
Maximum distance 'P' type PMMA/POF at 20°C	-	40	m
Maximum distance 'ST' type at 20°C	-	1000	m

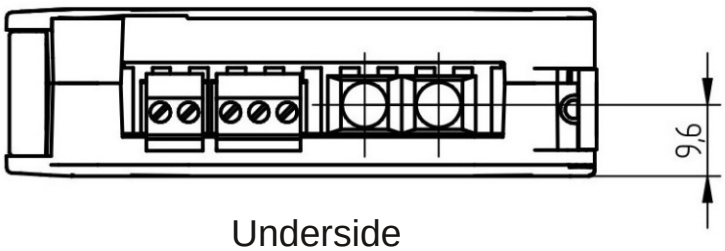
2.2 Nominal Values

All values, unless otherwise specified, refer to a supply voltage of 24V and an environmental temperature of 20°C.

Parameter	Min.	Typ.	Max.	Unit
Current consumption (running idle)	-	30	-	mA
Current consumption (250kBit/s, 100% load)	-	40	-	mA
Power supply voltage	10	24	30	V
Propagation delay (per pair of devices)	-	125	300	ns
Wavelength 'P' type	-	650	-	nm
Wavelength 'ST' type	-	850	-	nm

2.3 Dimensions





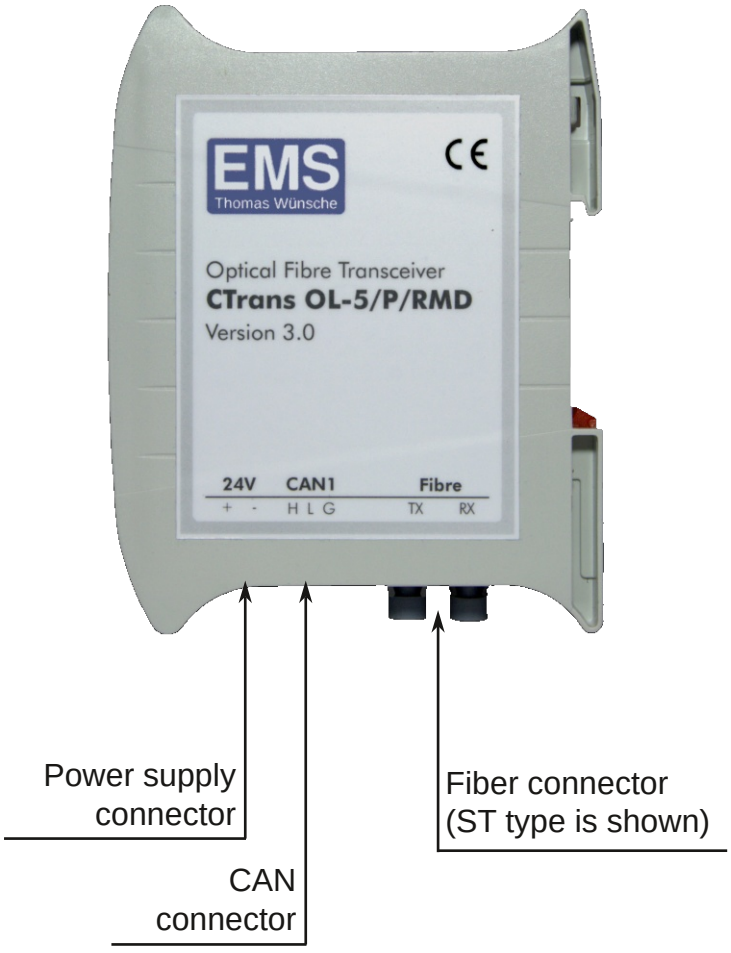
Underside

DIMENSIONS ARE IN MILLIMETERS
GENERAL TOLERANCES ISO 2768-1 c
DRAWINGS ARE NOT COMPLETELY TRUE TO THE ORIGINAL

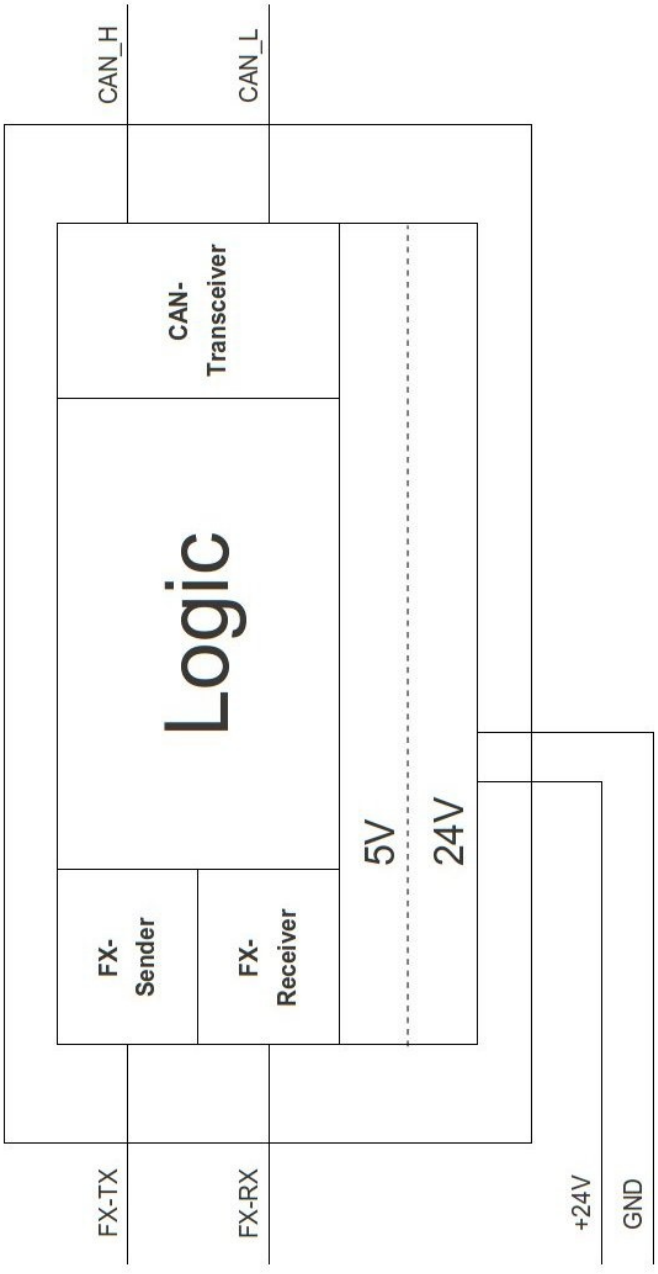
3 Operating Instructions

3.1 Layout and Connection

CTrans OL devices include one CAN segment (marked 'CAN') fed to a three pin pluggable terminal. Power is connected at a two pin pluggable terminal. The figure shows the locations of power, CAN and fiber optical connections. Three LEDs on the front panel indicate the status of power, CAN and optical transmissions.



3.2 Block Diagram

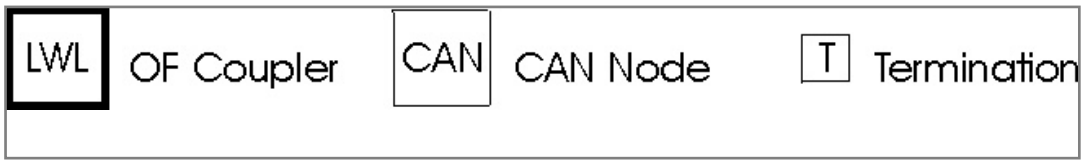


4 Appendix

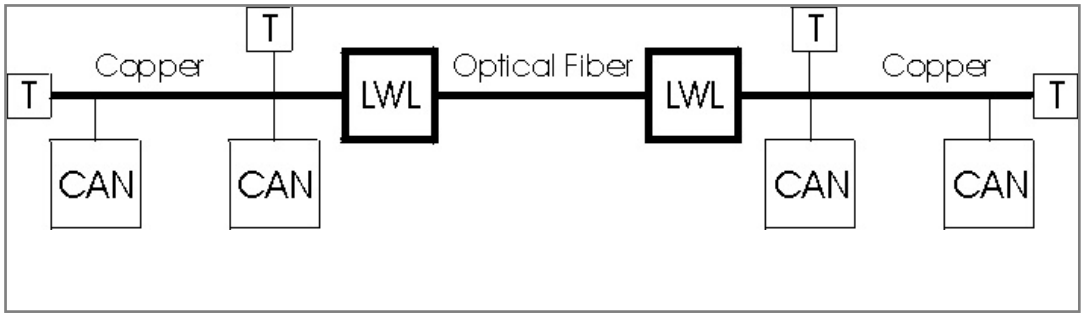
4.1 Topology examples

Each CAN segment has to be terminated on both ends, typically using a 120 Ohm termination resistor between CAN-High and CAN-Low signal lines.

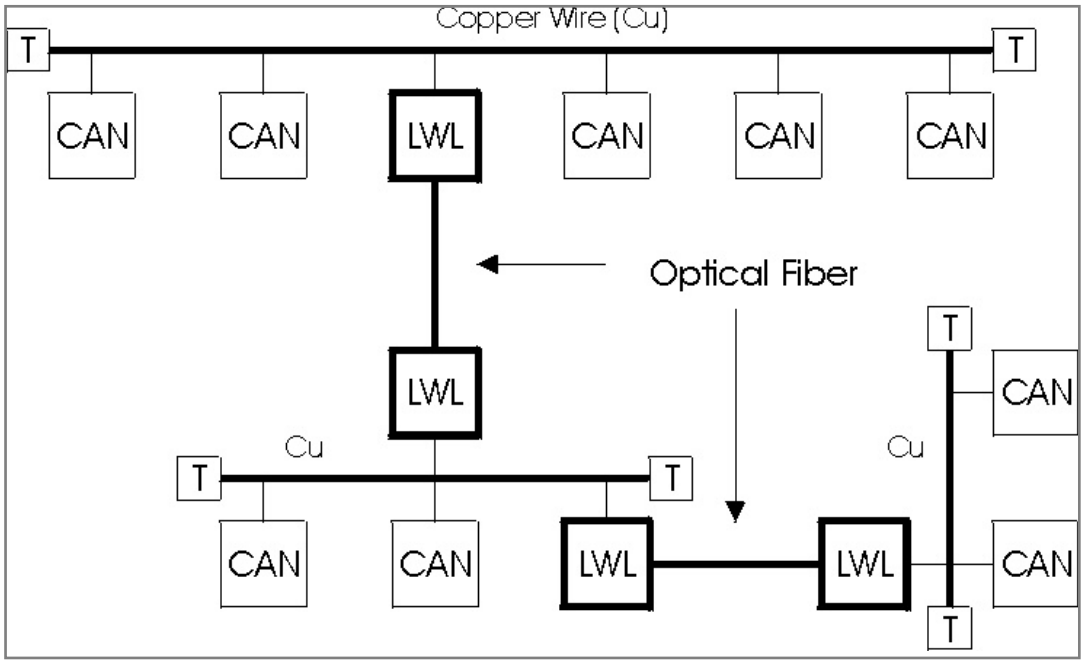
Legend



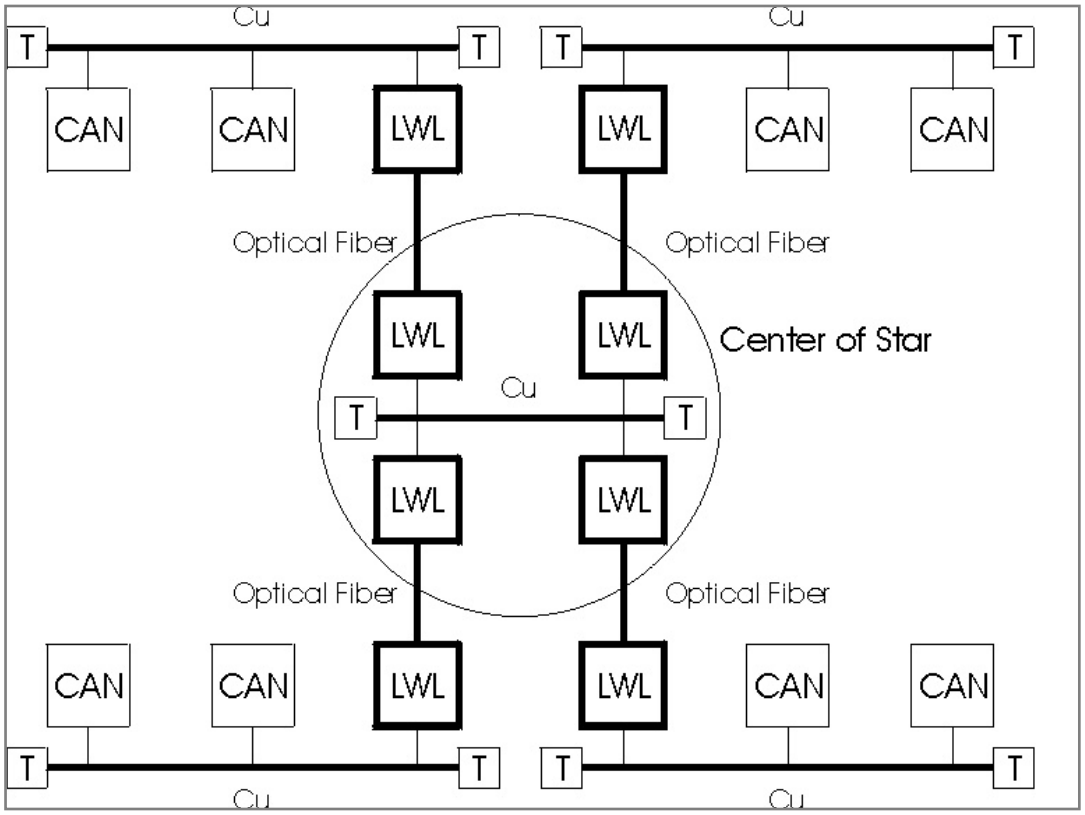
Line topology with Optical Fiber Transceivers



Tree topology with Optical Fiber Transceivers



Star topology with Optical Fiber Transceivers



4.2 Instruction for Disposal

Electronic Equipment Act (WEEE)

EMS is selling its products exclusively to commercial customers. This is the reason why all devices are designed for commercial use and have to be disposed appropriately. In accordance to § 10 para. 2 clause 3 Electronic Equipment Act (WEEE) the disposal of EMS products is regulated the following way.

The equipment must not be disposed at the public collection points. In accordance with the applicable law the disposal has to be done by the customer for own account. The same applies to products, which have been sold to third parties, if those parties do not take care of a disposal in accordance to the applicable law. As an alternative the products can be returned to EMS free of charge.

4.3 FCC Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

4.4 CE Conformity

Declaration of Conformity

CE

The manufacturer

EMS Dr. Thomas Wünsche e.K.
Sonnenhang 3
85304 Ilmmünster
Germany

hereby declares, that the following products:

Name	Article Number
CTrans OL-.../P/RMD Version 3.0	12-03-0xx-yy
CTrans OL-.../ST/RMD Version 3.0	12-03-1xx-yy

meet the requirements of the following standards:

Electromagnetic Immunity

DIN EN 55032:2022-08 VDE 0878-32:2022-08 – Electromagnetic compatibility of multimedia equipment – Immunity requirements(CISPR 32:2015 + COR1:2016 + A1:2019); German version EN 55032:2015 + AC:2016 + A11:2020 + A1:2020

Electromagnetic Emission
DIN EN 55032:2022-08 VDE 0878-32:2022-08– Electromagnetic compatibility of multimedia equipment – Emission Requirements (CISPR 32:2015 + COR1:2016 + A1:2019); German version EN 55032:2015 + AC:2016 + A11:2020 + A1:2020

and therefore conform with the EU requirements on:

Electromagnetic compatibility (2014/30/EG)

In accordance with the above mentioned EU directives, the EC declarations of conformity and the associated documentation are held at the disposal of the competent authorities.

RoHS 3

The RoHS 3 (EU 2015/863) commits manufacturers of „Electrical and Electronic Equipment" (EEE) to secure compliance with the RoHS Directive before placing a CE mark.

Based on technical documentation and to the best of our knowledge, we hereby confirm that the above mentioned products do not contain any of the restricted substances according to Article 4 of the RoHS Directive in excess of the maximum concentration values tolerated by weight in any of their homogeneous materials.

Ilmmünster, 26.07.23

Dr. Thomas Wünsche

EMS Thomas Wünsche