



CAN Repeater

CRep NM-.../RMD

User Manual

User manual for CAN Repeater CRep NM-.../RMD

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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 continuously 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 operation.

WARNING: CRep NM 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
- Low propagation delay
- Shutdown of erroneous bus segments
- Rail mountable
- Optional with 120 Ohm on one or two CAN channels available
- Tested against
 - DIN EN 60068-2-14Nb (04.2010)
 - DIN EN 60068-2-38 (06.2010)
 - DIN EN 60068-2-27 (02.2010)
 - DIN EN 60068-2-64 (04.2009)

1.2 General Description

The compact CAN repeater CRep NM has been designed for mobile use. It transmits and amplifies signals transparent to the CAN protocol.

Each of the two CAN connections has the physical behavior of a single bus node. CRep NM enables a flexible network topology design, such as star and tree structures, as well as long stub lines. This allows to choose an application specific network topology, that can lead to a reduction of installation costs.

The ability to isolate permanent dominant segments from the rest of the CAN system after an error time reduces the impact of the most frequently occurring errors on intact bus segments.

CRep NM is available without internal termination or with 120 ohm resistors on the second or both CAN channels.

CRep NM was designed for the use in mobile machines and has been tested for EMC, climate, and shock resistance against standards for earthmoving and construction machinery. An identical device has been used in large quantities by a global leading construction machinery company for many years.

Although designed for mobile use, CRep NM also qualifies as a cost-effective, compact solution for automation tasks involving CAN.

1.3 Application Specific Tests

CRep NM has been developed for the use in special-purpose vehicles such as machines for construction, agricultur or forestry.

To secure function in challenging environments several simulation tests have been conducted. In particular it has been tested against following DIN Norms.

DIN Norm	Name
DIN EN 60068-2-14Nb (04.2010)	Change of temperature
DIN EN 60068-2-38 (06.2010)	Composite temperature / humidity cycle
DIN EN 60068-2-27 (02.2010)	Shock
DIN EN 60068-2-64 (04.2009)	Vibration, broadband random guidance

The CAN communication of CRep NM was stable during these tests have been conducted. Test reports are send on request.

1.4 Ordering Information

12-01-3xy-zz	CRep NM-.../RMD Mobile CAN repeater, rail mountable (... inhibit time)
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Note: x denotes termination of CAN channels:

- 0 no internal termination
- 1 with internal termination on CAN 2
- 2 with internal termination on both CAN channels

y ... In case of ordering please specify the baud rate to determine the inhibit time:

- 2 -5 500ns
- 3 -10 1000ns
- 4 -20 2000ns
- 5 -50 5000ns
- 6 -100 10000ns

zz denotes language of delivery:

- 10 German
- 20 English

2 Electrical Characteristics

2.1 Absolute Limiting Values

Parameter	Minimal	Maximal	Unit
Storage temperature	-20	+85	°C
Operating temperature	-20	+85	°C
Supply voltage	-36	+36	V
Admissible power consumption (at 60 °C)	-	2000	mW
Voltage on CAN bus lines ¹	-25	25	V

¹ It should be noted that, with an existing termination resistor, the current flowing through it in the event of a fault will not lead to its overload.

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

2.2 Nominal Values

Parameter	Minimal	Typical	Maximal	Unit
Supply voltage at connector 1	10	24	30	V
Current consumption (running idle)	-	20	-	mA
Current consumption (250 kBit/s, 100 % busload)	-	35	-	mA
Propagation delay		100	180	ns
Error time	5	6	7	ms
Internal termination resistor	118	120	122	Ohm

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

3 Operating Instructions

3.1 Pin Assignment

A CRep NM device includes 2 CAN segments, wired by a terminal block with 4 clamps. The power supply of CRep NM is separately wired by a terminal block with 2 clamps.

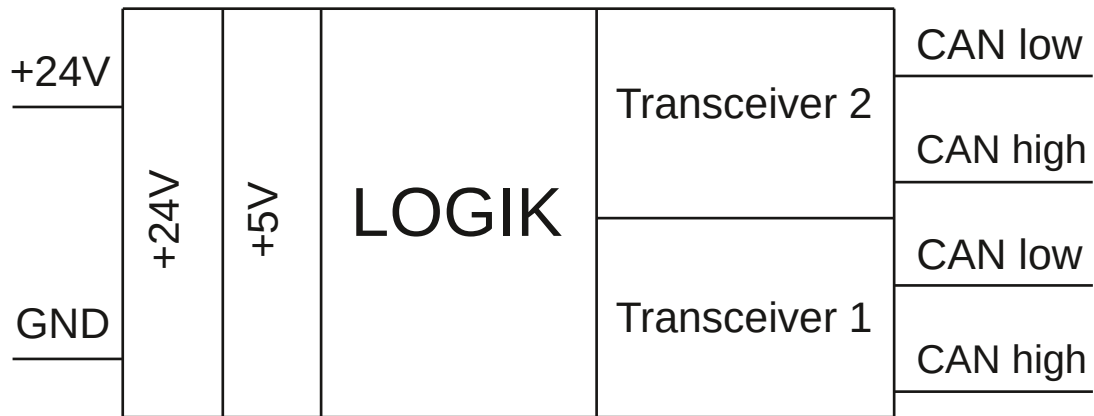
The following table shows the terminal assignment of the power connector:

Pin	Name	Function
1	+	Positive supply +24 V
2	-	Ground

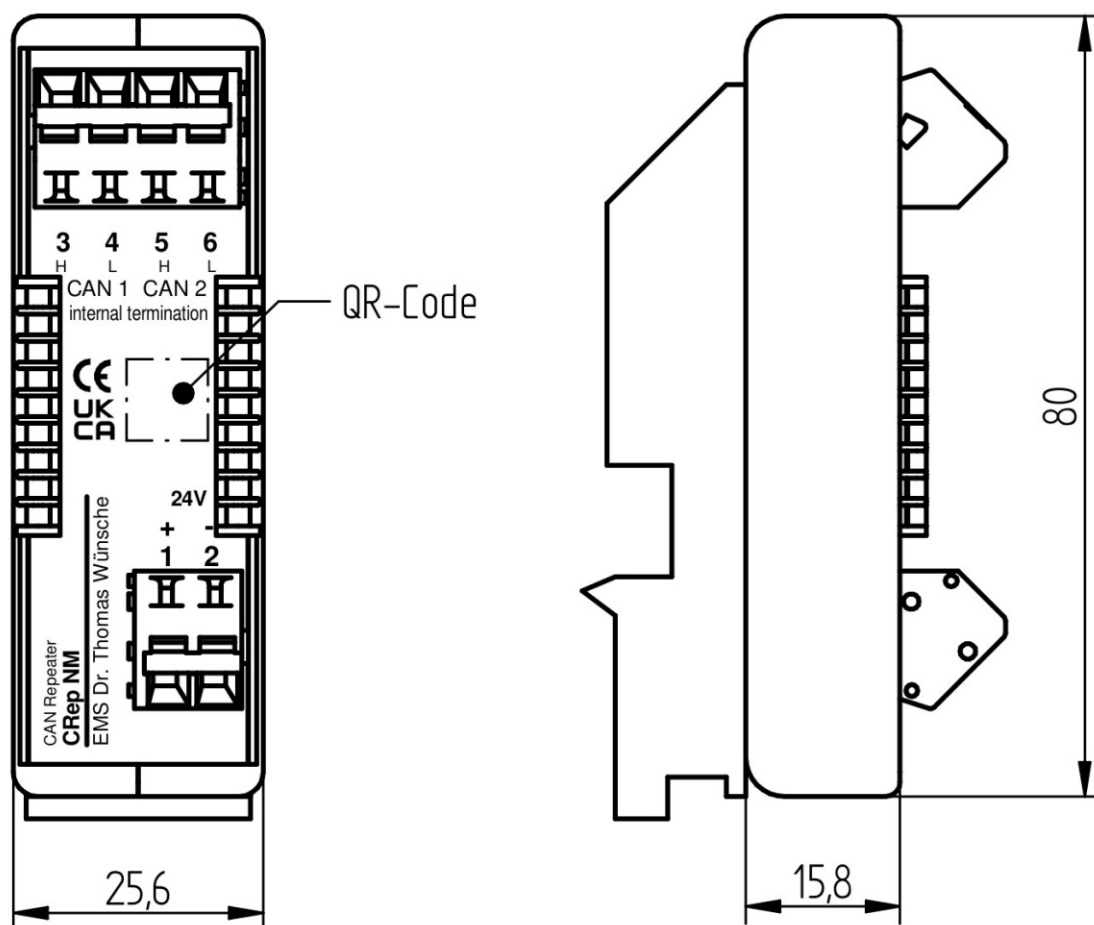
The following table shows the terminal assignment of the CAN connector:

Pin	Name	Function
3	H	CAN 1 high bus line
4	L	CAN 1 low bus line
5	H	CAN 2 high bus line
6	L	CAN 2 low bus line

3.2 Block Diagram



3.3 Dimensions



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

4 Appendix

4.1 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.

4.2 FCC Statement

CRep NM 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.

4.3 CE Conformity

Declaration of Conformity



The manufacturer

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hereby declares, that the following product:

Name	Article Number
CRep NM-x/RMD	12-01-3xx-yy

meets the requirements of the following standards:

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

Electromagnetic Immunity

DIN EN 55035/A11:2022-06 VDE 0878-35/A11:2022-06 – Electromagnetic compatibility of multimedia equipment – Immunity requirements; German version EN 55035:2017/A11:2020

and therefore conforms 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.

Immünster, 29.06.26

Dr. Thomas Wünsche

