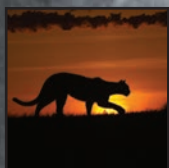
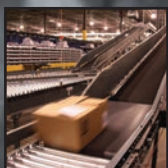
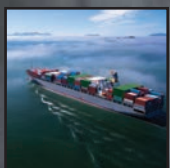


D5

Installation instructions



Repeaters

D5-21
D5-23

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CHAPTER 1: INTRODUCTION

THANK YOU FOR PURCHASING A TELE RADIO AB PRODUCT

Tele Radio AB's product range is composed of transmitters, receivers, and accessories intended for use together as a system.

Tele Radio AB systems are mainly intended for the industrial, lifting, hydraulic and mobile equipment markets.



READ ALL INSTRUCTIONS AND WARNINGS CAREFULLY BEFORE MOUNTING, INSTALLING, CONFIGURING AND OPERATING THE PRODUCTS.

These Installation instructions have been published by Tele Radio AB and are not subject to any guarantees. The Installation instructions may be withdrawn or revised by Tele Radio AB at any time and without further notice.

IMPORTANT! These instructions are intended for installers and authorized service and distribution centers. The instructions containing information about the installation and configuration of the radio remote control unit on the machine are NOT intended to be passed on to the end user. Only information that is needed to operate the machine correctly by radio remote control may be passed on to the end user.

Tele Radio AB remote controls are often built into wider applications. It is the responsibility of any such users or integrators to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use. Tele Radio AB shall not be responsible or liable for misuse of the information contained herein.

Always refer to the applicable local regulations for installation and safety requirements relating to cranes, hoists, material handling applications, lifting equipment, industrial machinery, and/or mobile hydraulic applications using Tele Radio AB products, e.g.:

- applicable local and industrial standards and requirements,
- applicable occupational health and safety regulations,
- applicable safety rules and procedures for the factory where the equipment is being used,
- user and safety manuals or instructions of the manufacturer of the equipment where Tele Radio AB remote control systems are installed.

Tele Radio AB Installation instructions do not include or address the specific instructions and safety warnings of the end product manufacturer.

Tele Radio AB products are covered by a warranty against material, construction, or manufacturing faults. See "Chapter 5: Warranty, service, repairs, and maintenance"

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1.1 ABOUT THIS DOCUMENT

Before installing or operating the product, read the corresponding documentation carefully.

Tele Radio AB's product range is composed of transmitters, receivers, and accessories intended for use together as a system.

Tele Radio AB Installation instructions covers main technical specifications, standard installation, configuration and operating instructions, and general troubleshooting.

Should you find any errors of omissions, in this documentation or if you have any suggestions for improvements or amendments, please inform us.

1.1.1 Copyright

Information in this document is subject to change without notice. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, photographic, mechanical (including photocopying), recording or otherwise for any purpose other than the purchaser's personal use without the written permission of Tele Radio AB.

1.1.2 Term and symbol definitions

The capitalized terms and symbol used herein shall have the following meaning:

- **WARNING:** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION:** indicates a hazardous situation which, if not avoided, will result in minor or moderate injury.
- **IMPORTANT:** is used for information that requires special consideration.
- **NOTE:** is used to address practices not related to physical injury.



This symbol is used to call attention to safety messages that would be assigned the signal words "WARNING" or "CAUTION".

1.2 ABOUT D5 REPEATER & ACTIVE ANTENNA

Depending on the application and/or the environment, repeaters or active antennas can be installed on all receivers to optimize data transmission.

D5 is a combined repeater /active antenna that can be used to extend transmissions so that the signal can cover greater distances or be received on the other side of an obstruction.

D5-21 and D5-23 share the same hardware and technical characteristics. D5-21 is intended for use together with R20/ R21 systems while D5-23 is intended for use together with Panther systems.

An active antenna is recommended whenever strict control distances are required or when the receiver is mounted in close proximity to unintentional electronic emitters, e.g. a truck alternator, welding machine or a variable frequency drive. If needed, the active antenna can be used together with one or more repeaters. When used as an active antenna, D5 is connected to the receiver via a bus-cable.

Each repeater is independent and has a range depending on the environment. A system can have up to 8 repeaters simultaneously.

1.2.1 System radio frequency

D5 repeaters operate on the frequency band 2.4 GHz. The frequency band has been divided into 16 channels (11 to 26). Once the channel has been selected on the transmitter, the receivers and repeaters will automatically detect and switch to the same channel.

CHAPTER 2: SAFETY

This product is to be used together with a Tele Radio ABradio system including one or more transmitters and receivers.

2.1 WARNINGS & RESTRICTIONS



Carefully read through the following safety instructions before proceeding with the installation, configuration, operation, or maintenance of the product. Failure to follow these warnings could result in death or serious injury.

This product must not be operated without having read and understood the Installation instructions, the specific technical documentation (for customized systems), and having received the appropriate training. The purchaser of this product has been instructed how to handle the system safely. The following information is intended for use as a complement to applicable local regulations and standards.

2.1.1 Installation and commission



This radio system must not be used in areas where there is a risk of explosion.



- Tele Radio AB remote controls are often built into wider applications. These systems should be equipped with:
 - a wired emergency stop where necessary
 - a brake
 - an audible or visual warning signal
 - Always switch off all electrical power from the equipment before installation procedure.
 - Only licensed or qualified personnel should be permitted to install the product..
 - To utilize the safety features of the system, use the stop relays in the safety circuitry of the object that you want to control.
 - Avoid registering transmitters in receivers where they are not being used.
-
- The product can withstands normal weather conditions but should be protected from extreme conditions.
 - Mount the product in such a location that the LEDs can be easily seen and the button on the receiver is accessible. Make sure to install possible accessories inside or on the receiver before permanently installing the receiver. A permanent installation of the receiver must include fuses protection of the equipment and cables from short circuit.

2.1.2 Operation



- Only qualified personnel should be permitted to access the transmitter and operate the equipment.
- Make sure that the user satisfies the age requirements in your country for operating the equipment.
- Make sure that the user is not under the influence of drugs, alcohol and medications.
- Make sure that the user knows and follows operating and maintenance instructions as well as all applicable safety procedures and requirements.
- **The user should:**
 - Always test the transmitter stop button before operating it. This test should be done on each shift, without a load.
 - Never use a transmitter if the stop button is mechanically damaged. Contact your supervisor or representative for service immediately.
 - Never leave the transmitter unattended.
 - Always switch the transmitter off when not in use. Store in a safe place.
 - Keep a clear view of the work area at all times.

2.1.3 Maintenance

- Keep the safety information for future reference. Always download the Installation instructions from our website, www.tele-radio.com, for the latest available version.
- If error messages are shown, it is very important to find out what caused them. Contact your representative for help.
- The functionality of the stop button should be tested at least after every 200 hours' use (see "Stop button" on page 1).
- If the stop button is mechanically damaged, do not use the transmitter. Contact your supervisor or representative for service immediately.
- Keep contacts and antennas clean.
- Wipe off dust using a clean, slightly damp cloth.
- Never use cleaning solutions.
- Check the encapsulation, foils and cable for damages. If the encapsulation or foil is damaged, moisture can cause serious damage to the electronics.

Before maintenance intervention on any remote controlled equipments:



- always remove all electrical power from the equipment.
- always follow lockout procedures.

CHAPTER 3: TECHNICAL DATA

REPEATER	D5-21, D5-23
Frequency	2405 – 2480 MHz
Power supply	12 ... 24 VDC (-50% ... +35%)
Current consumption	max. 500 mA
Cable length	~ 1.8 m / 5,9 ft
Connector	M12 5 pin male
Radio communication	Duplex
Radio frequency output power	CE EIRP: <12 dBm (16 mW) FCC EIRP: <22 dBm (158 mW)
Range	100 m (328 ft), adjustable depending on configuration
Dimension	62 x 62 x 37 mm / 2.44 x 2.44 x 1.46 in
Weight (typical)	~ 137 g / 0.3 lbs
IP code	IP67

3.1 CURRENT CONSUMPTION

Input power	D5-21, D5-23	
	Min.*	Max.**
12 V DC	28 mA	35 mA
24 V DC	16 mA	20 mA

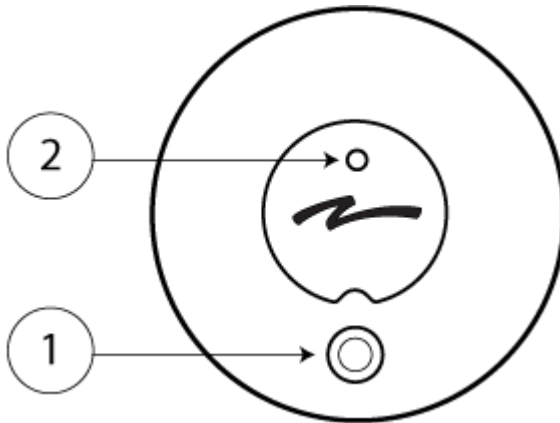
*Minimum current consumption = repeater powered, no radio session established.

**Maximum current consumption = repeater powered, radio session established.

CHAPTER 4: PRODUCT GENERAL DESCRIPTION

NOTE: The pictures shown in this chapter are for illustrative purposes only. Depending on the configuration, the actual product appearance may differ from the basic model used for reference.

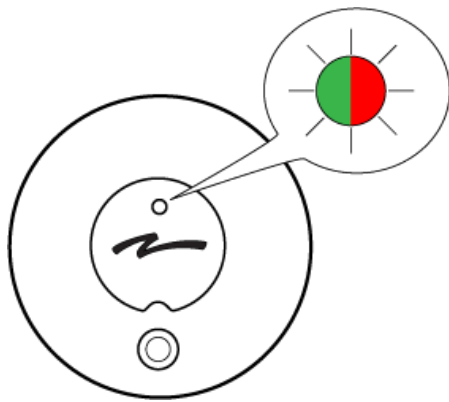
4.1 REPEATER DESCRIPTION



1. Function button (not implemented)

2. Power LED indicator

4.2 LED INDICATOR

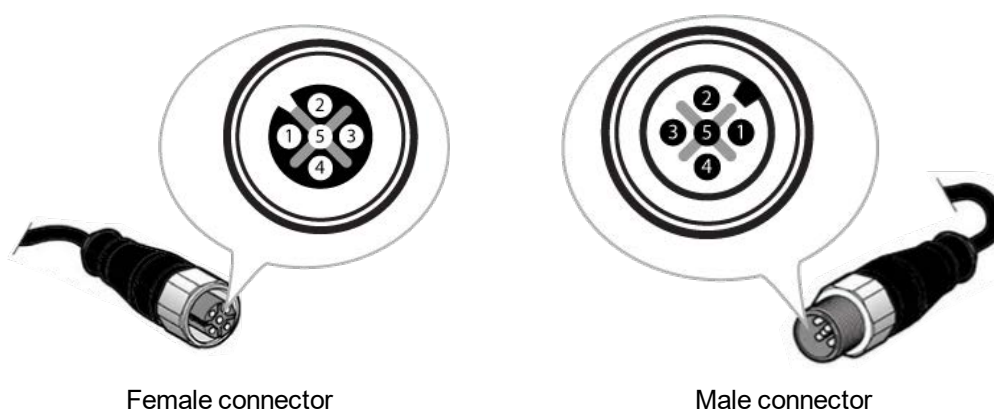


The repeater is equipped with one bi-color LED (power LED).

The Power LED is flashing green when the repeater/active antenna is powered up.

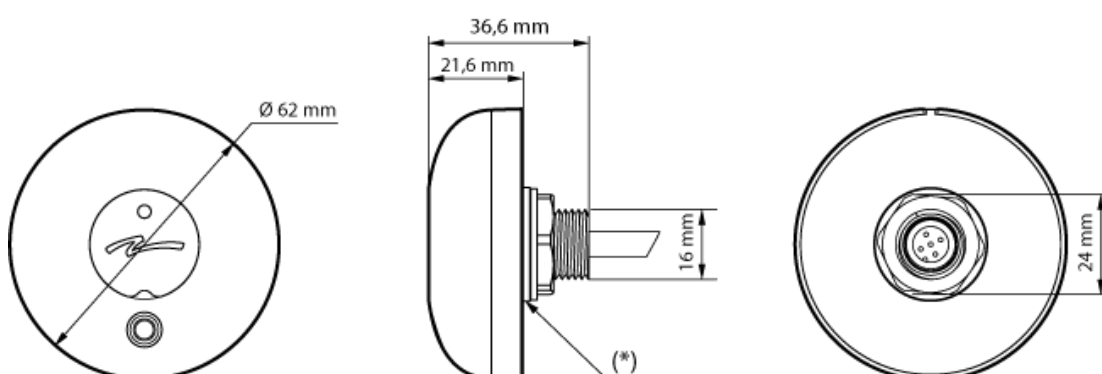
The Power LED lights red when the repeater is in registering mode (D5-23 only).

4.3 M12 CONNECTOR PINOUT



Pin	Signal	Cable color
1	RS485_SHLD	Brown
2	V+ (from power supply)	White
3	GND	Blue
4	RS485B	Black
5	RS485A	Grey

4.4 MOUNTING DIMENSIONS



* Gasket

4.4.1 Precautions for the installation of the repeater/ active antenna



Before connecting the equipment, make sure that the power supply is switched off.

IMPORTANT! Only authorized personnel should install the product.

Only correct installation meets the safety levels for the product.

- Install the repeater/active antenna in a location where the LED and button can easily be seen and accessed.

-
- For optimum performance, place the repeater/ active antennas away from metal objects such as metal girders, high-voltage cables, and other antennas.
 - Keep the longest distance possible between the repeater and e.g. engines, welding machines, power sources, inverters, x-ray devices and other radio transmitters.
 - Any repeater that is mounted separately must be positioned in as open a space as possible. A hidden antenna significantly impairs the reception.
 - Do not mount the repeater/ active antenna in a locker.
 - Test the equipment before installing the repeater/ active antenna permanently.

CHAPTER 5: WARRANTY, SERVICE, REPAIRS, AND MAINTENANCE

Tele Radio AB products are covered by a warranty against material, construction and manufacturing faults. During the warranty period, Tele Radio AB may replace the product or faulty parts. Work under warranty must be performed by Tele Radio AB or by an authorized service center specified by Tele Radio AB.

The following are **not** covered by the warranty:

- Faults resulting from normal wear and tear
- Parts of a consumable nature
- Products that have been subject to unauthorized modifications
- Faults resulting from incorrect installation and use
- Damp and water damage

MAINTENANCE

Repairs and maintenance must be performed by qualified personnel

Only use spare parts from Tele Radio AB

Contact your representative for service or any other assistance

Keep contacts and antennas clean

Wipe off dust using a slightly damp, clean cloth

NOTE: Never use cleaning solutions or high-pressure washer.

CHAPTER 6: REGULATORY INFORMATION

6.1 EUROPE

Applies to:

D5-21

D5-23

6.1.1 CE marking

Hereby, Tele Radio AB, declares that the radio equipment type(s) listed above is/ are in compliance with Directive 2014/53/EU.

The latest version of the complete EU Declaration of Conformity is available on the Tele Radio AB website, www.tele-radio.com.

6.1.2 WEEE directive



This symbol means that inoperative electrical and electronic products must not be mixed with household waste. The European Union has implemented a collection and recycling system for which producers are responsible. For proper treatment, recovery and recycling, please take this product to a designated collection point.

Tele Radio AB strives to minimize the use of hazardous materials, promotes reuse and recycling, and reduces emissions to air, soil and water. When a commercially viable alternative is available, Tele Radio AB strives to restrict or eliminate substances and materials that pose an environmental, health or safety risk.

6.2 NORTH AMERICA

Applies to:

D5-21

D5-23

6.2.1 FCC statement

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off

and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To satisfy FCC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended.

6.2.2 IC Statement

This product complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:

- (1) This device may not cause interference; and
- (2) This device must accept any interference, including interference that may cause undesired operation of device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1) l'appareil ne doit pas produire de brouillage;
- 2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

To satisfy IC RF exposure requirements, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during device operation. To ensure compliance, operation at closer than this distance is not recommended.

Afin d'assurer la conformité aux exigences de la IC en matière d'exposition aux RF, une distance de séparation d'au moins 20 cm doit être maintenue entre l'antenne de cet appareil et toute personne à proximité pendant le fonctionnement de l'appareil. Pour assurer le respect de ces exigences, il n'est pas recommandé d'utiliser l'appareil à une distance inférieure à celle-ci.

6.2.3 FCC/IC labels

The FCC ID and IC numbers can be found printed on the product label, as per below.



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These installation instructions are subject to change without prior notice.
Download the latest installation instructions from **www.tele-radio.com**.