



**CAN-Repeater**

**CRep N-.../S24/RMD**

User Manual

User manual for CAN-Repeater CRep N-.../S24/RMD.

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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 N-.../S24/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
- High throughput due to low latency
- ISO 11898 compatible bus interface
- Shutdown of erroneous bus segments
- Rail mountable

## 1.2 General Description

The compact CAN repeater CRep N 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 N permits a flexible design of the network topology. Star and tree structures can be implemented as well as long stub lines. Through the possibility 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 N 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 N. 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 N 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 occurring errors.

### 1.3 Ordering Information

12-01-001-xx	<b>CRep N-3/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 300ns inhibit time
12-01-002-xx	<b>CRep N-5/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 500ns inhibit time
12-01-003-xx	<b>CRep N-10/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 1 $\mu$ s inhibit time
12-01-004-xx	<b>CRep N-20/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 2 $\mu$ s inhibit time
12-01-005-xx	<b>CRep N-50/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 5 $\mu$ s inhibit time
12-01-006-xx	<b>CRep N-100/S24/RMD</b> CAN repeater for rail mounting, extended temperature range, 10 $\mu$ s 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	-40	+90	°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.

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	-	100	175	ns

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## 3 Operating Instructions

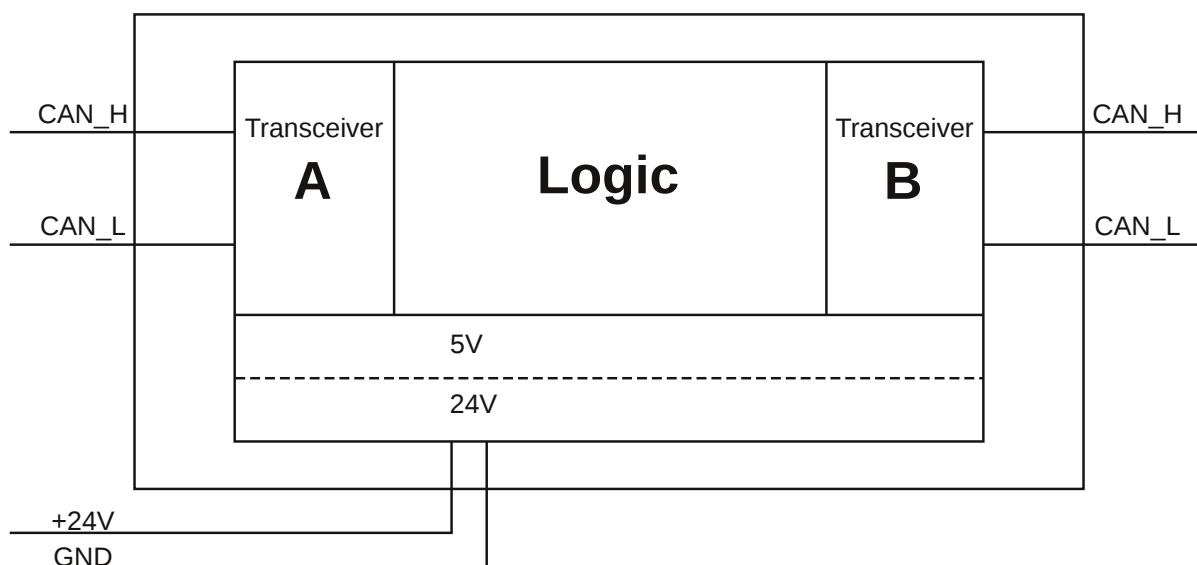
### 3.1 Pin Assignment

CRep N devices include 2 CAN segments, wired by a terminal block with 8 clamps. Besides the CAN signals the terminal block also carries the power supply for CRep N.

The following table shows the terminal assignment:

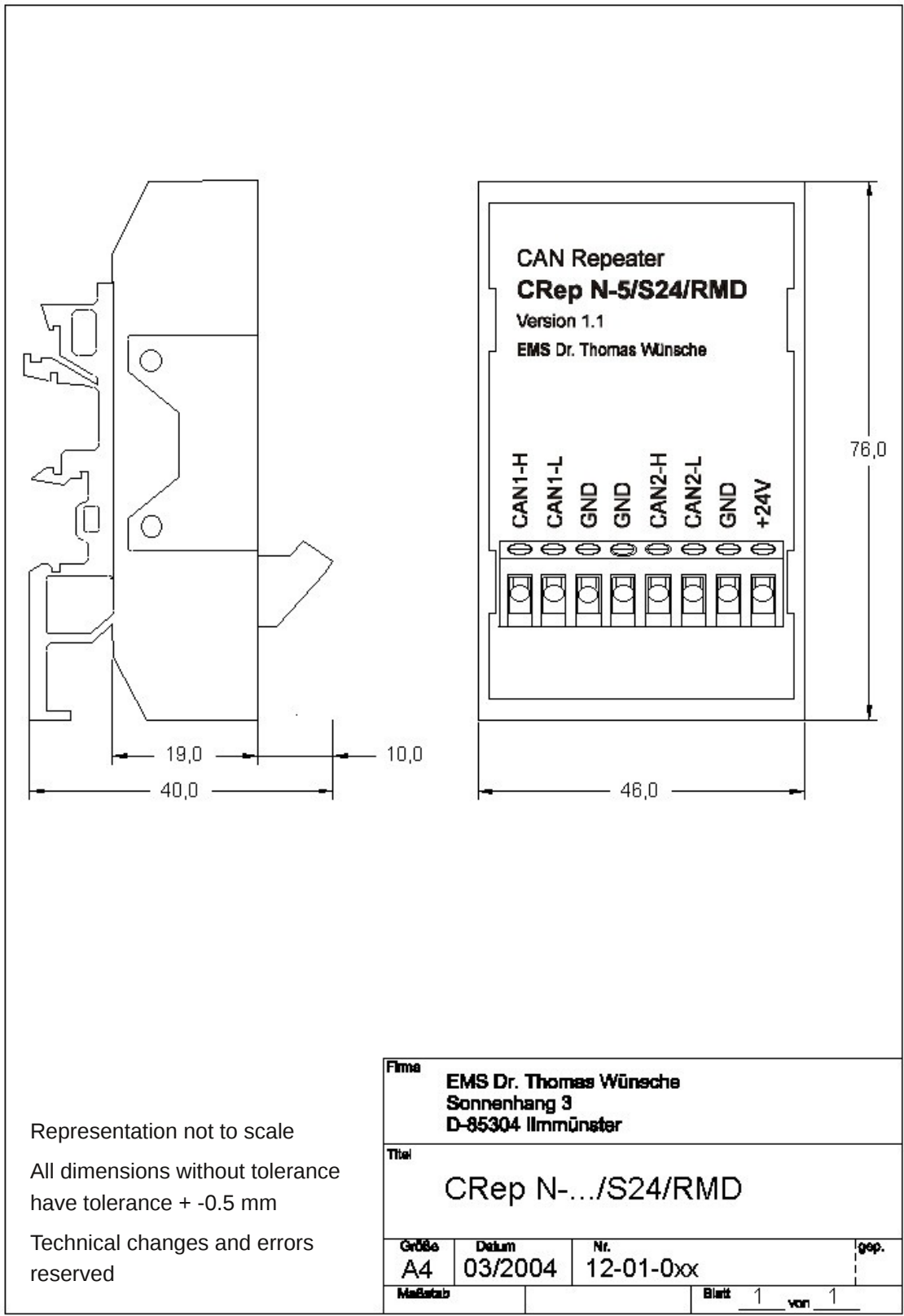
Pin	Function
CAN1-H	CAN1-High bus line
CAN1-L	CAN1-Low bus line
GND	Ground
GND	Ground
CAN2-H	CAN2-High bus line
CAN2-L	CAN2-Low bus line
GND	Ground
+24V	24V power supply

### 3.2 Block Diagram



### 3.3 Dimensions

All values in [mm].



## 4 Appendix

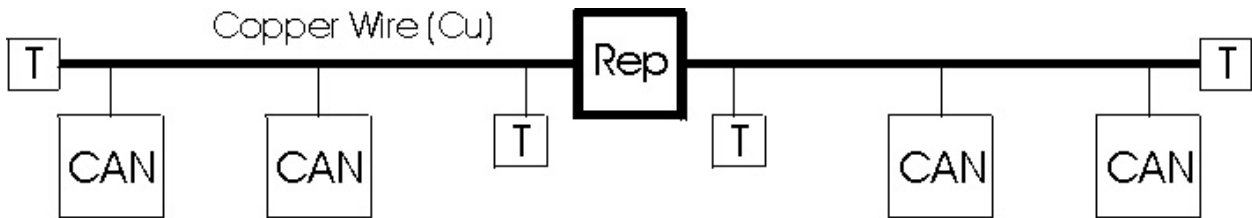
### 4.1 Topology examples

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

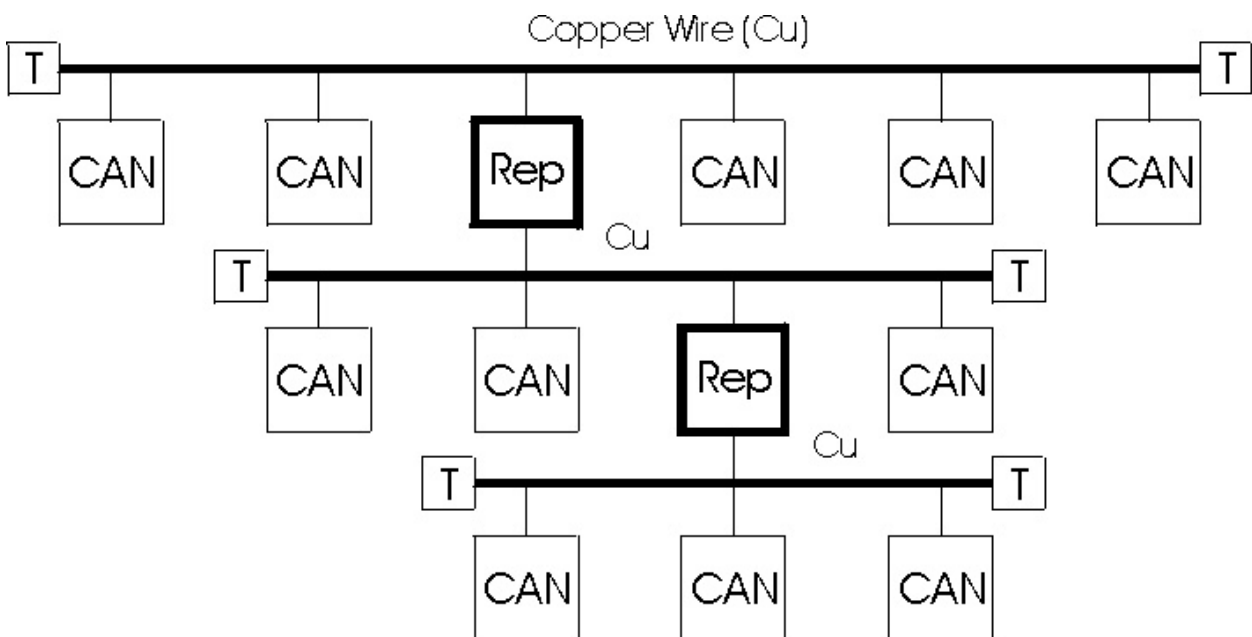
#### Legend



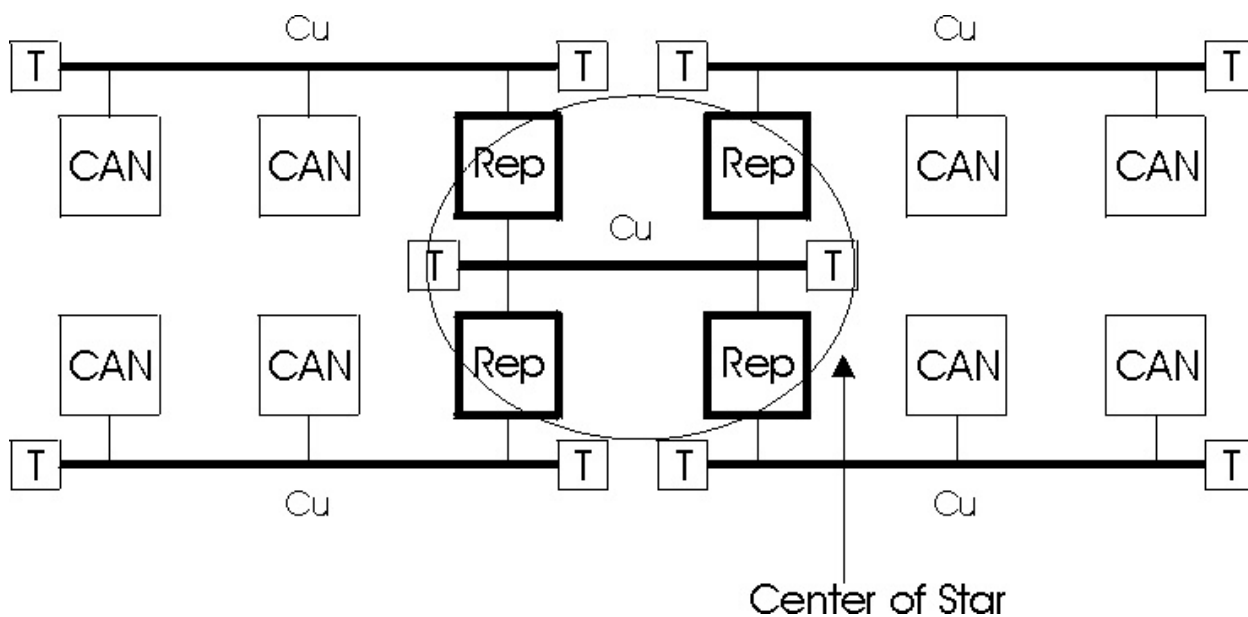
#### Line topology with repeaters



#### 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.

## 4.3 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



The manufacturer

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**Germany**

hereby declares, that the following product:

Name	Article Number
CRep N-3/S24/RMD	12-01-001-xx
CRep N-5/S24/RMD	12-01-002-xx
CRep N-10/S24/RMD	12-01-003-xx
CRep N-20/S24/RMD	12-01-004-xx
CRep N-50/S24/RMD	12-01-005-xx
CRep N-100/S24/RMD	12-01-006-xx

meets the requirements of the following standards:

#### **Electromagnetic Immunity**

EN 55024; VDE 0878-24:2016-05 – Information technology equipment – Immunity characteristics – Limits and methods of measurement (CISPR 24:2010 + Cor.:2011 + A1:2015); German version EN 55024:2010 +A1:2015

#### **Electromagnetic Emission**

EN 55022; VDE 0878-22:2011-12 – Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement (CISPR 22:2008, modified); German version EN 55022:2010

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 2 EEE**

The RoHS 2 Directive (2011/65/EU) 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, 04.05.2017

Dr. Thomas Wünsche



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