SCANRECO

Radio Remote Control

Instruction Manual

G5 Pocket System

Document	Revision	Language
66060	A	English

Contents

Document information

Attribute	Information
Document Type	Instruction Manual
Title	SCANRECO G5 Pocket
Document No.	66060
Language	English
Release date	2012-12-18
Original	English
Release date (original)	2012-12-18
Author	SCANRECO
Company	SCANRECO AB, SWEDEN

Revision history

Revision	Date	Note
A	2012-12-18	First release

1 General information

This instruction manual describes the SCANRECO G5 Pocket system, this instruction manual should be seen as a complement to the instruction manual for the application which the SCANRECO G5 Pocket is intended to operate with.

The SCANRECO G5 Pocket is a complete remote control system for mobile and stationary applications where durability and functionality is in high demand, the SCANRECO G5 Pocket offers the system installer a flexible and configurable remote control system with speed, precision and control under maximum security.
To ensure the safety of the remote control system and the application you should carefully study this instruction manual. This will ensure you are familiar with the system and ready to use it in it's intended application.

Notice to reader:

TO THE SYSTEM INSTALLER:

Pay special attention to the chapters Safety Information, Installation recommendations and Programming.

TO THE OPERATOR:

Pay special attention to the chapters Safety Information, Product description and Product Care.

TO THE SERVICE TECHNICIAN:

Pay special attention to the chapters Safety Information, Product Care, Trouble Shooting and Spare Parts

The following labels are used throughout this document to create awareness about important recommendations or warnings. It is important that these recommendations or warnings are considered by the installer, operator and service personnel.

IMPORTANT!
This information must be followed, potential hazards for the operator and environment if instructions are not followed.

ATTENTION!
General recommendations that may cause the system not to perform at full capacity if not followed.

NOTE!
General notice.

2 Safety information

2.1 General

READ THE SAFETY INSTRUCTIONS CAREFULLY BEFORE INSTALLING, CONFIGURATING AND OPERATING THIS PRODUCT!

MAKE SURE THAT YOU, THE OPERATOR OR SERVICE TECHNICIAN, HAVE FULLY UNDERSTOOD THE SAFETY INSTRUCTIONS BEFORE PROCEEDING

IMPORTANT!
The system installer is responsible for producing an instruction manual for the application where the SCANRECO G5 pocket has been installed and intended to control.
The system installer is responsible for producing a product approval, if such is required, for the application where the SCANRECO G5 pocket has been installed.
Prior to operation, the system installer is required to train the operator on all functions available using the SCANRECO G5 Pocket.
Prior to operation, the system installer is required to inform the operator of all potential hazardous situations that may appear when operating the application with the SCANRECO G5 pocket.
The system installer must take into account the specific installations instructions declared in this instruction manual.

Due to the unlimited variety of applications (cranes, machines, objects, vehicles and other equipment) on which the remote control system is used, and the numerous standards which are frequently the subject of varying interpretation, it is impossible for the personnel at SCANRECO to provide expert advice regarding the suitability of a given remote control for a specific application. It is the responsibility of the purchaser and system installer to determine the suitability of any SCANRECO remote control product for an intended application and to ensure that it is installed and guarded in accordance with all country, federal, state, local, and private safety and health regulation, codes, standards and the SCANRECO instructions in this document.

If the SCANRECO G5 Pocket will be used in a safety critical application, the purchaser / system installer must undertake appropriate testing and evaluation of the final application to prevent injury to the ultimate user.

SCANRECO does not take responsibility for any damage or injury.

Unauthorized tampering with any of the products will automatically void the SCANRECO guarantee and product responsibility.

2.2 Pre-operational

In order to ensure safety of the operator, bystanders and the machine, the user should study and learn all provided instructions regarding how to use the SCANRECO G5 Pocket as well as all safety instructions and the location of all emergency stop controls. This will enable the user to quickly get familiar with the new remote control system and how to safely utilize it.

The operator must understand and follow the below instructions at all times!

Prior to operation, the operator must ensure that: he/she:

- is fully trained by the system installer in proper use of the application and knows all functions available thru the SCANRECO G5 System.
- is responsible to ensure that non-qualified personnel **never** gains control of the SCANRECO G5 Pocket.
- has fully understood this instruction manual.
- has fully understood the instruction manual given by the system installer.
- is well aware of the positioning of all emergency stop arrangements.
- uses the correct transmitter with the correct receiver unit.
- has at all times full view of the work area where the application is used.
- always keeps the SCANRECO G5 Pocket deactivated if not used.
- never leaves the SCANRECO G5 Pocket unsupervised.
- stores the SCANRECO G5 Pocket in such way that unauthorized personnel cannot gain control of it.
- on a daily basis, or immediately if suspicion of such is defective; ensure that all safety related functions and emergency stop functions works accordingly.
- always reports faults that may have appeared during operation to the system installer.
- is aware of, and obeying, any local rules applied regarding operation the application the SCANRECO G5 Pocket is operating.

3 System information

3.1 System overview

The SCANRECO G5 Pocket system has been specially developed for hydraulically driven mobile machinery. The system is a digital remote control system based on advanced microprocessor technology which can cope with the roughest of environments. The system is protected against electromagnetic and radio frequency radiation. The G5 Pocket system is comprised of a Handheld Control Unit (HCU) with ON/OFF buttons. The Central Unit (CU) provides the connection points for connecting to the electro-hydraulic valves as well as through a CANopen bus system to other components of the control system. Each system utilizes two way communication; digitally coded control information is sent in both directions via radio between the HCU and the CU.

Typical system setup:

No	Description	Qty
1	Handheld G5 Pocket Transmitter	1
2	G5 Pocket Receiver	1

4 Radio information

The G5 system family incorporates an automated frequency jumping technology, a reliable radio transmission highly resistant to interference.

The radio transmission takes place within the ISM-band used at pre-defined channels.

The channel switching takes place multiple times per second following a pseudorandom sequence. This ensures that transmission takes place on an optimal frequency at all times!

No transmitter uses the same pseudorandom sequence order when switching channels; this minimizes the risk of two G5 systems interfering with each other.
The G5 Pocket is approved to transmit on the ISM band. See chapter 15 for approvals.
The radio is license free for the end user.

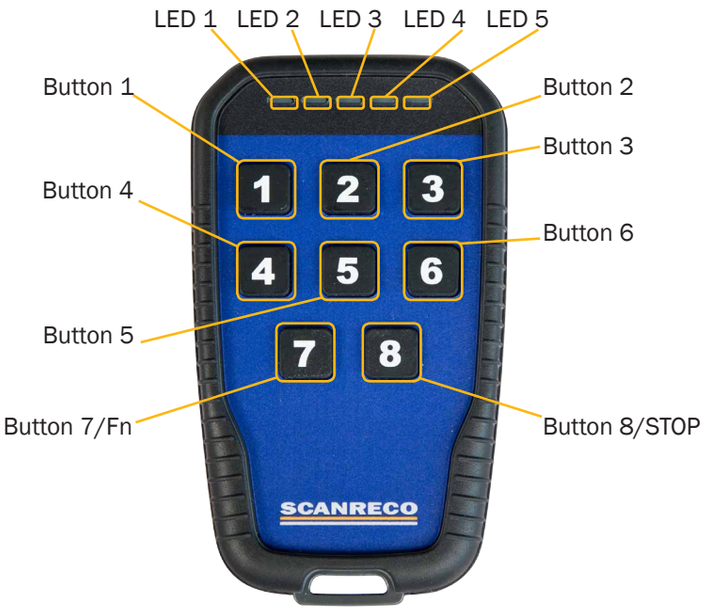
Technical information

Attribute	Information
Frequency	2,400 2,4835 GHz
Channels management	FHSS DSSS THSS
Channel order	Pseudorandom
Channel capacity	Duplex
System address/ID	<16777216 unique system addresses available
Redundancy	CRC-16
Range	100 meters

5 G5 Pocket Transmitter

5.1 Product description

The G5 Pocket HCU is a light weight, impact and water resistant handheld unit equipped with up to eight ON/OFF function buttons. It has five configurable Light Emitting Diodes (LED) for machine and status feedback. The buttons and the LED's can be configured for a variety of different operations. The unit is powered with 3 standard AAA batteries and the backside has a belt clip for convenient attachment on the operator's belt.



5.2 Versions

The G5 Pocket transmitter exists in the following versions:

G5-P3A G5-P4A G5-P6A G5-P8A G5-P8B G5-P8C

Model	Functions
G5-P3X	3 Push buttons
G5-P4X	4 Push buttons
G5-P6X	6 Push buttons
G5-P8X	8 Push buttons

X indicates A,B,C,... for different printed symbols on the buttons

5.3 Functionality

The G5 Pocket systems are required to be configured prior to operation but normally this is done already before delivery, refer to programming section in this document for further information.
The push buttons are easily programmed to activate any output or series of functions. Button definitions include momentary, interlocked, non-latched or latched output.

5.4 Changing battery

The G5 Pocket transmitter is equipped with 3 standard AAA cell batteries; to change batteries follow the instructions below

1. Remove the belt clip by unscrewing the top middle screw.
2. Unscrew the three screws holding the lid.
3. Remove the batteries.
4. Remove all dirt/dust to ensure no water can enter the unit.
5. Insert new batteries, mind the polarity!
6. Reassemble the lid and the belt clip.
   Tighten the screws according to chapter 7.4.

5.5 Technical information

Attribute	Information
Housing material	Plastic PC-ABS
IP-class	IP67
Ambient temperature	-25˚C to +70˚C
Supply	3 x AAA battery
Operating time	Several months (depending of usage and application)
Weight	160 g (0,35lb.) including battery

Dimensions:

6 G5 receiver

6.1 Product description

The Central Unit (CU) is manufactured in robust plastic housing and provides contacts for the connection of power supply and electro-hydraulic valves. Several of the outputs can also be used as digital inputs. Depending on the version off the G5 Central unit, it can either be equipped with MOSFET outputs and Deutsch connectors or can have relay outputs with terminal block.

Since the central unit can be exposed to very tough environments, the box is encapsulated to give protection from damp, heat, cold, dust, vibration and corrosive environments.

The Central unit has short circuit protected inputs and outputs and has protection against reverse polarity, over-voltage, large incoming voltage transients and EMC/RF.

IMPORTANT!
The Central unit ESTOP function is not equipped with internal fuse and therefore an external fuse is required at an appropriate rating (10A or lower).

6.2 Versions

The G5 Pocket Central Unit exists in different versions. The main difference between the version types is the output type which can be either MOSFET or normal relay output. Versions with MOSFET output have two 12-pin Deutsch connectors while versions with relay output have cable glands with internal screw terminals.

G5-CU M19A G5-CU RX

Model	Functions
G5-CU M19A	Two 12-pin Deutsch connectors. 19 Digital MOSFET outputs where 14 can be configured as digital inputs.
G5-CU RX	Two cable glands. Relay output where X indicates the number of outputs.

6.3 Functionality

The G5 Pocket system is required to be configured prior to operation, refer to programming section in this document for further information.

6.3.1 MOSFET Digital Output

The MOSFET digital outputs are designed to control electro-hydraulic valves but can also be used to load other accessories such as lamps or motors. The maximum load for each channel is described in table below.

Max load:

- 3A/Output
- 5A/Bank
- 10A/System

Bank	1	2	3	4	5	6	7	8	9	10
Output	1	2,3	4,5	6,16	7,9	8,10	11,12	13,17	18,19	14,15

6.3.2 Digital inputs

The digital inputs can be used as a switch to control different functions on the central unit or on the HCU. The maximum input voltage shall not exceed the supply voltage. The voltage threshold for the central unit to interpret the digital input signal as a logical 1 is 3,2 V.

6.3.3 Relay output

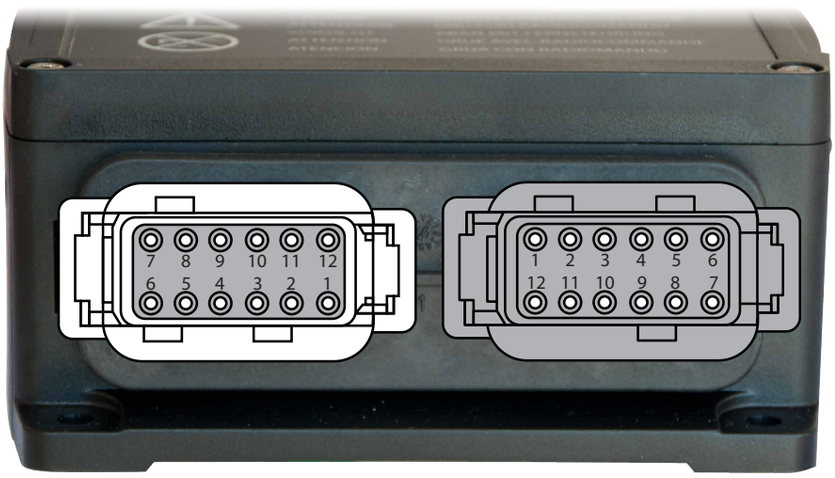
The relay output connectors are separated from the rest of the electronics in the central unit to create an electrically isolated output. The maximum load for each output is 10A. Through the terminal block, both the normally open and the normally closed connection points are available.

6.3.4 Estop

The Estop function works as a safety function. It is a digital output that can source up to 10 A. The output is active each time the HCU is active and communication has been established with the Central unit. This output is normally connected to a dump valve. It is required for the system installer to use this or similar function for the operator safety.
The Estop function is not equipped with internal fuse and therefore it is needed to have an external fuse at appropriate rating (10A or lower).

6.4 Terminal schematics Central Unit

6.4.1 Terminal schematics G5-CU M19A



1 = Output/input 16
2 = Output/input 15
3 = GND
4 = Output/input 14
5 = Estop
6 = Power Supply +
7 = Output 1
8 = Output 2
9 = Output 3
10 = Output 4
11 = Output 5
12 = Output/input 6

1 = Output/input 7
2 = Output/input 8
3 = Output/input 9
4 = Output/input 10
5 = Output/input 11
6 = Output/input 12
7 = RS232 TX
8 = RS232 RX
9 = Output/input 13
10 = Output/input 17
11 = Output/input 18
12 = Output/input 19

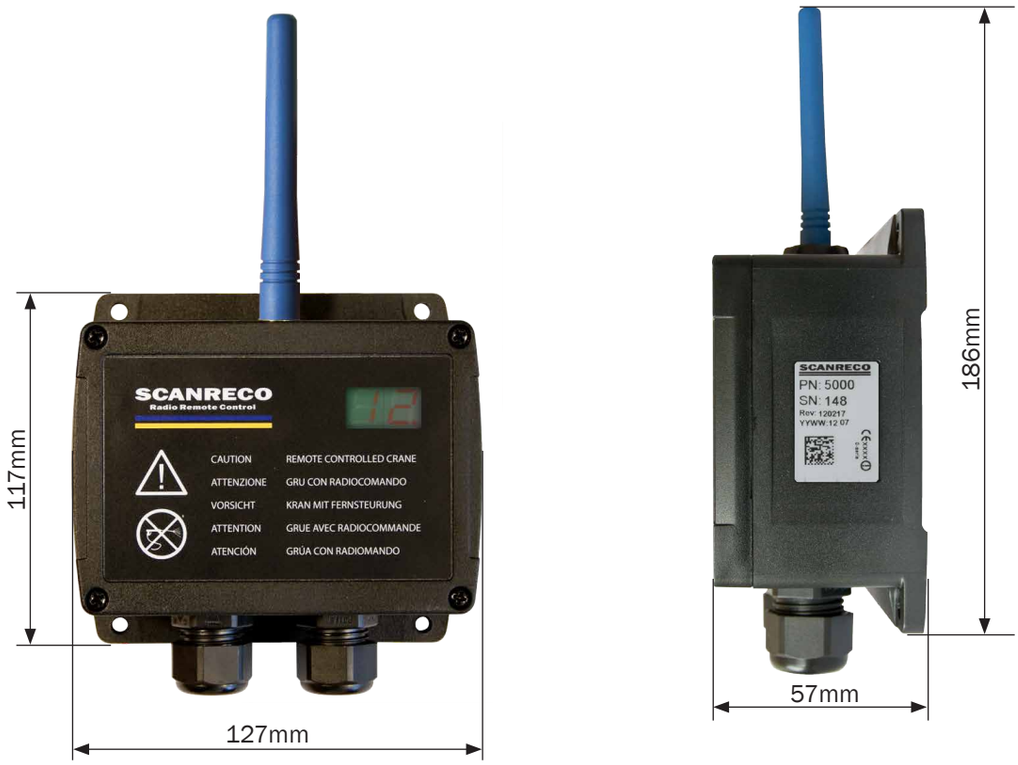
6.4.2 Terminal schematics G5-CU 5R

1 = GND
2 = Power Supply +
3 = REL1, common
4 = REL1, normally closed
5 = REL1, normally open
6 = REL2, common
7 = REL2, normally closed
8 = REL2, normally open
9 = REL3, common
10 = REL3, normally closed
11 = REL3, normally open
12 = REL4, common
13 = REL4, normally closed
14 = REL4, normally open
15 = REL5, common
16 = REL5, normally closed
17 = REL5, normally open

ATTENTION!
After assembly make sure you tighten the housing screws with 0,8 Nm to avoid any water ingress.

6.5 Technical Data Central Unit

Attribute	Information
Housing material	Plastic PC-PBT
IP-class	IP67 (for versions with cable glands IP65)
Ambient temperature	-25˚C to +70˚C
Supply voltage	9-36VDC
Fuse	For Estop digital out. Use appropriate rating (10A or lower)
Current consumption at idle	<30mA
MOSFET Output load	3 A, Max simultaneously load for each CU is 10A. See section that describes the allowed load for each output/bank.
Relay Output load	Max 10 A
Housing screw torque	0,8 Nm
Weight	MOSFET output approx. 0,5Kg Relay output approx. 0,35Kg



Size: approx. ~
127 x 117 x 57 mm / ~ 5,0 x 4,6 x 2,2 in.

7 Installation recommendation

7.1 General information

This chapter covers general recommendations for assembling of the G5 Pocket system.

ATTENTION: Assembly of the system in ways other than recommended in this chapter may affect the systems performance and life-span and may void any warranties given.

7.2 Installation of Central Unit

The Central Unit should be installed using the mounting holes in at the edges on the unit.

The Central Unit should be installed vertically or horizontally with with antenna facing upwards or horizontally. The Central Unit should never be assembled with cable glands / connectors facing upwards or in any ways where it is exposed to accumulation of water, moisture and other debris.

Engineering note: CU equipped with Deutsch connectors require M4 screws in the two lower holes.

The Central Unit should be assembled in such way that the operator can easily check the indications given from the units LED-display.

The Central Unit should be installed where it is exposed to a minimum amount of vibration and high temperature as possible.

As the Central Unit is equipped with an antenna it should be installed as high and free from obstacles as possible. An antenna obscured by object has a significantly reduced range!

The antenna must never touch a metal object and should not be mounted in an area that is surrounded by metal as it causes reflections that significantly reduce range. Keep the antenna at a distance of at least 10 cm from metal objects if possible.

Optimal range is achieved if the HCU and antenna are within line-of-sight.

7.3 Wiring assembly

The unit is equipped with an internal fuse. The Estop function is excluded from this fuse and this output needs to be provided with an external fuse at 10A or lower.

The emergency stop arrangement should be placed visible and easily accessed.

Ensure that wiring and cable glands are properly sealed as to minimize risk that water enters the unit.

IMPORTANT! During welding!

During welding on machine all connectors from the Central unit must be disconnected. Ignoring this may damage the central unit and void warranty.

7 Installation recommendation

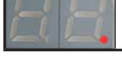
7.4 Torque values

8 Startup and LED indication

After installation of the Central unit and the batteries have been inserted into the HCU, the system should be fully operational.

The system can be configured to have an activation button before a radio link can be established. This button is normally Fn/On (button#7). Each button should now activate the central unit outputs according to the specification. If unit is configured with activation button there is also a deactivation button. This is the normally the STOP button (button#8).

The LED display on the central unit is used to indicate radio link or output activation. The list below describes the different indications.

LED Display	Meaning
	Link is established
	Standby
	Output 1 Activated
	Output 2 Activated
	Output 3 Activated
	Output 4 Activated
	Output 5 Activated
	Output 6 Activated
	Output 7/15 Activated
	Output 8/16 Activated
	Output 9/17 Activated
	Output 10/18 Activated
	Output 11/19 Activated
	Output 12 Activated
	Output 13 Activated
	Output 14 Activated

9 Programming

9.1 General Description

When a G5 system is delivered, configuration is normally done by Scanreco after final test. There should not be any need for further programming or pairing. Despite this, if there has been a change to the machine there may be need to reconfigurate the system. There are two ways to do this; connecting the system to a computer using RS232 with WinSCI software or so called “on-line” programming which is a simple method with less options. See chapter Online programming for more information.

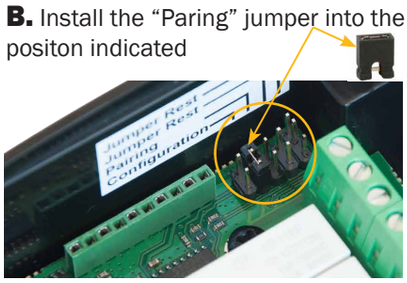
IMPORTANT!
Changes and modifications not expressly approved by the responsible system installer will void the operator’s authority to operate the application.

9.2 Safe Paring of HCU to CU

Safe pairing is used to get a unique assignment between a single Pocket HCU and a single G5 CU. To exchange the HCU and CU ID’s when replacing either the CU or HCU in a system follow the Safe Paring procedure below:

A. Remove power from CU (unplug the Grey connector for G5 24) and remove the cover

B. Install the “Paring” jumper into the positon indicated



C. Simultaneously press button #1 and button #3. LED#3 will light indicating the HCU is ready for Safe Pairing

D. Re-apply power to the CU
(Step D must be done within 10 seconds of C)

E.The HCU will confirm the download is complete by flashing LED#3 five times

F. The CU LED Display will flash

G. Remove the jumper from the “Paring” position and return it to the “Jumper Rest” position, turn the power to the CU off and re-install the CU cover.

9.3 Set to factory defaults

If for any reason it is needed to reset all settings to factory defaults this is possible by setting the jumpers on “Pairing” and “Configuration” mode. Do this without power supply connected and restart unit.

10 Product Care

10.1 Storage

Store the G5 Pocket HCU and CU in a dry environment where it is not exposed to unnecessary water/moist or extreme temperatures.

IMPORTANT!
Store the unit where it is safe! It is the operator's responsibility to ensure that the G5 Pocket HCU is kept out of unauthorized personnel's reach!

10.2 Maintenance

It is recommended that the following checks are done at regular intervals or when suspicion of malfunction is present:

- Check for damage on the HCU and CU chassis. Look for cracks, cavities, damaged gaskets or other damage that would compromise the integrity and allow water/moist to enter inside.
- Check wiring and cables for damage that could cause interruption or electrical disturbances.
- Check that the connector pins and the terminal block connections in the central unit are covered with grease suitable for electronic applications. The grease will prevent oxidation of the connectors caused by water/humidity and will increase the life span of the unit. We recommend GreaseWay SG 32 W grease.

In the event of system failure, please refer to the troubleshooting chapter in this document.

IMPORTANT!
Never conduct maintenance without disconnecting power first! Any eventual defects found must be reported to the system installer for proper judgement.

10.3 Cleaning

Only use a damp cloth to remove any mud, dirt, concrete or other debris from the HCU and CU when necessary.

ATTENTION!
Never use high-pressure to clean the HCU or CU, this will shorten the life span of the product or in worst cases damage it.

Never use acids, alcohol or thinner when cleaning HCU or CU as it dries up gaskets, significantly reducing its capability to prevent water/moist ingress.

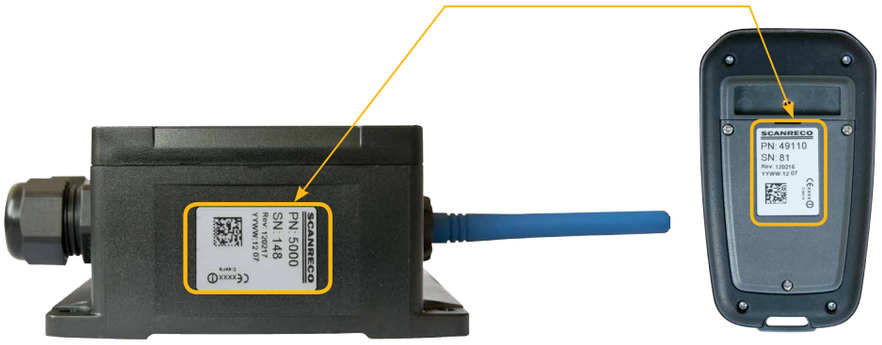
11 Troubleshooting

11.1 General

This chapter contains measures the operator can or should take before a service technician is contacted in the unlikely event you experience any problems with the HCU, CU or the radio communication.

Browse through the Troubleshooting chapter for most common scenarios / symptoms.

Before contacting support please have all part numbers and serial numbers available.



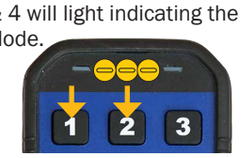
11.2 Troubleshooting

Scenario / Symptoms	Typical reason – Action
HCU does not start.	Batteries depleted, check batteries. Or CU is not powered, check CU display.
Nothing is shown on the CU display.	No power supply is connected, check power supply.
Some buttons on HCU do not work.	Button is not connected to any output. Check if buttons are operational by following the instruction in chapter 11.3. Contact machine installer how to connect a button to an output.
Display on CU showing “Po-00” or “Po-Id”.	Jumper inside is set to Configuration mode or Pairing mode, set both the jumpers to the “Jumper rest”.
The CU does not give any output to the valve.	Check that the output is activated by looking at the LED display. See chapter 8. Next check possible short circuit in coil in solenoid. Measure resistance in coil.
Communication between HCU and CU cannot be established.	HCU and CU are not paired. Follow instructions in chapter 9.2.

11.3 HCU Test mode

The HCU is equipped with a test mode to test the functionality of the buttons and LED’s on the HCU. RF communication is disabled while in test mode.

A. Simultaneously press button #1 and button #2. LED# 2, 3 & 4 will light indicating the HCU is in Test Mode.



B. Pressing any single button will illuminate LED# 1. Test all buttons one at a time to ensure they function correctly.

C. Pressing any two buttons at a time will illuminate LED# 5. This ensures the red LED is functioning correctly.

D. The HCU will automatically shut down if no buttons are pressed for 10 seconds.

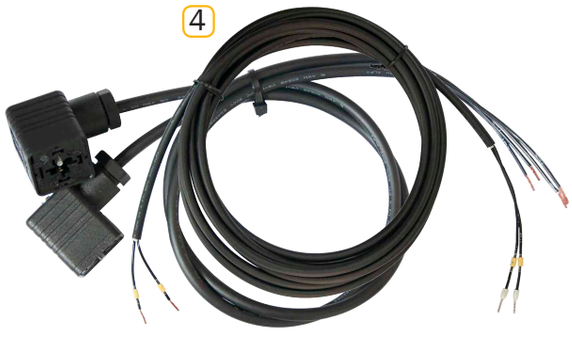
12 Spare parts

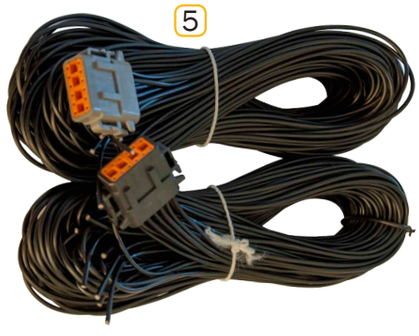
IMPORTANT!

Use only spare parts manufactured by SCANRECO for the specific product, usage of spare parts manufactured by other may cause product damage and will void warranty.

12.1 List of spare parts

	Part number	Description
1	49114	Battery 3 x AAA
2	49070	Antenna
3	49056	Belt clip
4	50258	Cable kit
5	50265	Cable kit





13 Accessories

Part number	Description
49963	Connector A Deutsch 1 x 12 incl crimp pins
49965	Connector B Deutsch 1 x 12 incl crimp pins

SCANRECO

Radio Remote Control