



CAN Repeater

CRep S4I/FD-.../S24/RMD

User Manual

User manual for CAN Repeater CRep S4I/FD-.../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.

WARNING: CRep S4I/FD 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 for CAN FD and CC
- 4 individually galvanically isolated CAN channels
- Galvanic separation of CAN channels to power supply
- Low propagation delay
- ISO 11898-2:2016 compatible bus interface (TI ISO1042)
- Detach of dominant locked bus segments
- Rail mountable
- Optional with 120 Ohm termination available

1.2 General Description

The compact CAN repeater CRep S4I/FD transmits and amplifies signals transparent to the classic CAN and CAN FD protocol. Each of the four CAN connections has the physical behavior of a single bus node. CRep S4I/FD permits a flexible design of the network topology and offers special support for star structured networks. Furthermore tree structures and long stub lines are supported. 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 the signal propagation delay, may be increased using CRep S4I/FD 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 S4I/FD. Each subnet can have the maximum number of CAN nodes specified by the used CAN transceivers. Where CAN signals have to be transmitted over long distances, CRep S4I/FD can be used for signal conditioning. The capability to detach permanent dominant segments from the rest of the CAN system reduces the impact on intact bus segments for many often occurring errors.

All CAN channels are galvanic separated to each other and to the power supply. This makes CRep-S4I/FD suitable for applications with diverging ground potentials. The device is available with 120 Ohm or with high impedance termination resistors. The later allows a flexible integration in systems with existing termination resistors. It also prevents faults when a segment which holds the termination is disconnected.

1.3 Ordering Information

12-51-002-xx	CRep S4I/FD-5/S24/RMD Multiport CAN repeater, with high impedance termination, rail mountable, 500ns inhibit time
12-51-003-xx	CRep S4I/FD-10/S24/RMD Multiport CAN repeater, with high impedance termination, rail mountable, 1000ns inhibit time
12-51-004-xx	CRep S4I/FD-20/S24/RMD Multiport CAN repeater, with high impedance termination, rail mountable, 2000ns inhibit time
12-51-005-xx	CRep S4I/FD-50/S24/RMD Multiport CAN repeater, with high impedance termination, rail mountable, 5000ns inhibit time
12-51-006-xx	CRep S4I/FD-100/S24/RMD Multiport CAN repeater, with high impedance termination, rail mountable, 10000ns inhibit time
12-51-102-xx	CRep S4I/FD-5/S24/RMD Multiport CAN repeater, with 120Ohm internal termination, rail mountable, 500ns inhibit time
12-51-103-xx	CRep S4I/FD-10/S24/RMD Multiport CAN repeater, with 120Ohm internal termination, rail mountable, 1000ns inhibit time
12-51-104-xx	CRep S4I/FD-20/S24/RMD Multiport CAN repeater, with 120Ohm internal termination, rail mountable, 2000ns inhibit time
12-51-105-xx	CRep S4I/FD-50/S24/RMD Multiport CAN repeater, with 120Ohm internal termination, rail mountable, 5000ns inhibit time
12-51-106-xx	CRep S4I/FD-100/S24/RMD Multiport CAN repeater, with 120Ohm internal termination, rail mountable, 10000ns 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 S4I/FD and connected devices.

Parameter	Min.	Max.	Unit
Storage temperature	-40	+85	°C
Operating temperature	-20	+60	°C
Power supply voltage	-100	+35	V
Voltage on CAN signal lines	-70	+70	V

2.2 Nominal Values

Parameter	Min.	Typ.	Max.	Unit
Current consumption (no load)	-	50	-	mA
Current consumption (0,5/2MBit/s, 100% busload)	-	75	-	mA
Power supply voltage	19	24	30	V
Propagation delay between 2 arbitrary CAN channels	-	190	220	ns

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 S4I/FD device includes 4 CAN segments, wired by terminal blocks with 3 clamps. The power supply of CRep S4I/FD is separately wired by a terminal block with 2 clamps.

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

Pin	Name	Function
1	H	CAN high bus line
2	L	CAN low bus line
3	G	CAN ground

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

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

The power supply is galvanic decoupled from the CAN system.

3.2 LED

Power

The presence of power is indicated by a LED.

On	The device is in normal operation mode
Off	No power supplied

CAN 1-4

Each CAN channel is provided with a LED indicating that this channel has originated a CAN or CAN FD message.

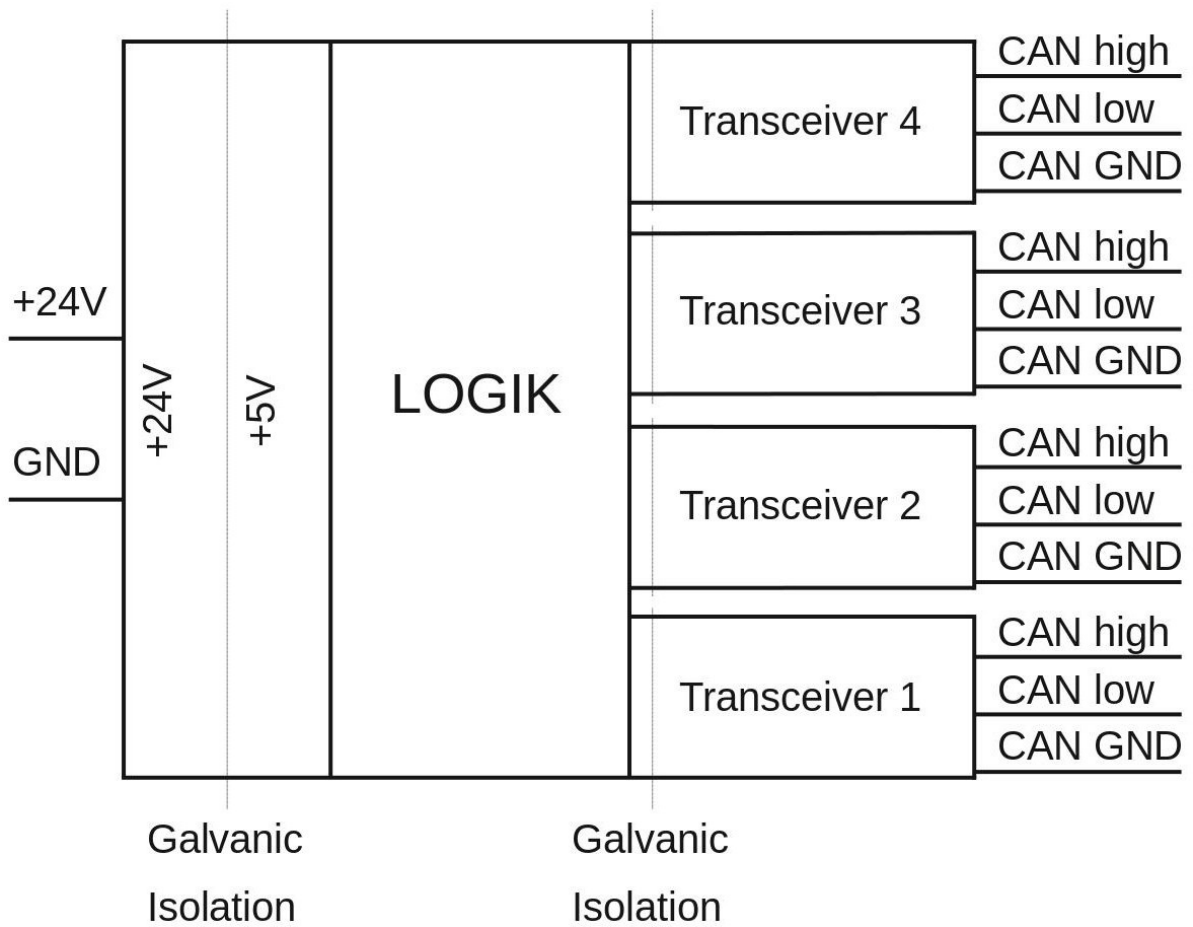
On	A connected node has originated a CAN message
Off	Channel is idle or driven by repeater logic

3.3 Termination

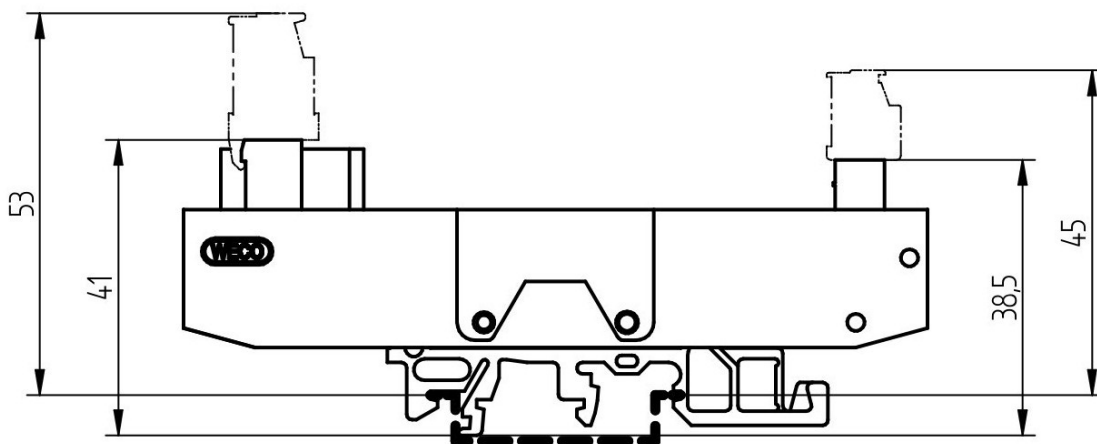
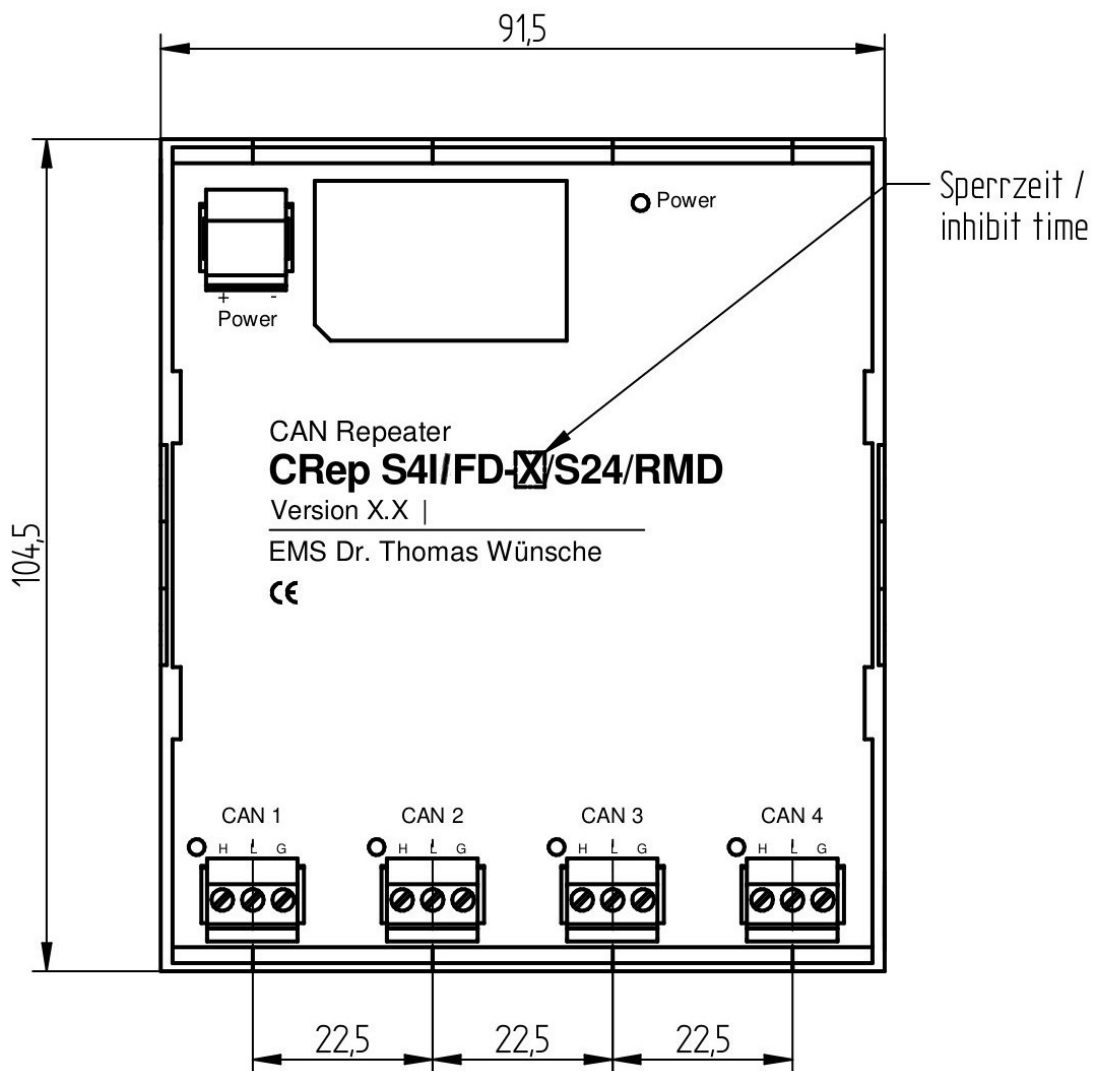
The device is either available with standard 120 Ohm termination resistors or with 3,3 kOhm resistors. The two versions can be distinguished with the label "internal termination" or "high impedance internal termination".

The later version can be used, if the repeater is connected somewhere in the middle of the CAN line and standard termination at the repeaters location is not applicable. However it must be ensured that the CAN signal can fade out fast enough at a repeaters open channel with no external termination. This is ensured by the 3,3 kOhm internal resistors. Although this value is suitable in most cases, it is recommended that an open channel is terminated with a 120 Ohm resistor plugged in the respective connector.

3.4 Block Diagram



3.5 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 CE Conformity

Declaration of Conformity



The manufacturer

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hereby declares, that the following product:

Name	Article Number
CRep S4I/FD-xx/S24/RMD	12-51-xxx-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 55035/A11:2022-06 VDE 0878-35/A11:2022-06 – Electromagnetic compatibility of multimedia equipment – Emission Requirements; German version EN 55035:2017/A11:2020

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, 21.05.24

Dr. Thomas Wünsche

