CAN Repeater

CRep Opto-./DS24/M12/RMD

User Manual

EMS
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User manual for CAN Repeater CRep Opto-./DS24/M12/RMD.

Document version: V 1.01
Documentation date: June 23rd, 2026

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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.

WARNING: CRep Opto-./DS24/M12/RMD 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

- Protocol transparent CAN repeater
- Robust metal housing
- Robust M12 connectors
- ISO 11898 compatible bus interface
- Shutdown of erroneous bus segments
- Rail mountable

1.2 General Description

The compact CAN repeater CRep Opto transmits and amplifies signals transparent to the CAN protocol. Each of the two CAN connections has the physical behaviour of a single bus node. CRep Opto permits a flexible design of the network topology. Star and tree structures can be implemented as well as long stub lines. Being able to use the network structure that fits the application best a reduction of installation costs can be reached.

The maximum data rate in CAN networks, depending on signal propagation delays, can be increased if CRep Opto is used to improve the network structure. An increase of the maximum node count in a CAN network can be reached by splitting the network in subnets that are connected by CRep Opto. Each subnet can include the number of CAN nodes permitted by the drivers output current.

Where CAN signals have to be transmitted over long distances, CRep Opto can be used for signal conditioning. The integrated shut down capability in case of errors reduces the impact on intact bus segments by defective segments for the most commonly occuring errors.

1.3 Ordering Information

12-02-112-xx	**CRep Opto-5/DS24/M12/RMD** CAN repeater for rail mounting, galvanic separation, double sided supply 24V, metal housing, M12 connectors, 500ns inhibit time
12-02-113-xx	**CRep Opto-10/DS24/M12/RMD** CAN repeater for rail mounting, galvanic separation, double sided supply 24V, metal housing, M12 connectors, 1µs inhibit time
12-02-114-xx	**CRep Opto-20/DS24/M12/RMD** CAN repeater for rail mounting, galvanic separation, double sided supply 24V, metal housing, M12 connectors, 2µs inhibit time
12-02-115-xx	**CRep Opto-50/DS24/M12/RMD** CAN repeater for rail mounting, galvanic separation, double sided supply 24V, metal housing, M12 connectors, 5µs inhibit time
12-02-116-xx	**CRep Opto-100/DS24/M12/RMD** CAN repeater for rail mounting, galvanic separation, double sided supply 24V, metal housing, M12 connectors, 10µs inhibit time

Note: xx 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 CRep N and connected devices.

Parameter	Min.	Max.	Unit
Storage temperature	-20	+80	°C
Operating temperature	-20	+80	°C
Power supply voltage	-100	+35	V
Voltage on signal lines	-30	+30	V
Maximum power dissipation (at 60°C)	-	1000	mW

2.2 Nominal Values

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

Parameter	Min.	Typ.	Max.	Unit
Current consumption (no load)	-	25	-	mA
Current consumption (250kBit/s, 100% busload)	-	35	-	mA
Power supply voltage	11	24	30	V
Propagation delay	-	125	200	ns

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3 Operating Instructions

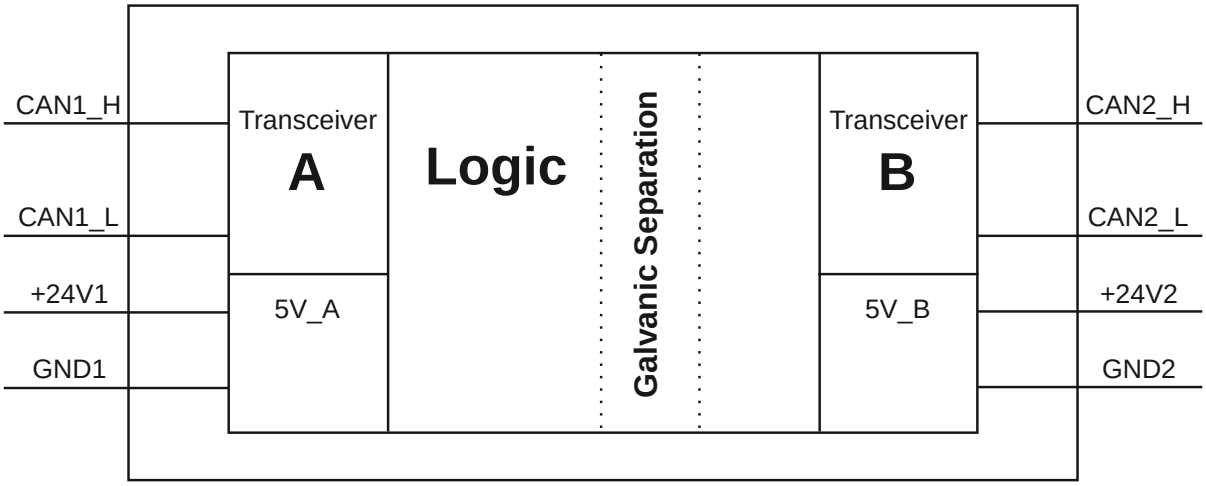
3.1 Pin Assignment

The device has two CAN segments with M12 connectors. Coding style is A, CAN1 is a female and CAN2 a male type connector. Besides the CAN signals they also carry the power supply.

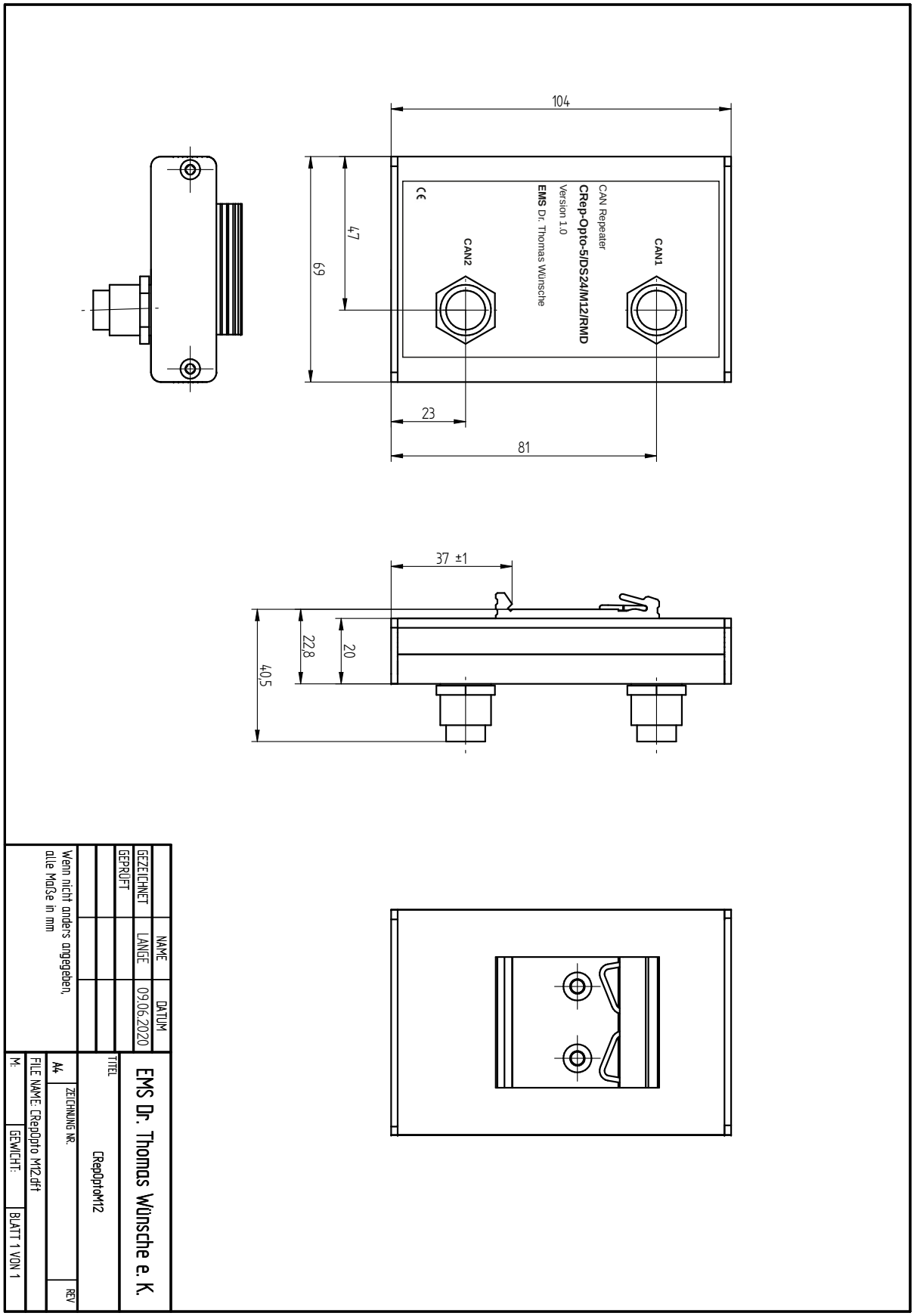
The following table shows the pin assignment:

Pin	Function
1	Shield
2	24V Supply line
3	GND
4	CAN High
5	CAN Low

3.2 Block Diagram



3.3 Dimensions



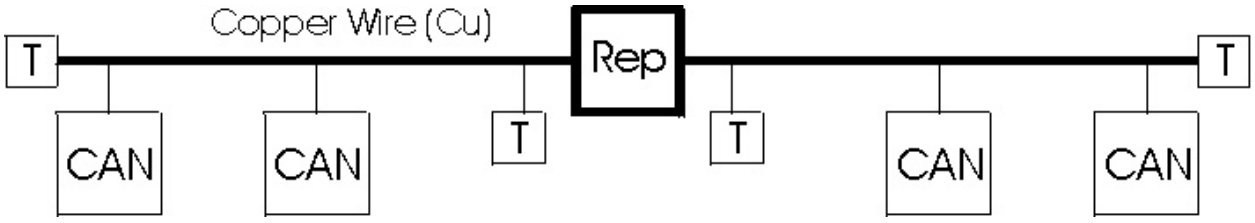
4 Appendix

4.1 Topology examples

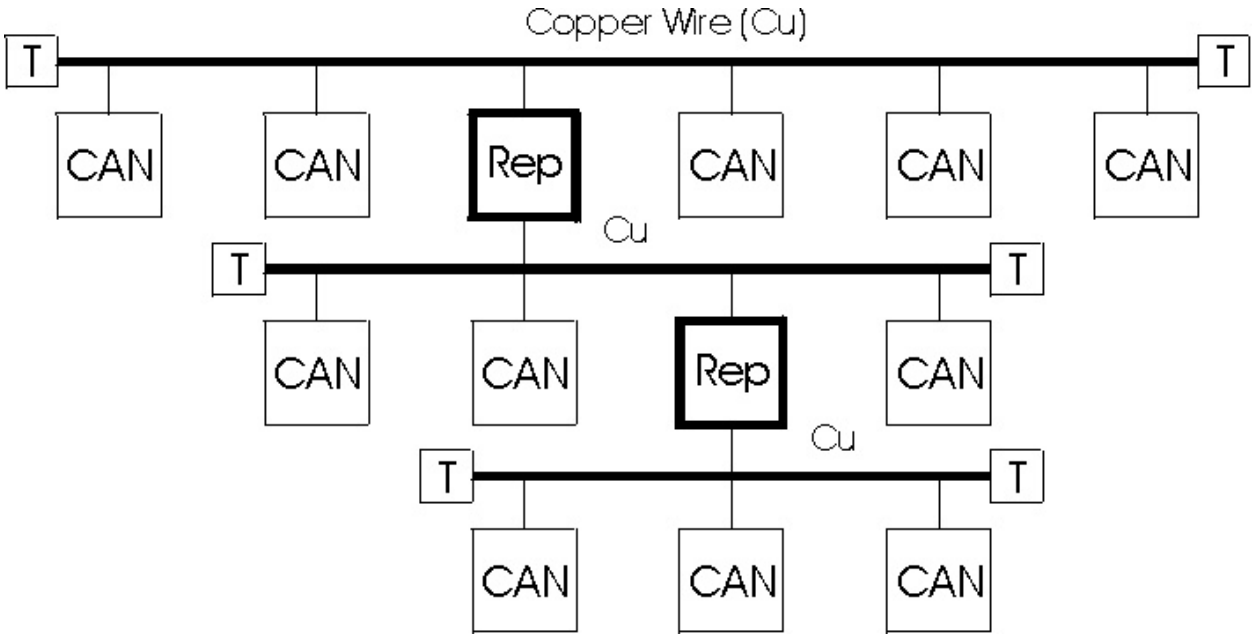
CAN busses should always be terminated on both ends, typically using a 120Ohm termination resistor between CAN-High and CAN-Low signal lines.

Legend

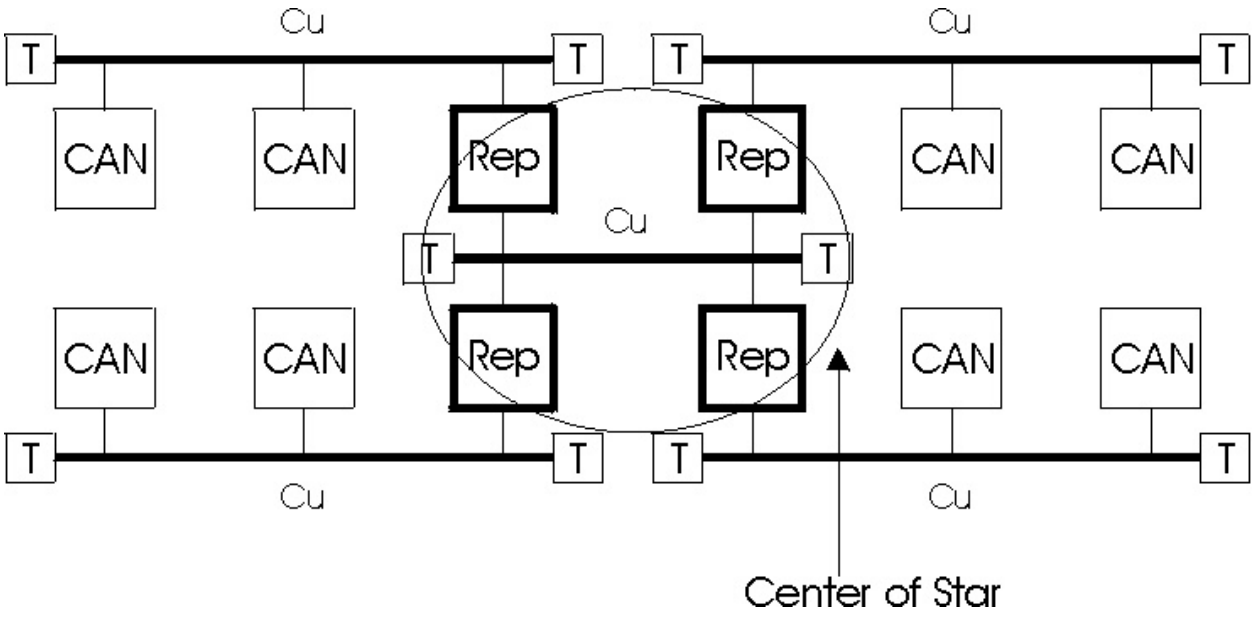
Line topology with repeaters



Tree topology with repeaters



Star topology with repeaters



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.

4.4 CE Conformity

Declaration of Conformity

CE

The manufacturer

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85304 Ilmmünster
Germany

hereby declares, that the following product:

Name	Article Number
CRep Opto-.../DS24/M12/RMD	12-02-11x-xx

meets the requirements of the following standards:

Electromagnetic Immunity
EN 55035:2018-04; VDE 0878-35:2018-04 – Electromagnetic compatibility of multimedia equipment – Immunity requirements (CISPR 35:2016, modified); German version EN 55035:2017

Electromagnetic Emission
EN 55032:2016-02; VDE 0878-32:2016-02 – Electromagnetic compatibility of multimedia equipment – Emission Requirements (CISPR 32:2015); German version EN 55032:2015

and therefore conform with the EU requirements on:

Electromagnetic compatibility (2014/30/EU)

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 EEE

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, 19.05.2020

Dr. Thomas Wünsche

EMS Thomas Wünsche