
Manual Part # 99905526

24562/28562 Loader Radio Remote System

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IOWA MOLD TOOLING CO., INC.

PO Box 189

Garner, IA 50438

Tel: 641-923-3711 FAX: 641-923-2424

Website: <http://www.imt.com>

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1. Introduction

This instruction manual on Scanreco G2 radio remote control is meant for the user of the crane and must be considered as a supplement to the "Instruction Manual, Loaders" and the "RCL 5300 Instruction manual".

It is important to read these instruction manuals before starting up and using the radio remote control. This should give the best starting point for an unproblematic use of the system.

The data transmission from the radio remote control is an integrated part of the crane's RCL Safety System. During crane operation, the Scanreco G2 radio remote control transmits signals to the RCL 5300 controller which monitors which crane functions that are activated, and stops the crane if critical situations occur.

During crane operation, the RCL Safety System monitors as follows:

- The load moment of the crane
- The operation of the crane
- The functional conditions

2. The components of the Scanreco G2 radio remote control

The Scanreco G2 radio remote control system together with the RCL 5300 controller consist of the following components:

1. Remote control box with radio transmitter
2. Radio controller
3. Battery charger
4. Battery for the remote control box (2 pcs.)
5. Remote control cable, 10 m
6. RCL 5300 controller
7. Cable kit, digital outputs
8. Cable kit, analogue outputs
9. External antenna (option)



3. Description of the system

3.1 The Scanreco G2 system, general description

The radio controller is connected to the RCL 5300 controller with an electric cable, and the RCL controller is connected to an electric activation on the control valve of the crane.

On certain crane models, the electric activations on the control valve of the crane may be connected directly to the radio controller via cables.

During crane operation, the control levers on the remote control box are operated. Digitally coded control information is thus sent via radio signals to the built-in radio receiver of the radio controller.

The radio signals are converted in the radio controller to CAN bus signals, which control the electric activations on the control valve of the crane.

3.2 Scanreco G2 remote control box

3.2.1 General description of the remote control box



The remote control box may be of the Maxi type with up to 8 control levers or the Mini type with up to 6 control levers depending on how many crane or stabilizer functions that are to be operated. Alternatively it is possible to supply the remote control box with up to 3 joysticks.

In the middle there is a **stop button**. The stop button is used when the system is to be interrupted as well as in case of emergency stop of the crane.

Right to the left of the stop button there is a **tumbler switch** with a **green diode** above. The tumbler switch is used for micro operation (reduced speed) of the crane.

Right to the right of the stop button there is an **“ON” push button** with a **red diode** above. The push button is used for starting up the system.

To the left there is a number of **tumbler switches** for operating extra functions. Please note: extra functions related to the engine control of the vehicle, are only active when the vehicle body builder/crane installer has carried out the necessary electric connections.

To the right there are 3 built-in **push buttons** for remote control of functions in the RCL 5300 controller. At the bottom to the right are additional **tumbler switches** for operation of extra functions.

Please note: not all tumbler switches are fitted as standard.

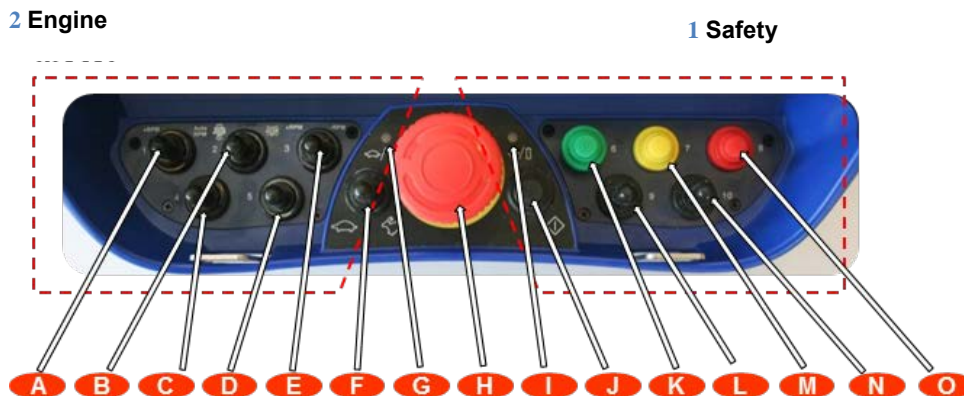
The diodes as well as the built-in **buzzer** currently keep the operator informed of the functional condition of the system.

Depending on crane model and equipment, the remote control box may, either as standard or as an option, be equipped with an HMF InfoCentre, which gives the operator additional useful information about the general condition of the crane regarding operation.

The remote control box is powered by a **battery** placed at the bottom of the box.

On the side of the remote control box there is a socket for connection of the remote control cable.

3.2.2 Push buttons and tumbler switches



All push buttons and tumbler switches on the remote control box only control the "ON/OFF"-functions in the RCL 5300 Safety System and the Scanreco G2 radio remote control system.

A. Number of engine revolutions "1"

Idle running - in central position.
Constant, high speed - to the left.
Automatic, high/low speed - to the right.
Please see chapter on *Engine control*.

B. Engine start-stop "2"

Start engine - to the left.
Stop engine - to the right.
Please see chapter on *Engine control*.

C + D. Extra functions

E. Engine throttle control "3"

Increased number of revolutions
- to the left.
Reduced number of revolutions
- to the right.
Please see chapter on *Engine control*.

F. Micro-operation

Reduction of speed, stepwise:
to the left:
5 steps: 80, 60, 40, 25 and 10%.
to the right: 100%.
Please see chapter on *Micro-operation*.

G. Green diode

Micro-operation:
1 flash at a max. speed of 80%.
2 flashes at a max. speed of 60%.
3 flashes at a max. speed of 40%.
4 flashes at a max. speed of 25%.
5 flashes at a max. speed of 10%.
Please see chapter on *Micro-operation*.
The quality of the radio signal -

please see chapter on *Signalling during crane operation*.

H. Stop button

Please see chapter on *Emergency stop during crane operation*.

I. Red diode

Lit when the remote control box is turned on.
Flashes in case of low battery voltage.
Please see chapter on *Replacement of the battery*.

J. ON push button

Activates the remote control box.
Please see chapter on *Start-up of the radio remote control system*.
Horn signal: Press once.
Please see chapter on *Horn*.
Regeneration:
Pressing "ON" once activates the regeneration system:
Load moment < 50%: Boom, jib and extensions.
Load moment > 50%: Extensions.
Subsequently pressing "ON" once disconnects the regeneration.
Please see chapter on *Activation of regeneration*.

K. Green push button "6"

Activation of RCL 5300.
Please see chapter on *Starting up*.
Deactivation of RCL 5300 buzzer -
see the RCL 5300 Instruction Manual.
Work light ON/OFF: hold down shortly.
See chapter on *Work light* and the RCL 5300
Instruction Manual.

L. Tumbler switch "9": Extra function**M. Yellow push button "7"**

Changeover for stabilizer functions: Press quickly twice.

Alternative function mode.

See chapter on *Stabilizer mode* and the RCL 5300 Instruction Manual.

N. Tumbler switch "10": Extra function

Possibility for one or more of the following extra functions:

Activation: Switch to the left: spring-loaded.

Switch to the right: holding action.

Please note! The signal function is the same when operating the right and the left side.

Changes the screen on the InfoCentre by pressing the yellow push button "M" at the same time.

Please see the chapter on *HMF G2 InfoCentre*.

Deactivates the engine throttle control.

Deactivates engine start/stop.

Deactivates changeover for stabilizer functions:

Changeover for extra valves on Fly-Jib when activating "+RPM" at the same time.

Please see chapter on *Operating symbols*.

Activates the control lever for the winch function.

Please see chapter on *Operating symbols*.

O. Red push button "8"

Override: Active 5 sec., non-operational time 30 sec.

See the RCL 5300 Instruction Manual.

Manual activation and deactivation of HDL.

See chapter on *The HDL system* and the RCL 5300 Instruction Manual.

Error indication:

See the RCL 5300 Instruction Manual.

3.2.3 Control levers

The control levers have stepless activation to both sides. They are spring-loaded and therefore automatically go back into neutral position when they are released.

The manual control valve levers move synchronously and in the same direction as the remote control levers.

The signal from a control lever is proportional, i.e. the more it is operated towards the extreme position, the more speed is increased on the crane function in question.

Please note that all control levers must be in neutral position before starting up the system.

The number of control levers depends on the number of crane and stabilizer functions, which are to be remote controlled. The positioning of the individual control lever as well as the direction of travel of the crane in relation to the direction of travel of the control levers are determined as standard configurations.

A standard configuration may be modified by an HMF service point upon the crane operator's request.

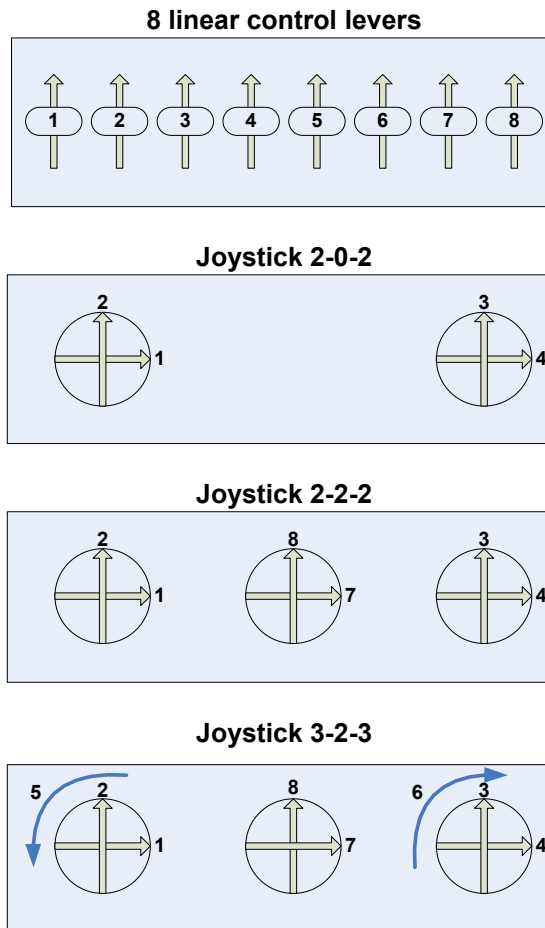
Standard configuration of remote control levers, operation direction

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

Remote control boxes with joystick has position, function and operation direction as indicated 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.



3.2.4 Operating symbols

Cranes equipped with radio remote control system are delivered from HMF with operating symbols labelled on the remote control box.

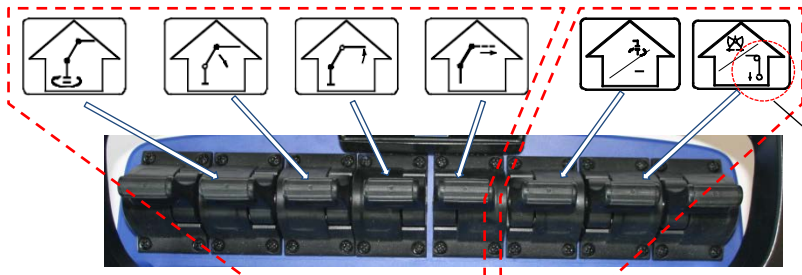
When changing a standard configuration, the operating symbols must be labelled on the remote control box corresponding to the lever sequence in question.

At the same time, you must state the change in this Instruction Manual by changing one of the below sketches.

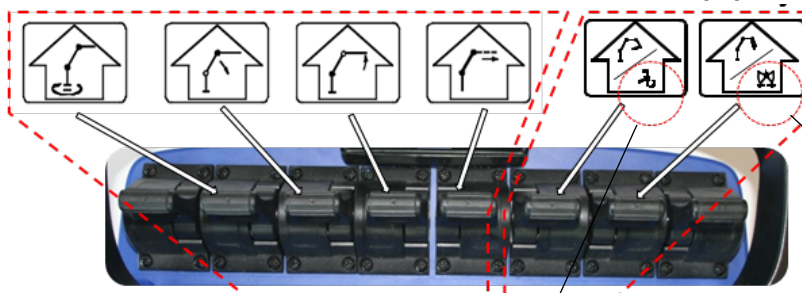
In the following pages, the different standard configurations of the remote control boxes are indicated with their corresponding operating symbols.

Please note: only remote control levers corresponding to the relevant crane functions are fitted. Where no control lever is fitted, a cover plate will be fitted instead.

Scanreco G2 Instruction Manual

6 functions + winch:**Basic crane****Equipment**

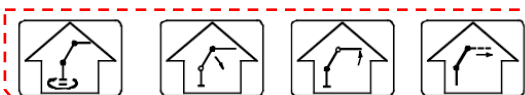
Change of work function from grab to winch on control lever pos. 7 is made by pushing the tumbler switch "10" to the right

**6 functions + rotator + grab****Basic crane****Equipment**

Change to extra functions on the control levers pos. 6 and 7 is made by pushing the tumbler switch no. "10" to the right.



Hold tumbler switch no.3 to the left, when operating an extra/alternative function by means of the control lever.

**4 functions****Basic crane**

3.2.5 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. Please see chapter on <i>Micro-operation</i> .

3.2.* Remote control box in stand-by mode

To optimise the running time of the battery as well as for safety reasons, the remote control box is pre-programmed to go into stand-by mode after approx. 5 minutes. At the same time the red diode turns off (I).

I.e. you have not operated the remote control box for the last approx. 5 minutes, it goes into stand-by mode, which reduces the power consumption a lot.

Please note! The remote control box is re-activated by means of the "ON" push button (J).



3.3 Scanreco G2 radio controller



Scanreco G2 Instruction Manual

The radio controller transmits and receives digitally coded control information to and from the remote control box via radio signals or via a remote control cable, if fitted.

The radio controller is connected to either 12 or 24 volts power supply from the accumulator of the vehicle. There are outputs for cable connection to the RCL System and, on certain crane models, to the electric activations of the control valve.

The radio controller has a built-in 7-segment LED display for indication of functional status, and for use by the HMF service point in case of system errors.

A socket is fitted on the side of the radio controller for connection of the remote control cable, as well as a tumbler switch for changing between radio remote control and emergency operation. Please see chapter on **Emergency operation of the crane**.

On the same side of the radio controller are two built-in diodes - Status and DV which indicate as follows:

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 flashing	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.

Furthermore the quality of the radio signal is indicated by means of the two diodes 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.

3.4 Scanreco G2 battery and battery charger

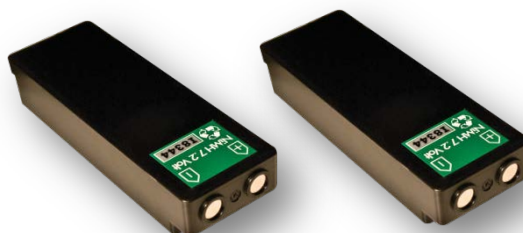
A rechargeable battery is placed at the bottom of the remote control box, which can be replaced by one single movement.

A complete Scanreco G2 radio remote control system is delivered with two rechargeable batteries.

The battery charger must be mounted in the driver's cab where it is protected against dirt, humidity, direct sunlight and large temperature fluctuations. Furthermore the battery charger has to be fitted in a way so that it is not exposed to unnecessary vibrations from the vehicle. The charger must via an external 3 ampere fuse be connected to a min. 10 / max. 35 volt power supply directly to the battery of the vehicle. This is how charging is made possible, also when the ignition is turned off.

A completely charged battery works for approx. 8 hours of radio remote control.

It takes approx. 3 hours to recharge a battery that has been completely discharged.



3.4.1 Replacement of the battery

The transmitter electronics in the remote control box continuously monitors the battery voltage. When the voltage comes below a certain value after approx. 8 hours of operation, the following is indicated on the remote control box:

- The buzzer gives a signal 3 times in succession
- The red diode (I) begins to flash

Now the battery has to be replaced by a recharged battery from the battery charger, and then follow the below procedure:

- Move the crane into a safe position.
- Push the stop button on the remote control box.
- Take out the discharged battery from the remote control box.
- Clean the battery compartment and make sure that the pole connectors are normally spring-loaded and not corroded.
- Put a recharged battery from the battery charger up into the battery compartment of the remote control box and press it into position, so that it is fixed and has a good electrical contact.
- Start up the remote control box according to the chapter: **Start-up of the radio remote control system**

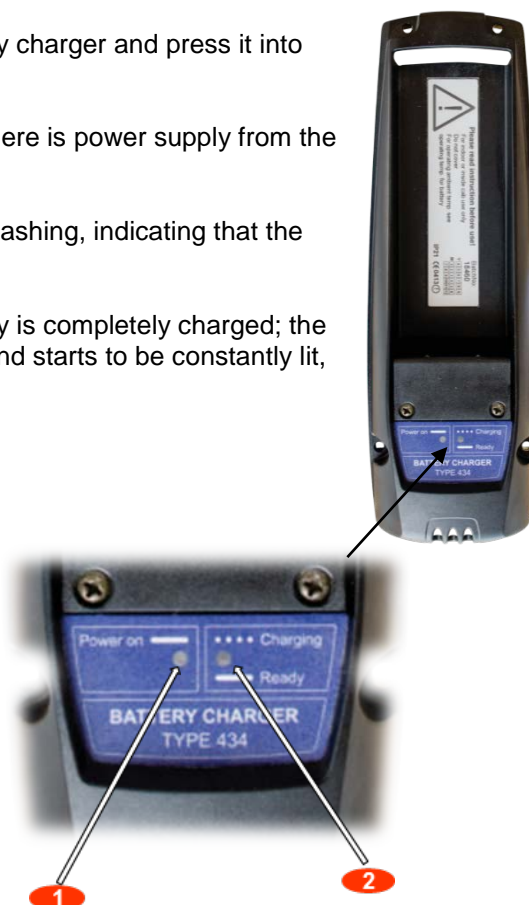
The radio remote control is now ready for operation.



3.4.2 Charging of the battery

Right after a discharged battery has been taken out of the remote control box, it has to be recharged in the battery charger according to the following procedure:

- Insert the battery into the battery compartment of the battery charger and press it into position so that it is fixed and has a good electrical contact.
- The red diode (1) on the charger is lit ("Power on"), when there is power supply from the accumulator of the vehicle.
- The green CHARGING (2) diode on the battery charger is flashing, indicating that the battery is being charged.
- The battery charger registers automatically when the battery is completely charged; the green CHARGING diode (2) of the charger stops flashing and starts to be constantly lit, indicating that the battery is charged.
- After approx. 3 hours the charging is completed.
- The battery charger now changes to "maintenance charging", ensuring that the battery does not discharge after some time.
- A completely charged battery is thus always available in the battery charger.



3.4.3 Good advice about the battery

To ensure the longest possible working time of the batteries, the following must be respected:

- The battery must be completely discharged before recharging it.
- Do not replace the battery before the red diode of the remote control box begins to flash thereby indicating that the battery has to be recharged.
- In case of low temperatures, the capacity and working time of the battery are reduced.
- Rechargeable batteries are to be discarded as special waste.

3.5 Remote control cable

The remote control box can be connected to the radio controller via a 10 m remote control cable, which is a part of the radio remote control system.

The remote control cable can be used if the remote control box cannot communicate with the radio controller in case of battery failure, interruption in the radio communication, errors in radio transmitter/receiver, or the like.

The cable has round plugs in both ends. Connect one of the plugs to the socket of the radio controller marked CABLE. The other plug is to be connected to the socket on the side of the remote control box.

It will now be possible to remote control the crane by means of the cable.

During crane operation with cable, the battery is automatically charged while placed in the remote control box.

3.6 Transmitter system, frequencies

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.

4. Maintenance

It is important to check and maintain the radio remote control system both currently and when the crane has its regular service overhaul at an authorised HMF service point.

The following items must be respected:

- When cleaning the crane, avoid spraying on water and never use high-pressure rinsing for cleaning the electronic components.
- Before carrying out mounting, maintenance or repair work, turn off the power supply to the system.
- Check whether there are any cracks on or damage to the radio remote control system. If yes, the equipment must be repaired immediately.

5. Safety regulations

The Scanreco G2 radio remote control system makes it possible to control the crane via radio signals, and therefore there are certain safety regulations that have to be respected:

- Only personnel, who have been instructed in operating the equipment, must work with a remote controlled crane.
- The crane operator must read the instruction manuals delivered together with the crane before starting up crane operation, and follow the instructions during crane operation.
- When the remote control box is not being used, disconnect it by pushing the stop button.
- For safety reasons, keep the remote control box inside the driver's cab when not in use.
- Before carrying out mounting, maintenance or repair work, turn off the power supply to the system.
- At the risk of too heavy electrical load on the system, like for example during welding onto the chassis of the vehicle or in case of boost charging the battery of the vehicle, the negative pole on the battery of the vehicle must be dismantled.
- When cleaning the crane, avoid spraying on water and never use high-pressure rinsing for cleaning the electronic components.
Do not change or remove anything from the safety devices.

Before crane operation, the crane operator must check as follows:

- that the remote control box belongs to the crane that is to be operated.
- whether there are any cracks on or damage to the radio remote control system.
- that the operating symbols on the remote control box are intact.
- that crane operation is stopped when pushing the stop button
- that the remote control system functions correctly.
- that no other person stays on or near the crane.
- that the parking brake of the vehicle has been applied before starting the engine by means of the remote control box.

During crane operation the operator must:

- stand in a suitable distance from the hook and the load, have a good visibility, and make sure that no unauthorised persons enter into the working area.
- be aware that it is not permitted to move the load over himself or anybody else.
- be ready to let go of the control levers and push the stop button, if he loses control over the crane movements.

After crane operation the operator must:

- push the stop button on the remote control box and on the crane.
- put the remote control box in a place inaccessible to others.
- report any errors, damage or defects on the equipment to the person responsible for the crane.

6. Starting up

Before starting up crane operation, the essential safety regulations have to be respected, just as the general procedure in connection with starting up the crane has to be followed.

Please see the *"Instruction Manual, Loader"* as well as the *"RCL 5300 Instruction Manual"*.

Before crane operation, extend the stabilizer beams and lower the stabilizer legs to the surface.

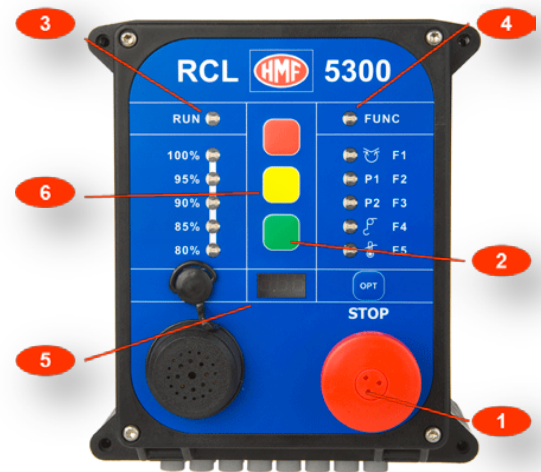
6.1 Starting up from the indicator panel of the RCL (manually controlled stabilizers)

When the crane is equipped with a radio remote control system, the diodes and the display on the RCL 5300 indicator panel have different indications than a manually controlled crane during start-up.

- Connect the pump (PTO); the RCL 5300 controller and the radio controller are thus powered.
- All stop buttons (1) must be pulled out (there is a stop button at each control position).
- Push the green press button (2) on the RCL indicator panel.
- the RUN (3) and FUNC (4) diodes are flashing and the display of the RCL controller (5) shows **1.8.0**, which indicates that the radio remote control system has not been started up.
- Push the yellow press button (6) twice to select the stabilizer function (Please see chapter on **Stabilizer mode**).
- When the stabilizer beams have been extended and the stabilizer legs lowered, push the yellow press button twice to change into crane mode.

Crane operation can start.

Please note: During stabilizer operation (stabilizer mode), a change of the load moment of the crane exceeding 10 % will entail that the system automatically changes into crane mode (operation of crane functions).



6.1.1 Start-up of the radio remote control system

Starting up the radio remote control system from the remote control box:

- The stop button (H) on the remote control box must be pulled out.
- All control levers must be in neutral position.
- Push the "ON" button (J) on the remote control box and the red diode (I) is lit.

The RCL 5300 safety system and the radio remote control system are ready and crane operation can start.



6.2 Starting up from the Scanreco G2 remote control box (radio remote controlled stabilizers)

Alternatively the RCL 5300 safety system and the radio remote control system can be started up from the remote control box:

- Connect the pump (PTO): the RCL 5300 controller and the radio controller are thus powered.
- All stop buttons must be pulled out (there is a stop button at each control position).
- Push the "ON" button (**J**) on the remote control box.
- Press the green push button (**K**) to start the RCL 5300 controller.
- Press the yellow push button (**M**) twice to select the stabilizer function (Please see chapter on **Stabilizer mode**).
- When the stabilizer beams have been extended and the stabilizer legs lowered, press the yellow push button twice to change into crane mode.



Crane operation can start.

6.3 Stabilizer mode

Select stabilizer mode by pushing the yellow press button on the RCL 5300 indicator panel or the remote control box, twice.

As a confirmation of this, the FUNC and F5 diodes on the RCL 5300 indicator panel are lit for a short while, as well as the FUNC diode by the display on the remote control box.

In stabilizer mode, the following is indicated:

- A periodic signal with slow frequency is heard from the buzzer in the RCL 5300 controller and the remote control box.

Return to crane mode

When you wish to return to normal crane operation, push the yellow press button twice again on either the RCL 5300 indicator panel or the remote control box.

The display changes into indication of operation information, and it will now be possible to operate the crane functions. Please see the labels with the two different kits of operating symbols.

7. Signalling during crane operation

When the crane is remote controlled, the operator must keep an eye on the indications of the RCL indicator panel. Please see the *RCL 5300 Instruction Manual*.

To avoid unexpected stops of the crane movements, it is important to pay attention to the indications from the remote control box.

When there are three signals in quick succession from the buzzer, and the red diode (I) begins to flash, move the crane into a safe position, and change the battery (for recharging). Please see chapter on **Replacement of battery**.

If the read diode (I) on the remote control box turns off and the crane cannot be remote controlled, it may be due to radio interference or system errors. Please see chapter on **Troubleshooting**.

During normal crane operation, the green diode (G) is turned off.

If the green diode is flashing (and the crane is not set for micro-operation), reduced radio communication between the radio controller and the remote control box is indicated. The crane operator must bring the remote control box in a more favourable position for good radio connection to the radio controller, so that crane stop can be avoided. If the green diode is constantly lit, the crane cannot be remote controlled due to missing radio contact.



8. Emergency stop during crane operation

If a dangerous situation occurs, where you are about to lose control of the crane, push the stop button (H) on the remote control box and stop the crane.

When the stop button is pushed on the remote control box, the RCL 5300 controller registers this as an error. The RUN and FUNC diodes begin to flash.

Start up the radio remote control system again according to the procedure and continue crane operation.

Please note! Test the functioning of the stop button every time the radio remote control system is started up. When pushing the stop button, it must not be possible to remote control the crane.



9. Stop of the radio remote control system

After crane operation, interrupt the radio remote control system according to the following procedure:

- Push the stop button.
- Stop the hydraulic pump, the power for the RCL 5300 safety system and the radio remote control system is thus interrupted.

10. Securing of the remote control box, after operation

To secure against unintentional operation by unauthorized persons, the remote control box must never be left unattended.

- When the remote control box is not being used, disconnect it by pushing the stop button.
- For safety reasons, keep the remote control box inside the driver's cab when not in use.

11. Optional extras

11.1 Remote control of optional extras and other crane functions

By means of the Scanreco G2 radio remote control system it is possible to remote control optional extras, if any, as well as a range of other functions on the crane.

11.1.1 The HDL system (option)

If the crane is equipped with an HDL system (Heavy Duty Lifting), it offers the possibility of an increase of the crane's nominal load by approx. 10 % while the working speed is reduced.

Proportional HDL

In connection with the radio remote control system, activation and deactivation of the HDL system is proportional, i.e. step-less.

Example:

A heavy load is extended at max. speed at a longer reach by means of the "extension out"-function. When the crane has reached approx. 80 % of its max. permissible lifting capacity, the HDL is automatically activated independent of the operator's doings.

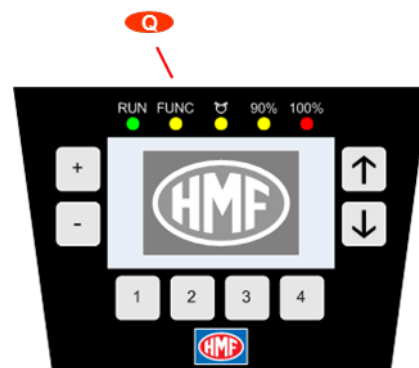
Now the speed of the "extension out" movement is reduced proportionally down to 20 % of the nominal working speed.

Correspondingly the working speed is increased proportionally to 100 %, if the load is retracted back to a shorter reach by means of the "extension in"-function.

The example describes how the HDL system works in connection with the extension-function. The proportional HDL-activation functions in the same way in connection with all other crane functions, which increase or reduce the load moment of the crane.

If the crane is equipped with EVS, the working speed is reduced proportionally at a heel of the vehicle from 70 % and up to the max. permissible heel.

When the HDL system is activated, this is indicated on the RCL 5300 indicator panel and the InfoCentre of the remote control box by the FUNC (Q) diode flashing.



Micro-operation, HDL

If the crane is to make positioning tasks, it will be possible to reduce the working speed of the crane by means of the HDL system.

Irrespective of the load moment of the crane, the working speed of the crane can be reduced to approx. 20 % by pressing the *red push button* (O) on the remote control box thus activating the HDL system.

By pressing *the red push button* once again, the HDL system is deactivated again. However, this implies that all control levers have been into neutral position at the same time as the load moment is below the crane's normal lifting capacity limit.



11.1.2 Micro-operation

The crane can be controlled at varying speed by activating the “Micro” tumbler switch (F).

When activating the switch several times to the left, the crane speed can be reduced stepwise, i.e. 5 steps: 60, 50, 40, 30 and 20 %.

As confirmation of the Micro-operation-function being activated, the green diode (G) flashes once in step 1, twice in step 2, etc.

When activating the switch to the right, the crane speed is changed back to 100 % no matter which step the speed was in previously.

Please note!

After pushing the stop button (H), the system starts up again at 100 % crane speed.



11.1.3 Engine control

By means of tumbler switches on the remote control box, it is possible to control the engine start/stop of the vehicle and the engine revolutions.

Engine start-stop

The engine of the vehicle can be started and stopped from the remote control box by means of the tumbler switch (B), which automatically goes back into neutral position:

- The engine is started by pushing the *tumbler switch* to the left
- The engine is stopped by pushing the *tumbler switch* to the right



Choice of number of engine revolutions

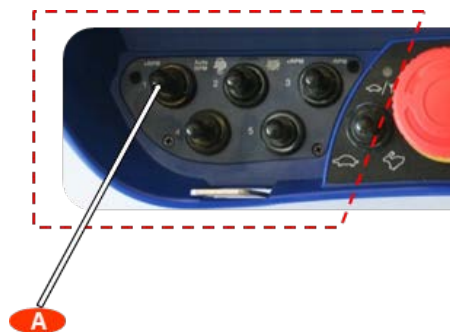
During crane operation, the number of engine revolutions must be increased to a fixed level (e.g. 900-1000 RPM) to optimise the capacity of the engine as well as the working speed of the crane.

The change from the engine running idle to its number of revolutions being increased into working level, can be remote controlled.

By means of the tumbler switch (A) on the remote control box, you can choose between two types of regulation of the number of engine revolutions.

- If the *tumbler switch* is in central position, the engine is running idle.
- If you push the *tumbler switch* to the left (+ RPM), the engine is continuously running at a high number of revolutions.
- If you push the *tumbler switch* to the right (AUTO RPM), the high number of revolutions is automatically engaged and disengaged.

I.e. when one of the control levers is being operated, the high number of revolutions is engaged. When the control levers are back in neutral position, the number of revolutions is reduced after approx. 5 seconds and the engine is running idle.



Engine throttle control

Throttle control of the engine of the vehicle can be carried out from the remote control box. The regulation area is between idling and a max. number of revolutions fixed by the HMF service point and programmed in the engine control by the supplier of the vehicle.

The throttle control is operated by means of the tumbler switch (E), which automatically goes back into neutral position:

- By pushing the *tumbler switch* several times to the left, the number of revolutions is increased (+ RPM) stepwise.
- By pushing the *tumbler switch* several times to the right, the number of revolutions is decreased (– RPM) stepwise.



11.1.4 Work light

On cranes fitted with work light (option), it is possible to turn the spotlight on and off by means of the remote control box.

- Turn on the spotlight by one push and a brief hold on the green push button (K).
- Turn off the spotlight again by pressing the green push button.



11.1.5 Horn

On cranes equipped with an acoustic horn it is possible to activate the horn by means of the remote control box and thereby warn persons in the vicinity.

- The horn is activated by pressing the "ON" push button (J) on the remote control box.



11.1.7 Activation of the regeneration system

Certain crane models are fitted with a hydraulic regeneration system on both the boom, jib and extension functions.

When one of the above-mentioned cylinder functions are extended, the hydraulic oil flows from the piston rod side to the piston side of a cylinder instead of back to the hydraulic tank.

Such a regeneration function increases the speed of the cylinder (and thus the speed of the crane), in the outgoing direction. If a cylinder function is retracted, the regeneration system is not activated.

The regeneration system can be connected electrically from the remote control box.

Which functions that can be connected depend on the load moment of the crane:

- For the boom and jib functions - only at a load moment below 50 %.
- For the extension function - independent of the load moment of the crane.

Connection of the regeneration system:

- Push the "ON" start button (J) on the remote control box once.
- If the load moment of the crane is below 50 %, the figure "2" appears together with the turtle/rabbit icon in the display for 5 seconds. Now, you have selected regeneration for both the boom, jib and extension functions.
- If the load moment of the crane exceeds 50 %, the figure "1" appears together with the turtle/rabbit icon in the display for 5 seconds. Now the regeneration system is only activated on the extension function.



Disconnection of the regeneration system:

If you wish to disconnect the regeneration function, push the "ON" start button (J) once on the remote control box. A zero appears on the display for 5 seconds, which indicates that the regeneration system has been disconnected.

11.1.8 Weighing function

By means of the HMF InfoCentre, it is possible to read the load of a current load, in a certain boom position. The hydraulic pressure in the boom cylinder of the crane is registered and converted into a load in [kg] or [lbs].

To be able to use the weighing function, you will have to make a calibration of the system in a given boom position. Then it will be possible in this boom position to read the weight of a load on the display.

Calibration of the system

1. Prepare a load with a known weight and place it on the ground, ready for lifting into a well-defined boom position (e.g. all jib extensions retracted, the main boom a little bit above horizontal and the jib in horizontal position).
2. Move the crane into the boom position required as described in the previous item. There must not be any load in the load hook.
3. Activate the option tumbler switch (**N**) on the remote control box.
4. Press and hold down the yellow button (**M**) on the remote control box, and activate the tumbler switch (**B**) once to the left (within 5 seconds). Now picture no. 1 has been chosen.
5. When you hear an acoustic signal, release the yellow button. The system is automatically calibrated, i.e. the tare weight of the crane in the current position is set at 0 kg.
6. The display automatically changes to screen no. 2, and the calibrated load of 0 kg appears at the top of the display.
7. The load with the known weight is lifted up into the known boom position.
8. The weight of the load is programmed into the InfoCentre by means of the "Engine start/stop" tumbler switch (**B**). If you push the tumbler switch to the left, the numerical value is increased by 50. If you push the tumbler switch to the right, the numerical value is reduced by 50.
9. Hold down the yellow button until you hear an acoustic signal. Now the weight has been registered and the InfoCentre returns to normal indication again.



M **N**



B

Weighing of load

Weighing of a load with an unknown weight is carried out as follows:

- Move the load up to the known boom position.
- The screen changes into the icon for "hook load in known crane position", where you can read the weight of the load.

12. Troubleshooting

We have attached great importance to fast identification and remedying of possible errors in the Scanreco G2 radio remote control system. Therefore the system is capable of carrying out a great number of self-tests during start-up and operation, and pass on detailed information on possible errors for use by both the operator and the HMF service point.

You will be informed of system errors in the following ways:

- Diodes and error code indications in the display of the RCL 5300 indicator panel - for the operator and the HMF service point.
- Diodes and buzzer on the remote control box - for the operator and the HMF service point.
- Diodes and error code indications in the InfoCentre of the remote control box - for the operator and the HMF service point.
- Error code indication in the display of the radio controller - only for internal troubleshooting for the HMF service point.

12.1. Error code indications on the RCL 5300 indicator panel

In case of an error in the radio communication or the transmission of data between the radio controller and the RCL 5300 controller, the system comes up with the following error messages:

- The RUN and FUNC diodes on the RCL 5300 indicator panel as well as on the InfoCentre are flashing.
- One of the below error codes in the display of the RCL will indicate where to find the error in the system.

Error code in the display of the RCL	Type of error	Remedy
0.0.1	The stop button on RCL 5300 controller is activated.	All the stop buttons of the RCL and radio remote control systems must be deactivated.
1.0.8	No CAN bus communication between the RCL 5300 controller and the radio controller.	Restart the RCL controller and the radio remote control system. Contact an authorised HMF service point.
1.7.0	Internal failure in the radio controller.	Restart the RCL controller and the radio remote control system. Contact an authorised HMF service point.
1.7.1	Output error in the radio controller	Contact an authorised HMF service point.
1.7.2	Defective stop button on the remote control box.	Contact an authorised HMF service point.
1.7.3	One of the remote control levers has been activated when starting up.	Check that all remote control levers are in neutral position and restart the remote control box. Contact an authorised HMF service point.
1.7.4	Unintentional regulation signal from the remote control levers.	Contact an authorised HMF service point.
1.7.5	Incorrect ID-coding between the radio controller and the remote control box.	Restart the RCL controller and the radio remote control system. Contact an authorised HMF service point.
1.7.6	Power supply too low for the radio controller.	Check the power supply. Contact an authorised HMF service point.
1.7.7	Power supply too high for the radio controller.	Check the power supply. Contact an authorised HMF service point.
1.8.0	No radio communication between the radio controller and the remote control box.	Restart the remote control box. Contact an authorised HMF service point.
1.8.1	Failure in the CAN bus communication between the RCL 5300 controller and the radio controller during start-up.	Restart the remote control box. Contact an authorised HMF service point.
1.8.2	Failure in the CAN bus communication between the RCL 5300 controller and the radio controller during operation.	Restart the remote control box. Contact an authorised HMF service point.
1.8.3	The stop button on the remote control box is activated.	All the stop buttons of the RCL and radio remote control systems must be deactivated.
1.8.4	Wire security signal between the RCL 5300 and the radio controller is interrupted.	Contact an authorised HMF service point.
1.8.5	Wire security signal between the RCL 5300 and the radio controller is short-circuited.	Contact an authorised HMF service point.
1.8.6	The tumbler switch on the radio controller is in Manual position.	In case of radio remote control, the tumbler switch must be in Remote position.
1.8.7	Error in the software of the radio controller.	Contact an authorised HMF service point.

The above error codes refer to a system error that concerns the Scanreco G2 radio remote control system. As to other RCL 5300 error codes, please see the RCL 5300 Instruction Manual.

12.2. Error indications from the remote control box

During start-up of the remote control box, the system automatically carries out a self-test, and any errors found are indicated in the following way:

- The red "ON" diode flashes a certain number of times as indication of an error according to the below table.
- The buzzer of the remote control box gives a certain number of periodic signals corresponding to the indications of the red diode.
- On remote control boxes with InfoCentre, an error screen appears. Please see chapter on **Scanreco G2 radio remote control, HMF InfoCentre**.

Indication	Type of error	Remedy
1 flash	The remote control lever - position 1- is not in neutral position when starting up, or it is defective.	Check that all remote control levers are in neutral position and restart the remote control box. Contact an authorised HMF service point.
2 flashes	The remote control lever - position 2- is not in neutral position when starting up, or it is defective.	
3 flashes	The remote control lever - position 3- is not in neutral position when starting up, or it is defective.	
4 flashes	The remote control lever - position 4- is not in neutral position when starting up, or it is defective.	
5 flashes	The remote control lever - position 5- is not in neutral position when starting up, or it is defective.	
6 flashes	The remote control lever - position 6- is not in neutral position when starting up, or it is defective.	
7 flashes	The remote control lever - position 7- is not in neutral position when starting up, or it is defective.	
8 flashes	The remote control lever - position 8- is not in neutral position when starting up, or it is defective.	
13 flashes	Error in the stop button when starting up.	Contact an authorised HMF service point.

12.3. Error indications on the radio controller

In case of system error the DV diode (4) on the radio controller turns off, indicating that the dump valve opens to tank (the crane stops), and the small display (5) indicates an error code for internal use for the HMF service point.

It could, however, be a good help for the HMF service technician who is to trouble-shoot the system, if the operator could inform him about the current error code in the display - in particular if an intermittent error occurs, which may be difficult to recreate in the workshop.



13. Emergency operation of the crane

In case of system errors, it will not be possible to operate the crane by means of the radio remote control system.

If the radio communication is interrupted, and it is not immediately possible to find and remedy the reason for the error by using the chapter **Troubleshooting** in this instruction manual, you can try to remote control the crane by fitting the remote control cable between the radio controller and the remote control box. Please see chapter on **“Remote control cable”**. In this situation, the radio communication is completely interrupted.

If it is not possible to operate the crane by means of the remote control cable, manual emergency operation of the crane will be possible instead, so that a job, which may already have been started, can be finished, and the crane can be folded and taken to an HMF service point.

Changeover to *emergency operation of the crane* is carried out as follows:

Push down the stop button on the remote control box.

Push the tumbler switch on the radio controller to the left towards **Manual** position. Alternatively changeover to emergency operation can be carried out from the RCL 5300 indicator panel by holding down the yellow press button while pushing the red press button.

- The red DV diode on the radio controller is lit.
- The RUN and FUNC diodes on the RCL indicator panel are still flashing.



Now emergency operation of the crane is possible by using the manual control levers on the control valve of the crane.

As a control of whether the system is set for emergency operation, it is possible to push the red press button on the RCL 5300 indicator panel and the 100 % diode will flash. If not, then change into emergency operation again according to the above-mentioned procedure.

Please note: In case of manual emergency operation of the crane, the lifting capacity of the crane is reduced (the crane is derated) to 90 % of its normal capacity.

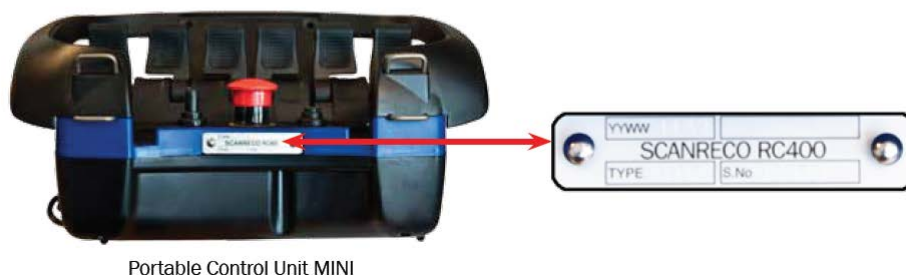
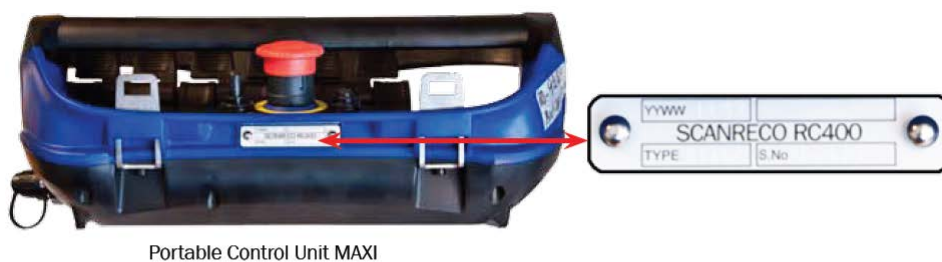
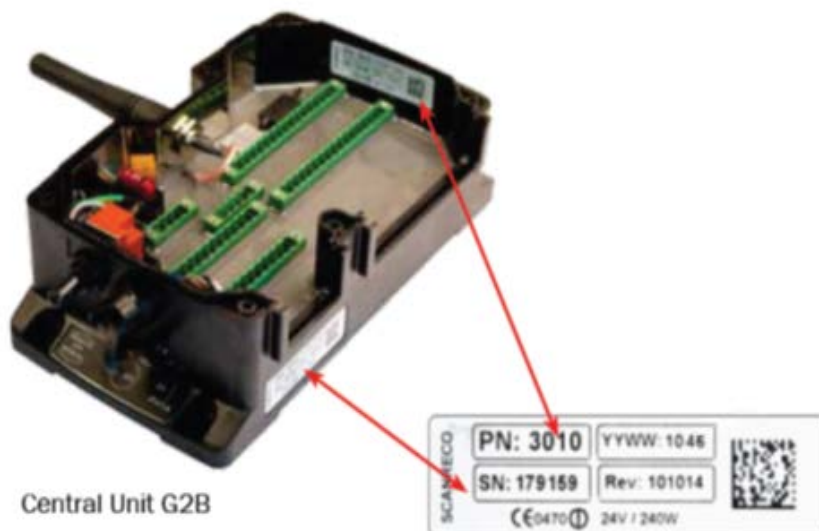
Changing back to remote control mode, is carried out by pushing the tumbler switch on the radio controller to the right towards **Remote** position, or by holding down the yellow press button while pushing the red press button on the RCL 5300 indicator panel.

Please note: The tumbler switch of the radio controller must be in **Remote** position, if the changeover between radio remote control and emergency operation is carried out via the RCL 5300 indicator panel.

14. 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 service points concerning support or when placing spare parts orders, please always state the part number of the component.



15. Technical data

General system data

Frequency, ISM band:	EU: 433.050 - 434.790 MHz. NAFTA: 902.000 - 928.000 MHz.
Channels:	EU: 67 NAFTA: 67
Channel shifting:	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.
Range:	Approx. 100 metres in industrial environments.

Radio controller

Power supply:	12/24 V direct current (+/- 20 %, max. ripple 5 %).
Internal fuse:	Plus: + 10 Amp. (Standard vehicle fuse-red).
Max. over current:	Approx. 33 V direct current (fuse blows).
Proportional functions:	1 - 8 proportional dual functions.
Wire security output:	Max. 2.0 Amp (fuse to avoid short circuit).
ON-OFF outputs:	Max. 1.8 Amp (fuse to avoid short circuit).
Regulation signals:	Voltage control or PWM control.
Power consumption when standing still:	40 mA.
Weight:	1.20 kg (valve - and connection cables not included).
Size (WxHxL):	227x205x78 mm
IP-class:	IP65.
Ambient temperature:	-25 to +70° C/approx. -15 to +160° F (Celsius/Fahrenheit).

Remote control box

Battery:	7.2 V direct current.
Running time:	Approx. 8 hours per recharging.
Weight/MAXI/Linear:	1.95/2.20 kg (excl./incl. battery)*
Weight/MAXI/Joysticks:	1.75/2.00 kg (excl./incl. battery)*
Weight/MINI/Linear:	1.45/1.70 kg (excl./incl. battery)*
Weight/MINI/Joysticks:	1.30/1.55 kg (excl./incl. battery)*
Size MAXI (WxHxL):	350x160x190 mm*
Size MINI (WxHxL):	290x160x190 mm*
IP-class:	IP65.
Ambient temperature:	-25 to +70° C/approx. -15 to +160° F (Celsius/Fahrenheit).

* Weights and dimensions are approximate values depending on the configuration.

Battery charger

Power supply:	10 - 30 V direct current.
Fuse:	Not built-in. External fuse of 3 Amp. is used.
Power consumption excl. battery:	10 – 20 mA
Power consumption incl. battery:	130 – 140 mA
Weight:	0.25 kg
Size (WxHxL):	252x85x36 mm
IP-class:	IP21
Ambient temperature:	-0 to +70° C/approx. -32 to +160° F (Celsius/Fahrenheit).

Battery

Type:	6 cell NiMH battery
Nominal voltage:	7.2 V direct current
Weight:	0.20 kg
Size (WxHxL):	150x50x28 mm
IP-class:	IP65
Ambient temperature:	-0 to +45° C/approx. -32 to +115° F (Celsius/Fahrenheit).

(in case of temperatures below -0 ° C/approx. -32° F, the running and charging time may be reduced).