

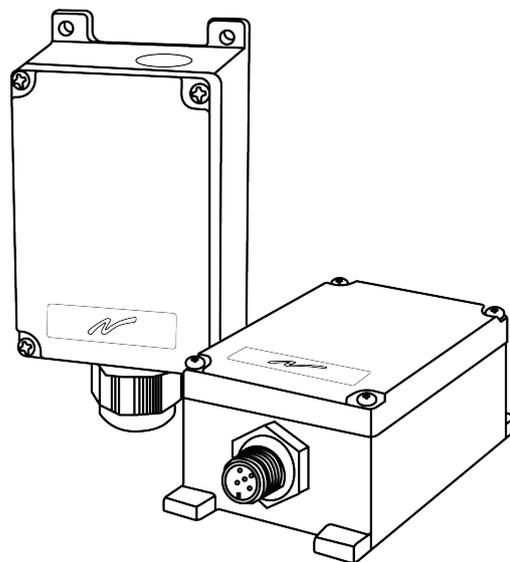
# INSTALLATION INSTRUCTIONS

*Receivers: R18-01, R18-02*

safe

smart

strong



---

**IMPORTANT! This document is intended for R18 receivers with software version SW0014-24v07 or higher.**

For receivers with software version SW0014-24v03 or lower, please refer to the installation instructions IM-PN-RX105-A03-EN.

**©Tele-Radio i Lysekil AB**

Datavägen 21

SE-436 32 Askim

Sweden

Phone: +46 (0)31 748 54 60

---

---

# CONTENTS

<b>CHAPTER 1: INTRODUCTION</b> .....	<b>5</b>
1.1 About this document .....	6
1.2 About R18 receiver .....	7
<b>CHAPTER 2: SAFETY</b> .....	<b>8</b>
2.1 Warnings & restrictions .....	8
<b>CHAPTER 3: TECHNICAL DATA</b> .....	<b>12</b>
3.1 Receiver specifications .....	12
3.2 Current consumption .....	12
<b>CHAPTER 4: PRODUCT GENERAL DESCRIPTION</b> .....	<b>13</b>
4.1 Receiver description .....	13
4.2 Mechanical installation .....	14
<b>CHAPTER 5: BOARD DESCRIPTION</b> .....	<b>16</b>
5.1 Base board .....	17
<b>CHAPTER 6: STATUS AND ERROR INDICATIONS</b> .....	<b>19</b>
6.1 Function LEDs indication in normal operation .....	19
6.2 CANopen run status (LED4) .....	20
6.3 CANopen error status (LED3) .....	21
6.4 J1939 run status (LED4) .....	21
6.5 J1939 error status (LED3) .....	21
6.6 Menu mode indications .....	22
6.7 Error indications and code messages .....	22
<b>CHAPTER 7: OPERATION</b> .....	<b>24</b>
7.1 General information .....	24
7.2 Radio mode .....	24
7.3 Login/logout function .....	24
<b>CHAPTER 8: CONFIGURATION MENU</b> .....	<b>25</b>
8.1 Menu mode .....	25
8.2 Register the transmitter in the receiver .....	26
8.3 Show/change CANopen node ID .....	27
8.4 Show/change CAN bit rate .....	28
8.5 Show/change radio mode .....	29
8.6 Active Load select .....	30

---

---

8.7 Register a batteryless button (BLB) transmitter .....	32
8.8 Log a transmitter out .....	34
8.9 Erase all registered transmitters .....	35
8.10 Master reset of the receiver .....	36
<b>CHAPTER 9: WARRANTY, SERVICE, REPAIRS, AND MAINTENANCE .....</b>	<b>37</b>
<b>CHAPTER 10: REGULATORY INFORMATION .....</b>	<b>38</b>
10.1 Europe .....	38
<b>ANNEX A: CANOPEN SPECIFICATION FOR PANTHER GEN2 SYSTEMS (IN ENGLISH) .....</b>	<b>39</b>
A.1 Introduction .....	39
A.2 General .....	40
A.3 Bus termination .....	40
A.4 Selection of CANopen node ID .....	40
A.5 Selection of CANopen baud rate .....	40
A.6 Configuration of CANopen object dictionary .....	41
A.7 LED indications .....	41
A.8 Internal states .....	41
A.9 Pre-defined connection set .....	42
A.10 Transmit Process Data Objects (TPDO) overview .....	44
A.11 Receive Process Data Objects (RPDO) overview .....	45
A.12 Manufacturer Specific Objects .....	46
A.13 Emergency Object (EMCY) .....	55
A.14 Object Dictionary .....	56
<b>ANNEX B: INDEX .....</b>	<b>62</b>

---

## CHAPTER 1: INTRODUCTION

### Thank you for purchasing a Tele Radio product



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

These Installation instructions have been published by Tele Radio and are not subject to any guarantees. The Installation instructions may be withdrawn or revised by Tele Radio at any time and without further notice. Corrections and updates will be added to the latest version of the manual. Always download the Installation instructions from our website, [www.tele-radio.com](http://www.tele-radio.com), for the latest available version. Keep the safety instructions for future reference.

**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 remote controls are often built into wider applications. This documentation is not intended to replace the determination of suitability or reliability of the product for specific user applications and should not be used for this purpose. 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 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 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 remote control systems are installed.

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

For battery precautions, see "Battery precautions" on page 1.

Tele Radio products are covered by a warranty against material, construction, or manufacturing faults. See "Chapter 9: Warranty, service, repairs, and maintenance".

## 1.1 About this document

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

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

These Installation instructions cover general safety issues, main technical specifications, standard installation, configuration and operating instructions, as well as general troubleshooting and battery information. Images shown in this document are for illustrative purposes only.

Please report any error or omission in this document, as well as any improvement or amendment suggestion to [td@tele-radio.com](mailto:td@tele-radio.com).

### 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.

### 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 R18 receiver

Tele Radio's remote control systems are suitable for a wide variety of applications for e.g. stationary or mobile equipments, hydraulic machines, construction, forestry or agriculture equipments and more. Tele Radio's transmitters and receivers are highly customizable and can be configured to suit the most wide-ranging application requirements & usage habits.

R18 receivers have simplex communication and can work in either discontinuous or continuous mode. They are intended for CANopen/J1939 communication.

There are two models available:

	Connector		Bus system
	Cable gland M12	M12	CANopen/ J1939
R18-01	●		●
R18-02		●	●

- Standard

## CHAPTER 2: SAFETY

### 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 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.

**IMPORTANT! Tele Radio 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

#### 2.1.1 INSTALLATION AND COMMISSIONING

**IMPORTANT! Only licensed or qualified personnel should be permitted to install the product.**



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



**Always switch off all electrical power from the equipment before installation procedure.**



**RISK OF UNINTENDED EQUIPMENT OPERATION**

**Only transmitters that are intended for use should be registered in the receiver.**

**Failure to follow these instructions could result in death, serious injury, or equipment damage.**

**RISK OF ELECTRIC SHOCK**



**The receiver must only be opened by qualified installers or authorized personnel.**

**Make sure the power supply is switched off before opening the receiver. Failure to follow these instructions could result in death, serious injury, or equipment damage.**



- **The receiver must be securely attached and located where it will not be hit by e.g. any moving parts.**
- **Do not install the product in areas affected by strong vibrations**
- **Cable glands and vent plugs must face downwards to prevent water ingress.**
- **Ensure that the power supply is connected to the correct terminals.**
- **Ensure that flexible cords and cables are not damaged through friction or stress.**
- **Do not use damaged cables.**
- **Ensure cables and connectors do not hang loose.**

- The receiver is designed to withstand normal weather conditions but should be protected from extreme conditions.
- Install the receiver in a location where the LED is easily visible and the button accessible.
- Make sure to install available accessories inside or on the receiver before permanently installing the receiver. A permanent installation of the product must include fuse protection of the equipment and cables against short circuits.

### 2.1.2 OPERATION



**This equipment is not suitable for use in locations where children are likely to be present.**



**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. See "Chapter 1: Emergency stop".
- 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



**Before maintenance intervention on any remote controlled equipments:**

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

- Keep the safety information for future reference. Always download the Installation instructions from our website, [www.tele-radio.com](http://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 the product in a clean, dry place.
- 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.

## CHAPTER 3: TECHNICAL DATA

### 3.1 Receiver specifications

#### 3.1.1 COMMON SPECIFICATIONS

Input power	12–24 V DC
Frequency band	2405 – 2480 MHz
Frequency management	Direct Sequence Spread Spectrum (DSSS)
Number of channels	16 (channel 11–26)
Radio communication	Simplex
Max. number of registered transmitters	8
Number of digital inputs	0
IP code	IP65
Operating temperature	-20...+55 °C / -4...+130 °F
Dimensions	96 x 54 x 38 mm / 3.8 x 2 x 1.5 in
Weight	Max. 200 g / 0.44 lbs
Antenna	Internal antenna
Bus system/com. protocols	CAN (CANopen by default or J1939 <sup>1</sup> )

#### 3.1.2 OTHER SPECIFICATIONS

	R18-01	R18-02
Connector	Cable gland M16	M12 connector

### 3.2 Current consumption

Input power	Typical*
12 V DC	0.05 A
24 V DC	0.02 A

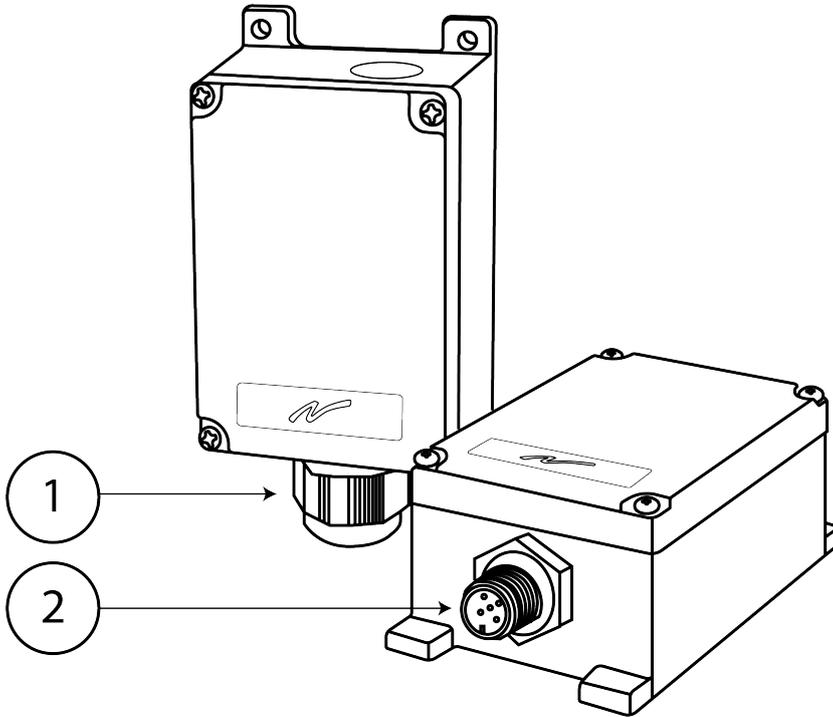
\*Receiver powered and CAN communication active

<sup>1</sup>To change from CANopen to J1939, contact your representative for assistance.

## CHAPTER 4: PRODUCT GENERAL DESCRIPTION

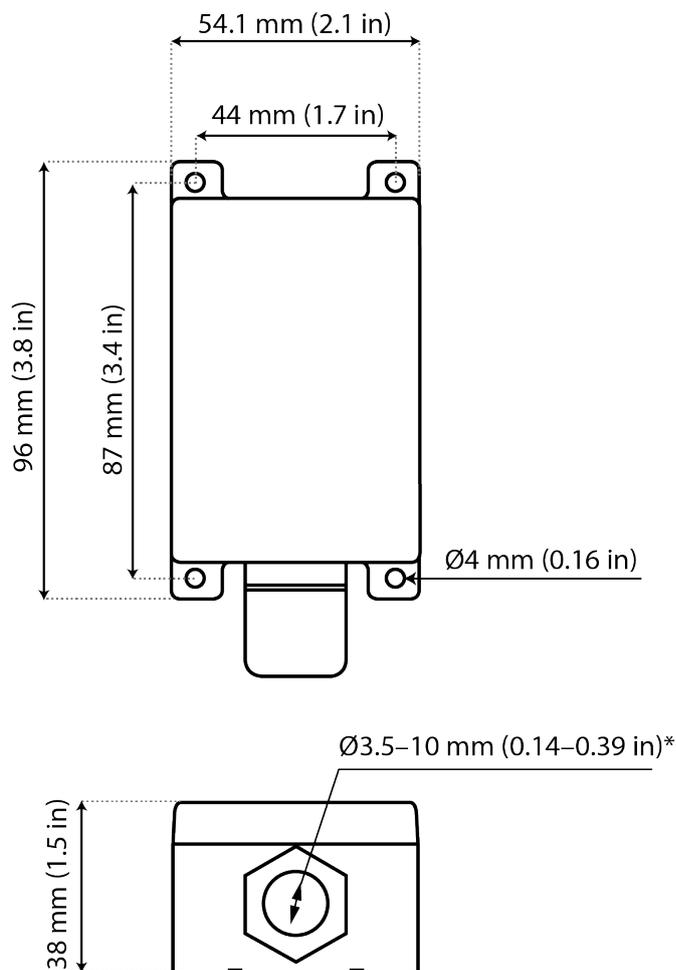
The pictures shown in this chapter are for illustrative purposes only.

### 4.1 Receiver description



- |                                |        |
|--------------------------------|--------|
| 1. Power cable gland (M12x1.5) | R18-01 |
| 2. M12 connector               | R18-02 |

## 4.2 Mechanical installation



NOTE: For mounting on a wall or equipment, use 4 M5x30 mm screws or equivalent fastening method.

### 4.2.1 INSTALLATION PRECAUTIONS

#### **RISK OF ELECTRIC SHOCK**

**The receiver must only be opened by qualified installers or authorized personnel.**



**Make sure the power supply is switched off before opening the receiver. Failure to follow these instructions could result in death, serious injury, or equipment damage.**

**IMPORTANT! Only authorized personnel should install the product.**

Only correct installation complies with the safety levels for the product.

- A permanent installation of the receiver must include fuses in order to protect the equipment and cables from short circuit.
- The receiver must be installed vertically, on a flat and rigid surface, with the cable at the bottom.

NOTE: For mounting on a wall or equipment, use 4 M5x30 mm screws or equivalent fastening method.

- Install the receiver in a location where the LED is easily visible and the button accessible.
- Consider the wiring limitation and the radio communication limitation to choose the receiver location.
- Ensure no obstacle is impairing the radio communication performance between the receiver and the transmitter.
- The receiver must not be installed inside closed metal containers.
- Make sure any accessories inside or on the receiver are installed before permanently installing the receiver.
- Test the equipment before installing the receiver permanently.

## CHAPTER 5: BOARD DESCRIPTION

NOTE: The pictures shown in this chapter are for illustrative purposes only.

### **RISK OF ELECTRIC SHOCK**

**The receiver must only be opened by qualified installers or authorized personnel.**

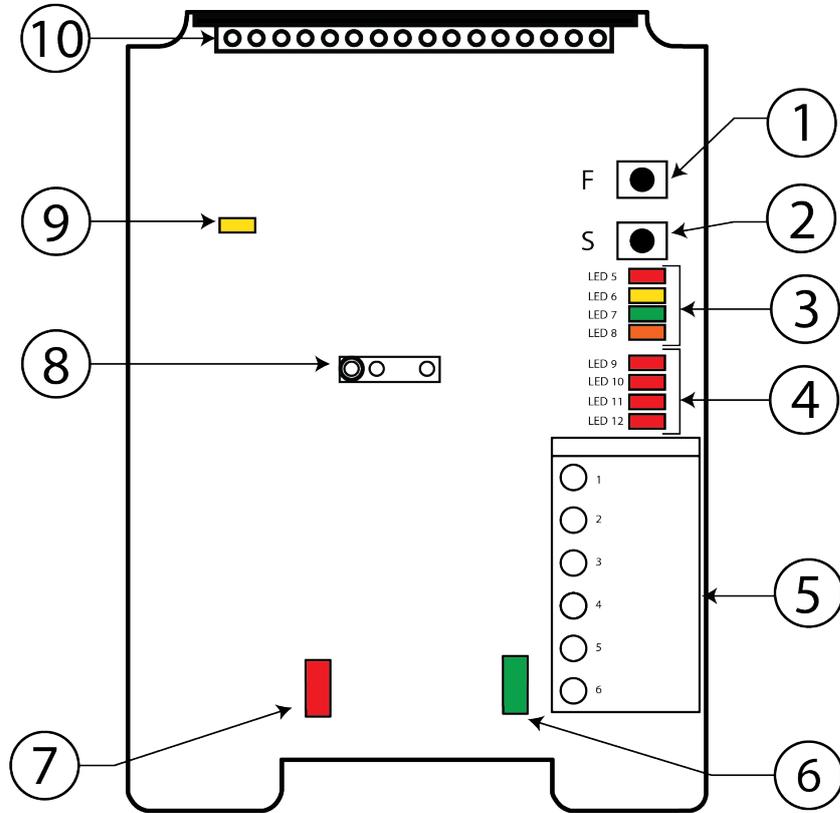


**Make sure the power supply is switched off before opening the receiver. Failure to follow these instructions could result in death, serious injury, or equipment damage.**

**IMPORTANT! Only experienced electronic technicians should add and map expansion boards and inputs/outputs.**

## 5.1 Base board

NOTE: This base board is integrated in all R18 models. It has position number A.



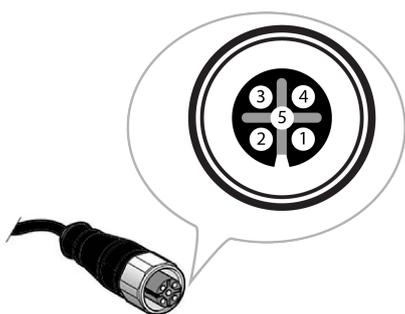
- |   |                                |
|---|--------------------------------|
| 1. <b>Function</b> button (cancel)                                  | 6. CAN run status LED (green)  |
| 2. <b>Select</b> button (OK)  | 7. CAN error status LED (red)  |
| 3. Function LEDs<br>(5 = red, 6 = yellow, 7 = green,<br>8 = orange) | 8. Programming contact         |
| 4. LED indicators 9–12 (red)  | 9. Power LED (yellow) (yellow) |
| 5. Terminal block for input power and<br>CAN signals                | 10. Radio module               |

### 5.1.1 TERMINAL BLOCK FOR INPUT POWER AND CAN SIGNALS

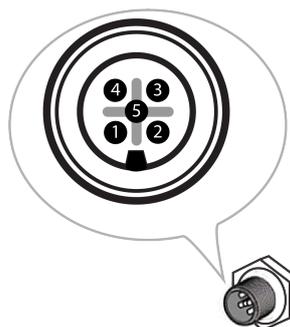
NOTE: The default mapping is for CANopen. For J1939, contact your representative for assistance.

	Signal	Cable color
	1. (not in use)	-
	2. Shield	White-Brown
	3. CAN_CH (CAN high)	Brown
	4. CAN_CL (CAN low)	Orange
	5. GND	Blue
	6. Input power 7–33 V DC	White-Blue

### 5.1.2 CAN M12 PINOUT



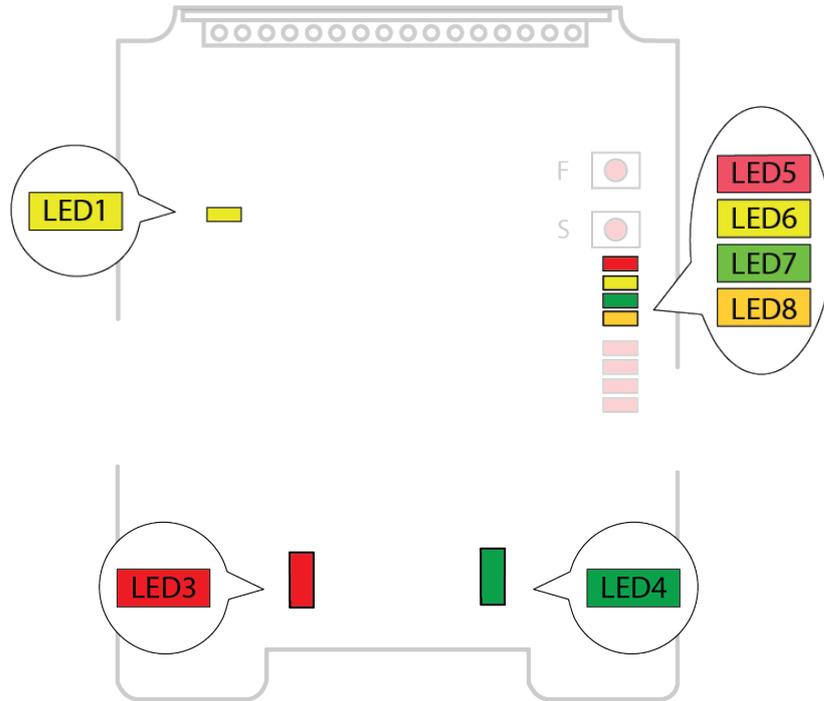
Female connector (cable)



Male connector (on the receiver)

Pin	Signal	Cable color
1	CAN SHLD	White-Brown
2	CAN V+	White-Blue
3	CAN GND	Blue
4	CAN_CH	Brown
5	CAN_CL	Orange

## CHAPTER 6: STATUS AND ERROR INDICATIONS



### 6.1 Function LEDs indication in normal operation

LED (s)	Color	Off	On	Flashing	Indicates
1	yellow	○			No power to the receiver
			●		Receiver is powered up
5	red	○			No transmitter is registered.
			●	Single flash	One or more transmitters are registered.. No radio link.
			●	Double flash	One or more transmitters are registered and logged in. No radio link.
			●	Solid	Radio link established.
6	yellow		●		Receiving a radio packet from a transmitter other than a Panther.
6	yellow		●		Receiving a radio packet from a transmitter set to a different radio mode (discontinuous or continuous) than the receiver.
7	green		●		

LED (s)	Color	Off	On	Flashing	Indicates
6	yellow		●		Receiving a radio packet from a transmitter that is not registered.
8	orange		●		
7	green		●		Receiving a radio packet, low signal (RSSI).
8	orange		●		Receiving a radio packet, configuration ID not accepted.
7	green		●		Receiving a radio packet, custom ID not accepted.
8	orange		●		
6	yellow		●		1. Receiving a radio packet from a registered transmitter. The receiver is already controlled by another registered transmitter.  <div style="border: 1px solid black; padding: 5px; margin: 5px 0;">NOTE: "Radio link" must be activated in the receiver.</div> 2. Load select mode is activated. . Incorrect Load is selected on the transmitter.
7	green		●		
8	orange		●		

## 6.2 CANopen run status (LED4)

LED color	On	Flickering ( red/ green alternately)	Single flash	Blinking
Green	Operational state	LSS	Stopped state	Pre-operational state

CANopen communication state	Description
Operational	State for process data transmission.
LSS	LSS services in progress.
Stopped	Except for node guarding or heartbeat messages, a node cannot transmit or receive any other messages in this state.
Pre-operational	State for the configuration of CANopen devices. PDO communication is not possible in this state.

### 6.3 CANopen error status (LED3)

LED color	On	Flickering (red/green alternately)	Single flash	Double flash	Triple flash
Red	Bus off	LSS	Warning limit reached	Error control event	Sync error

CANopen error code message	Problem description
Bus Off	CAN controller is in bus off.
Warning limit reached	At least one of the error counters in the CAN controller has reached or exceeded its warning level (e.g. too many error frames).
Error Control Event	A guard event or a heartbeat event has occurred.
Sync Error	The sync message has not been received within the configured communication cycle time.
LSS	LSS services in progress.

### 6.4 J1939 run status (LED4)

LED color	On	Single flash
Green	Operational	No address

J1939 communication state	Description
Operational	Address claim is correct, processing messages.
No address	Address claim is still running or has failed.

### 6.5 J1939 error status (LED3)

LED color	On	Single flash
Red	Bus off	Warning limit reached

J1939 error code message	Problem description
Bus Off	CAN controller is in bus off.
Warning limit reached	At least one of the error counters in the CAN controller has reached or exceeded its warning level (e.g. too many error frames).

## 6.6 Menu mode indications

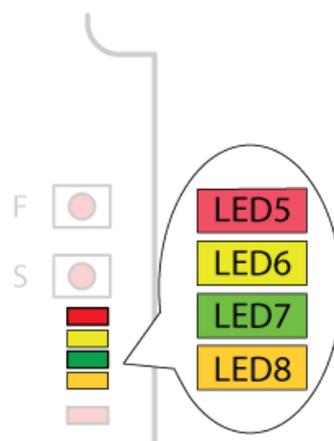
The different menus are identified by the Function LEDs 5–8 according to the following table.

●: LED is lit. ○: LED is off.

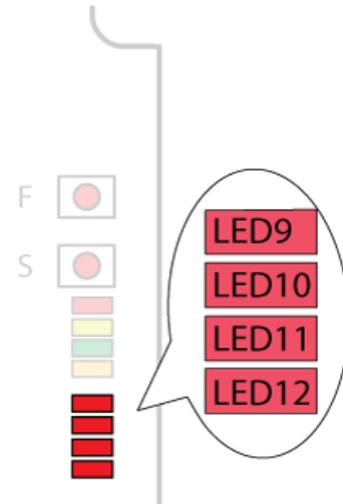
Function LEDs				Menu
LED 5 (red)	LED 6 (yellow)	LED 7 (green)	LED 8 (orange)	
●	○	○	○	Register/ erase transmitters
○	●	○	○	Show/ change CANopen node ID
○	○	●	○	Show/ change CAN bit rate
○	○	○	●	Show/ change radio mode
○	○	●	●	Active <b>Load select</b> (extended menu)

## 6.7 Error indications and code messages

Errors are indicated by function LEDs 5–8, which are all flashing at the same time.



Each error is identified by a code indicated by relay LEDs 9–12.



Write down which relay LEDs are lit and contact your representative for assistance.

●: LED is lit. ○: LED is off.

LED9 red	LED10 red	LED11 red	LED12 red	Indicates
○	○	○	●	Reading of production data failed
○	○	●	○	Radio module start-up failed
○	○	●	●	CANopen stack initialization failed
●	○	○	○	Receiver not locked on channel 11 when using BLB

## CHAPTER 7: OPERATION

### 7.1 General information

To control a receiver, the transmitter must be registered and logged in to the receiver. If another transmitter is already logged in to the receiver, it must be logged out before a different transmitter can be logged in.

If no transmitter is logged in to the receiver, proceed with the login procedure before using the system. Once a transmitter has been logged in, it will remain logged in until it is manually logged out.

More than one transmitter can be registered in the receiver, but only one transmitter can be logged in at a time.

NOTE: If more than one transmitter is registered in the same receiver, it is recommended to select the same frequency channel on all transmitters.

### 7.2 Radio mode

To establish a radio link between the transmitter and the receiver, both units must be set to the same radio mode.

This receiver is set to **discontinuous** mode by default.

Some settings can only be selected when the products are transmitting continuously. These settings are indicated with the note "Only for continuous radio mode."

### 7.3 Login/logout function

NOTE: Only for **continuous** radio mode.

NOTE: The login/logout function cannot be activated/deactivated in the receiver. Contact your representative for assistance.

**For this receiver, the login/logout function is deactivated by default.**

Logging out means stopping the communication between the transmitter and the receiver, and freeing the receiver for another registered transmitter to log in.

## CHAPTER 8: CONFIGURATION MENU

NOTE: The settings described in this chapter apply to R18 receiver with Software version **SW0014-24v05 or higher**.

All configuration settings require access to the receiver circuit board(s).

**RISK OF ELECTRIC SHOCK**

**The receiver must only be opened by qualified installers or authorized personnel.**



**Make sure the power supply is switched off before opening the receiver. Failure to follow these instructions could result in death, serious injury, or equipment damage.**

1. Remove the front cover of the receiver. Use a screwdriver to remove the screws.
2. Power the receiver up.
3. The power LED lights (yellow).
4. Proceed with the configuration instructions of your choice.

### 8.1 Menu mode

To select the different menus, press the **Function** button a predefined number of times according to the following table. Press the **Select** button to enter.

The different menus are identified by the function LEDs 5–8 (see "5.1 Base board").

●: LED is lit. ○: LED is off.

Menu	To select the menu, press the Function button...	Function LEDs light			
		LED 5 (red)	LED 6 (yellow)	LED 7 (green)	LED 8 (orange)
Register/Erase transmitters	once	●	○	○	○
Show/Change CANopen node ID	2 times	○	●	○	○
Show/Change CAN bit rate	3 times	○	○	●	○
Show/Change radio mode	4 times	○	○	○	●
Active <b>Load select</b> (extended menu)	5 times and keep pressed until LED7–8 light.	○	○	●	●

## 8.2 Register the transmitter in the receiver



### RISK OF UNINTENDED EQUIPMENT OPERATION

Only transmitters that are intended for use should be registered in the receiver.

Failure to follow these instructions could result in death, serious injury, or equipment damage.



### RISK OF UNINTENDED EQUIPMENT OPERATION

Do not perform this action when the receiver is in a session with another transmitter. The radio communication may be interrupted or broken.

Failure to follow these instructions could result in death, serious injury, or equipment damage.

NOTE: To establish a radio link between the transmitter and the receiver, both units must be set to the same radio mode.

NOTE: The registration procedure for PN-R18-1/2 differs compared to other Panther receivers.

1. Set the transmitter in registration mode (see relevant Tele Radio transmitter installation instructions).
2. Press the **Function** button.  
*Function LED lights (red).*
3. Press the **Select** button.  
*All indication LEDs light (red).*
4. Press buttons 1 and 2 on the transmitter to be registered in the receiver.<sup>1</sup>  
*All function LEDs and indication LEDs flash 3 times.*
5. Release the transmitter buttons.  
*All function LEDs and indication LEDs flash 1 time. The transmitter is registered.*

If the transmitter is registered, all function LEDs and indication LEDs flash 1 time.

If no transmitter is found within approximately 10 seconds, the receiver exits to normal operation.

---

<sup>1</sup>Button 1 and 2 are factory defaults (see relevant Tele Radio AB transmitter installation instructions).

### 8.3 Show/change CANopen node ID

CANopen node IDs 1–15 can be selected from the receiver user interface. Any value greater than 15 will be shown as 15 on the receiver user interface.

NOTE: When setting CANopen node IDs greater than 15, please contact your representative.

1. Press the **Function** button twice.

*Function LED 6 lights (yellow) and indication LEDs 9–12 (red) show the current CANopen node ID according to the table below:*

●: LED is lit. ○: LED is off

LED 9 (red)	LED 10 (red)	LED 11 (red)	LED 12 (red)	CANopen node ID
○	○	○	●	<b>1 (default)</b>
○	○	●	○	2
○	○	●	●	3
○	●	○	○	4
○	●	○	●	5
○	●	●	○	6
○	●	●	●	7
●	○	○	○	8
●	○	○	●	9
●	○	●	○	10
●	○	●	●	11
●	●	○	○	12
●	●	○	●	13
●	●	●	○	14
●	●	●	●	15

2. Press the **Select** button.

*Indication LEDs 9–12 (red) show the current CANopen node ID according to the following table. Function LED 6 flashes (yellow).*

3. Press the **Function** button to move to the next available CANopen node ID.  
*The corresponding indication LEDs lights.*

4. Press the **Select** button to confirm.  
*The new CANopen node ID is stored.*

The receiver returns to normal operation.

## 8.4 Show/change CAN bit rate

1. Press the receiver **Function** button three times.  
*Function LED 7 lights (green) and indication LEDs 9–12 (red) show the current CAN bit rate according to the table below:*

LED9 (red)	LED10 (red)	LED11 (red)	LED12 (red)	CAN bit rate (kbps)
○	○	○	○	1000
○	○	○	●	800
○	○	●	○	500
○	○	●	●	<b>250 (default)</b>
○	●	○	○	125
○	●	○	●	100
○	●	●	○	50
○	●	●	●	20
●	○	○	○	10

2. Press the **Select** button.  
*Function LED 7 flashes (green) and the indication LEDs 9–12 (red) show the current CAN bit rate according to the table above.*
3. Press the receiver **Function** button to move to the next available CAN bit rate.
4. Press the **Select** button to confirm.  
*The new CAN bit rate is saved.*

The receiver returns to normal operation.

## 8.5 Show/change radio mode

1. Press the **Function** button four times.

*Function LED 8 lights (green).*

*Indication LEDs 9–12 show the current settings according to the following table:*

LED9 (red)	LED10 (red)	LED11 (red)	LED12 (red)	Radio mode
●	○	○	○	Discontinuous transmitting mode
○	●	○	○	Continuous transmitting mode

2. Press the **Select** button.  
*Function LED 8 flashes (orange) and indication LEDs 9–12 (red) show the current radio mode according to the table above.*
3. Press the **Function** button. to move to the next available radio mode.
4. Press the **Select** button to confirm.  
*The new radio mode is saved.*

The receiver returns to normal operation.

## 8.6 Active Load select

NOTE: If this setting is set to 0 (status LEDs 1–4 are off), the receiver will always be activated when receiving a radio package. For all other settings, the receiver will be activated when the load select on the transmitter corresponds to one of the load select settings enabled in the receiver.

### 8.6.1 SHOW LOAD SELECT

1. Press the **Function** button five times and keep it pressed until function LEDs 8 (orange) and 7 (green) light.

*The receiver is now in extended menu mode. LEDs 5-8 show the current **Load select** setting according to the table below:*

●: LED is lit. ○: LED is off.

LED 9 (red)	LED 10 (red)	LED 11 (red)	LED 12 (red)	the receiver will be activated when...
●	○	○	○	Load A is selected on the transmitter
○	●	○	○	Load B is selected on the transmitter
○	○	●	○	Load C is selected on the transmitter
○	○	○	●	Load D is selected on the transmitter
○	○	○	○	The receiver does not listen to any load (s) and will always be activated when receiving a radio package.

NOTE: If no button is pressed within approximately 10 seconds, the receiver will automatically return to normal operation.

### 8.6.2 CHANGE LOAD SELECT

1. Press the **Select** button once.  
*LED 9 flashes. Load A can be activated.*
2. Press the **Function** button to enable/ unable the Load setting.  
*Function LEDs 7 (green) and 8 (orange) light when a Load has been activated. They are off when no Load has been selected.*
3. Press the **Select** button once to move to the next available **Load** (repeat until the LED combination corresponds to the desired **Load select**).  
*The corresponding status LED flashes and the Load can be activated.*
4. Press the **Select** button to confirm.  
*The new configuration is saved.*

The receiver returns to normal operation.

## 8.7 Register a batteryless button (BLB) transmitter

This procedure is intended for customer specific applications where a transmitter's function buttons 1–4 can be remapped (duplicated) to other buttons on the same transmitter or on a BLB transmitter.



### RISK OF UNINTENDED EQUIPMENT OPERATION

Only transmitters that are intended for use should be registered in the receiver.

Failure to follow these instructions could result in death, serious injury, or equipment damage.



### RISK OF UNINTENDED EQUIPMENT OPERATION

Do not perform this action when the receiver is in a session with another transmitter. The radio communication may be interrupted or broken.

Failure to follow these instructions could result in death, serious injury, or equipment damage.

**IMPORTANT!** For this procedure to succeed, the receiver must be set to discontinuous mode, the zero position check must be disabled and the receiver must be locked to channel 11.

NOTE: To establish a radio link between the transmitter and the receiver, both units must be set to the same radio mode.

1. Press the **Function** button.  
*Function LED 5 lights (red).*
2. Press the **Select** button.  
*Indication LED 9–12 light (red).*
3. Press the **Function** button.  
*Indication LED 9 flashes (red).*  
*Button remapping is now possible with the following settings as default<sup>1</sup>:*  
**LED 9= button 1, LED 10 = button 2, LED 11 = button 3 and LED 12 = button 4**
4. Press the **Function** button to move between the available "button remaps 1–4" until the desired button remap is selected.

---

<sup>1</sup>For other settings, contact your representative for assistance.

*The corresponding indication LED flashes.*

5. Press the **Select** button to confirm.

*The corresponding indication LED stops flashing and remains lit. The receiver is in BLB registration mode.*

**NOTE:** If no BLB button is pressed within 10 seconds, the receiver will exit registration mode.

6. Press the BLB button to be remapped to.

*All function LEDs and the selected indication LED flash 3 times. The button has been remapped.*

The receiver returns to normal operation.

## 8.8 Log a transmitter out

NOTE: Only for **continuous** radio mode.

NOTE: The login/logout function cannot be activated/deactivated in the receiver. Contact your representative for assistance.

**For this receiver, the login/logout function is deactivated by default.**

NOTE: This logout option should be used when a lost or damaged transmitter must be logged out from the receiver.

NOTE: If a transmitter has been lost or seriously damaged, use the replace procedure on the transmitter whenever possible.

Function LEDs 5 (red) is lit to indicate that one or more transmitter(s) are registered in the receiver and that one transmitter is logged in.

NOTE: Logout can only be performed when the transmitter is on and a radio link with one or more receivers has been established. The receiver must be powered-up for the logout procedure to be successful.

1. Press and hold the **Select** button for approx. 4 seconds or until function LED 8 goes off.
2. Release the **Select** button.  
*All function LEDs light briefly.*

The logged in transmitter has been logged out. The receiver returns to normal operation. Any registered transmitter can now log in.

## 8.9 Erase all registered transmitters

NOTE: The following instructions will erase all registered transmitters from the receiver.

NOTE: An erased transmitter cannot be logged in to the receiver until it has been registered in the receiver again.

1. Press the **Function** button once.  
*Function LED 5 lights (red).*
2. Press and hold the **Select** button for approx. 4 s or until indication LEDs 9–12 go off.  
*All registered transmitters have been erased.*

The receiver returns to normal operation.

## 8.10 Master reset of the receiver

This procedure will erase all settings from the receiver and restore factory defaults.

NOTE: The erase function cannot be activated/deactivated in the receiver. Contact your representative for assistance.



### **RISK OF UNINTENDED EQUIPMENT OPERATION**

**Do not perform this action when the receiver is in a session with another transmitter. The radio communication may be interrupted or broken.**

**Failure to follow these instructions could result in death, serious injury, or equipment damage.**

1. Press both the **Select** and the **Function** buttons for approx. 10 seconds or until all function LEDs go off.
2. Release both buttons.  
*All function LEDs light briefly. The receiver has been reset.*

The receiver returns to normal operation.

## CHAPTER 9: WARRANTY, SERVICE, REPAIRS, AND MAINTENANCE

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

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
- Contact your representative for service or any other assistance
- Keep the product in a clean, dry place
- Keep contacts and antennas clean
- Wipe off dust using a slightly damp, clean cloth

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

## CHAPTER 10: REGULATORY INFORMATION

NOTE: Models including additional naming conventions:

Model	Article names	Additional naming conventions
R18	R18-01	R00018-01, R18-1, PN-R18-1, PN-R18-01
	R18-02	R00018-02, R18-2, PN-R18-2, PN-R18-02

### 10.1 Europe

Applies to: **R18-01, R18-02**

#### 10.1.1 CE MARKING

 Hereby, Tele-Radio i Lysekil AB, declares that the product(s) listed above is/are in compliance with the Radio Equipment Directive 2014/53/EU.

The latest version of the complete EU Declaration of Conformity is available at the following website: [www.tele-radio.com](http://www.tele-radio.com).

#### 10.1.2 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 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 strives to restrict or eliminate substances and materials that pose an environmental, health or safety risk.

## ANNEX A: CANopen SPECIFICATION FOR PANTHER GEN2 SYSTEMS (IN ENGLISH)

NOTE: For receiver using Software version **SW0014-24v07 or higher**.<sup>1</sup>

NOTE: For EDS-file, please contact your representative

---

A.1 Introduction .....	39
A.2 General .....	40
A.3 Bus termination .....	40
A.4 Selection of CANopen node ID .....	40
A.5 Selection of CANopen baud rate .....	40
A.6 Configuration of CANopen object dictionary .....	41
A.7 LED indications .....	41
A.8 Internal states .....	41
A.9 Pre-defined connection set .....	42
A.10 Transmit Process Data Objects (TPDO) overview .....	44
A.11 Receive Process Data Objects (RPDO) overview .....	45
A.12 Manufacturer Specific Objects .....	46
A.13 Emergency Object (EMCY) .....	55
A.14 Object Dictionary .....	56

Version: v05

### A.1 Introduction

This document describes the CANopen specification for Panther Gen2 systems. This document is applicable for both Panther Gen2 PWM and Panther Gen2 CAN receivers.

---

<sup>1</sup>For receiver using software versions SW0014-24v03 or lower, please refer to the CANopen programmer's instructions IM-PN-RX016-A01-ALL. Contact your representative for assistance.

## A.2 General

The Panther Gen2 receiver CANopen interface operates according to CANopen Application Layer and Communication Profile and Pre-Defined Connection Set defined in CiA DS-301 version 4.2.0.

### General features:

- CANopen Slave device
- 4 freely mappable Transmit Process Data Objects (TPDO)
- 4 freely mappable Receive Process Data Objects (RPDO)
- 1 Service Data Object (SDO)
- Synchronisation Object (SYNC) Consumer
- Emergency Object (EMCY) Producer
- NMT protocols
- Bootup Protocol
- Node Guarding Protocol
- Heartbeat Protocol
- Layer Setting Service (LSS)
- CANopen Node ID selectable via Settings Manager or LSS: 1-127
- CANopen baud rate selectable via Settings Manager or LSS: 10 kbps, 20 kbps, 50 kbps, 100 kbps, 125 kbps, 250 kbps, 500 kbps, 800 kbps, 1 Mbps
- Vendor ID: 0x000000A6

## A.3 Bus termination

If the Panther Gen2 receiver is the last unit on the bus, the bus has to be terminated by connecting an external termination resistor.

## A.4 Selection of CANopen node ID

The CANopen node ID is selected using the PC program Settings Manager. The selected node ID has to be in the range 1 to 127.

## A.5 Selection of CANopen baud rate

The CANopen baud rate is selected using the PC program Settings Manager. The following baud rates can be selected: 10 kbps, 20 kbps, 50 kbps, 100 kbps, 125 kbps,

250 kbps, 500 kbps, 800 kbps, 1 Mbps.

## A.6 Configuration of CANopen object dictionary

A custom CANopen mapping can be configured using the PC program Settings Manager. This is above the CANopen protocol and changes what values are available to map in TPDOs and RPDOs. Changing this mapping is outside the scope of this document.

## A.7 LED indications

The CANopen interface has two indication LEDs, see table below.

### A.7.1 RUN-LED

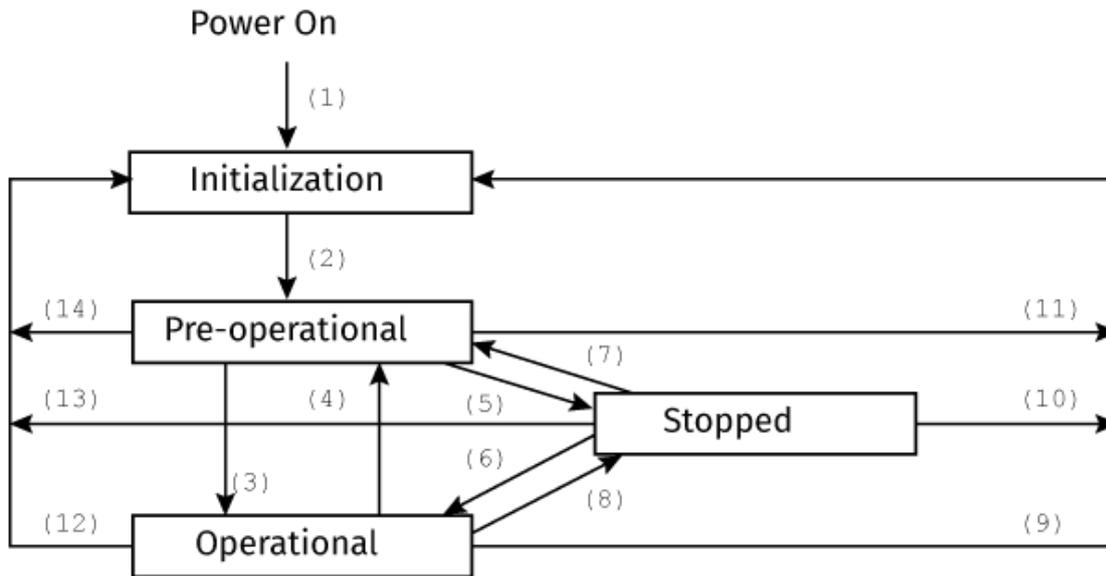
LED State	Indication	Description
Off	-	No power or CAN interface deactivated
Green	OPERATIONAL	State=OPERATIONAL
Green, blinking	PRE-OPERATIONAL	State=PRE-OPERATIONAL
Green, single flash	STOPPED	State=STOPPED

### A.7.2 ERROR-LED

LED State	Indication	Description
Off	-	No power or CAN interface deactivated
Red, single flash	Warning limit reached	A bus error counter reached or exceeded its warning level.
Red, flickering	LSS	LSS services in progress
Red	Bus off (Fatal Event)	Bus off.

## A.8 Internal states

The CANopen interface supports the following states:



State Transition	Trigger for State Transition
(1)	At Power On the Initialization state is entered autonomously
(2)	Initialization finished – enter state PRE-OPERATIONAL automatically
(3), (6)	Start Remote Node indication (NMT message)
(4), (7)	Enter PRE-OPERATIONAL State indication (NMT message)
(5), (8)	Stop Remote Node indication (NMT message)
(9), (10), (11)	Reset Node indication (NMT message)
(12), (13), (14)	Reset Communication indication (NMT message)

## A.9 Pre-defined connection set

The communication objects according to the pre-defined connection set have the following COB-IDs and communication parameters:

Object	Default COB-ID	Communication/Mapping Parameters at Index
NMT	0h	-
SYNC	80h	1005h, 1006h, 1007h, 1019h
EMERGENCY (EMCY)	80h + Node ID	1014h, 1015h
RPDO 1	200h + Node ID	1400h, 1600h
RPDO 2	300h + Node ID	1401h, 1601h
RPDO 3	400h + Node ID	1402h, 1602h
RPDO 4	500h + Node ID	1403h, 1603h
TPDO 1	180h + Node ID	1800h, 1A00h
TPDO 2	280h + Node ID	1801h, 1A01h
TPDO 3	380h + Node ID	1802h, 1A02h

<b>Object</b>	<b>Default COB-ID</b>	<b>Communication/Mapping Parameters at Index</b>
TPDO 4	480h + Node ID	1803h, 1A03h
Default SDO Client->Server (rx)	600h + Node ID	1200h
Default SDO Server->Client (tx)	580h + Node ID	1200h
NMT Error Control	700h + Node ID	1016h, 1017h

Default PDO transmission type is 254 (transmission when data changes).

## A.10 Transmit Process Data Objects (TPDO) overview

The default mappings of the TPDOs are listed below. These are sent from the Panther Gen2 receiver to the CANopen network. The index/sub-index in the object dictionary is shown below each description.

### TPDO 1: System status

UNSIGNED8	UNSIGNED8	UNSIGNED8	UNSIGNED8	UNSIGNED16		UNSIGNED16	
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
RX packet counter	Radio link quality	Radio link channel	Main TX type	Main TX radio link flags		Main TX load select	
2100h/01h	2100h/02h	2100h/03h	2100h/04h	2101h/03h		2101h/04h	

### TPDO 2: Buttons and directions

UNSIGNED16		UNSIGNED16		UNSIGNED16		UNSIGNED16	
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Main TX buttons, step 1		Main TX buttons, step 2		Main TX buttons, both steps		Directions	
2101h/05h		2101h/06h		2101h/07h		2101h/08h	

### TPDO 3: TX inputs (zero position)– not implemented

N/A							
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Not mapped				Not mapped			

### TPDO 4: TX id

UNSIGNED32				N/A			
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Main TX id				Reserved	Reserved	Reserved	Reserved
2102h/07h				Not mapped			

## A.11 Receive Process Data Objects (RPDO) overview

The default mappings of the RPDOs are listed below. These are received by the Panther Gen2 receiver from the CANopen network. The index/sub-index in the object dictionary is shown below each description.

### RPDO 1: Fieldbus input register 1 and 2

UNSIGNED32				UNSIGNED32			
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Generic U32 RPDO object 1				Generic U32 RPDO object 2			
2002h/01h				2002h/02h			

### RPDO 2: Fieldbus input register 3 and 4

UNSIGNED32				UNSIGNED32			
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Generic U32 RPDO object 3				Generic U32 RPDO object 4			
2002h/03h				2002h/04h			

### RPDO 3: Fieldbus input register 5 and 6

UNSIGNED32				UNSIGNED32			
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Generic U32 RPDO object 5				Generic U32 RPDO object 6			
2002h/05h				2002h/06h			

### RPDO 4: Fieldbus input register 7 and 8

UNSIGNED32				UNSIGNED32			
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Generic U32 RPDO object 7				Generic U32 RPDO object 8			
2002h/07h				2002h/08h			

## A.12 Manufacturer Specific Objects

The following Manufacturer Specific Objects are available in the object dictionary:

Index	Object Name	Description	Data Type	Access
2000h	Generic U8 RPDO objects	32 UNSIGNED8 input data objects accessible with value selectors	U8 Array	RWW
2001h	Generic U16 RPDO objects	16 UNSIGNED16 input data objects accessible with value selectors	U16 Array	RWW
2002h	Generic U32 RPDO objects	8 UNSIGNED32 input data objects accessible with value selectors	U32 Array	RWW
2003h	Generic I8 RPDO objects	32 INTEGER8 input data objects accessible with value selectors	I8 Array	RWW
2004h	Generic I16 RPDO objects	16 INTEGER16 input data objects accessible with value selectors	I16 Array	RWW
2005h	Generic I32 RPDO objects	8 INTEGER32 input data objects accessible with value selectors	I32 Array	RWW
2100h	Generic U8 TPDO objects	32 UNSIGNED8 output data objects configurable with value selectors	U8 Array	RO
2101h	Generic U16 TPDO objects	16 UNSIGNED16 output data objects configurable with value selectors	U16 Array	RO
2102h	Generic U32 TPDO objects	8 UNSIGNED32 output data objects configurable with value selectors	U32 Array	RO
2103h	Generic I8 TPDO objects	32 INTEGER8 output data objects configurable with value selectors	I8 Array	RO
2104h	Generic I16 TPDO objects	16 INTEGER16 output data objects configurable with value selectors	I16 Array	RO
2105h	Generic I32 TPDO objects	8 INTEGER32 output data objects configurable with value selectors	I32 Array	RO
2200h	System commands		U32 Array	RWW

### A.12.1 OBJECT 2000H: GENERIC U8 RPDO OBJECTS

Index: 2000h		
Name: Generic U8 RPDO objects		
Sub-indexes: 20h		
Data type: UNSIGNED8		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-32	General feedback from CANopen network (not used in default mapping)	Group: CANOPEN_INPUT_8BIT (50) Type: UINT8 (1) Indexes: 0-31

### A.12.2 OBJECT 2001H: GENERIC U16 RPDO OBJECTS

Index: 2001h		
Name: Generic U16 RPDO objects		
Sub-indexes: 10h		
Data type: UNSIGNED16		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-16	General feedback from CANopen network (not used in default mapping)	Group: CANOPEN_INPUT_16BIT (51) Type: UINT16 (3) Indexes: 0-15

### A.12.3 OBJECT 2002H: GENERIC U32 RPDO OBJECTS

Index: 2002h		
Name: Generic U32 RPDO objects		
Sub-indexes: 08h		
Data type: UNSIGNED32		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-8	General feedback from CANopen network (two sub-indexes mapped to each RPDO)	Group: CANOPEN_INPUT_32BIT (52) Type: UINT32 (5) Indexes: 0-7

#### A.12.4 OBJECT 2003H: GENERIC I8 RPDO OBJECTS

Index: 2003h		
Name: Generic I8 RPDO objects		
Sub-indexes: 20h		
Data type: INTEGER8		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-32	General feedback from CANopen network (not used in default mapping)	Group: CANOPEN_INPUT_8BIT (50)  Type: INT8 (2)  Indexes: 0-31

#### A.12.5 OBJECT 2004H: GENERIC I16 RPDO OBJECTS

Index: 2004h		
Name: Generic I16 RPDO objects		
Sub-indexes: 10h		
Data type: INTEGER16		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-16	General feedback from CANopen network (not used in default mapping)	Group: CANOPEN_INPUT_16BIT (51)  Type: INT16 (4)  Indexes: 0-15

#### A.12.6 OBJECT 2005H: GENERIC I32 RPDO OBJECTS

Index: 2005h		
Name: Generic I32 RPDO objects		
Sub-indexes: 08h		
Data type: INTEGER32		
Access: RWW		
Sub-index	Description	Value selector (internal parameter)
1-8	General feedback from CANopen network (not used in default mapping)	Group: CANOPEN_INPUT_32BIT (52)  Type: INT32 (6)  Indexes: 0-7

### A.12.7 OBJECT 2100H: GENERIC U8 TPDO OBJECTS

Index: 2100h		
Name: Generic U8 TPDO objects		
Sub-indexes: 20h		
Data type: UNSIGNED8		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1	<b>RX packet counter</b> Incremented by one on every 16 received valid radio packets	Group: SESSION_DATA (4) Type: UINT8 (1) Index: 4
2	<b>Radio link quality</b> Based on RSSI, range 0...15 Corresponds to RSSI values -90...-60	Group: SESSION_DATA (4) Type: UINT8 (1) Index: 5
3	<b>Radio link channel</b> Zero if no session active, otherwise range 11...26	Group: SESSION_DATA (4) Type: UINT8 (1) Index: 6
4	<b>Main TX type</b> Value 00h => No TX active/Invalid Value 01h => Gen1 TX Value 81h => Gen1 PLD TX Value 10h => Gen2 simple TX Value 90h => Gen2 simple PLD TX Value 11h => Gen2 button TX Value 91h => Gen2 button PLD TX Value 12h => Gen2 joystick TX Value 92h => Gen2 joystick PLD TX	Group: TX2RX_STATE_DATA (1) Type: UINT8 (1) Index: 36
5-32	Not used in default mapping	-

### A.12.8 OBJECT 2101H: GENERIC U16 TPDO OBJECTS

Index: 2101h		
Name: Generic U16 TPDO objects		
Sub-indexes: 10h		
Data type: UNSIGNED16		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1-2	Not used in default mapping	-
3	<p><b>Main TX radio link flags</b></p> <p>Bit 00: RAW_LINK</p> <p>Bit 01: ACTIVE_LINK</p> <p>Bit 02: SESSION</p> <p>Bit 03: SHORT_LINK</p> <p>Bit 04: ZERO_LINK</p> <p>Bit 05: START_PHASE</p> <p>Bit 06: KILL_PHASE</p> <p>Bit 07: ACTIVE_STOP</p> <p>Bit 08: PASSIVE_STOP</p> <p>Bit 09: CM_ACT_LINK</p> <p>Bit 10: BAD_BATTERY</p> <p>Bit 11: LOGOUT</p> <p>Bit 12-15: Reserved</p>	<p>Group: TX2RX_STATE_DATA (1)</p> <p>Type: UINT16 (3)</p> <p>Index: 5</p>
4	<p><b>Main TX load select</b></p> <p>Bit 00: Load A</p> <p>Bit 01: Load B</p> <p>Bit 02: Load C</p> <p>Bit 03: Load D</p> <p>Bit 04-15: Reserved</p>	<p>Group: TX2RX_STATE_DATA (1)</p> <p>Type: UINT16 (3)</p> <p>Index: 6</p>

5	<b>Main TX buttons, step 1</b>  Bit 00: Button 01, step 1 Bit 01: Button 02, step 1 Bit 02: Button 03, step 1 Bit 03: Button 04, step 1 Bit 04: Button 05, step 1 Bit 05: Button 06, step 1 Bit 06: Button 07, step 1 Bit 07: Button 08, step 1 Bit 08: Button 09, step 1 Bit 09: Button 10, step 1 Bit 10: Button 11, step 1 Bit 11: Button 12, step 1 Bit 12: Button 13, step 1 Bit 13: Button 14, step 1 Bit 14: Button 15, step 1 Bit 15: Button 16, step 1	Group: TX2RX_STATE_DATA (1)  Type: UINT16 (3)  Index: 2
---	--	---

6	<b>Main TX buttons, step 2</b>  Bit 00: Button 01, step 2  Bit 01: Button 02, step 2  Bit 02: Button 03, step 2  Bit 03: Button 04, step 2  Bit 04: Button 05, step 2  Bit 05: Button 06, step 2  Bit 06: Button 07, step 2  Bit 07: Button 08, step 2  Bit 08: Button 09, step 2  Bit 09: Button 10, step 2  Bit 10: Button 11, step 2  Bit 11: Button 12, step 2  Bit 12: Button 13, step 2  Bit 13: Button 14, step 2  Bit 14: Button 15, step 2  Bit 15: Button 16, step 2	Group: TX2RX_STATE_DATA (1)  Type: UINT16 (3)  Index: 3
---	--	---

7	<p><b>Main TX buttons, both steps</b></p> <p>Bit 00: Button 01, both steps</p> <p>Bit 01: Button 02, both steps</p> <p>Bit 02: Button 03, both steps</p> <p>Bit 03: Button 04, both steps</p> <p>Bit 04: Button 05, both steps</p> <p>Bit 05: Button 06, both steps</p> <p>Bit 06: Button 07, both steps</p> <p>Bit 07: Button 08, both steps</p> <p>Bit 08: Button 09, both steps</p> <p>Bit 09: Button 10, both steps</p> <p>Bit 10: Button 11, both steps</p> <p>Bit 11: Button 12, both steps</p> <p>Bit 12: Button 13, both steps</p> <p>Bit 13: Button 14, both steps</p> <p>Bit 14: Button 15, both steps</p> <p>Bit 15: Button 16, both steps</p>	<p>Group: TX2RX_STATE_DATA (1)</p> <p>Type: UINT16 (3)</p> <p>Index: 4</p>
8	<p><b>Directions</b></p> <p>Bit 00: Direction 01, pos negative 01</p> <p>Bit 01: Direction 01, pos negative 02</p> <p>Bit 02: Direction 01, pos positive 01</p> <p>Bit 03: Direction 01, pos positive 02</p> <p>Bit 04: Direction 02, pos negative 01</p> <p>Bit 05: Direction 02, pos negative 02</p> <p>Bit 06: Direction 02, pos positive 01</p> <p>Bit 07: Direction 02, pos positive 02</p> <p>Bit 08: Direction 03, pos negative 01</p> <p>Bit 09: Direction 03, pos negative 02</p> <p>Bit 10: Direction 03, pos positive 01</p> <p>Bit 11: Direction 03, pos positive 02</p>	<p>Group: Information about current session (4)</p> <p>Type: UINT16 (3)</p> <p>Index: 6</p>

### A.12.9 OBJECT 2102H: GENERIC U32 TPDO OBJECTS

Index: 2102h		
Name: Generic U32 TPDO objects		
Sub-indexes: 08h		
Data type: UNSIGNED32		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1-4	Not used in default mapping	-
5-6	Not implemented	-
7	<b>Main TX id</b>  Zero if no session with main TX, id of main TX otherwise	Group: TX2RX_STATE_DATA (1)  Type: UINT32 (5)  Index: 0
8	Not implemented	-

### A.12.10 OBJECT 2103H: GENERIC I8 TPDO OBJECTS

Index: 2103h		
Name: Generic I8 TPDO objects		
Sub-indexes: 20h		
Data type: INTEGER8		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1-14	Not used in default mapping	-
15	<b>Stepped joystick speed 0 and 1</b>  Bit 00-03: INT4 speed value of stepped joystick index 0  Bit 04-07: INT4 speed value of stepped joystick index 1  Range is -6... 6 for both 4-bit values	Group: STEPPED_JOYSTICK_INPUT (69)  Type: INT4 (7)  Index: 0  Group: STEPPED_JOYSTICK_INPUT (69)  Type: INT4 (7)  Index: 1
16	<b>Stepped joystick speed 2 and 3</b>  Bit 00-03: INT4 speed value of stepped joystick index 2  Bit 04-07: INT4 speed value of stepped joystick index 3  Range is -6... 6 for both 4-bit values	Group: STEPPED_JOYSTICK_INPUT (69)  Type: INT4 (7)  Index: 2  Group: STEPPED_JOYSTICK_INPUT (69)  Type: INT4 (7)  Index: 3
17-24	Not used in default mapping	-

### A.12.11 OBJECT 2104H: GENERIC I16 TPDO OBJECTS

Index: 2104h		
Name: Generic I16 TPDO objects		
Sub-indexes: 10h		
Data type: INTEGER16		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1-16	Not used in default mapping	-

### A.12.12 OBJECT 2105H: GENERIC I32 TPDO OBJECTS

Index: 2105h		
Name: Generic I32 TPDO objects		
Sub-indexes: 08h		
Data type: INTEGER32		
Access: RO		
Sub-index	Description	Value selector (internal parameter)
1-8	Not used in default mapping	-

### A.12.13 OBJECT 2200H: SYSTEM COMMANDS

Index: 2200h	
Name: System commands	
Sub-indexes: 01h	
Data type: UNSIGNED32	
Access: RWW	
Sub-index	Description
1	<p><b>System command</b></p> <p>Bit 00-07: Contains the ascii value 'T'</p> <p>Bit 08-15: Contains the ascii value 'R'</p> <p>Bit 16-23: Contains the ascii value 'C'</p> <p>Bit 24-31: One of the following values:</p> <p>01h: Activate TX register mode on RX</p>

## A.13 Emergency Object (EMCY)

The Emergency Object is sent to the CANopen network with the following information:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
EMCY Error Code Low Byte	EMCY Error Code High Byte	Error Register (1001h)	Manufacturer specific field (not used)				

The EMCY Error Codes for internal CANopen diagnostics are interpreted as follows:

EMCY Error Code	Description
8100h	Communication error
8110h	CAN controller signalled a lost message (overrun)
8120h	CAN controller reached the warning limit due to error frames
8130h	An error control event has occurred (either a life guarding or a heartbeat event)
8140h	CAN controller has recovered from a BUS OFF state
8210h	A received PDO was smaller than specified by the valid mapping table
8220h	The DLC of a received PDO exceeded the length specified by the valid mapping table

## A.14 Object Dictionary

### A.14.1 ABBREVIATIONS

RO	Read Only
RW	Read, Write
RWW	Read, Write on process output
U8	Unsigned8
U16	Unsigned16
U32	Unsigned32
I8	Integer8
I16	Integer16
I32	Integer32

### A.14.2 GENERAL PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
0002h	Dummy Object	00h	Dummy Type Object for I8	U32	RW	0000 0008h
0003h	Dummy Object	00h	Dummy Type Object for I16	U32	RW	0000 0010h
0004h	Dummy Object	00h	Dummy Type Object for I32	U32	RW	0000 0020h
0005h	Dummy Object	00h	Dummy Type Object for U8	U32	RW	0000 0008h
0006h	Dummy Object	00h	Dummy Type Object for U16	U32	RW	0000 0010h
0007h	Dummy Object	00h	Dummy Type Object for U32	U32	RW	0000 0020h

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1000h	Device Type	00h	Device Type	U32	RO	0000 0000h (No Profile)
1001h	Error Register	00h	Error Register	U8	RO	-
1003h	Pre-defined error field	00h	Number of errors	U8	RW	
		01h-0Ah	Error field	U32	RO	
1005h	COB-ID Sync	00h	COB-ID Sync	U32	RW	Default value is 0000 0080h
1006h	Communication Cycle Period	00h	Period between transmissions of SYNC in $\mu$ s	U32	RW	0000 0000h
1007h	Synchronous Window Length	00h	Synchronous Window Length in $\mu$ s (0 is disabled)	U32	RW	0000 0000h
1008h	Manufacturer Device Name	00h	Manufacturer Device Name	Visible string	RO	R0018v2
1009h	Manufacturer Hardware Version	00h	Manufacturer Hardware Version	Visible string	RO	HW version number in string format, ex: "0003" TR361
100Ah	Manufacturer Software Version	00h	Manufacturer Software Version	Visible string	RO	"SW0014-24vXX"
100Ch	Guard Time	00h	Guard Time	U16	RW	-
100Dh	Life Time Factor	00h	Life Time Factor	U8	RW	-
1010h	Store Parameters	00h	Largest sub-index supported	U8	RO	02h
		01h	Store all parameters	U32	RW	Both sub-indexes have the same effect when ASCII "SAVE" is written
		02h	Store Communication parameters	U32	RW	
1011h	Restore Parameters	00h	Largest sub-index supported	U8	RO	02h

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
		01h	Restore all default parameters	U32	RW	Both sub-indexes have the same effect when ASCII "LOAD" is written
		02h	Restore communication default parameters	U32	RW	
1014h	COB-ID EMCY	00h	COB-ID EMCY	U32	RO	-
1015h	Inhibit Time EMCY	00h	Inhibit Time EMCY	U16	RW	Default value is 0000h
1016h	Consumer Heartbeat Time	00h	Number of entries	U8	RO	01h
		01h	Consumer Heartbeat Time	U32	RW	Node ID + Heartbeat Time. Value must be a multiple of 1ms.
1017h	Producer Heartbeat Time	00h	Producer Heartbeat Time	U16	RW	-
1018h	Identity object	00h	Number of entries	U8	RO	04h
		01h	Vendor ID	U32	RO	0000 00A6h
		02h	Product Code	U32	RO	5212 74602h
		03h	Revision Number	U32	RO	HW version as integer
		04h	Serial Number	U32	RO	
1019h	Sync counter	00h	Sync counter	U8	RO	-

### A.14.3 SERVER SDO PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1200h	Server SDO Parameter	00h	Largest sub-index supported	U8	RO	02h
		01h	COB ID Client to Server (Receive SDO)	U32	RO	Node ID + 0600h
		02h	COB ID Server to Client (Transmit SDO)	U32	RO	Node ID + 0580h

#### A.14.4 RECEIVE PDO COMMUNICATION PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1400h	Receive PDO Communication Parameter	00h	Largest sub-index supported	U8	RO	05h
...		01h	COB-ID used by PDO	U32	RW	-
1403h		02h	Transmission Type	U8	RW	-
		03h	Inhibit Time (not used)	U16	RW	-
		05h	Event Timer (not used)	U16	RW	-

#### A.14.5 RECEIVE PDO MAPPING PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1600h	Receive PDO Mapping Parameter	00h	Number of mapped application objects in PDO	U8	RW	-
...		01h	Mapped object No.1	U32	RW	-
1603h		02h	Mapped object No.2	U32	RW	-
		...	...	U32	RW	-
		n	Mapped object No.n	U32	RW	-

#### A.14.6 TRANSMIT PDO COMMUNICATION PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1800h	Transmit PDO Communication Parameter	00h	Largest sub-index supported	U8	RO	05h
...		01h	COB-ID used by PDO	U32	RW	-
1803h		02h	Transmission Type	U8	RW	-
		03h	Inhibit Time	U16	RW	-
		05h	Event Timer (ms)	U16	RW	-

#### A.14.7 TRANSMIT PDO MAPPING PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
1A00h	Transmit PDO Mapping Parameter	00h	Number of mapped application objects in PDO	U8	RW	-
...		01h	Mapped object No.1	U32	RW	-
1A03h		02h	Mapped object No.2	U32	RW	-
		...	...	U32	RW	-
		n	Mapped object No.n	U32	RW	-

### A.14.8 MANUFACTURER SPECIFIC PARAMETERS

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
2000h	Generic U8 RPDO objects	00h	Largest sub-index supported	U8	RO	20h
		01h-20h	32 UNSIGNED8 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U8	RWW	
2001h	Generic U16 RPDO objects	00h	Largest sub-index supported	U8	RO	10h
		01h-10h	16 UNSIGNED16 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U16	RWW	
2002h	Generic U32 RPDO objects	00h	Largest sub-index supported	U8	RO	08h
		01h-08h	8 UNSIGNED32 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U32	RWW	
2003h	Generic I8 RPDO objects	00h	Largest sub-index supported	U8	RO	20h
		01h-20h	32 INTEGER8 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I8	RWW	
2004h	Generic I16 RPDO objects	00h	Largest sub-index supported	U8	RO	10h
		01h-10h	16 INTEGER16 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I16	RWW	
2005h	Generic I32 RPDO objects	00h	Largest sub-index supported	U8	RO	08h
		01h-08h	8 INTEGER32 input data objects accessible with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I32	RWW	
2100h	Generic U8 TPDO objects	00h	Largest sub-index supported	U8	RO	20h
		01h-20h	32 UNSIGNED8 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U8	RO	

Index	Object Name	Sub-Index	Description	Data Type	Access	Note
2101h	Generic U16 TPDO objects	00h	Largest sub-index supported	U8	RO	10h
		01h-10h	16 UNSIGNED16 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U16	RO	
2102h	Generic U32 TPDO objects	00h	Largest sub-index supported	U8	RO	08h
		01h-08h	8 UNSIGNED32 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	U32	RO	
2103h	Generic I8 TPDO objects	00h	Largest sub-index supported	U8	RO	20h
		01h-20h	32 INTEGER8 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I8	RO	
2104h	Generic I16 TPDO objects	00h	Largest sub-index supported	U8	RO	10h
		01h-10h	16 INTEGER16 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I16	RO	
2105h	Generic I32 TPDO objects	00h	Largest sub-index supported	U8	RO	08h
		01h-08h	8 INTEGER32 output data objects configurable with value selectors in the Panther Gen2 RX using the PC program Settings Manager	I32	RO	
2200h	System commands	00h	Largest sub-index supported	U8	RO	01h
		01h	System command trigger	U32	RWW	

## ANNEX B: INDEX

### A

Active Load select .....	30
Antenna .....	12

### B

Base board .....	17
Boards .....	16

### C

CAN M12 Pinout .....	18
CANopen specifications .....	39
CE marking .....	38
code messages .....	22
Configuration menu .....	25
Enter menu mode .....	25
Connector .....	12
Current consumption .....	12

### E

EMCY .....	55
Erase all registered transmitters .....	35
Error indications .....	22
CANopen .....	21
J1939 .....	21

### F

Frequency band .....	12
Function LEDs in normal operation mode .....	19

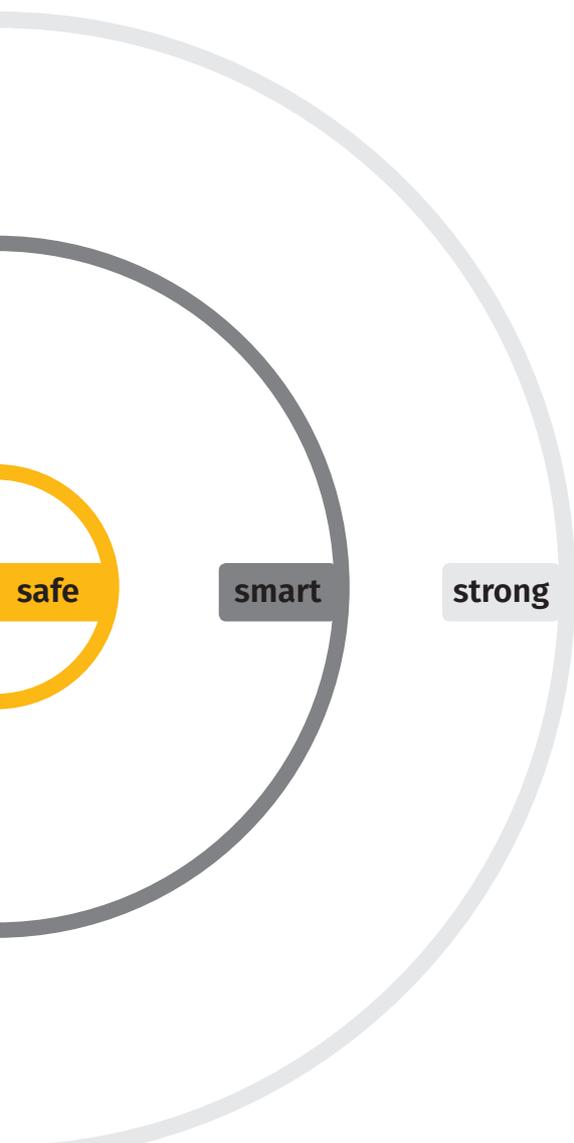
### I

Input power .....	12
-------------------	----

Installation precautions .....	14
<b>L</b>	
Log a transmitter out .....	34
Login/Logout .....	24
Login/Logout function .....	24
Logout .....	34
<b>M</b>	
Maintenance .....	37
Master reset .....	36
Menu mode	
Enter menu mode .....	25
Menu mode indications .....	22
Mounting dimensions	
Receiver .....	14
<b>O</b>	
Operating temperature .....	12
<b>P</b>	
Pre-defined connection set .....	42
<b>R</b>	
Radio communication .....	12
Radio mode .....	24
Register .....	26
Register a BLB transmitter .....	32
RPDO .....	45
<b>S</b>	
Show/ change radio mode .....	29
Show/change CAN bitrate .....	28

Show/change CANopen node ID .....	27
Specifications .....	12
Status and error indications .....	19
Status indications	
CANopen .....	20
J1939 .....	21
<b>T</b>	
terminal block for input power and can signals .....	18
TPDO .....	44
<b>W</b>	
Warnings & restrictions .....	8
Installation and commission .....	8
Maintenance .....	10
Operation .....	10
WEEE directive .....	38

(This page has intentionally been left blank)



 **tele radio**<sup>®</sup>  
wireless solutions

These Installation instructions are subject to change without prior notice.

Download the latest Installation instructions from [www.tele-radio.com](http://www.tele-radio.com).