

Scanreco G2, Radio remote control system

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Introduction

The present manual is meant for installation and service personnel and describes the Scanreco G2 radio remote control system on HMF loader cranes, installation, programming, servicing etc.

With regards to starting up, operation, indications, display indications, frequency control and technical data etc. please see the Scanreco G2 Instruction Manual.

Component overview, the Scanreco G2 radio remote control system

The Scanreco G2 radio remote control system is connected to the RCL 5300 controller and they communicate with each other in an integrated CAN bus system.



1. Remote control box, MAXI and MINI
2. Radio controller
3. Battery charger
4. Battery, NiMH 7.2 volt
5. Remote control cable, 10 m
7. Cable kit with cables for the power supply and digital outputs
8. Cable kit with analogue/digital outputs
9. External antenna (option)

Remote control box, MAXI or MINI

The Scanreco G2 radio remote control system includes two versions of remote control boxes - MAXI or MINI. Their functionality is the same apart from the fact that the MINI version only has up to 6 linear control levers because of its size.



The remote control boxes can be configured with different control lever combinations in both EU and NAFTA frequency versions.

Compared to the previous G1 system, it is now possible to configure the MAXI remote control box (option) with an additional 3 tumbler switches (4, 5 and 9).

It is possible to configure both types of remote control boxes with a display.

Control lever	Configuration
MAXI-linear	1 - 8
MAXI-joystick	2-0-2, 2-2-2, 2-3-2 3-2-3, 3-0-3
MINI-linear	1 - 6
MINI-joystick	2-0-2, 2-2-2

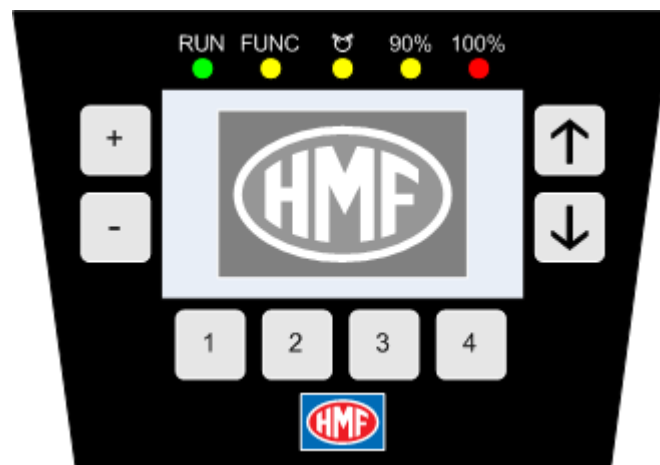


Operation, indications and display indications etc. are stated in the Scanreco G2 Instruction Manual.

New functions in the HMF InfoCentre

The InfoCentre of the remote control box has the following indications and operation:

- A big display with a detailed graphic screen.
- The display has a status bar that illustrates the same as the percentage indication.
- The RUN, FUNC, 90 %, 100 % and Slewing symbol diodes.
- The + and ÷ press buttons for adjusting the sound level of the buzzer.
- The ↑/↓ press buttons for scrolling between the different screens.
- The 1-4 press buttons for selecting specific screens.



The screens are configured as described in the Scanreco G2 Instruction Manual.

Radio controller

The design of the radio controller:

1. Standard antenna (possibility for connecting external antenna)
2. Tumbler switch, Manual-OFF-Remote
3. M12 plug for remote control cable
4. LED status indication of the functional condition
5. LED display, 2 x 7 segment



- Plastic box with protection class IP65.
- All electric in- and outputs are protected against polarity reversal, over current and EMC/FR.
- Power supply: 12/24 V direct current (+/- 20 %, max. ripple 5 %).
- Built-in radio receiver.
- Tumbler switch:
 - In Remote position, the crane is controlled from the remote control box.
 - In Manual position, the crane is manually controlled by means of the control valve levers.
 - In OFF position, the radio controller is completely interrupted.
- All electronics are cast.
- Built-in 10 ampere positive fuse.
- All electric in- and outputs are connected via plug and socket-outlets.
- The cable lead-ins at the bottom can be dismantled.
- Different cable kits are used depending on the system configuration.



General system description

The radio controller is connected to the RCL 5300 controller, which is the master controller in a CAN bus network where the radio remote control system and the safety system of the crane are communicating in an integrated system.

Depending on the system configuration, the radio controller can control different combinations of crane and stabilizer functions as well as digital functions.

CAN proportional control of PVED electric activations

The CAN output in the radio controller is via the RCL 5300 controller connected to the PVED electric activations of the Danfoss PVG 32 control valve, which are activating the individual crane functions proportionally with the signal from the remote control levers.

Proportional voltage control of the PVE electric activations

The output terminals in the radio controller are via cables directly connected to the PVE electric activations of the Danfoss PVG 32 control valve, which are activating the individual crane functions proportionally with the signal from the remote control levers.

In 24 volt systems the proportional voltage control is adjusting according to the following values $6 \leftarrow 12 \rightarrow 18$ volt. In 12 volt systems the voltage control is $3 \leftarrow 6 \rightarrow 9$ volt.

Please note: The above control requires a radio controller with another type of hardware.

Proportional current control of the PWM electric activations

The digital outputs in the radio controller are via cables directly connected to the PWM (Pulse Width Modulation) electric activations of the control valve, which are activating the individual crane functions proportionally with the signal from the remote control levers.

All in all it is possible to connect 8 dual (A and B direction) PWM outputs.

Digital voltage control of ON-OFF solenoid valves (RC-controlled stabilizers)

The digital outputs in the radio controller are via cables directly connected to the solenoid valves of the stabilizer control valve, which are activating the different stabilizer functions ON-OFF with the signal from the control levers of the remote control box.

Combined radio remote control functions

The above-mentioned radio remote controls may be combined. Typically the CAN proportional control of the Danfoss PVED electric activations is combined with the voltage control of the ON-OFF solenoid valves on the stabilizer control valve.

Digital functions

The radio controller has 14 digital outputs for for example engine functions, horn, light tower as well as other available functions.

Set-up guides

Installation of the radio controller

- To ensure optimal radio communication the radio controller must be fitted in as high a place as possible and with as much space around it as possible. If the antenna is surrounded by fixed objects, this will weaken the radio reception. It may be necessary to connect an external antenna.
- The antenna must not touch metallic parts.
- The radio controller must be fitted on a bracket free of vibrations and must be at a distance from heat coming from for example the exhaust system of the engine.
- The electric cables must turn downwards and away from the radio controller.



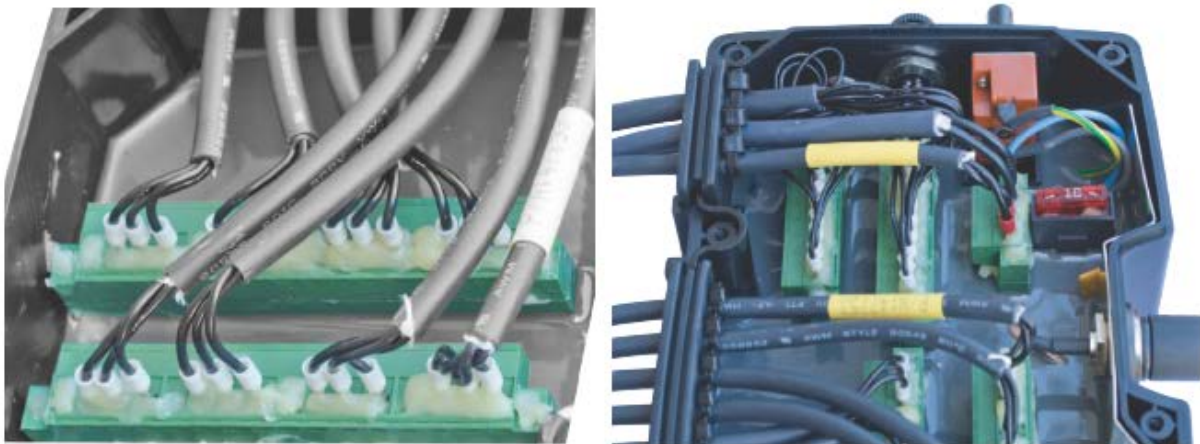
- Grease the internal plug connections with water repellent grease meant for electronic components.



- Penetrate the membranes of the cable lead-ins with for instance a small screwdriver. The fitting must be tight when pulling through the cable to ensure a tight system.
- Fit a cable relief on the inside.



- Cover all visible metallic parts on wires and in ground connections with water repellent lubricant.
- Position the cables as shown in the picture.



In case of welding on the vehicle

Before carrying out any welding on the vehicle, all electric connections for external components and power supply (both + and -) must be dismantled.

In case of recharging by means of a boost starter

Remove the cable for the power supply, if the battery of the vehicle is discharged, and connect a “boost starter” to start the engine. Any kind of too high charging voltage (power supply) or voltage peaks entail the risk of overloading and in the worst case damaging the electronic safety system.

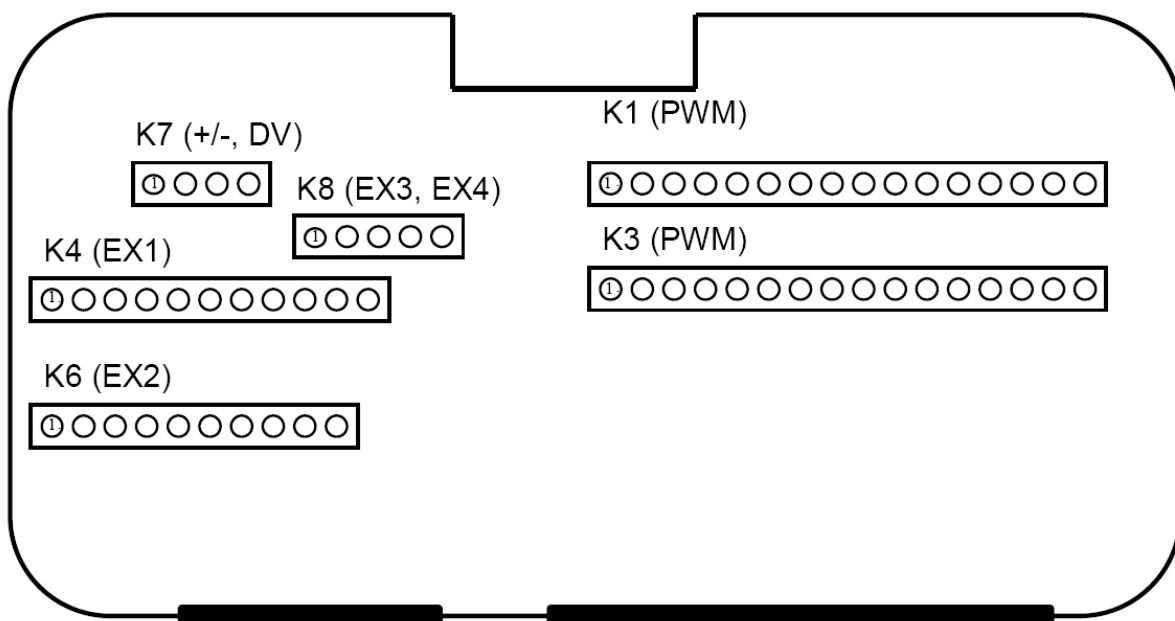
Plug and socket outlets in the radio controller

Each of the 6 plug and socket-outlets are dedicated to different crane and extra functions, CAN bus and power supply.

In certain applications the outputs may be configured for alternative functions.

In the table you can see the interconnection between sockets, functions and output cables.

Socket	Function	Cable
K1	Outputs for proportionally controlled PWM (Pulse Width Modulation) electric activations or outputs for digitally controlled ON-OFF solenoid valves on the stabilizer control valve	1A-4A and 1B-4B
K3	Outputs for proportionally controlled PWM electric activations or outputs for digitally controlled ON-OFF solenoid valves on the stabilizer control valve	5A-6A and 5B-6B
K4	Outputs for engine control functions and horn	EX1 and 60 (horn)
K6	Outputs for digital control of available ON-OFF solenoid valve functions	EX2
K7	Power supply (+/-) and dump output (wire security signal for RCL 5300)	RC
K8	CAN-in from RCL 5300 Possibility for CAN-out for a subsequent CAN controller, if any.	EX3



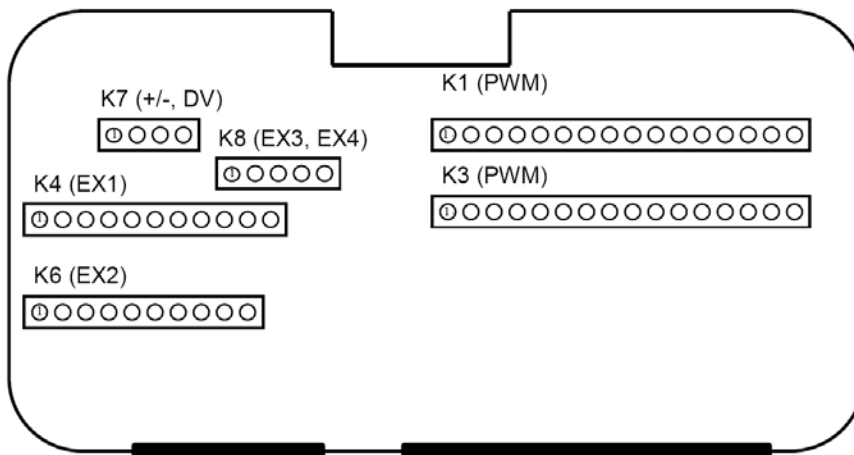
Survey of terminals in the radio controller

In the below table we have stated the number of the output terminals and output cables as well as the signal.

Connection of output cables and the corresponding function can be found in the electric diagrams for the Scanreco G2 radio remote control system.

Please note: In certain applications the output terminals may be configured for alternative functions.

Terminals in K1 socket	Cable	Signal	Terminals in K3 socket	Cable	Signal	Terminals in K4 socket	Cable	Signal
K1.1	1A	PWM +	K3.1	5A	PWM +	K4.1	EX1	ON-OFF 1
K1.2	1A	PWM ÷	K3.2	5A	PWM ÷	K4.2	EX1	ON-OFF 2
K1.3	1B	PWM +	K3.3	5B	PWM +	K4.3	EX1	ON-OFF 3
K1.4	1B	PWM ÷	K3.4	5B	PWM ÷	K4.4	EX1	ON-OFF 4
K1.5	2A	PWM +	K3.5	6A	PWM +	K4.5	EX1	ON-OFF 5
K1.6	2A	PWM ÷	K3.6	6A	PWM ÷	K4.6	EX1	ON-OFF 6
K1.7	2B	PWM +	K3.7	6B	PWM +	K4.7	EX1	GND (÷)
K1.8	2B	PWM ÷	K3.8	6B	PWM ÷	K4.8	EX1	DIG IN 1
K1.9	3A	PWM +	K3.9	7A	PWM +	K4.9	EX1	DIG IN 2
K1.10	3A	PWM ÷	K3.10	7A	PWM ÷	K4.10	EX1	DIG IN 3
K1.11	3B	PWM +	K3.11	7B	PWM +	K4.11	EX1	Input, VDC
K1.12	3B	PWM ÷	K3.12	7B	PWM ÷			
K1.13	4A	PWM +	K3.13	8A	PWM +			
K1.14	4A	PWM ÷	K3.14	8A	PWM ÷			
K1.15	4B	PWM +	K3.15	8B	PWM +			
K1.16	4B	PWM ÷	K3.16	8B	PWM ÷			



Terminals in K6 socket	Cable	Signal	Terminals in K7 socket	Cable	Signal	Terminals in K7 socket	Cable	Signal
K6.1	EX2	ON-OFF 7	K7.1	RC	12/24 V	K8.1	EX3	CAN High
K6.2	EX2	ON-OFF 8	K7.2	RC	GND (÷)	K8.2	EX3	CAN Low
K6.3	EX2	ON-OFF 9	K7.3	RC	Wire security	K8.3	EX3	CAN ÷
K6.4	EX2	ON-OFF 10	K7.4	RC	DMP ÷	K8.4	EX3	CAN High
K6.5	EX2	GND (÷)				K8.5	EX3	CAN Low
K6.6	EX2	ON-OFF 11						
K6.7	EX2	ON-OFF 12						
K7.8	EX2	ON-OFF 13						
K8.9	EX2	ON-OFF 14						
K9.10	EX2	GND (÷)						

The Scanreco G2 radio remote control system and CGW 5355

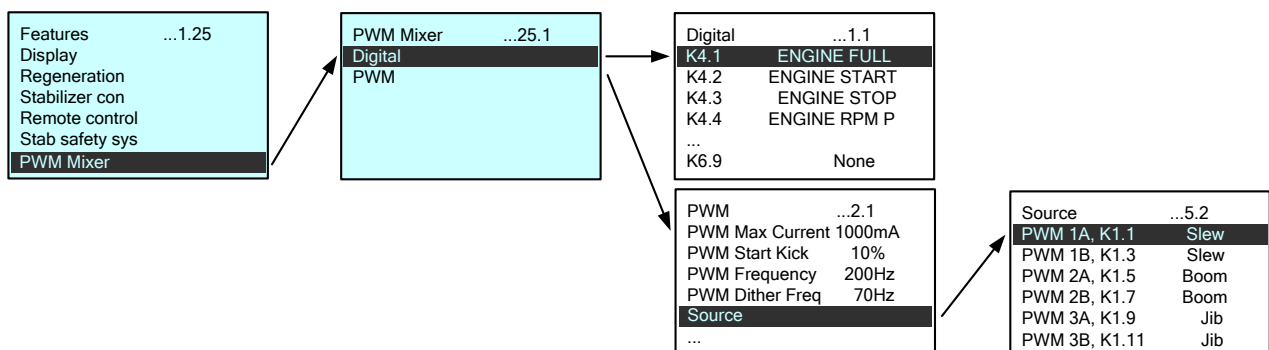
In the service terminal CGW5355 a number of functions, used for setting-up, downloading, monitoring and reading of error log in relation to the G2 radio remote control system, have been implemented.

Most of the SG2 set-up is carried out in the PWM Mixer feature as indicated in Fig. 7.

Survey of CGW 5355 functions

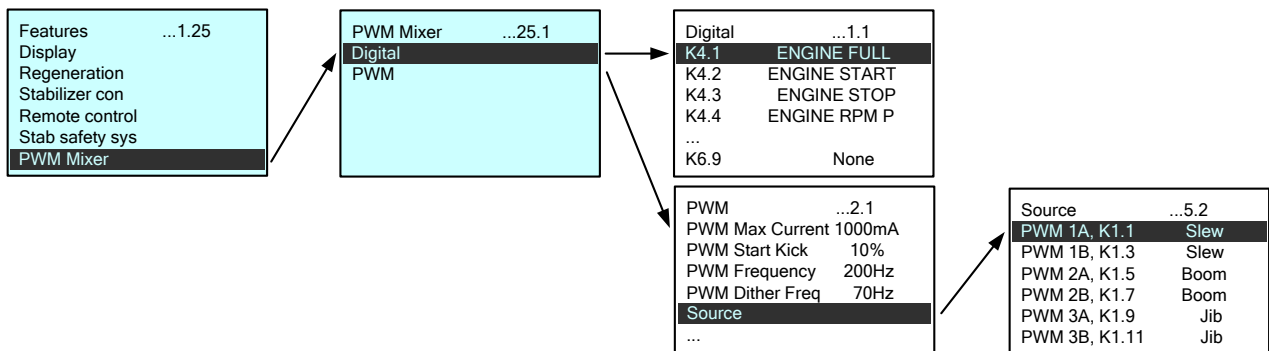
- Profile > View > Setup > Features > PWM Mixer
 - Digital: K4.1-6 and K6.9
 - PWM:
 - PWM Max Current
 - PWM Start Kick
 - PWM Frequency
 - PWM Dither Freq
 - Source: PWM 1A, K1.1 – PWM 8B, K3.15
 - Source Setup: A/B Proportional, A/B Digital and A/B Digital, hold
 - Min. Current: 0-100 %
 - Max. Current: 0-100%
 - Ignore Dump
- Network > CAN-Modules > Network: 100 Scanreco G2
- Monitor > Output signals > Remote: Button 1-28
- Black box
 - Error 1-50
 - Timestamp: date and time stamp
 - Emergency error: CAN error code
 - Manufacturer error: SG2 error code
 - RCL error: Error code indicated on the RCL display
- Tools:
 - <Download Icons>
 - <Download Texts>

Fig. 7



Description of Scanreco G2 parameters in the CGW 5355

In the table below is indicated the PWM Mixer parameters in the CGW 5355, the corresponding menu items and description of functions and parameters. Please also see examples of setting up operation of crane, stabilizer and extra functions from the remote control box in this manual.



Menu item in CGW 5355	Description of functions and parameters
1.1.1.1.1.25 PWM Mixer	The main function which is to be used when the PWM outputs in the Scanreco G2 radio remote control system are to be set up.
1.1.1.1.1.25.1 Digital	It is possible to set up 14 digital signals from the K4 and K6 sockets. The K4 outputs are used as standard for engine control signals, and the K6 outputs are used for extra optional functions.
1.1.1.1.1.25.2 PWM	It is possible to set up 8 dual outputs (direction A and B) from the K1 and K3 sockets. The outputs can be set up in order to control PWM signals from the remote control levers (e.g. proportional control of crane functions) or digital signals (extra optional functions).
1.1.1.1.1.25.2.1 PWM Max Current	In this menu item is inserted a value for the current intensity (mA) depending on whether the system voltage is 24 or 12 volt. The standard value for 24 volt NEM solenoid valves is 650 mA. The standard value for 12 volt NEM solenoid valves is 1400 mA.
1.1.1.1.1.25.2.2 Start Kick	The function adds extra starting current to ensure a stable starting up of activation of the valve, as there is stick-slip in the seals etc., when the spool has been in neutral position for a while. The standard value is 20 % for the NEM control.
1.1.1.1.1.25.2.3 PWM Frequency	The PWM (Pulse Width Modulation) carrier frequency (Hz) states the number of digital pulses that are controlled with. The standard value is 200 Hz (pulses per second) for the NEM control.
1.1.1.1.1.25.2.4 PWM Dither Freq	The PWM Dither frequency (Hz) is a superposed carrier frequency, which ensures that the solenoid valve and thereby the spool is kept in constant movement to prevent stick-slip and give a better regulation. The standard value is 70 Hz for the NEM control.

Menu item in CGW 5355	Description of functions and parameters
1.1.1.1.1.25.2.5 Source 1.1.1.1.1.25.2.5- 1.1.1.1.1.25.2.5- 1.1.1.1.1.25.2.5- 1.1.1.1.1.25.2.5-	Each PWM output can be controlled by an optional output signal - operated from the remote control box - in the <i>Source</i> menu. The output signal may be for a crane function, stabilizer function or extra function. The following outputs can be activated: PWM 1A, K1.1 - PWM 4A, K1.13 and PWM 5A, K3.1 - PWM 8A, K3.13 PWM 1B, K1.3 - PWM 4B, K1.15 and PWM 5B, K3.3 - PWM 8B, K3.15
1.1.1.1.1.25.2.6 Source Setup	In <i>Source Setup</i> it is possible for each PWM output signal in <i>Source</i> to select (SET and arrow down) between the following signal types: 1. <u>None</u> 2. <u>A Prop.</u> Operation from a remote control lever. A proportional signal for a NEM activation for oil flow to the A port on a crane control valve function (a crane function selected in <i>Source</i>) or the A port of another type of proportional control valve (an Ex. 1-16* function selected in <i>Source</i>). 3. <u>B Prop.</u> Operation from a remote control lever. A proportional signal for a NEM activation for oil flow to the B port on a crane control valve function (a crane function selected in <i>Source</i>) or the B port of another type of proportional control valve (an Ex. 1-16* function selected in <i>Source</i>). 4. <u>A Dig.</u> Operation from a remote control lever. A digital signal for an ON-OFF activation for oil flow to the A port on a stabilizer control valve function (an STB 1-16 function selected in <i>Source</i>) or another type of ON-OFF control valve (an Ex. 1-16* function selected in <i>Source</i>). 5. <u>B Dig.</u> Operation from a remote control lever. A digital signal for an ON-OFF activation for oil flow to the B port on a stabilizer control valve function (an STB 1-16 function selected in <i>Source</i>) or another type of ON-OFF control valve (an Ex. 1-16* function selected in <i>Source</i>). 6. <u>A Hold</u> Operation from a remote control lever. A digital holding signal for an ON-OFF activation for oil flow to the A port on a control valve function, which is to be kept activated (an Ex. 1-16* function selected in <i>Source</i>). 7. <u>B Hold</u> Operation from a remote control lever. A digital holding signal for an ON-OFF activation for oil flow to the B port on a control valve function, which is to be kept activated (an Ex. 1-16* function selected in <i>Source</i>). 8. <u>Digital</u> Operation from a tumbler switch or push button on the remote control box. An ordinary digital output signal for a function selected in <i>Source</i> . 9. <u>Digital hold</u> Operation from a tumbler switch or push button on the remote control box. An ordinary digital holding signal for a function selected in <i>Source</i> . *) The Ex. 1-16 signals can be used for control of the control valves for optional extras. They can be used both in crane mode (e.g. Ex. 1-4) and stabilizer mode (for example Ex. 8-16). However, the same Ex.-signal cannot be used both in crane mode and stabilizer mode. The signals are by default proportional and come from an activation of the remote control levers on the remote control box. The signals can also be digital (or digital with holding function) so that the remote control levers can be used "as push buttons" or "tumbler switches" for activating and deactivating an output terminal.

Menu item in CGW 5355	Description of functions and parameters
1.1.1.1.1.25.2.7 Min. Current	Indicates the minimum current in % of PWM Max Current for a solenoid valve. The value is individually adjustable for each single PWM output so that the manual control valve lever starts activation (flow from the port) when the remote control lever in case of activation has just passed the dead band. If a PWM output is used for ON/OFF control of a solenoid valve, the value is adjusted at 0 %.
1.1.1.1.1.25.2.8 Max. Current	Indicates the maximum current in % of PWM Max Current for a solenoid valve. The value is individually adjustable for each single PWM output so that the manual control valve lever is just completely activated when the remote control lever in case of activation is completely activated. If a PWM output is used for ON/OFF control of a solenoid valve, the value is adjusted at 100 %.
1.1.1.1.1.25.2.9 Ignore Dump	With the parameter <i>Ignore Dump</i> it is possible to select whether the current output is to be deactivated when the dump valve is open (no dump signal). <i>Ignore Dump</i> selected (ticked off) ⇒ The current output is not deactivated in case of dump. <i>Ignore Dump</i> not selected (not ticked off) ⇒ The current output is deactivated in case of dump. For example the work light (LIGHT) or functions used in stabilizer mode are not to be turned off in case of dump.

Setting up of output signals by means of the CGW 5355

By means of the CGW 5355 it is possible to select signal sources which activate different output signals from the Scanreco G2 radio controller or controllers in the RCL 5300 Safety System.

In the table below is indicated each single selectable signal name, the corresponding signal source and a description of the functionality controlled by the signal.

Please note that it is the same set of parameters of signal names that can be selected in the *Output config*, menu 1.1.1.1.2.4 when setting up the output terminals in the RCL 5300 and other controllers in the CAN network. Therefore there will also appear signal names others than the ones relating to the Scanreco G2 radio remote control system.

The signal names are indicated in the order in which they appear in the CGW display when pressing SET on an output in *PWM Mixer - PWM - Source*, menu item 1.1.1.1.25.2.5.1-16 and when pushing the "arrow down" button.

In the table is indicated signal sources from the remote control levers, tumbler switches and push buttons on the remote control box.

Designations of tumbler switches and push buttons appear from the photo.



Signal name	Signal source	Description of signal
None	No	No signal
OFF	No	Always low signal
ON	Signal from controllers in the RCL 5300 safety system or from the Scanreco G2 radio controller.	Constant high signal
DMP1	Signal from the RCL 5300 controller.	High signal for dump valve 1 in all situations where the RCL safety system allows the crane to work.
DMP2	Signal from the RCL 5300 controller.	High signal for dump valve 2 in all situations where the RCL safety system allows the crane to work.
STB SHIFT VALVE	2 x activating the yellow push button (pos. 7) on the remote control box or the RCL 5300 indicator panel.	High signal for the change-over valve - oil flow for crane functions or stabilizer functions. Change from crane mode to stabilizer mode.
HDL	Signal from the RCL 5300 safety system when the load moment of the crane is less than 90%.	High signal for the HDL valve when the crane is in crane mode - not HDL.
REGEN BOOM	Activation of the ON push button on the remote control box.	High signal for the regeneration valve on the "boom up" function (regeneration), when the load moment of the crane is less than 50 %.

Signal name	Signal source	Description of signal
REGEN JIB	Activation of the ON push button on the remote control box.	High signal for the regeneration valve on the "jib - up" function (regeneration), when the load moment of the crane is less than 50 %.
REGEN EXT	Activation of the ON push button on the remote control box.	High signal for the regeneration valve on the "extension - out" function (regeneration), when the load moment of the crane is less than 50 %.
REGEN BOOM JIB	Activation of the ON push button on the remote control box.	High signal for the regeneration valve on the "boom - up" and "jib - up" function (regeneration), when the load moment of the crane is less than 50 %.
ENGINE FULL	Activation of tumbler switch no. 1 - to the left - on the remote control box.	High signal for the engine control of the truck. In case of activation, the number of revolutions is increased to a predetermined value. Requires selection of <i>Engine</i> in <i>Features</i> .
	----- Activation of tumbler switch no. 1 - to the right - on the remote control box.	High signal for the engine control of the truck, when a crane function is activated by the remote control lever. When the remote control lever is in neutral position, the signal goes low after a certain interval: <i>Engine timeout</i> (1.1.1.1.9.6). Requires selection of <i>Engine</i> in <i>Features</i> .
ENGINE RPM M	Activation of tumbler switch no. 3 - to the right - on the remote control box.	High signal for the engine control of the truck. The number of revolutions is reduced stepwise by each activation of the tumbler switch.
ENGINE RPM P	Activation of tumbler switch no. 3 - to the left - on the remote control box.	High signal for the engine control of the truck. The number of revolutions is increased stepwise by each activation of the tumbler switch.
LIGHT	Activated by green press button (holding) on the RCL 5300 or green press button on the remote control box.	Signal for a relay that powers a spotlight. The signal is permanently coded in the RCL 5300 application program.
PVSK DMP	2 x activating the yellow push button (pos. 7) on the remote control box or the RCL 5300 indicator panel.	High signal for the PVEO electric activation on the PVSK module of the Danfoss PVG 32 control valve - change to crane mode - by the first activation of a crane function with a remote control lever, when the RCL safety system allows the crane to work.
PVSK SHIFT	2 x activating the yellow push button (pos. 7) on the remote control box or the RCL 5300 indicator panel.	High signal for the PVEO electric activation on the PVSK module of the Danfoss PVG 32 control valve that changes to stabilizer mode.
HORN	Activation of the ON push button on the remote control box or the OPT press button on the RCL 5300 (kept down).	High signal for a horn fitted on the crane.
FLASH	Activation of the green press button (pos. 6) when starting up the RCL system.	High signal for the alarm flash. E.g. for LED band on the stabilizer legs.
ENGINE START	Activation of tumbler switch no. 2 - to the left - on the remote control box.	High signal for the engine control of the truck. Starting up the engine.
ENGINE STOP	Activation of tumbler switch no. 2 - to the right - on the remote control box.	High signal for the engine control of the truck. Stop of the engine.
EVS BYPASS	Activation of the key switch from the "EVS on" position to the "2 ZONE LMB on" position.	High signal when the key switch is in the "2 ZONE LMB on" position. In this position you change from the EVS system to the 2-stage LMB system.

Signal name	Signal source	Description of signal
WINCH PARK	Activation of the yellow push button on the remote control box.	High signal for changeover of a solenoid valve in the hydraulic system for winch, so that the winch can be moved up into and down from stowing position.
FJ EX 1	Simultaneous activation of tumbler switch no. 10 and tumbler switch no. 3 to the left.	High signal for the solenoid valve for change between Fly-Jib and grab, when the lever configuration "Fly Jib Shift Grab" is activated in "Lever Config."
FJ EX 2	Simultaneous activation of tumbler switch no. 10 and tumbler switch no. 3 to the right.	High signal for the solenoid valve for change between Fly-Jib and rotator, when the lever configuration "Fly Jib Shift Rotator" is activated in "Lever Config."
STB LOW	Signal by 0-50 % activation of a remote control lever in stabilizer mode.	High signal for the solenoid valve for low stabilizer speed (1 st version of Odin and Thor stabilizer valve block).
STB HIGH	Signal by 50-100 % activation of a remote control lever in stabilizer mode.	High signal for the solenoid valve for high stabilizer speed (1 st version of Odin and Thor stabilizer valve block).
STB DIR A	Signal by activation of a remote control lever forwards - in stabilizer mode.	High signal for the directional valve of the stabilizer control valve for control of oil flow for "stabilizer legs - up" and "stabilizer beams - retract".
STB DIR B	Signal by activation of a remote control lever backwards - in stabilizer mode.	High signal for the directional valve of the stabilizer control valve for control of oil flow for "stabilizer legs - down" and "stabilizer beams - extend".
STB 1 - STB 16	Digital signal by activation of a remote control lever - in stabilizer mode.	The digital signals control the functions of the stabilizer control valve (PWM activations or ON-OFF activations) for cylinders for stabilizer legs and stabilizer beams.
Ex.1 - Ex.16	Proportional signal (can be defined as <i>digital</i> or <i>digital hold</i>) by activation of a remote control lever - both in crane mode and stabilizer mode.	The proportional signals (PWM activations) can operate the control valve functions for optional extras on the crane or on a vehicle.
LEV COL 1-12 = Lever setup 1 - 12 (1.1.1.1.2.8.1-12)	Activation of a tumbler switch or a combination of tumbler switches.	When activating the tumbler switch, a signal appears for changeover to another configuration of the remote control levers. If for example the crane has radio remote control of stabilizers, the remote control levers change function from operation of crane functions to operation of stabilizer functions when pushing the yellow press button twice (2 x yellow) (change between crane mode and stabilizer mode). By means of configuration/activation of different tumbler switches it is possible to change between up to 12 different types of operation from the remote control levers.
Led Run	The same signal as for the RUN diode on the RCL 5300 indicator panel.	The signal follows the RUN diode: constant signal or periodic signal.
Led 100	The same signal as for the 100 % diode on the RCL 5300 indicator panel.	The signal follows the 100 % diode: constant signal or periodic signal.
Led 90	The same signal as for the 90 % diode on the RCL 5300 indicator panel.	The signal follows the 90 % diode: constant signal or periodic signal.

Signal name	Signal source	Description of signal
RC But 1 (RED)	Activation of the red push button (pos. 8).	The signal gives the corresponding functions as when pushing the red press button on the RCL 5300.
RC But 2 (YELLOW)	Activation of the yellow push button (pos. 7).	The signal gives the corresponding functions as when pushing the yellow press button on the RCL 5300.
RC But 3 (GREEN)	Activation of the green push button (pos. 6).	The signal gives the corresponding functions as when pushing the green press button on the RCL 5300.
RC But 4 (E START)	Activation of tumbler switch no. 2 - to the left.	In the default settings the signal is used for starting the engine.
RC But 5 (E STOP)	Activation of tumbler switch no. 2 - to the right.	In the default settings the signal is used for stopping the engine.
RC But 6 (RPM P)	Activation of tumbler switch no. 3 - to the left.	In the default settings the signal is used for increasing the number of engine revolutions.
RC But 7 (RPM M)	Activation of tumbler switch no. 3 - to the right.	In the default settings the signal is used for reducing the number of engine revolutions.
RC But 8 (FULL)	Activation of tumbler switch no. 1 - to the left.	High signal for the engine control of the truck. In case of activation, the number of revolutions is increased to a predetermined value. Configuration N/A.
RC But 9 (AUTO)	Activation of tumbler switch no. 1 - to the right - on the remote control box.	High signal for the engine control of the truck, when a crane function is activated by the remote control lever. When the remote control lever is in neutral position, the signal goes low without delay. Configuration N/A.
RC But 10 (FLYSH1)	Activation of tumbler switch no. 10 and tumbler switch no. 3 - to the left.	If there are only 6 remote control levers on the remote control box and a change-over valve has been fitted between the Fly-Jib functions and the extra functions: When activating the two tumbler switches, the change-over valve receives a high signal. Now the remote control lever changes function from "Fly-Jib - jib" to "rotator".
RC But 11 (FLYSH2)	Activation of tumbler switch no. 10 and tumbler switch no. 3 - to the right.	If there are only 6 remote control levers on the remote control box and a change-over valve has been fitted between the Fly-Jib functions and the extra functions: When activating the two tumbler switches, the change-over valve receives a high signal. Now the remote control lever changes function from "Fly-Jib - extension" to "grab".
RC But 12 (OPT 1)	Activation of tumbler switch no. 10 to the right (holding function) or the left (spring-loaded).	In the default settings the signal is used for different functions. Can be used for output signal for optional extras or as reverser function together with alternative operation.
RC But 13 (OPT 2)	Like OPT 1.	Like OPT 1.
RC But 14 (OPT 3)	Activation of tumbler switch MICRO - to the left.	In the default settings the signal is used for reducing (in steps per activation) the crane speed.
RC But 15 (OPT 4)	Activation of tumbler switch MICRO - to the right.	In the default settings the signal is used for increasing (in steps per activation) the crane speed after a previous reduction.

Signal name	Signal source	Description of signal
RC But 16 (OPT 5)	Activation of the ON push button.	In the default settings the signal is used for starting up the remote control box.
RC But 17 (OPT 6)	Reserved	No signal has been defined.
RC But 18 (DIS SEL)	Activation of tumbler switch no. 10 and the yellow push button (pos. 7).	When activating the yellow press button several times, you change between the screens of the remote control box.
RC But 19 (OPT 7)	Activation of tumbler switch no. 10 and tumbler switch no. 2 - to the left (spring return).	Extra available digital signal for an extra function.
RC But 20 (OPT 8)	Activation of tumbler switch no. 10 and tumbler switch no. 2 - to the right (spring return).	Extra available digital signal for an extra function.
RC But 21 (REGEN)	Activation of the ON push button.	In the default settings the signal is used for activating the regeneration function.
RC But 22 (STAB)	Activation of tumbler switch no. 2 - to the left.	In the default settings the signal is used as an extra activation with holding function (safety function), when operating stabilizers in stabilizer mode.
RC But 23 (OPT 9)	Activation of tumbler switch no. 4 - to the left.	Extra available digital signal for an extra function (option)
RC But 24 (OPT 10)	Activation of tumbler switch no. 4 - to the right.	Extra available digital signal for an extra function (option)
RC But 25 (OPT 11)	Activation of tumbler switch no. 5 - to the left.	Extra available digital signal for an extra function (option)
RC But 26 (OPT 12)	Activation of tumbler switch no. 5 - to the right.	Extra available digital signal for an extra function (option)
RC But 27 (OPT 13)	Activation of tumbler switch no. 9 - to the left.	Extra available digital signal for an extra function (option)
RC But 28 (OPT 14)	Activation of tumbler switch no. 9 - to the right.	Extra available digital signal for an extra function (option)
Slew	Activation of a remote control lever.	Proportional signal for the crane function – "Slew".
Boom	Activation of a remote control lever.	Proportional signal for the crane function – "Boom".
Jib	Activation of a remote control lever.	Proportional signal for the crane function – "Jib".
Extension	Activation of a remote control lever.	Proportional signal for the crane function – "Extension".
Flyjib	Activation of a remote control lever.	Proportional signal for the crane function – "Fly-Jib - jib".
Flyjib Ext.	Activation of a remote control lever.	Proportional signal for the crane function – "Fly-Jib - extension".
Winch	Activation of a remote control lever.	Proportional signal for the crane function – "Winch".
Rotator	Activation of a remote control lever.	Proportional signal for the crane function – "Rotator".
Grab	Activation of a remote control lever.	Proportional signal for the crane function – "Grab".
Aux1	Activation of a remote control lever.	Proportional signal for a first extra control valve function.
Aux2	Activation of a remote control lever.	Proportional signal for a second extra control valve function.
Aux3	Activation of a remote control lever.	Proportional signal for a third extra control valve function.
Aux4	Activation of a remote control lever.	Proportional signal for a fourth extra control valve function.

Setting up control valve functions

By means of the CGW 5355 it is possible to set up the control valve functions that are relevant to the crane configuration in question.

In menu 1.1.1.1.2.7 - *Valve function* - ENT, 1.1.1.1.2.7.1 - *Primary function* - ENT you can select up to 15 crane functions - *Valve 1-15*.

In menu 1.1.1.1.2.7.1.1 - *Valve 1* - SET select a crane function by means of the "arrow down" button.

When the function has been selected, press ENT.

Select the other control valve functions in the same way. Please see the table.

Function	Description
OFF	When you do not select a control valve function, there must be written <i>OFF</i> .
Slew	Choice of slewing function.
Boom	Choice of boom function.
Jib	Jib function.
Ext	Extension function.
Fly-Jib	Fly-Jib - jib function.
FJExt	Fly-Jib - extension function.
Winch	Winch function.
Winch park	Winch stowing function.
Rotator	Rotator function.
Cr.Aux.1	First extra control valve function.
Cr.Aux.2	Second extra control valve function.
Cr.Aux.3	Third extra control valve function.
Cr.Aux.4	Fourth extra control valve function.

Configuration of remote control levers

By means of the CGW 5355 it is possible to configure which remote control lever that has to activate the control valve functions.

It is possible to set up 12 different configurations in menu 1.1.1.1.2.8.1 - *Lever function* - ENT: *Lever setup 1-12*. Press ENT For each *Lever setup* it is possible to configure 8 remote control levers - Lever 1-8.

In menu 1.1.1.1.2.8.1.1.6 - Lever 1 - SET select which control valve function that has to be operated from the remote control lever no. 1 from the left.

When the function has been selected, press ENT.

Select which control valve functions the other 7 remote control levers are to operate in the same way.

Please see the table and the next chapter "Configuration of remote control levers, operation direction".

Function	Description
None	Is selected if the remote control lever is not going to operate any function.
Std	The remote control lever operates the same function as selected in a previous configuration (<i>Lever setup</i>).
Slew	The remote control lever is going to operate the slewing function.
Boom	Operation of boom function.
Jib	Jib function.
Ext	Extension function.
Fly-Jib	Fly-Jib - jib function.
FJ Ext	Fly-Jib - extension function.
Winch	Winch function.
W. park	Winch stowing function.
Rotator	Rotator function.
Grab	Grab function.
Cr.Aux.1	First extra control valve function.
Cr.Aux.2	Second extra control valve function.
Cr.Aux.3	Third extra control valve function.
Cr.Aux.4	Fourth extra control valve function.
Ex.1-16	The remote control lever is going to operate a control valve function for optional extras. The function is by default proportional (PWM).
Stb.1-16	The remote control lever is going to operate an ON-OFF control valve function for stabilizers.

Configuration of remote control levers, operation direction

In the previous chapter, configuration of remote control levers by means of the CGW 5355 is described. In *Lever setup* (e.g. Lever setup 1 ⇒ ENT ⇒ Lever 1-8, menu 1.1.1.1.2.8.1.1.6-13) the position of the remote control levers, function, and operation direction are as standard defined as indicated in the drawing of a remote control box with 8 linear remote control levers:

Remote control boxes with joystick have position, function and operation direction as indicated in the table and in the drawings: 2-0-2, 2-2-2 and 3-2-3.

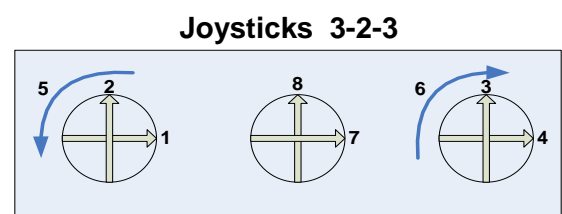
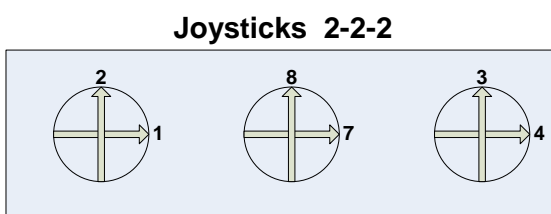
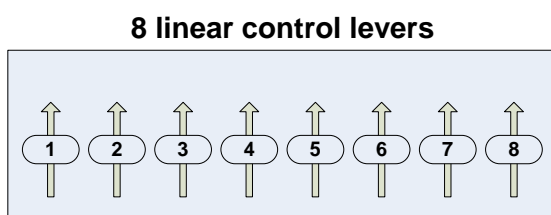
Joystick 2 has 2 proportional functions.

Joystick 3 has 3 proportional functions: cross and turn.

Scanreco "MAXI", crane functions, operation direction A

	4 sections	6 sections	7 sections	8 sections
Lever 1			Slew right	Slew right
Lever 2		Slew right	Boom down	Boom down
Lever 3	Slew right	Boom down	Jib up	Jib up
Lever 4	Boom down	Jib up	Extension out	Extension out
Lever 5	Jib up	Extension out	Fly-Jib, jib up	Fly-Jib, jib up
Lever 6	Extension out	Fly-Jib, jib up / Rotator right	Fly-Jib, extension out	Fly-Jib, extension out
Lever 7		Fly-Jib, extension out / Grab open up / Winch down		Rotator right
Lever 8			Winch down	Grab open up / Winch down

Scanreco "MAXI", position of the levers, operation direction A

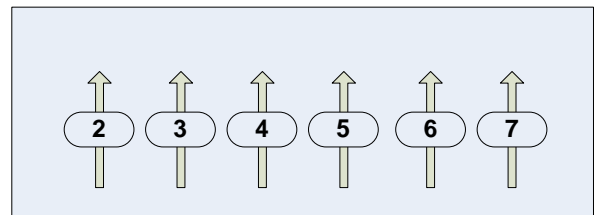


Scanreco "MINI" crane functions, operation direction A

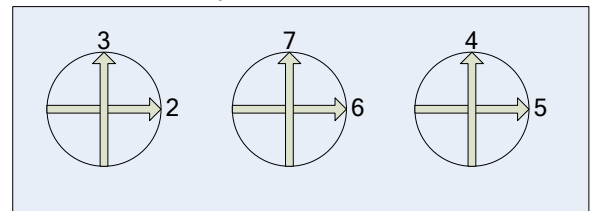
	4 sections	6 sections
Lever 2		Slew right
Lever 3	Slew right	Boom down
Lever 4	Boom down	Jib up
Lever 5	Jib up	Extension out
Lever 6	Extension out	Fly-Jib, jib up / Rotator right
Lever 7		Fly-Jib, extension out / Grab open up / Winch down

Scanreco "MINI", position of the levers, operation direction A

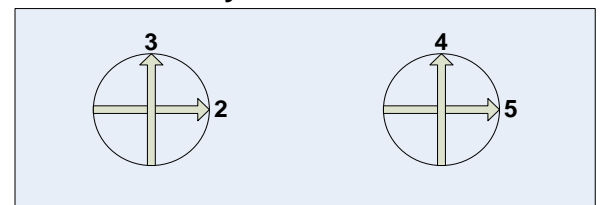
6 linear control levers



Joysticks 2-2-2



Joysticks 2-0-2



Set-up, CAN control of the crane functions

In the table below is indicated an example of setting up a radio remote control system consisting of:

- Danfoss PVG 32 control valve.
- PVED electric activations for crane functions.
- PVEO-DI electric activation on the PVSJ section for change between crane mode and stabilizer mode.
- Scanreco G2 radio remote control.

The RCL 5300 software must be version 29_20 or higher.

The example is a standard set-up valid for cranes where the control valve is fitted on the base of the crane.

Depending on the equipment there may be used other in- and output terminals in the RCL 5300.

Please also see the chapter "Description of Scanreco G2 parameters in the CGW 5355" and "Setting up of output signals by means of the CGW 5355" as well as the electric diagram IRC, G2.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.3.17 - Remote control	Press ENT	- Activate the feature <i>Remote control</i> .
1.1.1.1.1.17 - Remote control	ENT	- Set up the parameters in the <i>Remote control</i> menu.
1.1.1.1.1.17.1 - Type	SET	- Select <i>Scanreco V2</i> by means of the arrow key, ENT.
1.1.1.1.1.17.2 - RF.Adr	-	- Radio frequency 0.
1.1.1.1.1.17.3 - Ebox SN	-	- Radio controller, serial no. is not indicated.
1.1.1.1.1.17.4 - Recei. SN	-	- Radio receiver, serial no. is not indicated.
1.1.1.1.1.17.5 - Trans. SN	-	- Radio transmitter, serial no. is not indicated.
1.1.1.1.1.17.6 - Lever number	SET	- State number of lever functions, ENT.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.3.11 - Display	ENT	- Activate the feature - <i>Display</i> - if the remote control box has a display fitted.
1.1.1.1.3.19 - PVED 1.2.2.1 - Valves	ENT ENT	- Activate the feature <i>PVED</i> . - Each single PVED electric activation, which is fitted on the control valve, is programmed for the respective crane functions.
1.1.1.1.3.9 - Engine 1.1.1.1.1.9 - Engine	ENT ENT SET, arrow up	- Activate the feature <i>Engine</i> . - Mark the required engine control functions. - A cross (ticked off) indicates that the function has been selected.
1.1.1.1.2.2.4 - PVSK-PVEO-DI	SET, arrow up	- Activate the PVEO electric activation for the PVSK section of the PVG 32 control valve. A cross (ticked off) indicates that the function has been selected.
1.1.1.1.2.3.2.6 - Wire sec 1.1.1.1.2.3.2.6.1 - Module 1.1.1.1.2.3.2.6.2 - 1.1.1.1.2.3.2.6.3 - 1.1.1.1.2.3.2.6.4 -	ENT SET, select RCL 5300B Input, select K384 (D4) Invert <input type="checkbox"/> NPN <input type="checkbox"/>	- Configure the Wire Security signal from the G2 radio controller as input signal to the RCL 5300. - Input signal to the RCL 5300B processor. - Configuration of the input terminal K384. - The signal is not to be inverted (not ticked off). - The signal must be PNP (not ticked off).
1.1.1.1.2.4.1.1 - O1 K397 1.1.1.1.2.4.1.1.1 - Min current 1.1.1.1.2.4.1.1.2 - Max current 1.1.1.1.2.4.1.1.3 - Signal	ENT SET, type 0 SET, type 2000 SET, select PVSK DMP	- Configuration of the output signal for activation of the PVEO-DI electric activation on the PVSK-module. - Set the minimum current at 0 mA. - Set the maximum current at 2000 mA. - Output signal for activation of the PVEO-DI electric activation - crane mode
1.1.1.1.2.4.1.2 - O1 K395 1.1.1.1.2.4.1.2.1 - Min current 1.1.1.1.2.4.1.2.2 - Max current 1.1.1.1.2.4.1.2.3 - Signal	ENT SET, type 0 SET, type 2000 SET, select PVSK SHIFT	- Configuration of the output signal for activation of the PVEO-DI electric activation on the PVSK-module. - Set the minimum current at 0 mA. - Set the maximum current at 2000 mA. - Output signal for activation of the PVEO-DI electric activation - stabilizer mode.
1.1.1.1.2.3.2.25 - PVSK dump 1.1.1.1.2.3.2.25.1 - Module 1.1.1.1.2.3.2.25.2 - 1.1.1.1.2.3.2.25.3 - 1.1.1.1.2.3.2.25.4 -	ENT SET, select RCL 5300B Input, select K387 Invert <input type="checkbox"/> NPN <input type="checkbox"/>	- Configuration of the input signal from the PVEO-DI electric activation on the PVSK-module. - Input signal (feedback) to the RCL 5300B processor informing that the PVSK-module is moved towards crane mode. - Configuration of the input terminal K387. - The signal is not to be inverted (not ticked off). - The signal must be PNP (not ticked off).
1.1.1.1.2.3.2.26 - PVSK shift 1.1.1.1.2.3.2.26.1 - Module 1.1.1.1.2.3.2.26.2 1.1.1.1.2.3.2.26.3 1.1.1.1.2.3.2.26.4	ENT SET, select RCL 5300B Input, select Invert <input type="checkbox"/> NPN <input type="checkbox"/>	- Configuration of the input signal from the PVEO-DI electric activation on the PVSK-module. - Input signal to the RCL 5300B processor informing that the PVSK-module is moved towards stabilizer mode. - Configuration of the input terminal K388. - The signal is not to be inverted (not ticked off). - The signal must be PNP (not ticked off).
1.1.1.1.2.7 - Valve function 1.1.1.1.2.7.1 - Primary function 1.1.1.1.2.7.1.1 - Valve 1 1.1.1.1.2.7.1.1 - Valve 2 Etc.	ENT ENT SET, arrow down SET, arrow down SET, arrow down	- Configuration of the crane functions included in the current crane control valve. - Select the first of two possible configurations. - Select the first crane function (e.g. Slew), ENT. - Select the second crane function (e.g. Boom), ENT. - Select all relevant crane functions.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.2.8 - Valve sensing 1.1.1.1.2.8.1 - Lever function	ENT ENT	- Configuration of remote control levers. - Configuration of the position of the control levers on the remote control box.
1.1.1.1.2.8.1.1 - Lever setup 1	ENT	- Select the first of several possible configurations.
1.1.1.1.2.8.1.1.1 - Description 1.1.1.1.2.8.1.1.2 - Active 1.1.1.1.2.8.1.1.3 - Mode 1.1.1.1.2.8.1.1.4 - Activation 1	SET, select Crane SET, arrow down SET, select Crane SET, select Std	- Configuration of crane functions. - A cross (ticked off) activates the configuration. - The configuration is activated in crane mode. - The configuration lies directly on the remote control levers.
1.1.1.1.2.8.1.1.5 - Activation 2	SET, select OFF	- No other operation on the remote control box necessary to activate the configuration.
1.1.1.1.2.8.1.1.6 - Lever 1	SET, arrow down	- Select the crane function you wish to operate from the first control lever from the left (or no crane function).
1.1.1.1.2.8.1.1.7 - Lever 2	SET, arrow down	- Select the crane function you wish to operate from the second control lever from the left.
Etc.	SET, arrow down	- Select all relevant remote control levers.
1.1.1.1.2.8.2 - Lever invert	ENT	- The function of the remote control lever is inverted.
1.1.1.1.2.8.2.1 - Slew <input type="checkbox"/>	SET, arrow up	- A cross (ticked off) indicates that the remote control lever for the slewing movement has been inverted.
1.1.1.1.2.8.2.2- Boom <input type="checkbox"/>	SET, arrow up	- A cross (ticked off) indicates that the remote control lever for the boom movement has been inverted.
Etc.	SET, arrow up	The function can be changed for the functions you require.
1.1.1.1.2.10 - Function speed	ENT	- Adjustment of the speeds of the crane functions.
1.1.1.1.2.10.1 - Load HDL	ENT	- Adjustment of the crane and HDL speeds.
----- 1.1.1.1.2.10.1.1 - Slew 1.1.1.1.2.10.1.1.1 - C.S. CCW 1.1.1.1.2.10.1.1.2 - C.S. CW 1.1.1.1.2.10.1.1.3 - HDL CCW 1.1.1.1.2.10.1.1.4 - HDL CW 1.1.1.1.2.10.1.1.5 - Start load	ENT SET, type number (%) SET, type number (%) SET, type number (%) SET, type number (%) SET, type number (%)	- Adjustment of the slewing function. - Speed for the "slew-left" function, ENT. - Speed for the "slew-right" function, ENT. - The HDL speed, "slew-left", ENT. - The HDL speed, "slew-right", ENT. - The load moment by which the proportional HDL is activated, ENT.
1.1.1.1.2.10.1.1.6 - Full load	SET, type number (%)	- The load moment by which the proportional HDL is fully activated.
1.1.1.1.2.10.1.1.7-F.curveCCW	SET, type number (%)	- Regulation of the oil flow for "slew-left". The higher value, the more progressive is the regulation curve in relation to the movement of the remote control lever.
1.1.1.1.2.10.1.1.8 - F.curve CW	SET, type number (%)	- Regulation of the oil flow for "slew-right". The higher value, the more progressive is the regulation curve in relation to the movement of the remote control lever.
----- 1.1.1.1.2.10.1.2 - Boom Etc.	ENT SET, arrow up	- Adjustment of the boom function. - As indicated for the slewing movement, it is possible to make adjustments for the other crane functions.

Set-up, PWM control of the crane functions

In the table below is indicated an example of setting up a radio remote control system consisting of:

- Hydrocontrol control valve with 6 functions.
- NEM electric activations for 6 crane functions.
- Dump valve (DMP 1) in the inlet section of the control valve.
- Scanreco G2 radio remote control.

The RCL 5300 software must be version 29_20 or higher.

The example is a standard set-up for cranes configured with the above-mentioned system. Depending on the equipment, there may be used other output terminals in the radio controller.

Please also see the chapter "Description of Scanreco G2 parameters in the CGW 5355" and "Setting up of output signals by means of the CGW 5355" as well as the electric diagram: NEMRC, G2.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.3.17 - Remote control	Press ENT	- Activate the feature <i>Remote control</i> .
1.1.1.1.1.17 - Remote control	ENT	- Set up the parameters in the <i>Remote control</i> menu.
1.1.1.1.1.17.1 - Type	SET	- Select <i>Scanreco V2</i> by means of the arrow key, ENT.
1.1.1.1.1.17.2 - RF.Adr	-	- Radio frequency 0.
1.1.1.1.1.17.3 - Ebox SN	-	- Radio controller, serial no. is not indicated.
1.1.1.1.1.17.4 - Recei. SN	-	- Radio receiver, serial no. is not indicated.
1.1.1.1.1.17.5 - Trans. SN	-	- Radio transmitter, serial no. is not indicated.
1.1.1.1.1.17.6 - Lever number	SET	- State number of lever functions, ENT.
1.1.1.1.3.11 - Display	ENT	- Activate the feature - <i>Display</i> - if the remote control box has a display fitted.
1.1.1.1.3.25 - PWM Mixer	ENT	- Activate the feature <i>PWM Mixer</i> .
1.1.1.1.1.25 - PWM Mixer	ENT	- Setting up in <i>PWM Mixer</i> .
1.1.1.1.1.25.2 - PWM	ENT	- Setting up of crane functions.
1.1.1.1.1.25.2.1 - Max Current	SET, type 650	- Select the current intensity to 650 mA at 24 volt.
	SET, type 1400	- Select the current intensity to 1400 mA at 12 volt.
1.1.1.1.1.25.2.2 - Start Kick	SET, type 20	- Select increased starting current to 20 %.
1.1.1.1.1.25.2.3 - Frequency	SET, type 200	- Select the carrier frequency at 200 Hz.
1.1.1.1.1.25.2.4 - Dither Freq	SET, type 70	- Select the superposed carrier frequency at 70 Hz.
1.1.1.1.1.25.2.5 - Source	ENT	- Setting up the crane functions on the outputs of the radio controller.
1.1.1.1.1.25.2.5.1 - 1A, K1.1	SET, arrow down	- "Slew-right" on output terminal K1.1: Slew
1.1.1.1.1.25.2.5.2 - 1B, K1.3	SET, arrow down	- "Slew-left" on output terminal K1.3: Slew
1.1.1.1.1.25.2.5.3 - 2A, K1.5	SET, arrow down	- "Boom-down" on output terminal K1.5: Boom
1.1.1.1.1.25.2.5.4 - 2B, K1.7	SET, arrow down	- "Boom-up" on output terminal K1.7: Boom
1.1.1.1.1.25.2.5.5 - 3A, K1.9	SET, arrow down	- "Jib-up" on output terminal K1.9: Jib
1.1.1.1.1.25.2.5.6 - 3B, K1.11	SET, arrow down	- "Jib-down" on output terminal K1.11: Jib
1.1.1.1.1.25.2.5.7 - 4A, K1.13	SET, arrow down	- "Extension - out" on output terminal K1.13: Extension
1.1.1.1.1.25.2.5.8 - 4B, K1.15	SET, arrow down	- "Extension - in" on output terminal K1.15: Extension
1.1.1.1.1.25.2.5.9 - 5A, K3.1	SET, arrow down	- "Rotator-right" on output terminal K3.1: Rotator
1.1.1.1.1.25.2.5.10 - 5B, K3.3	SET, arrow down	- "Rotator-left" on output terminal K3.3: Rotator
1.1.1.1.1.25.2.5.11 - 6A, K3.5	SET, arrow down	- "Grab-open" on output terminal K3.5: Grab
1.1.1.1.1.25.2.5.12 - 6B, K3.7	SET, arrow down	- "Grab-close" on output terminal K3.7: Grab

1.1.1.1.1.25.2.6 - Source Setup	ENT	- Setting up the signal type for the individual output terminals for crane functions.
1.1.1.1.1.25.2.6.1 - K1.1	SET, arrow down	- Signal type for output terminal K1.1: A Prop
1.1.1.1.1.25.2.6.2 - K1.3	SET, arrow down	- Signal type for output terminal K1.3: B Prop
1.1.1.1.1.25.2.6.3 - K1.5	SET, arrow down	- Signal type for output terminal K1.5: A Prop
1.1.1.1.1.25.2.6.4 - K1.7	SET, arrow down	- Signal type for output terminal K1.7: B Prop
1.1.1.1.1.25.2.6.5 - K1.9	SET, arrow down	- Signal type for output terminal K1.9: A Prop
1.1.1.1.1.25.2.6.6 - K1.11	SET, arrow down	- Signal type for output terminal K1.11: B Prop
1.1.1.1.1.25.2.6.7 - K1.13	SET, arrow down	- Signal type for output terminal K1.13: A Prop
1.1.1.1.1.25.2.6.8 - K1.15	SET, arrow down	- Signal type for output terminal K1.15: B Prop
1.1.1.1.1.25.2.6.9 - K3.1	SET, arrow down	- Signal type for output terminal K3.1: A Prop
1.1.1.1.1.25.2.6.10 - K3.3	SET, arrow down	- Signal type for output terminal K3.3: B Prop
1.1.1.1.1.25.2.6.11 - K3.5	SET, arrow down	- Signal type for output terminal K3.5: A Prop
1.1.1.1.1.25.2.6.12 - K3.7	SET, arrow down	- Signal type for output terminal K3.7: B Prop
1.1.1.1.1.25.2.7 - Min. Current	ENT	- Setting up the minimum current for the individual output terminals.
1.1.1.1.1.25.2.7.1 - K1.1	SET, type value	- Minimum current for "slew-right": 66%.
1.1.1.1.1.25.2.7.2 - K1.3	SET, type value	- Minimum current for "slew-left": 66 %
1.1.1.1.1.25.2.7.3 - K1.5	SET, type value	- Minimum current for "boom-down": 75 %
1.1.1.1.1.25.2.7.4 - K1.7	SET, type value	- Minimum current for "boom-up": 65 %
1.1.1.1.1.25.2.7.5 - K1.9	SET, type value	- Minimum current for "jib-up": 75 %
1.1.1.1.1.25.2.7.6 - K1.11	SET, type value	- Minimum current for "jib-down": 65 %
1.1.1.1.1.25.2.7.7 - K1.13	SET, type value	- Minimum current for "extension-out": 60 %
1.1.1.1.1.25.2.7.8 - K1.15	SET, type value	- Minimum current for "extension-in": 60 %
1.1.1.1.1.25.2.7.9 - K3.1	SET, type value	- Minimum current for "rotator-right": 60 %
1.1.1.1.1.25.2.7.10 - K3.3	SET, type value	- Minimum current for "rotator-left": 60 %
1.1.1.1.1.25.2.7.11 - K3.5	SET, type value	- Minimum current for "grab-open": 60 %
1.1.1.1.1.25.2.7.12 - K3.7	SET, type value	- Minimum current for "grab-close": 60 %
1.1.1.1.1.25.2.8 - Max. Current	ENT	- Setting up the maximum current for the individual output terminals.
1.1.1.1.1.25.2.8.1 - K1.1	SET, type value	- Maximum current for "slew-right": 95 %
1.1.1.1.1.25.2.8.2 - K1.3	SET, type value	- Maximum current for "slew-left": 95 %
1.1.1.1.1.25.2.8.3 - K1.5	SET, type value	- Maximum current for "boom-down": 100 %
1.1.1.1.1.25.2.8.4 - K1.7	SET, type value	- Maximum current for "boom-up": 100 %
1.1.1.1.1.25.2.8.5 - K1.9	SET, type value	- Maximum current for "jib-up": 100 %
1.1.1.1.1.25.2.8.6 - K1.11	SET, type value	- Maximum current for "jib-down": 100 %
1.1.1.1.1.25.2.8.7 - K1.13	SET, type value	- Maximum current for "extension-out": 100 %
1.1.1.1.1.25.2.8.8 - K1.15	SET, type value	- Maximum current for "extension-in": 100 %
1.1.1.1.1.25.2.8.9 - K3.1	SET, type value	- Maximum current for "rotator-right": 100 %
1.1.1.1.1.25.2.8.10 - K3.3	SET, type value	- Maximum current for "rotator-left": 100 %
1.1.1.1.1.25.2.8.11 - K3.5	SET, type value	- Maximum current for "grab-open": 100 %
1.1.1.1.1.25.2.8.12 - K3.7	SET, type value	- Maximum current for "grab-close": 100 %
1.1.1.1.1.25.2.9 - Ignore Dump	ENT	- Setting up the output terminals, whether they are to be active even if the RCL goes into stand by mode.
1.1.1.1.1.25.2.9.1 - K1.1	<input type="checkbox"/>	- Active in case of stand by (not ticked off).
1.1.1.1.1.25.2.9.2-12	<input type="checkbox"/>	- All the above-mentioned terminals must be active in stand by mode (not ticked off).
1.1.1.1.2.4.1.1 - O1 K397	ENT	- Configuration of the RCL 5300 output terminal K397 for dump valve 1 (DMP1).
1.1.1.1.2.4.1.1.1 - Min current	SET, type value	- Set the minimum current for DMP1 at 0 mA.
1.1.1.1.2.4.1.1.2 - Max current	SET, type value	- Set the maximum current for DMP1 at 2000 mA.
1.1.1.1.2.4.1.1.3 - Signal	SET, arrow down	- Output signal for activation of dump valve 1 (crane mode). Select: DMP1

Set-up and connection of engine control functions

In the table below is indicated an example of the standard set-up of the engine control functions.

The engine control functions are activated by the tumbler switches 1, 2 and 3 on the remote control box. When operating an engine function, the configured output terminals in the K4 socket in the radio controller receive a high signal, which continues onto the conductors of the EX1 cable.

Please also see the detailed description of the engine control functions in the chapter "Setting up of output signals by means of the CGW 5355" as well as the electric diagrams: IRC, G2 or NEMRC, G2.

The RCL 5300 software must be version 29_20 or higher.



Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.3.25 - PWM Mixer 1.1.1.1.1.25 - PWM Mixer 1.1.1.1.1.25.1 - Digital	Press ENT ENT ENT	- Activate the feature <i>PWM Mixer</i> . - Setting up in <i>PWM Mixer</i> . - Setting up of digital outputs.
1.1.1.1.1.25.1.1 - K4.1	SET, arrow down	- Signal on the output terminal K4.1 for increasing the number of revolutions when operating a crane function: select ENGINE FULL
1.1.1.1.1.25.1.2 - K4.2	SET, arrow down	- Signal on the output terminal K4.2 for starting up the engine: select ENGINE START
1.1.1.1.1.25.1.3 - K4.3	SET, arrow down	- Signal on the output terminal K4.3 for stopping the engine: select ENGINE STOP
1.1.1.1.1.25.1.4 - K4.4	SET, arrow down	- Signal on the output terminal K4.4 for increasing the number of revolutions of the engine by each activation of the tumbler switch no. 3 to the left: select ENGINE RPM P
1.1.1.1.1.25.1.5 - K4.5	SET, arrow down	- Signal on the output terminal K4.5 for reducing the number of revolutions of the engine by each activation of the tumbler switch no. 3 to the right: select ENGINE RPM M

Set-up, radio remote control of stabilizer functions

In the table below is indicated an example of setting up radio remote controlled stabilizer functions in a system consisting of:

- A standard radio remote controlled crane control valve.
- A stabilizer control valve with 8 PWM electric activations - or ON-OFF activations - for operating the stabilizers of the crane (down/up, extend/retract) as well as a separate traverse (down/up, extend/retract).
- Scanreco G2 radio remote control.
- CIO 5376 controller

The RCL 5300 software must be version 29_20 or higher.

The example is a standard set-up for cranes configured with the above-mentioned system. Depending on the equipment there may be used other in- and output terminals in the radio controller.

Please also see the chapter "Description of Scanreco G2 parameters in the CGW 5355" and "Setting up of output signals by means of the CGW 5355" as well as the electric diagram: Stabilizers by remote G2, 4+2 ways.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.1.15 - Stabilizer con	ENT	- Setting up the stabilizer valve with PWM or ON-OFF electric activations.
1.1.1.1.1.15.3 - Remote n modul	SET, arrow up	- The box must be ticked off. This offers the possibility of activating outputs with STB1-16 for PWM and ON-OFF electric activations.
1.1.1.1.2.3.2.17 - StabSecBut	ENT	- Activation of a holding function - the tumbler switch for "Engine start/stop" is kept to the left - to be able to operate the radio remote control of the stabilizers.
1.1.1.1.2.3.2.17.1 - Module	SET, arrow down	- Activation signal from the radio controller: select - RemoteControl
1.1.1.1.2.3.2.17.2 - Input	SET, arrow down	- Activation signal: select Button 22
1.1.1.1.2.3.2.17.3 - Invert	<input type="checkbox"/>	- The signal is not to be inverted - not ticked off.
1.1.1.1.2.3.2.17.4 - NPN	<input type="checkbox"/>	- The signal must be PNP - not ticked off.
1.1.1.1.3.25 - PWM Mixer	ENT	- Activate the feature <i>PWM Mixer</i> .
1.1.1.1.1.25 - PWM Mixer	ENT	- Setting up in <i>PWM Mixer</i> .
1.1.1.1.1.25.2 - PWM	ENT	- Setting up of stabilizer functions.
1.1.1.1.1.25.2.1 - Max Current	SET, type 1800	- Select the current intensity to 1800 mA at 24 and 12 volt.
1.1.1.1.1.25.2.2 - Start Kick	SET, type 20	- Select increased starting current to 20 %.
1.1.1.1.1.25.2.3 - Frequency	SET, type 200	- Select the carrier frequency at 200 Hz.
1.1.1.1.1.25.2.4 - Dither Freq	SET, type 70	- Select the superposed carrier frequency at 70 Hz.
1.1.1.1.1.25.2.5 - Source	ENT	- Setting up the outputs of the radio controller for operating the functions of the stabilizer control valve.
1.1.1.1.1.25.2.5.1 - 1A, K1.1	SET, arrow down	- Directional valve for control of oil flow for "stabilizer legs - up" and "stabilizer beams - retract" on output terminal K1.1: STB DIR A
1.1.1.1.1.25.2.5.2 - 1B, K1.3	SET, arrow down	- Directional valve for control of oil flow for "stabilizer legs - down" and "stabilizer beams - extend" on output terminal K1.3: STB DIR B
1.1.1.1.1.25.2.5.3 - 2A, K1.5	SET, arrow down	- Left front stabilizer leg "up/down" on output terminal K1.5: STB 5
1.1.1.1.1.25.2.5.4 - 2B, K1.7	SET, arrow down	- Right front stabilizer leg "up/down" on output terminal K1.7: STB 7

1.1.1.1.1.25.2.5.5 - 3A, K1.9	SET, arrow down	- Left rear stabilizer leg "up/down" on output terminal K1.9: STB 6
1.1.1.1.1.25.2.5.6 - 3B, K1.11	SET, arrow down	- Right rear stabilizer leg "up/down" on output terminal K1.11: STB 8
1.1.1.1.1.25.2.5.7 - 4A, K1.13	SET, arrow down	- Right rear stabilizer beam "extend/retract" on output terminal K1.13: STB 4
1.1.1.1.1.25.2.5.8 - 4B, K1.15	SET, arrow down	- Right front stabilizer beam "extend/retract" on output terminal K1.15: STB 3
1.1.1.1.1.25.2.5.9 - 5A, K3.1	SET, arrow down	- Left rear stabilizer beam "extend/retract" on output terminal K3.1: STB 2
1.1.1.1.1.25.2.5.10 - 5B, K3.3	SET, arrow down	- Left front stabilizer beam "extend/retract" on output terminal K3.3: STB 1
1.1.1.1.1.25.2.6 - Source Setup	SET, arrow down	- Setting up the signal type for the individual output terminals for stabilizer functions.
1.1.1.1.1.25.2.6.1 - K1.1	SET, arrow down	- Signal type for output terminal K1.1: Digital
1.1.1.1.1.25.2.6.2 - K1.3	SET, arrow down	- Signal type for output terminal K1.3: Digital
1.1.1.1.1.25.2.6.3 - K1.5	SET, arrow down	- Signal type for output terminal K1.5: Digital
1.1.1.1.1.25.2.6.4 - K1.7	SET, arrow down	- Signal type for output terminal K1.7: Digital
1.1.1.1.1.25.2.6.5 - K1.9	SET, arrow down	- Signal type for output terminal K1.9: Digital
1.1.1.1.1.25.2.6.6 - K1.11	SET, arrow down	- Signal type for output terminal K1.11: Digital
1.1.1.1.1.25.2.6.7 - K1.13	SET, arrow down	- Signal type for output terminal K1.13: Digital
1.1.1.1.1.25.2.6.8 - K1.15	SET, arrow down	- Signal type for output terminal K1.15: Digital
1.1.1.1.1.25.2.6.9 - K3.1	SET, arrow down	- Signal type for output terminal K3.1: Digital
1.1.1.1.1.25.2.6.10 - K3.3	SET, arrow down	- Signal type for output terminal K3.3: Digital
1.1.1.1.1.25.2.7 - Min. Current	ENT	- Setting up the minimum current for the individual output terminals.
1.1.1.1.1.25.2.7.1 - K1.1	SET, type value	- Minimum current for "slew-right": 0%.
1.1.1.1.1.25.2.7.2 - K1.3	SET, type value	- Minimum current for "slew-left": 0%
1.1.1.1.1.25.2.7.3 - K1.5	SET, type value	- Minimum current for "boom-down": 0%
1.1.1.1.1.25.2.7.4 - K1.7	SET, type value	- Minimum current for "boom-up": 0%
1.1.1.1.1.25.2.7.5 - K1.9	SET, type value	- Minimum current for "jib-up": 0%
1.1.1.1.1.25.2.7.6 - K1.11	SET, type value	- Minimum current for "jib-down": 0%
1.1.1.1.1.25.2.7.7 - K1.13	SET, type value	- Minimum current for "extension-out": 0%
1.1.1.1.1.25.2.7.8 - K1.15	SET, type value	- Minimum current for "extension-in": 0%
1.1.1.1.1.25.2.7.9 - K3.1	SET, type value	- Minimum current for "rotator-right": 0%
1.1.1.1.1.25.2.7.10 - K3.3	SET, type value	- Minimum current for "rotator-left": 0%
1.1.1.1.1.25.2.8 - Max. Current	ENT	- Setting up the maximum current for the individual output terminals.
1.1.1.1.1.25.2.8.1 - K1.1	SET, type value	- Maximum current for "slew-right": 100%
1.1.1.1.1.25.2.8.2 - K1.3	SET, type value	- Maximum current for "slew-left": 100%
1.1.1.1.1.25.2.8.3 - K1.5	SET, type value	- Maximum current for "boom-down": 100%
1.1.1.1.1.25.2.8.4 - K1.7	SET, type value	- Maximum current for "boom-up": 100%
1.1.1.1.1.25.2.8.5 - K1.9	SET, type value	- Maximum current for "jib-up": 100%
1.1.1.1.1.25.2.8.6 - K1.11	SET, type value	- Maximum current for "jib-down": 100%
1.1.1.1.1.25.2.8.7 - K1.13	SET, type value	- Maximum current for "extension-out": 100%
1.1.1.1.1.25.2.8.8 - K1.15	SET, type value	- Maximum current for "extension-in": 100%
1.1.1.1.1.25.2.8.9 - K3.1	SET, type value	- Maximum current for "rotator-right": 100%
1.1.1.1.1.25.2.8.10 - K3.3	SET, type value	- Maximum current for "rotator-left": 100%
1.1.1.1.1.25.2.9 - Ignore Dump	ENT	- Setting up the output terminals, whether they are to be active even if the RCL goes into stand by mode.
1.1.1.1.1.25.2.9.1 - K1.1	<input type="checkbox"/>	- Active in case of stand by (not ticked off).
1.1.1.1.1.25.2.9.2-12	<input type="checkbox"/>	- All the above-mentioned terminals must be active in stand by mode (not ticked off).
1.1.1.1.2.8 - Valve sensing	ENT	- Configuration of remote control levers.
1.1.1.1.2.8.1 - Lever function	ENT	- Configuration of the position of the control levers on the remote control box.
1.1.1.1.2.8.1.1 - Lever setup 1	ENT	- Select the first of several possible configurations.
1.1.1.1.2.8.1.1.1 - Description	SET, arrow down	- Configuration of stabilizer functions: select Stb.Control .
1.1.1.1.2.8.1.1.2 - Active	SET, arrow down	- A cross (ticked off) activates the configuration.

1.1.1.1.2.8.1.1.3 - Mode	SET, arrow down	- The configuration is activated in stabilizer mode: select Stb.
1.1.1.1.2.8.1.1.4 - Activation 1	SET, arrow down	- The configuration lies directly on the remote control levers. select std.
1.1.1.1.2.8.1.1.5 - Activation 2	SET, arrow down	- No other operation on the remote control box necessary to activate the configuration: select OFF.
1.1.1.1.2.8.1.1.6 - Lever 1	SET, arrow down	- Left front stabilizer beam "extend/retract" is operated from the 1 st control lever from the left: select Stb.1.
1.1.1.1.2.8.1.1.7 - Lever 2	SET, arrow down	- Left rear stabilizer beam "extend/retract" is operated from the 2 nd control lever from the left: select Stb.2.
1.1.1.1.2.8.1.1.8 - Lever 3	SET, arrow down	- Right front stabilizer beam "extend/retract" is operated from the 3 rd control lever from the left: select Stb.3.
1.1.1.1.2.8.1.1.9 - Lever 4	SET, arrow down	- Right rear stabilizer beam "extend/retract" is operated from the 4 th control lever from the left: select Stb.4.
1.1.1.1.2.8.1.1.10 - Lever 5	SET, arrow down	- Left front stabilizer leg "up/down" is operated from the 5 th control lever from the left: select Stb.5.
1.1.1.1.2.8.1.1.11 - Lever 6	SET, arrow down	- Left rear stabilizer leg "up/down" is operated from the 6 th control lever from the left: select Stb.6.
1.1.1.1.2.8.1.1.12 - Lever 7	SET, arrow down	- Right front stabilizer leg "up/down" is operated from the 7 th control lever from the left: select Stb.7.
1.1.1.1.2.8.1.1.13 - Lever 8	SET, arrow down	- Right rear stabilizer leg "up/down" is operated from the 8 th control lever from the left: select Stb.8.
1.1.1.1.2.3.2.18 - Stab right act	ENT	The acknowledgement button which is to be pushed when operating the right stabilizer beam "extend/retract" is configured in the CIO 5376-1 controller (there may be more CIO controllers in the network).
1.1.1.1.2.3.2.18.1 - Module	SET, arrow down	- Configuration of the B processor in the CIO 5376 controller: select CIO5376B 1.
1.1.1.1.2.3.2.18.2 - Input	SET, arrow down	- Configuration of the input signal when activating the acknowledgement button: select K369(AD3).
1.1.1.1.2.3.2.18.3 - Invert	<input type="checkbox"/> SET, arrow up	- The signal is to be inverted - tick off.
1.1.1.1.2.3.2.18.4 - NPN	<input type="checkbox"/> SET, arrow up	- The signal must be NPN - tick off.
1.1.1.1.2.3.2.19 - Stab left act	ENT	The acknowledgement button which is to be pushed when operating the left stabilizer beam "extend/retract" is configured in the CIO 5376-1 controller (there may be more CIO controllers in the network).
1.1.1.1.2.3.2.19.1 - Module	SET, arrow down	- Configuration of the B processor in the CIO 5376 controller: select CIO5376B 1.
1.1.1.1.2.3.2.19.2 - Input	SET, arrow down	- Configuration of the input signal when activating the acknowledgement button: select K370(AD4).
1.1.1.1.2.3.2.19.3 - Invert	<input type="checkbox"/> SET, arrow up	- The signal is to be inverted - tick off.
1.1.1.1.2.3.2.19.4 - NPN	<input type="checkbox"/> SET, arrow up	- The signal must be NPN - tick off.

Set-up and connection of extra digital outputs

In the table below is indicated an example of the standard set-up of extra digital functions (option) via the output terminals in the radio controller.

The extra functions are operated by means of the tumbler switches nos. 4, 5 and 9 on the remote control box. When operating extra digital functions, the configured output terminals in the K6 socket in the radio controller receive a high signal, which continues onto the conductors of the EX2 cable that are connected to terminals in an extra connection box - Box2.

In case of retro-fitting, you need to order a kit of tumbler switches (4, 5 and 9), an EX2 cable as well as a Box 2 with terminals.

Please also see the detailed description of the extra digital functions in the chapter "Setting up of output signals by means of the CGW 5355" as well as the electric diagram: Extra digital outputs, G2.

The RCL 5300 software must be version 29_20 or higher.



Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.3.25 - PWM Mixer	Press ENT	- Activate the feature <i>PWM Mixer</i> .
1.1.1.1.1.25 - PWM Mixer	ENT	- Setting up in <i>PWM Mixer</i> .
1.1.1.1.1.25.1 - Digital	ENT	- Setting up of digital outputs.
1.1.1.1.1.25.1.7 - K6.1	SET, arrow down	- Signal on the output terminal K6.1 for an extra digital function when activating the tumbler switch no. 4 to the left: select RC But 23 (OPT9) .
1.1.1.1.1.25.1.8 - K6.2	SET, arrow down	- Signal on the output terminal K6.2 for an extra digital function when activating the tumbler switch no. 4 to the right: select RC But 24 (OPT10) .
1.1.1.1.1.25.1.9 - K6.3	SET, arrow down	- Signal on the output terminal K6.3 for an extra digital function when activating the tumbler switch no. 5 to the left: select RC But 25 (OPT11) .
1.1.1.1.1.25.1.10 - K6.4	SET, arrow down	- Signal on the output terminal K6.4 for an extra digital function when activating the tumbler switch no. 5 to the right: select RC But 26 (OPT12) .
1.1.1.1.1.25.1.11 - K6.6	SET, arrow down	- Signal on the output terminal K6.6 for an extra digital function when activating the tumbler switch no. 9 to the left: select RC But 27 (OPT13) .
1.1.1.1.1.25.1.12 - K6.7	SET, arrow down	- Signal on the output terminal K6.7 for an extra digital function when activating the tumbler switch no. 9 to the right: select RC But 28 (OPT14) .

Set-up and connection of spotlight

In the table below is indicated an example of the standard set-up of a spotlight operated from the remote control box.

The work light is operated by means of the green push button - hold for approx. 2 seconds - on the remote control box.

When operating the spotlight, the configured output terminal K393 in the RCL 5300 controller receives a high signal, which continues by cable 55F onto a relay in the connection box - Box1. Connect a separate power supply to Box1 and the spotlight is powered via the relay and the 55A cable.

In case of retro-fitting, you need to order - apart from the spotlight - a 55F cable, a relay and a power supply cable for Box1 as well as a power supply cable - 55A - for the spotlight.

Please also see the detailed description of the spotlight in the chapter "Setting up of output signals by means of the CGW 5355" as well as the electric diagram: Work light, RCL.

Menu item in CGW 5355	Configuration	Description of the function
1.1.1.1.2.4.1 - RCL 530x	ENT	Configuration of output terminal in RCL 5300.
1.1.1.1.2.4.1.3 - O3 K393	ENT	Configuration of output terminal O3 K393.
1.1.1.1.2.4.1.3.1 - Min current	SET, type 0	Set the minimum current at 0 mA.
1.1.1.1.2.4.1.3.2 - Max current	SET, type 2000	Set the maximum current at 2000 mA.
1.1.1.1.2.4.1.3.2 - Signal	SET, arrow down	Output signal for activation of the work light. Select: LIGHT



Download of icons and texts

It is possible to download icons and text messages for the HMF InfoCentre by means of the CGW 5355 service terminal. During the procedure, the icons and texts are first downloaded to the radio controller and then to the remote control box.

The procedure is as follows:

1. Turn off the remote control box by pushing down the red stop button.
2. The radio controller must be powered and the tumbler switch must be in *Remote* position.
3. Connect the remote control cable between the radio controller and the remote control box.
4. Connect the CGW 5355 service terminal to the RCL 5300 controller, the download procedure is carried out as follows:

Menu item in CGW 5355	Configuration	Description of the function
1.5 - Tools	ENT	Selection of download function.
1.5.5 - <Download Icons>	ENT	Icons are downloaded to the radio controller.
1.5.6 - <Download Texts>	ENT	Text is downloaded to the radio controller.

5. Then follow the procedure for ID-coding in the chapter "Programming of ID-code" further in this manual.

The radio remote control system and the HMF InfoCentre are now ready for use.



Monitoring of the radio remote control system by means of the CGW 5355

It is possible to monitor the output signals from the radio controller as well as feedback on spool travel etc. by means of the CGW 5355 service terminal.

Please note! As always when monitoring, you need to press SET to read the values online.

Menu item in CGW 5355	Description	CGW command
1.4 - Monitor	- Monitor	ENT
1.4.3 - Output signals	- Output signals from controllers and sensors.	ENT
1.4.3.3 - Remote	- Output signals from the radio remote control system.	ENT
1.4.3.3.1 - 28 Button 1 - 28	- It is possible to monitor whether the RCL 5300 "sees" a signal from the push buttons and tumbler switches (please see the chapter "Setting up of output signals by means of the CGW 5355") when they are activated on the remote control box.	Press SET to activate the CGW online.
1.4.8 - Valve	- Monitoring of control valve functions.	ENT
1.4.8.1 - Valve sensing	- Monitoring of spool sensors.	ENT
1.4.8.1.1-14 - Slew.....	- Monitoring of spool sensors, all crane functions. Direction: A - Neutral - B.	SET
-----	-----	-----
1.4.8.3 - Crane speed	- Monitoring of speed of crane functions. The activation in percentage (0-100%) of the remote control levers.	ENT
1.4.8.3.1-15 - Slew.....	- Monitoring of speed for all crane functions.	SET
-----	-----	-----
1.4.8.4 - Spool position	- Monitoring of feedback from the electric activations of the control valve about the activation in percentage (0-100%) of the spool.	ENT
1.4.8.4.1-15 - Slew.....	- Monitoring of the activation of the spool for all crane functions.	SET
1.4.10 - Lever Function	- Monitoring of which crane functions are configured on which remote control levers.	ENT
1.4.10.1-8 - Lev1.....	- Monitoring of crane function on remote control lever 1-8.	

Retro-fitting of HMF InfoCentre

It is possible to retro-fit an InfoCentre on a Scanreco G2 radio remote control system.

EU radio remote control systems

The MAXI and MINI remote control boxes are as standard fitted with a simplex radio transmitter meant for one-way communication. The simplex radio transmitter is not the same for MAXI and MINI.

An InfoCentre requires that a duplex radio transceiver is fitted meant for two-way communication. As standard the radio controller has a built-in duplex transceiver.

There is an InfoCentre kit for MAXI and one for MINI. Both kits consist of a duplex radio transceiver, an LED display and a flat transmission cable with plug.

NAFTA radio remote control systems

The MAXI and MINI remote control boxes are as standard fitted with a duplex radio transceiver which is the same for both the MAXI and MINI boxes.

As standard the radio controller has a built-in duplex transceiver.

There is an InfoCentre kit that fits both the MAXI and MINI boxes. The kit consist of an LED display and a flat transmission cable with plug.

Installation procedure

- Mount the LED display.
- As to EU radio remote control systems (not NAFTA) the simplex radio transmitter is to be replaced by the duplex radio transceiver.
- Select *Display* in the Add feature menu 1.1.1.1.3.1 - ENT by means of the CGW 5355. "Update controller".
- Download of icons and texts. Please see the chapter in this manual.
- Programming of ID. Please see the chapter in this manual.



Programming of ID-code

In order to establish a radio communication between the remote control box and the radio controller, the two units must be programmed with a unique ID-code.

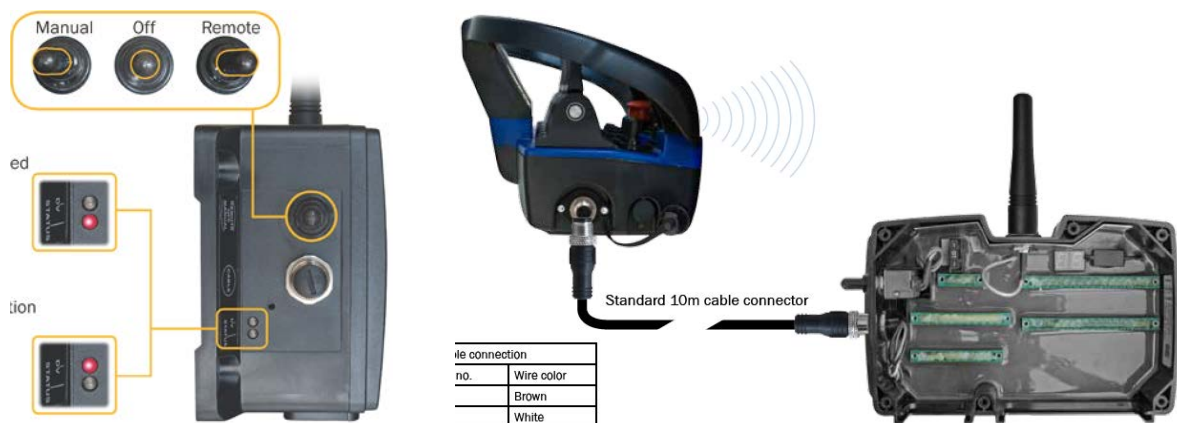
The ID-code is saved in the remote control box which ensures that it is not possible to transmit radio signals from another remote control box.

The ID-coding is carried out by connecting the remote control cable between the remote control box and the radio controller.

After ended ID-coding procedure, the ID-code is saved in the memory of the radio controller.

Procedure for ID coding

1. Take out the battery from the remote control box.
2. Connect the remote control cable between the remote control box and the radio controller.
3. Test the remote control system by operating the crane from the remote control box via the remote control cable.
4. Push the stop button on the remote control box.
5. Put the tumbler switch on the radio controller in **OFF** position.
6. Turn/pull out the stop button on the remote control box.
7. Put the tumbler switch on the radio controller in **Remote** position, and within 10 seconds carry out step 8.
8. Push the **ON** button on the remote control box and hold it down for approx. 5 seconds until you hear a short signal* from the buzzer.
*If the short signal is followed by a long signal, the remote control box turns off and the LED display of the radio controller shows "**b L**", the ID-coding has not been carried out (see the chapter: "Reasons for errors when carrying out ID coding" below).
9. Release the **ON** push button and wait a little while.
10. When the ID coding has been carried out correctly, the system acknowledges as follows:
 - The buzzer of the remote control box gives a signal.
 - The LED display in the radio controller will for approx. 8 seconds show "**Po-Id**".
 - The buzzer gives 5 periodic signals.
 - The remote control box turns off.
11. Push the **ON** button and release it again.
12. Wait until the LED display in the radio controller shows "**1 -**".
13. After ID-coding, remove the remote control cable, insert the battery and test the radio remote control system by operating the crane.



Control of ID coding

While the remote control cable is fitted, it is possible by means of the LED display of the radio controller to check whether the ID coding has been accepted.

- If the LED display indicates "2 - ", the radio controller and the remote control box are not ID coded together.
- If the LED display indicates "1 - ", the radio controller and the remote control box have been ID coded together.

Reasons for errors when carrying out ID coding

If the ID coding has not been carried out/accepted it may be due to the following reasons:

- Pushing/holding the push button **ON** in step 8 has not begun within the 10 seconds after the radio controller has started (step 7).
- Failure in the remote control cable or the plug. Check that it is possible to operate the crane via cable remote control.
- There must not be a battery in the remote control box.
- Check that the red Power LED is lit during the entire procedure, i.e. until the buzzer has given 5 periodic signals (step 10).
- If the remote control box turns off after starting up or during the ID coding, it is due to an internal error.



Indications, radio controller

Functional status is indicated two places on the radio controller:

- Two external diodes **Status** and **DV** give a general indication (pos. 4).
- The internal LED display gives more detailed information (pos. 5).








The two external diodes

The Status diode	Explanation
Not lit	The radio controller is deactivated
Red lit	The radio controller is activated and the tumbler switch is in Remote position. There is no connection or communication with the remote control box.
Green lit	The radio controller is activated and the tumbler switch is in Remote position. There is connection and communication with the remote control box.
Red flashes	A system error is indicated (see chapter on error indications).

The DV diode	Tumbler switch	Explanation
Red lit	Position - Manual	The dump valve of the control valve is powered when the tumbler switch is in Manual position.
Red lit	Position - Remote	The dump valve of the control valve is powered after the first operation of a crane function.

The internal LED display

LED	Explanation
	Rotating LED segment. The radio controller is in stand by mode - no communication with the remote control box.
	The radio controller is in stand by mode - there is radio communication with the remote control box.
	There is communication with the remote control box via the remote control cable. The ID-code is approved/accepted.
	There is radio communication with the remote control box via automatic continuous frequency hopping (see chapter).
	System error - where also the external red diode is flashing. The internal LED display is flashing, indicating an underlying error code (see chapter).

Indications, remote control box

The remote control box has two diodes and a buzzer which indicate the functional status.



Power LED	Explanation
Turned off	The remote control box is deactivated
Red lit	The remote control box is activated and data are transmitted.
Red flashes once per sec.	The remote control box is activated and data are transmitted. The battery is discharged. In case of low battery level the buzzer gives a periodic signal at the first 3 flashes of the diode.

Micro LED	Explanation
Turned off	The crane is working in normal mode.
Green flashing	The crane is working at reduced speed, 1-5 steps. See Instruction Manual.

The quality of the radio signal

The quality of the radio signal can be examined by means of indications from the external diodes of the radio controller and the internal LED display.



Status	LED display	Explanation
Green lit	I H constantly lit	Optimum quality of the radio signal and normal radio communication.
Green flashing	I H flashing	There are short interruptions of the radio signal and thereby loss of data packets. The faster it flashes - the weaker the radio reception.
Red lit	Rotating LED segment	The radio controller is in stand by mode. No radio communication.

Frequency hopping

Contrary to radio remote control systems where it is possible to change manually between radio channels in case of externally induced radio interferences, the G2 radio remote control system has a built-in automatic frequency hopping technology.

The radio transmission takes place within the ISM band where defined channels have been assigned. Frequency hopping means shifting many times a second in a random sequence between 67 radio channels.

This ensures that the radio transmission takes place at an optimum frequency at any time .

No other radio remote control system uses the same random sequence when shifting between radio channels, which minimizes the risk of two systems colliding.

This is how to avoid that the radio transmission is stopped, thus avoiding crane stop.

Technical Data

System	Data
Frequency, ISM band	EU: 433,050 – 434,790 MHz NAFTA: 902,000 – 928,000 MHz
Channels	EU: 67 NAFTA: 67
Channel switching	Automatic frequency hopping
Sequence for channel switching	Random hops up and down the frequency band.
Types of channels	Simplex. Duplex.
Channel band width	25 kHz
RF Power	10 mW
Modulation	FM / FSK
System addresses	More than 16,000,000 unique system addresses available.
Redundancy	CRC - checksum
Power supply	Remote control box; NiMH 7,2 volt VDC battery Radio controller: 10-30 volt power supply from the battery of the vehicle.
Reach	Approx. 100 metres in industrial environments.

Online programming

All kinds of programming of parameters - crane speeds, HDL speeds, direction of crane functions when operating remote control levers etc. - must be carried out by means of the CGW 5355 service terminal which is connected to the RCL 5300 controller.

On cranes with a Scanreco G2 radio remote control system fitted, which controls PWM electric modules but where no RCL 5300 controller is included, it is possible to carry out online programming directly from the remote control box.

In case of proportional control of NEM electric activations on the Hydrocontrol control valve, the starting and final current must be adjusted for each crane function.

Only in this case, online programming is permitted. A mixture of online adjustment and adjustment by means of the CGW 5355 will make it impossible to carry out the settings correctly.

1. Take out the battery from the remote control box.
2. Connect the remote control cable between the remote control box and the radio controller.
3. Test the remote control system by operating the crane from the remote control box via the remote control cable.
4. Push the stop button on the remote control box.
5. Put the tumbler switch on the radio controller in **OFF** position.
6. Turn/pull out the stop button on the remote control box.
7. Put the tumbler switch on the radio controller in **Remote** position, and within 10 seconds continue with item 8.
8. Push the **ON** button; the Power LED is turned on.
9. Activate in a fast sequence the **Micro** tumbler switch 10 times to the right, until a long buzzer signal appears.
The LED display in the radio controller shows "Po" - "00", and the system is in online programming mode.
10. Push the **ON** button twice; the LED display shows "Po" - "02". The minimum starting current is adjusted here.
11. Activate the remote control lever for a crane function. When the **Micro** tumbler switch is pushed to the right, the starting current is increased. When pushing to the left, the starting current is reduced. The starting current is adjusted so that the manual control valve lever starts activation (flow from the port) when the remote control lever in case of activation has just passed the dead band. The starting current is adjusted for the other crane functions in the same way.
12. Push the **ON** button once; the LED display shows "Po" - "03". The maximum current (final current) is adjusted here.
13. Activate the remote control lever for a crane function completely. The current is adjusted by means of the **Micro** tumbler switch, so that the manual control valve lever is just completely activated when the remote control lever in case of activation is completely activated. The maximum current is adjusted for the other crane functions in the same way.



The LED display shows the value for the adjustment and the output terminal in question.

Example: "2A" - "20"

- 2A is the output terminal
- 20 is the current intensity in percent.

To get out of the online programming mode, push the red stop button.

Self-test mode

In connection with service and troubleshooting, it is possible to put the remote control box in self-test mode. All push buttons, tumbler switches and remote control levers can be tested without having to disassemble the remote control box.

Procedure for testing

1. Push the stop button.
2. Turn/pull out the stop button again.
3. Activate the ON push button a couple of seconds; the red Power LED is constantly lit.
4. Push the ON button approx. 10 times in rapid succession until the Power LED is flashing.
5. When pushing a push button or activating a tumbler switch, the buzzer must give a signal, thereby confirming a correct activation.
6. When activating a remote control lever, the buzzer must give a signal that increases in intensity the more the remote control lever is activated. When the remote control lever is completely activated, the buzzer gives a constant signal.

To get out of the self-test mode, push the red stop button.

If there is no signal when operating in self-test mode, it may be due to an error in the remote control lever/push button/tumbler switch, in the plug and socket-outlet or in the printed circuit board.



Fault monitoring, error indications and error codes

The Scanreco G2 radio remote control system is working in an integrated network with the RCL 5300 controller. If failures occur in the radio remote control system, an error code will appear on the RCL 5300 display.

Error code	Description
170	Internal failure in the radio controller.
171	Error related to output terminals in the radio controller.
172	Failure at the stop button of the remote control box.
173	A remote control lever is activated when starting up the system.
174	Error in the signal from a remote control lever.
175	Missing ID-coding between the radio controller and the remote control box.
176	The power supply for the radio controller is too low.
177	The power supply for the radio controller is too high.
180	No radio connection between the radio controller and the remote control box.
184	The RCL 5300 does not receive any wire security signal.
185	Error in the wire security signal (DV) from the radio controller.
186	The tumbler switch on the radio controller is in Manual position (which is manual mode).
192	The RCL 5300 does not communicate with the radio controller on the network.

These RCL error codes span in several cases several groups of errors. The internal LED display of the radio controller indicates a more specific error code. Please see the table below.

Both the radio controller and the remote control box carry out constant fault monitoring. If an error is discovered it will entail an interruption of all control signals.

In case of error, the fault monitoring will intervene as follows:

- An error is identified.
- All outputs (control signals) are interrupted
- The external red **Status** diode (pos. 4) is flashing in a rapid sequence
- The internal LED display (pos. 5) indicates which output is related to the error.

The entire monitoring sequence takes approx. 6 seconds.

If it is a temporary error (the error disappears at once), the system will automatically be "reset". In certain cases it may be necessary to restart the radio controller (the tumbler switch in **OFF** position and back in **Remote** again).



Error indication, LED display

All the outputs of the radio controller are monitored with regards to short circuit or overload. If the radio controller registers an error, it is indicated by the external red **Status** diode, which is flashing. At the same time, the internal LED display flashes first "Er" and then 2 x 2 digits (a total of 3 display indications), indicating the error code.

Example of error code indication:



The error code sequence is repeated 3 times, if the error is considered to be a minor error, and then the radio controller restarts for stand by mode.

If the error is considered to be an important error, the error code sequence continues until the power supply is interrupted.

In the table is shown a general error grouping.

Display 1	Display 2	Display 3	Explanation
Err	01	01-07	Checksum error
Err	02	02	Short circuit on DV output
Err	04	01-14	Short circuit on a digital output
Err	07	1A-8B	Error on an analogue output
Err	15	1A-8B	Short circuit on an analogue output
Err	16	1A-8B	Connection interrupted on an analogue output
Err	17	01	Power supply too low
Err	17	02	Power supply too high

In the table below is a more detailed list of errors with specific error codes.

Troubleshooting by means of the CGW 5355

When the fault monitoring of the radio controller registers an error, and error codes are indicated as stated above, data with the error code are transmitted to the RCL 5300 controller, saving the error code in an error log in the black box.

By means of the CGW 5355 service terminal it is possible to read the error code from the black box.

Example of indication of error codes:

Menu item in CGW 5355	Description	CGW command
1.3	Black box	ENT
1.3.4	Remote log	ENT
1.3.4.1 - Error 1	Example of error code: 171	ENT
1.3.4.1.1 - Date 1.3.4.1.2 - RCL error 1.3.4.1.3 - SRG2 error	Date, hour and minute when the error occurred 171 - Error code as indicated on the RCL 5300 display 0202 - Error code in the LED display in the radio controller.	
1.3.4.2 - 50	The RCL saves up to 50 different error types	

In connection with troubleshooting, it is possible by means of the CGW 5355 to read the specific type of error without having to remove the cover of the radio controller.

In the table below you see the interconnections between the error codes. Furthermore there is an explanation of the type of error, the reason for the error, if any, as well as what can be done to remedy the error.

Error codes			Comment		
RCL display	LED display in G2	Error code in the RCL 5300 black box	Error description	Cause	Remedy
170	01.01	0101	Checksum error in EEPROM	Checksum when starting up is incorrect.	The system is in safe mode. Restart the system. Please contact HMF Technical Service.
170	01.02	0102	Checksum error in FLASH	Checksum in the FLASH memory is incorrect.	The system is in safe mode. Restart the system. Please contact HMF Technical Service.
170	01.03	0103	Unstable execution of program routines in the software.	Incorrect data set in the CAN open protocol, incorrect data flow or overflow on CAN.	The system carries out automatic reset. Please contact HMF Technical Service.
170	01.04	0104	Instability in the hardware	Error in RAM or hardware identification.	The system carries out automatic reset. Please contact HMF Technical Service.

Error codes			Comment		
RCL display	LED display in G2	Error code in the RCL 5300 black box	Error description	Cause	Remedy
185	02.01	0201	Incorrect voltage on the DV output.	Error in the DV output. A low signal is expected, but it is high (perhaps externally induced voltage).	Check the DV output, cable and plug. Remove the plug and restart the system.
171	02.02	0202	Short circuit on the DV output.	The DV output is short-circuited or receives over current.	Check the DV output, cable and plug. Remove the plug and restart the system.
171	02.03	0203	Wrong voltage for the safety switch.	Incorrect voltage. A low signal is expected, but there is a high signal.	The system carries out automatic reset. Remove all plugs and restart the system.
171	02.04	0204	Short circuit of the safety switch.	Incorrect voltage. A high signal is expected, but there is a low signal.	The system carries out automatic reset. Remove all plugs and restart the system.
171	03.00	0300	Wrong voltage on a digital output.	Wrong voltage on one of the digital output terminals 1-14. A low signal is expected, but there is a high signal.	The system carries out automatic reset. Check all digital output terminals. Remove the plug and restart the system.
171	04.00	0400	Short circuit on a digital output.	There is a short circuit on one of the digital output terminals 1-14. A high signal is expected, but there is a low signal.	The system carries out automatic reset. Check all digital output terminals. Remove the plug and restart the system.
171	07.xy	----	Incorrect current on an analogue output X=channel 1-16 Y=direction A or B.	The third sequence on the LED display indicates which output has an error. 1A, 1B.....	The system carries out automatic reset. Check all analogue output terminals. Remove the plug and restart the system.
170	08.01	0801	CAN in passive mode.	CAN bus is in passive mode.	The system carries out automatic reset. Check the CAN connections and other CAN controllers in the network.
170	08.02	0802	Too many CAN data packets.	The CAN data quantity is too large on either a CAN input or a CAN output.	The system carries out automatic reset. Check both the CAN in-and output as well as a CAN controller connected to the CAN output (if fitted).
170	08.03	0803	CAN working again after being interrupted.	The CAN communication has been in interrupted condition.	The system carries out automatic reset. Check the CAN connections. Check the controller connected to the CAN output (if fitted).

Error codes			Comment		
RCL display	LED display in G2	Error code in RCL 5300 black box	Error description	Cause	Remedy
170	08.04	0804	CAN PDO - error in message length.	The length of the CAN data packet is too long	The system carries out automatic reset. Restart the system.
170	08.05	0805	CAN PDO - error in message length.	The length of the CAN data packet is too short	The system carries out automatic reset. Restart the system.
170	08.06	0806	Error in the transmission of CAN messages.	There are too many CAN data packets.	The system carries out automatic reset. Check the CAN connections. Check the controller connected to the CAN output (if fitted).
172	10.00	1000	Failure in the stop button.	The failure is transmitted from the remote control box. Error in the signal from the stop button of the remote control box.	The system carries out automatic reset again. Check the stop button for faults.
173	11.00	1100	A control lever is activated when starting up from the remote control box.	The error is transmitted from the remote control box. An analogue input signal is high when starting up.	The system will not automatically carry out reset but is in safe mode. Check that all remote control levers are in neutral position and do not give an analogue signal. Restart the remote control box.
174	13.00	1300	There is not a redundant signal from a control lever.	There is a signal which is not permitted from an analogue input from the remote control box.	The system carries out automatic reset again. Troubleshoot with the remote control box in TEST MODE.
175	14.01	1401	ID-coding has not been carried out.	The ID-coding or the parameter settings have not been approved by the system.	The system carries out automatic reset again. Repeat downloading the ID-code.
170	14.02	1402	The system does not support the value of a parameter.	A parameter has been incorrectly set up.	The system carries out automatic reset again.
171	15.xy	15xy	Short circuit on an analogue output: X=channel 1-16 Y=direction A or B.	The third sequence on the LED display indicates which output has an error. 1A, 1B.....	The system carries out automatic reset. Check all analogue output terminals. Remove the plug and restart the system.
-	16.xy	----	Open analogue output X=channel 1-16 Y=direction A or B.	The third sequence on the LED display indicates which output has an error. 1A, 1B.....	The system carries out automatic reset. Check all analogue output terminals. Remove the plug and restart the system.

Error codes			Comment		
RCL display	LED display in G2	Error code in the RCL 5300 black box	Error description	Cause	Remedy
176	17.01	1701	The power supply is too low.	The power supply is below 9 VDC.	The system carries out automatic reset. Check the power supply and the cable connections and the plug and socket-outlets.
177	17.02	1702	The power supply is too high.	The power supply exceeds 36 VDC.	The system carries out automatic reset. Check the power supply and the cable connections and the plug and socket-outlets.
174	98.00	9800	There is a general failure in the remote control box.	There is an undefinable failure in the remote control box.	Troubleshoot with the remote control box in TEST MODE.
170	99.00	9900	There is a general failure in the radio controller.	There is an undefinable failure in the radio controller.	The system carries out automatic reset. Dismount all plug and socket-outlets in the radio controller. Check the power supply and the cable connections and the plug and socket-outlets.

Error indication, remote control box

The remote control box monitors all analogue and digital inputs for errors that are indicated on the two Micro LED and Power LED diodes as well as by the buzzer.



The following is indicated if the remote control levers are not in neutral position when starting up:

Power LED	Buzzer	Explanation
1 flash	1 indication	Lever no. 1* is not in neutral position.
2 flashes	2 indications	Lever no. 2* is not in neutral position.
3 flashes	3 indications	Lever no. 3* is not in neutral position.
4 flashes	4 indications	Lever no. 4* is not in neutral position.
5 flashes	5 indications	Lever no. 5* is not in neutral position.
6 flashes	6 indications	Lever no. 6* is not in neutral position.
7 flashes	7 indications	Lever no. 7* is not in neutral position.
8 flashes	8 indications	Lever no. 8* is not in neutral position.

*Please see the chapter: "Configuration of remote control levers, operation direction".

As regards radio remote control systems with HMF InfoCentre that have a two-way transmission system (Duplex), the Micro LED is used for indicating the radio quality on the signal from the radio controller and back to the remote control box.

Micro LED	Explanation
Red flashing	Bad radio signal from the transmitter of the radio controller to the transceiver of the remote control box.
Red lit	Missing radio signal from the transmitter of the radio controller to the transceiver of the remote control box.

Remote control cable, cable connections and plug and socket-outlets

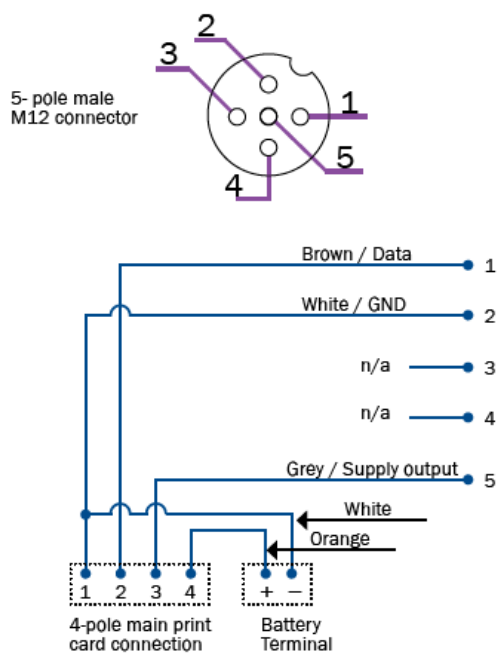
It is possible to remote control the crane by fitting a 10 m remote control cable between the radio controller and the remote control box.

When the remote control cable is fitted, the radio communication is interrupted.

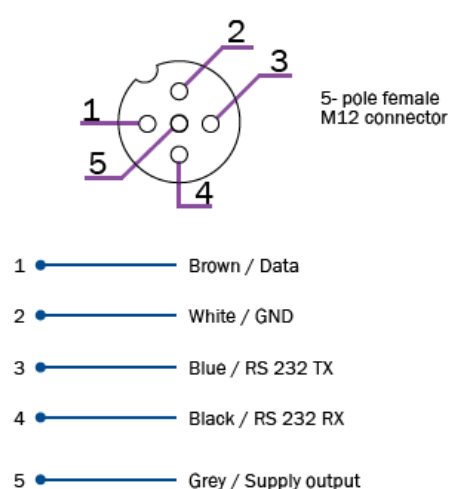
Below is indicated fitting, wire colours and terminal numbers in the sockets and plugs.



Portable Control Unit Pin assignments



Central Unit G2B/G3B Pin Assignments



Marking and identification

All radio controllers and remote control boxes are marked by a label, stating the part number and the serial number of the components in question.

When contacting HMF concerning support or in case of warranty claims, please always state the part number of the component.

